The information in this Draft Placement Memorandum is not complete and may be changed. The Issue is meant only for Eligible Investors on a private placement basis and is not an offer to the public or to any other class of investors to subscribe to the Units. This Draft Placement Memorandum is not an offer to sell any Units and is not soliciting an offer to subscribe to or buy the Units in any jurisdiction where such offer, sale or subscription 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 Final Placement Memorandum.

Draft Placement Memorandum
Subject to completion
Not for circulation and strictly confidential
Serial Number: _____

NXT-INFRA TRUST

*(Settled in the Republic of India as an irrevocable trust by way of a trust deed dated October 26, 2023, under the Indian Trusts Act, 1882 and registered as an infrastructure investment trust under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended ("**InvIT Regulations**") on November 8, 2023, having registration number IN/INVIT/23-24/00028*

Principal place of business: 501, 5th Floor, Vikas Hub, Vikas Centre, Dr. C G Road, Wadavali Village, Chembur East, Mumbai 400 074, Maharashtra, India
Tel: +91 9867088529 **Compliance Officer**: Pratik Desai
E-mail: im-infra@nxt-infra.com; **Website**: www.nxt-infra.com

Sponsor **Actis Highway Infra Limited**	**Investment Manager** **Walter Infra Manager Private Limited**	**Trustee** **Catalyst Trusteeship Limited**

Nxt-Infra Trust ("**Trust**") is proposing an initial offer of up to [●] Units through a private placement at a price of ₹ [●] per Unit (the "**Issue Price**"), aggregating up to ₹1,90,000 lakhs (the "**Issue**").

THE ISSUE, AND THE DISTRIBUTION OF THIS DRAFT PLACEMENT MEMORANDUM, IS BEING MADE ONLY TO THE ELIGIBLE INVESTORS IN RELIANCE UPON REGULATION 14(2) OF THE INVIT REGULATIONS.

The Units are proposed to be listed on the National Stock Exchange of India Limited (the "**NSE**") ("**Stock Exchange**"). In-principle approval for listing of the Units has been received from the NSE on [●], 2024. NSE is the Designated Stock Exchange. Applications shall be made to the Stock Exchange for obtaining the final listing and trading approval for the Units to be Allotted pursuant to the Issue. NSE assumes 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 Issue for trading on the NSE should not be taken as an indication of the merits of the Trust or of the Units.

A copy of this Draft Placement Memorandum has been filed with the Securities and Exchange Board of India (the "**SEBI**") and delivered to NSE and a copy of the Placement Memorandum and the Final Placement Memorandum will be delivered to SEBI and NSE. This Draft Placement Memorandum 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.

This is an initial offer of Units and there is no pre-existing formal market for the Units. The Issue Price (determined and justified in accordance with the InvIT Regulations by the Investment Manager in consultation with the Lead Manager), 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.

The Investment Manager, having made all reasonable inquiries confirms that this Draft Placement Memorandum contains all information with regard to the Trust, the Units and the Issue, which is material in the context of the Issue, that the information contained in this Draft Placement Memorandum is true, correct and adequate in all material aspects and is not misleading in any material respect, that the opinions and intentions expressed herein are honestly held and have been reached after considering all relevant circumstances and are based on reasonable assumptions and information presently available with the Investment Manager and that there are no other facts, the omission of which makes this Draft Placement Memorandum as a whole or any of such information or the expression of any such opinions or intentions misleading in any material respect.

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 being offered and allotted outside the United States in offshore transactions in reliance on Regulation S under the Securities Act ("**Regulation S**") and applicable law of the jurisdictions where such offers and allotments occur. The Units are transferable only in accordance with the restrictions described under the section titled "*Selling and Transfer Restrictions*" on page 286 of this Draft Placement Memorandum.

THE PLACEMENT MEMORANDUM SHALL BE PERSONAL TO THE ELIGIBLE INVESTORS. THIS DRAFT PLACEMENT MEMORANDUM HAS BEEN PREPARED BY THE TRUST SOLELY FOR PROVIDING INFORMATION IN CONNECTION WITH THE ISSUE.

YOU MAY NOT, AND ARE NOT AUTHORISED TO, (1) DELIVER THIS DRAFT PLACEMENT MEMORANDUM TO ANY OTHER PERSON; OR (2) REPRODUCE THIS DRAFT PLACEMENT MEMORANDUM IN ANY MANNER WHATSOEVER. ANY DISTRIBUTION OR REPRODUCTION OF THIS DRAFT PLACEMENT MEMORANDUM, IN WHOLE OR IN PART, IS UNAUTHORISED. FAILURE TO COMPLY WITH THIS INSTRUCTION MAY RESULT IN A VIOLATION OF THE INVIT REGULATIONS, AND/ OR OTHER APPLICABLE LAWS OF INDIA AND/ OR OF OTHER JURISDICTIONS.

RISKS IN RELATION TO THE ISSUE

INVESTMENTS IN UNITS INVOLVE RISKS AND ELIGIBLE INVESTORS SHOULD NOT INVEST ANY FUNDS IN THE ISSUE UNLESS THEY CAN AFFORD TO TAKE THE RISK OF LOSING ALL OR PART OF THEIR INVESTMENT. FOR MAKING AN INVESTMENT DECISION, ELIGIBLE INVESTORS MUST RELY ON THEIR OWN EXAMINATION OF THE TRUST, THE UNITS, THE ISSUE AND THE PLACEMENT MEMORANDUM. ELIGIBLE INVESTORS ARE ADVISED TO CAREFULLY READ THIS DRAFT PLACEMENT MEMORANDUM, INCLUDING THE SECTIONS TITLED "RISK FACTORS" AND "RIGHTS OF UNITHOLDERS" BEGINNING ON PAGES 48 AND 287, RESPECTIVELY, BEFORE MAKING AN INVESTMENT DECISION. THE UNITS HAVE NOT BEEN RECOMMENDED OR APPROVED BY SEBI NOR DOES SEBI GUARANTEE THE ACCURACY OR ADEQUACY OF THE CONTENTS OF THIS DRAFT PLACEMENT MEMORANDUM. THE ELIGIBLE INVESTORS ARE ADVISED TO CONSULT THEIR OWN ADVISORS ABOUT THE CONSEQUENCES OF AN INVESTMENT IN THE UNITS BEING ISSUEED PURSUANT TO THIS DRAFT PLACEMENT MEMORANDUM.

Unless a serially numbered Placement Memorandum along with an Application Form is addressed to a particular Eligible Investors, no invitation to offer shall be deemed to have been made to the Eligible Investors to make an offer to subscribe to Units on private placement basis pursuant to the Issue. For further details, please see the section titled 'Issue Procedure' on page 292. The distribution of this Draft Placement Memorandum and the Placement Memorandum or the disclosure of its contents without the Trustee's or Investment Manager's prior consent to any person other than the Eligible Investors is unauthorised and prohibited. Each addressee, by accepting delivery of the Placement Memorandum, agrees to observe the foregoing restrictions and to make no copies of the Placement Memorandum or any documents referred to in the Placement Memorandum. The information on the website of the Sponsor, Sponsor Group, Investment Manager, Project Manager, Lead Manager or Trust, as applicable, any website directly or indirectly linked to such websites, or the website of the Trustee does not form part of this Draft Placement Memorandum and Eligible Investors should not and shall not be entitled to rely on such information contained in, or available through, any such websites.

LEAD MANAGER	REGISTRAR AND UNIT TRANSFER AGENT
Axis Capital Limited 1st Floor, Axis House Wadia International Centre Pandurang Budhkar Marg, Worli Mumbai 400 025 Maharashtra, India **Tel.:** + 91 22 4325 2183 **E-mail:** nxt-infra.invit@axiscap.in **Website:** www.axiscapital.co.in **Investor grievance mail:** compliants@axiscap.in **Contact Person:** Sagar Jatakiya/Pavan Naik **SEBI Registration No:** INM000012029	**Link Intime India Private Limited** C-101, 247 Park L.B.S. Marg Vikhroli West Mumbai 400 083 Tel: +91 810 811 4949 Fax: +91 22 4918 6195 E-mail: Nxtinfra.invit@linkintime.co.in Website: www.linkintime.co.in Investor grievance e-mail: Nxtinfra.invit@linkintime.co.in Contact Person: Shanti Gopalakrishnan SEBI Registration No.: INR000004058

This Draft Placement Memorandum is dated January 5, 2024

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NOTICE TO THE ELIGIBLE INVESTORS

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

The Lead Manager nor any of its 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 Draft Placement Memorandum or any other information supplied in connection with the Issue or the distribution of the Units, other than in relation to themselves. Each Eligible Investor receiving this Draft Placement Memorandum acknowledges that such person has neither relied on the Lead Manager, or any financial, legal or other advisors to the Sponsor nor any of their shareholders, employees, counsel, officers, directors, representatives, agents, associates or affiliates in connection with their investigation of the accuracy of such information or such person's investment decision. Each Eligible Investor must rely on its own examination of the Trust and the merits and risks involved in investing in the Units. The Eligible Investors should not construe the contents of this Draft Placement Memorandum as legal, tax, accounting or investment advice. The Eligible Investors receiving this Draft Placement Memorandum acknowledge that in making an investment decision, they have relied solely on the information contained in this Draft Placement Memorandum and not on any other disclosure or representation by the Investment Manager, Sponsor, Trustee or any of their respective financial, legal or other advisors or other party. Nothing contained herein is, or may be relied upon, as a promise or representation as to the future performance of the Trust.

No person is authorized to give any information or to make any representation not contained in this Draft Placement Memorandum and any information or representation not so contained must not be relied upon as having been authorized by or on behalf of the Trust or by, or on behalf, of the Sponsor, the Investment Manager or the Lead Manager. The delivery of this Draft Placement Memorandum, at any time, does not imply that the information contained in it, is correct as of any time subsequent to its date. This Draft Placement Memorandum is personal to the Eligible Investors. This Draft Placement Memorandum shall not be relied upon by, and the Investment Manager, Sponsor, Sponsor Group, Trustee or the Project Manager and/ or the Lead Manager shall not be liable to, any subsequent acquirer, transferee or investor of the Units.

This Draft Placement Memorandum contains summaries of some terms of certain documents which are qualified in their entirety by the terms and conditions of those documents.

The distribution of this Draft Placement Memorandum, the Placement Memorandum and the Final Placement Memorandum or the disclosure of their contents to any person, other than the Eligible Investors to whom it is addressed and retained by the Eligible Investors to enable them to make a decision with respect to its subscription to the Units, is unauthorised and prohibited. The Eligible Investors, by accepting delivery of this Draft Placement Memorandum, the Placement Memorandum and the Final Placement Memorandum, agree to observe the foregoing restrictions and make no copies of this Draft Placement Memorandum, the Placement Memorandum and the Final Placement Memorandum or any other material in connection with the Issue or the Units.

Certain U.S. Matters

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

The Units have not been, and will not be, registered under the Securities Act or any other applicable state securities laws of the U.S. and, unless so registered, may not be offered or sold within the U.S. 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 being offered and sold only outside the United States in offshore transactions in reliance on Regulation S, in compliance with the applicable laws of the jurisdictions where those offers and sales occur.

The Eligible Investors will be deemed to have made the representations, agreements and acknowledgments as described in the section titled "*Notice to the Eligible Investors – Representations by the Eligible Investors"* on page 2.

THE UNITS OFFERED HEREBY HAVE NOT BEEN AND WILL NOT BE REGISTERED WITH, OR APPROVED OR DISAPPROVED BY THE U.S. SECURITIES AND EXCHANGE COMMISSION (THE "SEC") OR ANY STATE SECURITIES COMMISSION IN THE U.S. OR ANY OTHER U.S. REGULATORY AUTHORITY. ACCORDINGLY, THE UNITS MAY NOT BE OFFERED, SOLD, RESOLD OR OTHERWISE TRANSFERRED WITHIN THE

UNITED STATES OR THE TERRITORIES OR POSSESSIONS THEREOF, EXCEPT IN A TRANSACTION EXEMPT FROM THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT. THE UNITS REFERRED TO IN THIS DRAFT PLACEMENT MEMORANDUM ARE BEING OFFERED AND SOLD IN OFFSHORE TRANSACTIONS OUTSIDE THE UNITED STATES IN COMPLIANCE WITH REGULATION S UNDER THE SECURITIES ACT TO PERSONS LOCATED IN JURISDICTIONS WHERE SUCH OFFER AND SALE OF THE UNITS IS PERMITTED UNDER LAWS OF SUCH JURISDICTIONS. THE OFFERING TO WHICH THIS DRAFT PLACEMENT MEMORANDUM RELATES IS NOT, AND UNDER NO CIRCUMSTANCES IS TO BE CONSTRUED AS, AN OFFERING OF ANY UNITS FOR SALE IN THE UNITED STATES OR AS A SOLICITATION THEREIN OF AN OFFER TO BUY ANY OF THE SAID SECURITIES. ACCORDINGLY, YOU SHOULD NOT FORWARD OR TRANSMIT THIS DRAFT PLACEMENT MEMORANDUM IN OR INTO THE UNITED STATES AT ANY TIME. FURTHERMORE, THE FOREGOING AUTHORITIES HAVE NOT PASSED ON OR ENDORSED THE MERITS OF THE OFFERING OR THE ACCURACY OR ADEQUACY OF THIS DRAFT PLACEMENT MEMORANDUM. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE IN THE U.S.

Notice to Investors in certain other jurisdictions

The distribution of this Draft Placement Memorandum, the Placement Memorandum, the Final Placement Memorandum and the issue of the Units in certain jurisdictions may be restricted by law. As such, this Draft Placement Memorandum, the Placement Memorandum, the Final Placement Memorandum 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 authorised 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 Manager which would permit an issue of the Units in any jurisdiction other than India. Accordingly, the Units may not be offered or sold, directly or indirectly, and neither this Draft Placement Memorandum, the Placement Memorandum, the Final Placement Memorandum nor any Issue materials in connection with the Units be distributed or published in or from any country or jurisdiction that would require registration of the Units in such country or jurisdiction. Please see section titled "*Selling and Transfer Restrictions*" on page 286.

THE VALUE OF THE UNITS AND THE INCOME DERIVED FROM THEM MAY FLUCTUATE. THE UNITS ARE NOT OBLIGATIONS OF, DEPOSITS IN, OR GUARANTEED BY THE TRUST, THE TRUSTEE, THE SPONSOR, THE INVESTMENT MANAGER, THE LEAD MANAGER OR ANY OF THEIR RESPECTIVE SHAREHOLDERS, EMPLOYEES, COUNSEL, OFFICERS, DIRECTORS, REPRESENTATIVES, AGENTS, ASSOCIATES OR AFFILIATES. AN INVESTMENT IN THE 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 THEIR RESPECTIVE SHAREHOLDERS, EMPLOYEES, COUNSEL, OFFICERS, DIRECTORS, REPRESENTATIVES, AGENTS, ASSOCIATES OR AFFILIATES TO REDEEM THEIR UNITS WHILE THE UNITS ARE LISTED, UNLESS OTHERWISE PERMITTED BY APPLICABLE LAW. THE PERFORMANCE OF ANY OF THE LISTED UNITS OF THE TRUST IS NOT NECESSARILY INDICATIVE OF THE FUTURE PERFORMANCE OF THE ORDINARY UNITS OF THE TRUST.

Representations by the Eligible Investors

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

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

1. You are an "Institutional Investor" as defined in Regulation 2(1)(ya) of InvIT Regulations or a "Body Corporate" as defined in Regulation 2(1)(d) of InvIT Regulations, and are eligible under applicable laws and regulations of India, and undertake: (i) to acquire, hold, manage or dispose of any of the Units that are Allotted to you in accordance with InvIT Regulations, other applicable laws and under the laws of all relevant jurisdictions; (ii) that you are entitled to acquire and 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 Issue 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 Draft Placement Memorandum, the Placement Memorandum and the Final Placement Memorandum) and will honour such obligations; and (iii) to comply with all requirements under applicable laws in relation to filing and reporting obligations, if any, in this relation including making all necessary filings, in relation to the Issue and your investment in the Units, with appropriate governmental, statutory or regulatory authorities, including the RBI, as may be required, pursuant to applicable law, rules and regulations in India and in your respective jurisdiction, if applicable;

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

3. 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 appropriate withholding of taxes in accordance with the IT Act or other penalties under FATCA, the CRS or other similar exchange of tax information regimes, as maybe applicable. 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 by or disclosure of such information or documentation to, any relevant regulatory, governmental or statutory authority;

4. 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, 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 Institutional Investors and Bodies Corporate. The Placement Memorandum will be submitted to the SEBI and NSE and would be displayed on the website of SEBI and NSE;

5. 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 Issue; or (ii) if you have participated in or attended any Presentations, you understand and acknowledge that the Lead Manager, the Investment Manager, the Sponsor 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, you acknowledge that the Lead Manager, the Trustee (or its agents), the Investment Manager or the Sponsor have advised you not to rely in any way on any information that was provided to you at such Presentations;

6. None of the Sponsor, the Investment Manager, the Trustee or the Lead Manager or any of their respective shareholders, 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 Issue and that participation in the Issue is on the basis that you are not and will not, up to the Allotment, be a client of the Lead Manager. None of the Sponsor, the Trustee, the Investment Manager, the Lead Manager or any of their respective shareholders, 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 Issue and are in no way acting in a fiduciary capacity towards you;

7. All statements, other than statements of historical fact included in this Draft Placement Memorandum, including, without limitation, those regarding the Trust's financial position, business strategy, plans and objectives for future operations, the Investment Objectives, and the Projections, 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 the 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 Draft Placement Memorandum. The Trust, the Trustee, the Sponsor, the Investment Manager and the Lead Manager or any of their respective shareholders, directors, officers, employees, counsel, representatives, agents, associates or affiliates assume no responsibility to update any of the forward-looking statements contained in this Draft Placement Memorandum. You are cautioned not to place undue reliance on such forward-looking statements and not to regard such statements to be a guarantee or assurance of our future performance or returns to investors;

8. You have read this Draft Placement Memorandum in its entirety, including, in particular, the section titled *"Risk Factors"* on page 48. Further, you will be provided with a serially numbered copy of the Placement Memorandum and will be deemed to have read the Placement Memorandum in its entirety, including, in particular, the section titled *"Risk Factors"* on page 48;

9. You are aware and understand that the Units are being offered only to you and are not being offered to the general public and the Allotment shall be on a discretionary basis;

10. You understand that the Units have not been, and will not be, registered under the Securities Act or with any securities regulatory authority of any state of the United States and accordingly, may not be offered or sold within the United States, except in reliance on an exemption from the registration requirements of the Securities Act; the Units are being offered and sold outside the United States in an offshore transaction within the meaning of Regulation S and the applicable law of the jurisdictions in which those offers and sales occur. You are not in United States and are eligible to acquire, and are acquiring, the Units in an offshore transaction meeting the requirements of Regulation S. You further understand that no offer or sale of the Units is the result of any "directed selling efforts" in the United States (as such term is defined in Regulation S). You further acknowledge and agree that Trust and the Lead Manager, and their respective affiliates and representatives (including their legal counsel), will rely upon the truth and accuracy of the foregoing acknowledgements, representations, warranties and agreements and agree that, if at any time any of the

acknowledgements, representations, warranties and agreements made in connection with the Units is no longer accurate, you shall immediately notify Trust and the Lead Manager in writing;

11. In making your investment decision, you have (i) relied on your own examination of the Trust, the Units and the terms of the Issue, including the merits and risks involved, (ii) consulted your own independent advisors or otherwise have satisfied yourself concerning, without limitation, the effects of local laws; (iii) relied solely on the information contained in this Draft Placement Memorandum and the Placement Memorandum and no other disclosure or representation by the Sponsor or the Investment Manager, any of their respective financial, legal or other advisors or any other party; and (iv) received all information in this Draft Placement Memorandum that you believe is necessary or appropriate in order to make an investment decision in respect of Trust and the Units;

12. 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 Memorandum, look to any of the Investment Manager, the Trustee, the Sponsor or the Lead Manager or any of their respective shareholders, employees, counsel, officers, directors, representatives, financial advisors, 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 Issue 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;

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

14. You are not the Trustee, or the Valuer or an employee of the Valuer involved in the valuation of the Project SPVs;

15. You are aware that (i) we have received in-principle approval from the NSE dated [●] and (ii) the application for the final listing and trading approval will be made only after Allotment. There can be no assurance that the final approval for listing and trading of the Units will be obtained in a timely manner, or at all. The Trust, the Trustee, the Investment Manager, Sponsor, shall not be responsible for any delay or non-receipt of such final approval (except to the extent prescribed under the InvIT Regulations) or any loss arising from such delay or non-receipt. Further, you shall not undertake any trade in the Units credited to your demat account until such time that the final listing and trading approval for the Units have been issued by NSE;

16. You understand that, subject to the terms of this Draft Placement Memorandum, none of the Trust, the Investment Manager, the Lead Manager, the Sponsor, the Sponsor Group or the Trustee has any obligation to purchase or subscribe to all, or any part, of the Units subscribed by you in the Issue or to support any losses directly or indirectly sustained or incurred by you for any reason whatsoever in connection with the Issue;

17. You agree and acknowledge that, in the event you hold more than ten percent of the total outstanding units of the Trust, you shall comply with the stewardship code as specified in Schedule VIII of the InvIT Regulations;

18. You agree and acknowledge that no person, other than the Sponsor, its related parties and its associates, shall acquire units of the Trust which taken together with units held by such person and by persons acting in concert with such person in such InvIT, exceeds 25% of the value of outstanding units of the Trust, unless approval from the unit holders is obtained in terms of the InvIT Regulations and in the manner specified by SEBI.

19. The only information you are entitled to rely on, and on which you have relied, in committing yourself to acquire the Units is contained in the Placement Memorandum, 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 Manager, the Investment Manager or the Sponsor, and neither the Trustee, the Lead Manager, the Investment Manager nor the Sponsor will be liable for your decision to accept an invitation to participate in the Issue based on any other information, representation, warranty or statement that you have obtained or received;

20. You understand that the Units to be Allotted in this Issue will, when issued, be credited as fully paid and 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, except as permitted under applicable law. For details, please see the section titled "*Distributions*" on page 234;

21. You understand and agree that the Units are transferable only in accordance with the restrictions described in the section titled "*Selling and Transfer Restrictions*" on page 286;

22. You are eligible to Bid for, and hold, Units, so Allotted. You are aware that your holding 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 Trust, the Trustee, the Investment Manager, the Sponsor and the Lead Manager 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 Sponsor, the Lead Manager, their respective shareholders, 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 Manager on their own behalf and on behalf of the Trust, the Sponsor, 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. Any dispute arising in connection with the Issue will be governed by, and construed in accordance with, the laws of the Republic of India and shall be subject to the jurisdiction of the courts at Mumbai, Maharashtra;

27. You have made the representations, warranties, acknowledgements and agreements 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, until and including the Allotment of Units, listing and trading of Units in the Issue; and

28. You have made, or are deemed to have made, as applicable, the representations provided in the section titled "*Selling and Transfer Restrictions*" on page 286.

Available Information

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

Disclaimer

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

DEFINITIONS AND ABBREVIATIONS

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

References to any legislation, act, regulation, rule, guideline, circular, notification, clarification or policy shall be to such legislation, act, regulation, rule, guideline, circular, notification, clarification or policy 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 Draft Placement Memorandum, but not defined herein shall have the meaning ascribed to such terms under the InvIT Regulations, the SEBI Act, the SCRA, the Depositories Act, and the rules and regulations made thereunder.

Notwithstanding the foregoing, the terms not defined but used in the sections titled "Risk Factors", "Statement of Tax Benefits", "Industry Overview", "Business", "Regulations and Policies", and "Legal and Other Information" at pages 48, 300, 134, 163, 269, and 280, respectively, and "Special Purpose Combined Financial Statements", and "Projections of Revenue from Operations and Cash Flows from Operating Activities", attached as Annexure I and II, respectively, shall have the meanings ascribed to such terms in those respective sections.

In this Draft Placement Memorandum, unless the context otherwise requires, a reference to "we", "us" and "our" refers to the Trust and the Project SPVs on a combined basis and as the context requires, WIPL. The Trust will own 49% equity interest in WIPL which holds the 8 laning of Mukarba Chowk – Panipat section of NH-1 (new NH-44) from km 15.500 to km 86.000 in the state of Haryana under NHDP-IV through PPP on toll basis pursuant to the WIPL Concession Agreement, and which is accounted for as an investee under the equity method of accounting. The interest of the Trust in WIPL is accounted for using the equity method in accordance with Ind AS 28, after initially being recognized at the net book value as at April 1, 2020. For details of accounting policies as required by Ind AS (read with Ind AS 28) relating to the accounting of WIPL as equity accounted investee, please refer the sections titled "Presentation of Financial Data and Other Information" and "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPVs of the Trust" on pages 12 and 237 respectively.

Trust Related Terms

Term	Description
Actis Group	Actis LLP, Actis GP LLP, and any unincorporated body, body corporate or partnership which is a subsidiary, subsidiary undertaking or holding company or parent undertaking of Actis LLP or Actis GP LLP and each unincorporated body, body corporate or partnership which is a subsidiary or subsidiary undertaking of the holding company or parent undertaking of Actis LLP or Actis GP LLP (as per English Companies Act, 2006).
Associate	Associate shall have the meaning under Regulation 2(1)(b) of the InvIT Regulations
Auditor/ Statutory Auditor	S R B C & Co. LLP, Chartered Accountants and statutory auditors of the Trust
Audit Committee	The audit committee constituted by the Board pursuant to a resolution dated December 27, 2023, for the purpose of assisting the Board in fulfilling its fiduciary responsibilities towards the Investment Manager.
Borrowing Policy	The borrowing policy of the Trust adopted by the Investment Manager pursuant to a resolution of the IM Board dated December 27, 2023 and as amended from time to time.
Capital Contribution	The total subscription amounts (either by way of cash or share swap or otherwise (including transfer of interest in the InvIT Assets by the Sponsor and any other entities)) received by the Trust from the Unitholders (including the Sponsor), for subscription of Units, in accordance with applicable law and the Trust Documents, through private placement (as defined in the InvIT Regulations).
CGRG	Nxt-Infra CGRG Highways Limited (formerly known as MBL (CGRG) Road Limited)
Completion Date	The date on which the first of the transactions contemplated under the Securities Purchase Agreements shall be completed.
Concession Agreements	Collectively, the concession agreements entered into between the Project SPVs and the relevant concessioning authorities. For details, please see the section titled "*Summary of Key Agreements*" on page 186
Credit Rating Agency	[●]
CTHPL	Chikhali- Tarsod Highways Private Limited
Distribution Policy	The distribution policy of the Trust adopted by the Investment Manager pursuant to a resolution of the IM Board dated December 27, 2023 and as amended from time to time.
Finance and Investment Committee	The Finance and Investment Committee has been constituted by the Board pursuant to a resolution dated December 27, 2023, for the purpose of formulating the strategic investments plan, to review every investment and divestment decision of the Trust and the Project SPVs, to evaluate, analyse and execute various mergers and acquisitions.
DME	Welspun Delhi Meerut Expressway Private Limited
Deed of Assignment	The deed of assignment executed between the Sponsor, the Trustee (acting on behalf of the Trust) and the Investment Manager dated [●].
Formation Transaction	The settlement of the Trust under the Indian Trusts Act, 1882, its registration as an infrastructure investment trust with SEBI and the transfer of the Project SPVs to the Trust in accordance with the SEBI InvIT Regulations.

Term	Description
GSY	Nxt-Infra GSY Highways Limited (formerly known as MBL (GSY) Road Limited)
HAM Projects	Project SPVs operating and managing projects on a 'hybrid annuity model' basis, being WRIPL, CGRG, CTHPL, DME, and GSY.
Investment Management Agreement	The investment management agreement dated October 26, 2023 entered into between the Trustee (on behalf of Trust) and the Investment Manager.
Investment Manager	Walter Infra Manager Private Limited
Investment Objects	The investment objectives of the Trust, as provided in the section titled "*Overview of the Trust*" on page 19
InvIT Committee	The InvIT Committee has been constituted by the Board pursuant to a resolution dated December 27, 2023, for the purpose of managing, operating and supervising the functioning of the Trust.
InvIT Documents	The Trust Deed, the Investment Management Agreement, Project Implementation and Management Agreement, any other document, letter or agreement with respect to the Trust or the Units, executed for the purpose of this Trust, the Offer Document and such other documents in connection therewith, as originally executed and amended, modified, supplemented or restated from time to time, together with the respective annexures, schedules and exhibits, if any.
Nomination and Remuneration Committee	The Nomination and Remuneration Committee constituted by the Board pursuant to a resolution dated December 27, 2023, for the purpose of formulation of the criteria for determining qualifications, positive attributes and independence of a director and recommend to the board of directors a policy relating to, the remuneration of the directors, key managerial personnel and other employees.
O&M Agreement(s)	Agreements entered into by the Project SPVs with the O&M Contractors in relation to the operations, maintenance and management activities of the respective Project SPVs. For details in relation to the O&M Agreements, please see the section titled "*Business – Key O&M Agreements*" on page 184.
O&M Contractor(s)	Third-party contractors undertaking the operations, maintenance and management activities of the Project SPVs in accordance with the O&M Agreements
Parties to the Trust	Collectively, the Sponsor, the Sponsor Group, the Trustee, the Investment Manager and the Project Manager.
Project Implementation and Management Agreement/ PIMA	The project implementation and management agreement to be entered into amongst the Trustee, the Project Manager, the Investment Manager and the Project SPVs.
Project(s)/ Initial Portfolio Assets/InvIT Assets	Together, four laning of Chutmalpur, Ganeshpur section of NH-72A (from 0.00 km to 16.00 km) and Roorkee-Chutmalpur – Gagalheri section of NH-73 (from 0.00 km to 33 km) in the state of Uttarakhand and Uttar Pradesh; roads joining (i) district place in Akola district (41.59 km) and Akola and Amravati district (26.80 km); (ii) taluka place in Akola and Amravati district (22.42 km) and district place in Amravati (44.15 km); (iii) district place in Amravati district (Amravati Chandur Railway Dhamangaon) ; (iv) Chikhaldara hill station in Amravati district; and (v) Warud Gavankund Bahada Jarud Mangruli Kachurna Hatuma and Morshi Pala Salbardi Dongaryavali Dapori; four laning of Chikhali-Tarsod section of NH-6 from 360.00 km to 422.70 km in the state of Maharashtra; from km 0.00 to existing km 8.36 on the Delhi UP Border section of NH 24 in the state of Delhi by six laned expressway and four laned either; four laning of Gagalheri-Saharanpur-Yamunanagar (UP/Haryana Border) section of NH-73 from km 33.00 (design chainage km 35.40) to km 71.64 (design chainage km 86.86) in the state of Uttar Pradesh; and 8 laning of Mukarba Chowk – Panipat section of NH-1 (new NH-44) from km 15.500 to km 86.000 in the state of Haryana under NHDP-IV
Project Manager	Walter Infra Project Manager Private Limited
Project SPVs	Unless the context otherwise requires, WRIPL, CGRG, CTHPL, DME, GSY and WIPL
Projections of Revenue from Operations and Cash Flow from Operating Activities or Projections	Statement of Projections of 'Revenue from Operations' and 'Cash Flow from Operating Activities' and the basis and notes to these projections along with assumptions underlying the Projections and other explanatory information of the Trust and the following Project SPVs for the financial years ending March 31, 2024, March 31, 2025 and, March 31, 2026 along with the underlying assumptions and other explanatory information.
Related Parties	Related parties of the Trust, as defined under Regulation 2(1)(zv) of the InvIT Regulations
ROFR Agreement	The deed of right of first refusal executed between the Sponsor, the Trustee (acting on behalf of the Trust) and the Investment Manager dated [●].
Risk Management Committee	The Risk Management Committee constituted by the Board pursuant to a resolution dated December 27, 2023, for the purpose of assisting the Board in fulfilling its fiduciary responsibilities towards the Investment Manager in the best interest of all unitholders of the Trust and the Project SPV. The Risk Management Committee is in compliance with the applicable provisions of the InvIT Regulations and and the SEBI Listing Regulations.
RPT Policy	Related party transactions policy adopted by the Investment Manager pursuant to a resolution of the IM Board dated December 27, 2023, and as amended from time to time.
Securities Purchase Agreements	The securities purchase agreements to be executed between the Trust (acting through the Trustee), the Investment Manager, the Sponsor, and the Project SPVs, in relation to the Formation Transaction.
Settlor	Walter Infra Project Manager Private Limited
Special Purpose Combined Financial Statements	The audited special purpose combined financial statements of CGRG, GSY, CTHPL, DME, WRIPL and WIPL (Investment Entity accounted using equity method) which comprise the special purpose combined balance sheets as at September 30, 2023, March 31, 2023, March 31, 2022 and March 31, 2021, the special purpose combined statements of profit and loss (including other comprehensive income), special purpose combined statements of changes in equity, the special purpose combined cash flow statements for the six months period ended September 30, 2023 and for the years ended March 31, 2023, March 31, 2022, and March 31, 2021, the combined statement of net assets at fair value as at September 30, 2023, the combined statement of total returns at fair value for the six month period ended September 30, 2023 and year ended March 31, 2023 and a summary of significant accounting policies and other explanatory information, prepared in accordance with Guidance Note on Reports in Company Prospectuses (Revised 2019), and

Term	Description
	the Guidance Note on Combined and Carve Out Financial Statements issued by the Institute of Chartered Accountants of India (the "**Guidance Notes**") using the recognition and measurement principles of Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 read with Section 133 of the Companies Act, 2013 ("**Ind AS**"), except Ind AS 33 earnings per share, and other generally accepted accounting principles and other provisions relating to disclosures required as per of the InvIT Regulations and pursuant to paragraph 3.3.4 of SEBI Master Circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2023/115 dated 06 July 2023 on 'Disclosure of Financial Information in Placement Memorandum or any Offer Document for InvITs' ("**SEBI Circular on Financial Disclosures**").
Sponsor	Actis Highway Infra Limited
Sponsor Group	Collectively, the Sponsor and Actis Infrastructure India PCC Limited
Stakeholders' Relationship Committee	The stakeholders' relationship committee constituted by the Board pursuant to a resolution dated December 27, 2023, to specifically look into the various aspects of interest of unitholders.
Trust	Nxt-Infra Trust
Trust Assets	The aggregate of the immovable, movable and other assets and cash (including cash equivalents) owned by the Trust, whether directly, or through holding companies or special purpose vehicles, and includes all rights, interests and benefits arising from and incidental to ownership of such assets, in accordance with the InvIT Regulations and applicable law.
Trust Documents	Trust Deed, the Investment Management Agreement, the Securities Purchase Agreements, PIMA, any agreement between the Trustee and/or the Investment Manager and/or the Project Manager with respect to the Trust or to which the Investment Manager or the Trustee is a party in their capacity as the manager or trustee of the Trust or Units or any other obligations, securities or instruments as permitted under the applicable law, executed for the purpose of the Trust, this Draft Placement Memorandum, the Placement Memorandum, the Final Placement Memorandum or any offer document, and such other documents in connection therewith, as originally executed and amended, modified, supplemented or restated from time to time.
Trust Deed	The trust deed dated October 26, 2023, entered into amongst the Sponsor, the Settlor and the Trustee.
Trustee	Catalyst Trusteeship Limited
Unitholder	Any person who owns any Unit in the Trust.
Units	An undivided beneficial interest in the Trust, and all issued and allotted Units together represent the entire beneficial interest in the Trust.
Valuation Report	The valuation report dated December 27, 2023 issued by the Valuer, which sets out its opinion as to the fair enterprise value of the Project SPVs as on September 30, 2023.
Valuer	S. Sundararaman, a registered valuer.
We/Us/Our	Unless the context otherwise requires or implies, the Trust and the Project SPVs or WIPL
WIPL or DBFOT (Toll) SPV	Welspun Infrafacility Private Limited
WRIPL	Welspun Road Infra Private Limited

Issue Related Terms

Term	Description
Allocated/ Allocation	The allocation of Units, by the Investment Manager to Eligible Investors on the basis of the Application Form submitted by them
Allot/ Allotment/ Allotted	Unless the context otherwise requires, the issue and allotment of Units to the Eligible Investors, pursuant to the Issue
Allottees	Bidders to whom Units are issued and Allotted pursuant to the Issue
Application Form	The serially numbered form pursuant to which Eligible Investors shall submit a Bid for the Units in the Issue
Bid(s)	Indication of interest of the Eligible Investor, as provided in the Application Form, to subscribe for the Units at the Issue Price, in terms of the Placement Memorandum and the Application Form
Bid Amount	The amount payable by a Bidder for the number of Units Bid for at the Issue Price specified in the Placement Memorandum
Bid/Issue Closing Date	[●], which is the last date up to which the Application Forms shall be accepted
Bid/Issue Opening Date	[●], which is the date on which a serially numbered copy of the Placement Memorandum along with the Application Form was circulated to each Eligible Investor by the Investment Manager and the date from which, the Investment Manager accepted Application Forms
Bid/Issue Period	Period between the Bid/Issue Opening Date and the Bid/Issue Closing Date, inclusive of both days, during which Eligible Investors can submit their Bids
Bidder	Any Eligible Investor, who makes a Bid pursuant to the terms of the Placement Memorandum and the Application Form
Bid Lot	A minimum of [●] Units and in multiples of [●] Units thereafter
Body Corporate/ Bodies Corporate	Body Corporate / Bodies corporate as defined in Regulation 2(1)(d) of the InvIT Regulations, whether Indian or foreign
Business Days	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 should transfer money through direct credit/NEFT/NECS/RTGS in respect of the Bid Amount when submitting a Bid
Cash Escrow Agreement	The cash escrow agreement to be entered into amongst the Trust (acting through the Trustee), the Investment Manager, the Lead Manager, the Sponsor and the Escrow Collection Bank, as applicable, for, among others, collection of the Bid Amounts and for remitting refunds, if any, of the amounts collected, to the Bidders

Term	Description
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 Issue shall be made, i.e. on or about [●]
Demographic Details	Details of the Bidders, including the Bidder's address, investor status, occupation and bank account details
Designated Account	The account wherein the Bidders should transfer money through direct credit/NEFT/NECS/RTGS in respect of the Bid Amount when submitting a Bid
Designated Stock Exchange	National Stock Exchange of India Limited (NSE)
Draft Placement Memorandum	This draft placement memorandum dated January 5, 2024, in relation to this Issue, filed with SEBI and NSE, and issued in accordance with the InvIT Regulations, which does not contain the complete particulars of the Issue, including any modifications, amendments, supplements, notices, corrections or corrigenda thereto
Eligible Investors	Institutional Investors and Bodies Corporate, whether Indian or foreign
Eligible Unitholder(s)	Unitholder(s) holding such percentage of the total outstanding units of the Trust, either individually or collectively, as may be prescribed by SEBI from time to time
Escrow Collection Bank	[●]
Final Placement Memorandum	The final placement memorandum to be issued in relation to this Issue, in accordance with the InvIT Regulations
Institutional Investors	Institutional investor as defined in Regulation 2(1)(ya) of the InvIT Regulations
Issue	The initial offer of up to [●] Units at an Issue Price of ₹[●] per Unit, aggregating to ₹ 1,90,000 lakhs, on a private placement basis to the Eligible Investors and the Sponsor.
Issue Price	₹ [●] per Unit, being the price at which Units will be Allotted to Eligible Investors in terms of the Draft Placement Memorandum
Issue Proceeds	The proceeds of the Issue of up to ₹ 1,90,000 lakhs. For further details about the use of the Issue Proceeds, please see the section titled "*Use of Proceeds*" on page 222.
Issue Size	The initial offer of up to [●] Units aggregating up to ₹ 1,90,000 lakhs to the Eligible Investors and the Sponsor
Listing Agreement	The listing agreement to be entered into with NSE 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"
Lead Manager	Axis Capital Limited
Listing Date	The date on which the Units will be listed on NSE.
Minimum Bid Size	₹ 2,500 lakhs
Placement Agreement	The placement agreement dated January 5, 2024 entered into among the Trust (acting through its Trustee), the Trustee, the Investment Manager, the Sponsor, the Project Manager and the Lead Manager
Placement Memorandum	The placement memorandum dated [●], 2023 issued in relation to this Issue in accordance with the InvIT Regulations
Qualified Institutional Buyers or QIB(s)	Qualified institutional buyers, as defined under Regulation 2(1)(ss) of the SEBI ICDR Regulations, which currently includes (i) a mutual fund, a VCF, an AIF and an FVCI registered with SEBI, (ii) an FPI, other than individuals, corporate bodies and family offices, (iii) a public financial institution as defined in section 2(72) of the Companies Act, 2013, (iv) a scheduled commercial bank as included in the second schedule to the Reserve Bank of India Act, 1934, (v) a multilateral and bilateral development financial institution, (vi) a state industrial development corporation, (vii) an insurance company registered with the IRDAI, (viii) a provident fund with minimum corpus of ₹2,500 lakhs, (ix) a pension fund with minimum corpus of ₹2,500 lakhs, (x) National Investment Fund set up by resolution no. F. No. 2/3/2005-DDII dated November 23, 2005 of the Government published in the Gazette of India, (xi) insurance funds set up and managed by army, navy or air force of the Union of India, (xii) insurance funds set up and managed by the Department of Posts, India, and (xiii) systemically important non-banking financial companies. For the avoidance of doubt, this term is not used herein as it is defined in Rule 144A
Registrar and Unit Transfer Agent or Registrar	Link Intime India Private Limited
Unitholder Nominee Director	A non-independent director nominated by Eligible Unitholder(s) on the Board of the Investment Manager, as prescribed by SEBI from time to time
Working Day	Working Day, with reference to (a) Bid/Issue 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/Issue Closing Date and the listing of the Units on NSE, shall mean all trading days of NSE, excluding Sundays and bank holidays

Technical and Industry Related Terms

Term	Description
AADT	Annual Average Daily Traffic
BOT	Build Operate and Transfer
BTKM	Billion Net Tonne Kilometre
COD	Commercial Operations Date
DBFOT	Design, Build, Finance, Operate and Transfer
HAM	Hybrid Annuity Model
Lane kms	the length of the road calculating by considering length of each lane comprising such road
MCA	Model Concession Agreement
NCR	National Capital Region
NCT	National Capital Territory
NH	National Highway

Term	Description
O&M	Operation and maintenance
PPP	Public Private Partnership
Technical Consultant	Samarth Infraegg Technocrats Private. Limited
Technical Reports	The technical reports prepared by the Technical Consultant in relation to the Project SPVs, attached as Annexure IV.
TOT	Toll, operate and transfer model
Total Borrowings	Total borrowings include non-current borrowings and current borrowings
Traffic Report	The traffic and revenue due diligence report prepared by the Traffic Consultant in relation to the DBFOT (Toll) SPV, attached as Annexure V.
Traffic Consultant	Steer Davies & Gleave India Private Limited
WPI	Wholesale Price Index

Abbreviations

Term	Description
AIF	Alternative Investment Fund as defined in and registered with SEBI under the SEBI AIF Regulations
Air Act	Air (Prevention and Control of Pollution) Act, 1981
AUM	AUM is the enterprise value as set out by the Valuer under the Valuation Report. For details, please see the '*Valuation Report*', attached as Annexure III
Board/Board of Directors	The board of directors of the Investment Manager
BSE	BSE Limited
CAGR	Compounded annual growth rate
CCDs	Compulsorily convertible debentures
CCPS	Compulsorily convertible preference shares
CDSL	Central Depository Services (India) Limited
CPI	Consumer Price Index
Civil Code	Code of Civil Procedure, 1908
Companies Act	Companies Act, 1956 and/or the Companies Act, 2013, as amended, as applicable
Companies Act, 1956	Companies Act, 1956 and the rules, regulations, modifications and clarifications made thereunder as the context requires, repealed as of January 30, 2019
Companies Act, 2013	Companies Act, 2013, as amended and read with the rules, regulations, notifications, clarifications and modifications thereunder
COVID-19	A public health emergency of international concern as declared by the World Health Organization on January 30, 2020 and a pandemic on March 11, 2020
CPCB	The Central Pollution Control Board of India
Depositories	Depositories registered with SEBI under the Securities and Exchange Board of India (Depositories and Participant) Regulations, 2018, being the NSDL and the CDSL
Depositories Act	Depositories Act, 1996
Depository Participant	A depository participant as defined under the Depositories Act
DIN	Director Identification Number
DP ID	Depository Participant ID
EIA	Environment Impact Assessment
EV	Enterprise Value
Environment Act	Environment (Protection) Act, 1986
FEMA	Foreign Exchange Management Act, 1999, read with rules and regulations thereunder
FEMA Rules	Foreign Exchange Management (Non-Debt Instrument) Rules, 2019
Fiscal/Financial Year	Period of 12 months ended March 31 of that particular year, unless otherwise stated
FPI	Foreign Portfolio Investors
GAAP	Generally Accepted Accounting Principles
GoI or Government	Government of India
ICAI	Institute of Chartered Accountants of India
Ind AS	Indian Accounting Standards prescribed under Section 133 of the Companies Act, 2013, as notified under Rule 3 of the Companies (Indian Accounting Standards) Rules, 2015, notified on February 19, 2015 by the MCA, including any amendments or modifications thereto
Indian GAAP	Accounting principles generally accepted in India, including the Accounting Standards as prescribed under Section 133 of the Companies Act, 2013 read with Rule 7 of the Companies (Accounts) Rules, 2014
InvIT	Infrastructure investment trust
Indian Trusts Act	Indian Trusts Act, 1882
IST	Indian Standard Time
IT Act	The Income tax Act, 1961
MCA	Ministry of Corporate Affairs
MoEF	Ministry of Environment, Forest and Climate Change
MoRTH	Ministry of Road Transport and Highways
Mutual Funds	Mutual funds registered with SEBI under the Securities and Exchange Board of India (Mutual Funds) Regulations, 1996
NAPCC	National Action Plan on Climate Change
NCD	Non-convertible debentures
NHAI	National Highways Authority of India
NRE	Non-Resident External
NSDL	National Securities Depository Limited

Term	Description
OCDs	Optionally convertible debentures
O&M	Operation and maintenance
PAN	Permanent Account Number
PCB	Pollution Control Boards
PWD	Public Works Department
RBI	Reserve Bank of India
Regulation S	Regulation S under the Securities Act
Rs./Rupees/INR/₹	Indian Rupees
RTGS	Real Time Gross Settlement
SCRA	The Securities Contracts (Regulation) Act, 1956
SEBI	Securities and Exchange Board of India
SEBI Act	The Securities and Exchange Board of India Act, 1992
SEBI AIF Regulations	Securities and Exchange Board of India (Alternative Investments Funds) Regulations, 2012
SEBI FPI Regulations	Securities and Exchange Board of India (Foreign Portfolio Investors) Regulations, 2014
SEBI Intermediaries Regulation	Securities and Exchange Board of India (Intermediaries) Regulations, 2008
SEBI ICDR Regulations	Securities and Exchange Board of India (Issue of Capital and Disclosure Requirements) Regulations, 2018
SEBI InvIT Regulations or InvIT Regulations	Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 and circulars issued by SEBI from time to time
SERC	State Electricity Regulatory Commissions
Securities Act	U.S. Securities Act of 1933, as amended
Securities Exchange Act	U.S. Securities Exchange Act of 1934, as amended
Tax	(i) all forms of direct and indirect taxes, duties, charges, levies, including without limitation corporate income tax, withholding tax, minimum alternate tax, sales tax, goods & services tax, value added tax, customs and excise duties, service tax, capital gains tax and all charges, interest, penalties and fines incidental or relating to any taxation falling within paragraph (i) above or which arise as a result of the failure to pay any taxes on the due date or to comply with any obligation relating to Tax
U.S./U.S.A/United States	United States of America, including the territories and possessions thereof
USD/US$	United States Dollars
Water Act	Water (Prevention and Control of Pollution) Act, 1974

PRESENTATION OF FINANCIAL DATA AND OTHER INFORMATION

References herein to "we", "our" and "us" are to the Trust, together with the Project SPVs and, as the context requires, WIPL, the Trust will own 49% equity interest in WIPL which holds the 8 laning of Mukarba Chowk – Panipat section of NH-1 (new NH-44) from km 15.500 to km 86.000 in the state of Haryana under NHDP-IV through PPP on toll basis pursuant to the WIPL Concession Agreement, and which is accounted for as an investee under the equity method of accounting. The interest of the Trust in WIPL is accounted for using the equity method in accordance with Ind AS 28, after initially being recognized at the net book value as at April 1, 2020. For details of accounting policies as required by Ind AS (read with Ind AS 28) relating to the accounting of WIPL as equity accounted investee, please refer below and to the section titled "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPVs of the Trust" on page 237.

Certain Conventions

All references in this Draft Placement Memorandum to "India" are to the Republic of India and all references to the "U.S.", or the "United States" are to the United States of America and all references to "Canada" are to the Dominion of Canada.

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

Financial Data

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

Unless stated otherwise or unless context requires otherwise, the financial information in this Draft Placement Memorandum is derived from the Special Purpose Combined Financial Statements. The Trust was settled as a contributory irrevocable trust on October 26, 2023, and will not acquire ownership of the Project SPVs until immediately prior to the Allotment of the Units in the Issue. As of the date of this Draft Placement Memorandum, there is no available financial information of the Trust. The Special Purpose Combined Financial Statements have been prepared based on the audited interim financial statements of the respective Project SPV's prepared in accordance with the recognition and measurement principles of IND AS 34 for six months period ended September 2023 and the annual audited financial statements of the respective Project SPV's for the years ended March 31, 2023, 2022 and 2021 prepared in accordance with Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 prescribed under Section 133 of the Companies Act, 2013 that have been audited by the respective year's auditors of the Project SPVs. The Special Purpose Combined Financial Statements have been prepared in accordance with Guidance Note on Reports in Company Prospectuses (Revised 2019), and the Guidance Note on Combined and Carve Out Financial Statements issued by the Institute of Chartered Accountants of India (the "**Guidance Notes**") using the recognition and measurement principles of Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 read with Section 133 of the Companies Act, 2013 ("**Ind AS**") , except Ind AS 33 earnings per share and other generally accepted accounting principles and other provisions relating to disclosures required as per of the InvIT Regulations and the SEBI Master Circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2023/115 dated 06 July 2023 comprising the 'Disclosure of Financial Information in Placement Memorandum or any Offer Document for InvITs' ("**SEBI Circular on Financial Disclosures**").

Financial information for six months period ended September 30, 2023 are not indicative of full year's results and are not comparable with annual financial information.

This Draft Placement Memorandum includes projections of revenue from operations and cash flows from the operating activities and the underlying assumptions of the Trust on a combined basis and each of the Project SPVs, individually, for the Financial Years ending March 31, 2024, March 31, 2025 and March 31, 2026. For further details, please see "*Projections of Revenue from Operations and Cash Flow from Operating Activities*" attached as Annexure I.

Further, this Draft Placement Memorandum includes summaries of the standalone financial statements of the Sponsor, for the period from March 24, 2022 (date of incorporation of the Sponsor) to March 31, 2023, prepared in accordance with International Financial Reporting Standards and in compliance with the requirements of Mauritius Companies Act 2001. Further, our Investment Manager is a newly incorporated company, having been incorporated on March 13, 2023, and accordingly financial statements of the Investment Manager are included for the period March 13, 2023 to June 30, 2023. For further details, please see the sections titled "*Summary Financial Information of the Sponsor*" and "*Summary Financial Information of the Investment Manager*" on pages 31 and 36, respectively.

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

In this Draft Placement Memorandum, any discrepancies in any table between the total and the sums of the amounts listed are due to rounding off. All figures and percentage figures have been rounded off to two decimal places. However, where any figures may have been sourced from third-party industry sources, such figures may be rounded-off to such number of decimal points as provided in such respective sources.

Non-GAAP Measures

Debt Equity ratio is a non-GAAP measure, presented in this Draft Placement Memorandum is a supplemental measure of our performance and liquidity that is not required by, or presented in accordance with, Ind AS, Indian GAAP, IFRS or US GAAP. Further, this non-GAAP measure is not a measurement of our financial performance or liquidity under Ind AS, Indian GAAP, IFRS or US GAAP and should not be considered in isolation or construed as an alternative to cash flows, profit/ (loss) for the years/ period or any other measure of financial performance or as an indicator of our operating performance, liquidity, profitability or cash flows generated by operating, investing or financing activities derived in accordance with Ind AS, Indian GAAP, IFRS or US GAAP. In addition, Debt Equity ratio is not a standardised term, hence a direct comparison of this non-GAAP measure between companies may not be possible. Other companies may calculate this non-GAAP measure differently from us, limiting its usefulness as a comparative measure. Although such non-GAAP measure is not a measure of performance calculated in accordance with applicable accounting standards, the Investment Manager believes that they are useful to an investor in evaluating us as it is a widely used measure to evaluate our operating performance.

Currency and Units of Presentation

All references to:

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

Except otherwise specified, numerical information in this Draft Placement Memorandum has been presented in "lakhs" units. 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 Draft Placement Memorandum, have been calculated on the basis of the Special Purpose Combined Financial Statements and the Summary Financial Statements of (i) the Sponsor; and (ii) the Investment Manager.

Exchange Rates

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

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

(in ₹)

Currency	Exchange Rate as on September 30, 2023	Exchange Rate as on March 31, 2023	Exchange Rate as on March 31, 2022	Exchange Rate as on March 31, 2021
1 USD	83.06	82.22	75.81	73.50

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

Industry and Market Data

Unless stated otherwise, industry and market data used in this Draft Placement Memorandum has been obtained or derived from the CRISIL Report with respect to the 'Assessment of the Roads Sector in India: For Actis' which is a commissioned report, and publicly available information as well as other Government and industry publications and sources. The Investment Manager has commissioned CRISIL Report to provide an independent estimation of the assessment of roads sector in India, which is based on historical data and certain assumptions. The CRISIL Report dated September 2023 is issued by the CRISIL Market Intelligence & Analytics division of CRISIL Limited and is subject to its consent letter dated December 28, 2023 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 Nxt-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."

Industry publications as well as government publications generally state that the information contained in such publications has been obtained from various sources believed to be reliable but that their accuracy and completeness are not guaranteed, and their reliability cannot be assured. Accordingly, no investment decisions should be based solely on such information. The data used in these sources may have been re-classified for the purposes of presentation. Data from these sources may also not be comparable. Such data involves risks, uncertainties and numerous assumptions and is subject to change based on various factors, including those disclosed in the section titled "*Risk Factors*" on page 48. Accordingly, investment decisions should not be based solely on such information.

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

Technical Data

The Technical Report was commissioned by the Investment Manager for the purposes of the Issue.

Traffic Report

The Traffic Report, prepared by the Traffic Consultant, was commissioned by the Investment Manager for purposes of the Issue. The Traffic Report was issued by the Traffic Consultant and is subject to the following disclaimer:

*"This report has been produced for the sole benefit of Actis Highway Infra Limited**.** This Report (the "Report") is confidential and disclosed only for information purposes, and it may not be relied upon by any party other than the Client or a Party to a Reliance Letter, and Steer: a) makes no warranty, expressed or implied, with respect to the use of any information or methods disclosed in this Report; and b) assumes no liability with respect to the use of any information or methods disclosed in this document. Any such party by its acceptance or use of this Report releases Steer from any liability for direct, indirect, consequential, or special loss or damage whether arising in contract, warranty, express or implied, tort or otherwise.*

The Report is based on standard professional efforts, and information available to us at the time the review took place and is subject to time and budget constraints of the Report's scope of work. This Report, information and statements contained herein, are all based on third party data provided to us, or sourced by us, and Steer has not sought to establish the reliability of the data, except as specifically stated in the Report. Steer bears no responsibility for the results of any actions taken based on third-party data.

Certain forward-looking statements in the Report are estimates based on interpretations or assessments of information available at the time of writing. The Report is thus to be viewed as an assessment that is time-relevant, specifically referring to conditions at the time of the review. Steer undertakes no obligation to update the Report for any reason.

While the estimates contained in the Report are not precise forecasts, they do represent, in our view a reasonable expectation of the future, based on information we have been provided with or sourced.

However, the estimates necessarily rely on numerous assumptions and judgements, and circumstances may occur over the timeframe of the project that go counter to these assumptions and judgements and that affect the project's realized revenues. Actual events may differ from those assumed, and events are subject to change. Therefore, Steer makes or provides no warranty, whether implied or otherwise, as to the accuracy of forward-looking information presented. Further, it is important to note that forecasts presented represent long term growth profiles; the results for individual time periods may vary from forecasted values.

Traffic Consultant developed the relationships in the models used to produce the forecasts for the projects based on data available through November 2023. This report does not consider variations in traffic performance due to changing macro and force majeure events such (but not limited to) as global wars, economic uncertainty (high inflation, global recession), and changes in the regulatory environment. The situation remains dynamic and is subject to significant change in the short and medium term. In this challenging context, Traffic Consultant has produced base forecasts with a view on a possible scenario for the traffic forecasts. 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 such macro-economic/force majeure events. 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 scenario, Traffic Consultant advises that all readers of the Report consider the Report in the context of their own assessment of the impact of such events."

Valuation Report

The Valuation Report, prepared by the Valuer, was commissioned by the Investment Manager for the purposes of the Issue.

Websites

The information contained on the websites of the Trust, the Sponsor, the Trustee, the Lead Manager, or the other websites referred in this Draft Placement Memorandum or that can be accessed through our websites or such other websites, neither constitutes part of this Draft Placement Memorandum, nor is it incorporated by reference therein and should not form the basis of any investment decision. For details of the websites of the Trust, Sponsors, Trustee and the Lead Manager, please see the section titled *"General Information"* on page 81.

FORWARD-LOOKING STATEMENTS

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

All statements regarding the Trust's expected financial conditions, results of operations, cash flows, business plans and prospects are forward-looking statements. These forward-looking statements include statements as to the Trust's business strategy, revenue, cash flows and profitability (including, without limitation, any financial or operating projections or forecasts) and other matters discussed in this Draft Placement Memorandum that are not historical facts.

These forward-looking statements and any other projections contained in this Draft Placement Memorandum (whether made by the Parties to the Trust or any third party), are based on current plans, estimates, presumptions and expectations and involve known and unknown risks, uncertainties, assumptions and other factors that may cause the Trust's actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements or other projections. In accordance with the InvIT Regulations, the Projections have been included in this Draft Placement Memorandum. The Projections should be read together with the underlying assumptions and notes thereto. Please see "*Projections of Revenue from Operations and Cash Flows from Operating Activities*" attached as Annexure I.

The Valuation Report included in this Draft Placement Memorandum, 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 III.

The Technical Report and Traffic Report includes projections, assumptions and estimates in relation to the information contained therein, including pertaining to, *inter alia*, routine and periodic maintenance, traffic volumes, O&M Contracts review, and operational analysis and accordingly, should be read in conjunction with the relevant estimates and assumptions thereto.

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

Factors that could cause actual results, performance or achievements of the Trust to differ materially include, but are not limited to those disclosed under the sections titled "*Risk Factors*", "*Industry Overview*", "*Business*" and "*Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPVs of the Trust*", on pages 48, 134, 163, and 237, respectively. Some of the factors that could cause the Trust's actual results, performance or achievements to differ materially from those in the forward-looking statements, financial projections and financial information include, but are not limited to, the following:

- The Nxt-Infra Trust is a newly settled trust with no established operating history and no historical financial information and, as a result, investors may not be able to assess prospects of the Trust on the basis of past records or accurately assess future growth prospectus of the Trust.

- Consummation of the Formation Transactions pursuant to which we will acquire the Project SPVs is subject to receipt of approval from NHAI or the relevant concessioning authority and timely release of certain security created over the InvIT Assets.

- Our failure and inability to identify and acquire new infrastructure assets that generate comparable revenue, profits or cash flows may have an adverse effect on our business, financial condition, cash flows and results of operations and our ability to make distributions.

- We may be subject to penalties and claims from the concessioning authorities and third parties during the course of operations of the Projects SPVs and may not be able to recover all operational losses from the Project Manager and/ or other contractors providing operations and maintenance services to the Projects SPVs.

The forward-looking statements, Projections, and the Valuation Report 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 we believe that the expectations and the assumptions upon which such forward-looking

statements are based, are reasonable at this time, we cannot assure Bidders that such expectations will prove to be correct or accurate. Given these uncertainties, investors are cautioned not to place undue reliance on such forward-looking statements and not to regard such statements as a guarantee of future performance.

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

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

THE ISSUE

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

Issue	Initial Offer of up to [●] Units aggregating up to ₹ 1,90,000 lakhs
Issue Price	₹ [●]
Minimum Bid Size	₹ 2,500 lakhs
Bid/Issue Opening Date	[●]
Bid/Issue Closing Date	[●]
Sponsor	Actis Highway Infra Limited
Trustee	Catalyst Trusteeship Limited
Investment Manager	Walter Infra Manager Private Limited
Project Manager	Walter Infra Project Manager Private Limited
Eligible Investors	Institutional Investors and Bodies Corporate, Indian or foreign, subject to applicable law
Authority for this Issue	This Issue was authorised and approved by the board of directors of the Investment Manager on December 27, 2023.
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 titled "*Parties to the Trust*" on page 85.
Units issued and outstanding as of the date of this Draft Placement Memorandum	As of the date of this Draft Placement Memorandum, there are no issued and outstanding Units.
Units issued and outstanding immediately after this Issue	Up to [●] Units
Sponsor Units as on the date of the Placement Memorandum	Up to [●] Units The Units held by the Sponsor and Sponsor Group shall rank *pari passu* with and have the same rights as the Units to be Allotted pursuant to this Issue. The Units to be held by the Sponsor shall comprise (i). the Units of the Trust to be allotted pursuant to the Securities Purchase Agreements, and (ii). the Units proposed to be subscribed to in the Issue.
Distribution	Please see the section titled "*Distributions*" on page 234.
Indian Taxation	For statement of possible tax consideration/ benefits available to the InvIT and its Unitholders under applicable laws in India. Please see the section titled "*Statement of Tax Benefits"* on page 300.
Use of Proceeds	Please see the section titled "*Use of Proceeds*" on page 222.
Listing	Prior to this Issue, there has been no market for the Units. The Units are proposed to be listed on NSE. In-principle approval for listing of the Units has been received from NSE on [●]. The Investment Manager shall apply to NSE for the final listing and trading approval, after the Allotment and the credit of the Units to the demat accounts of the Allottees.
Designated Stock Exchange	NSE
Closing Date	The date on which Allotment of the Units pursuant to this Issue shall be made, i.e. on or about [●]
Ranking	The Units being issued shall rank *pari passu* in all respects, including rights in respect of distribution. Please see the section titled *"Rights of Unitholders"* on page 287.
Lock-in and Rights of Unitholders	For details, please see the sections titled "*Information Concerning Units*" and "*Rights of Unitholders*" on pages 221 and 287, respectively.
Risk Factors	Prior to making an investment decision, Bidders should consider carefully the matters discussed in the section titled *"Risk Factors*" on page 48.

The Issue is a private placement of listed Units under Regulation 14(2) of the SEBI InvIT Regulations.Upon listing of the Units on NSE, the Units shall be traded only on the dematerialized segment of NSE.

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. However, in the future, the Trust may issue subordinate units of the Trust only to the Sponsor and its Associates, in compliance with the InvIT Regulations, where such subordinate units of the Trust shall carry only inferior voting or other rights compared to the Units. No person connected with the Issue, including any person connected with the distribution of this Draft Placement Memorandum, shall offer any incentive, whether direct or indirect, in any manner, whether in cash or kind or services or otherwise to any person for making an application for Allotment of the Units.

For further details in relation to this Issue, including the method of application, please see the section titled "*Issue Procedure*" on page 292.

OVERVIEW OF THE TRUST

The following overview is qualified in its entirety by, and is subject to, the more detailed information contained in, or referred to elsewhere in this Draft Placement Memorandum The statements contained in this summary that are not historical facts may be forward-looking statements. Such statements are subject to certain risks, uncertainties and assumptions that could cause actual results of the Trust to differ materially from those forecasted or projected in this Draft Placement Memorandum. Under no circumstances should the inclusion of such information herein be regarded as a representation, warranty or prediction of the accuracy of the underlying assumptions by the Trust or the Parties to the Trust or the Lead Manager or any other person or that these results will be achieved or are likely to be achieved. Investment in Units involves risks. Bidders are advised not to rely solely on this overview, however, and should read this Draft Placement Memorandum in its entirety and in particular, the section titled "Risk Factors" on page 48.

Structure and description the Trust

The Sponsor set up the Trust as a contributory, determinate and irrevocable trust under the provisions of the Trusts Act in Mumbai, India pursuant to the Trust Deed. The Trust has been registered with the SEBI as an infrastructure investment trust under the InvIT Regulations on November 8, 2023 having registration number IN/INVIT/23-24/00028. The Settlor has settled the Trust for an initial sum of ₹ 10,000. The Sponsor shall not have any beneficial interest in such initial sum of the Trust and such sum shall not be distributed to Sponsor under any circumstances.

For details of the principal place of business and contact person of the Sponsor, please see the section titled "*General Information*" on page 81.

Walter Infra Manager Private Limited has been appointed as the Investment Manager to the Trust, and Walter Infra Project Manager Private Limited, an associate of the Sponsor, has been appointed as the Project Manager pursuant to the resolutions passed by the Board and the Investment Management Agreement. The Project Manager, the Investment Manager and the Project SPVs shall also enter into the Project Implementation and Management Agreement in this regard. For further details, please see the sections titled "*General Information*" and "*Parties to the Trust*" on pages 81 and 85, respectively.

Investment Objectives

The Investment Objectives of the InvIT as described in the Trust Deed, shall be to carry on the activities of, and to make investments as, an infrastructure investment trust, as permissible in terms of the InvIT Regulations ("**Investment Objectives**"). The investment of the InvIT shall be in any manner permissible under, and in accordance with, the InvIT Regulations and Applicable Law, including in such holding companies and/or SPVs and/or infrastructure projects and/or securities in India as permitted under the InvIT Regulations and in accordance with the investment strategy and/or policies as detailed in this Draft Placement Memorandum, as well as to carry on the activities as may be required for operating the Trust, including incidental and ancillary matters thereto.

The objective and purpose of the Trust includes the following:

(a) to raise funds in accordance with applicable law, for the purpose of attaining the objective and purpose of the Trust;

(b) to make investments or re-investments as an infrastructure investment trust as permissible in terms of InvIT Regulations. Investment of the InvIT shall be in accordance with the InvIT Regulations, including in such holding company. SPVs, entities engaged in infrastructure business, or infrastructure projects (whether completed or otherwise), securities in India, or other investments (including any business of operation and maintenance of any InvIT Assets), as permitted in accordance with the Trust Documents and applicable law, including investments in government securities, money market instruments, liquid mutual funds or cash equivalents, in the manner and to the extent permitted under the InvIT Regulations;

(c) to hold park amounts held by the Trust pending investment or distribution, or as a reserve of the Trust's anticipated obligations, as permitted under the InvIT Regulations;

(d) to make distributions to the Unitholders in the manner prescribed in the Trust Deed;

(e) to do all other things necessary and conducive to the attainment of the investment objective of the Trust, through agents or other delegates (including the Investment Manager); and

(f) to carry on generally such other activities as may be permitted under applicable laws.

For further details in relation to the business and investment strategy of the Trust, please see the section titled "*Business"* on page 163. The Trust is required to make distributions to the Unitholders in accordance with the InvIT Regulations and the Distribution Policy. For details in relation to the distribution policy of the Trust, please see the section titled "*Distribution*s" on page 234.

The Trustee shall ensure that the Capital Contribution and other InvIT Assets shall be utilized solely for the purposes of making investments as stated above, in accordance with the InvIT Regulations and applicable law and shall not be utilized for any

activities prohibited under the InvIT Regulations. Further, the Trustee shall ensure that the Trust complies with any additional conditions as may be specified by SEBI or applicable law.

Investments by the Trust shall be in compliance with the provisions of the InvIT Regulations and unless specifically provided under applicable law, the Trust shall not carry out any other principal activity or trade, in contradiction of the restrictions and requirements under applicable law. The Trust, through the Investment Manager, shall do all things necessary and conducive to the attainment of the Investment Objectives, directly or through agents or other delegates (including the Investment Manager and the Project Manager), subject to the provisions of the InvIT Regulations and any other applicable law.

The Trustee, on the advice of the Investment Manager, may, if it deems expedient, from time to time, review, revise, amend, vary or alter the Investment Objectives in accordance with the Trust Deed, subject to the provisions of the InvIT Documents, the InvIT Regulations and any other applicable law.

All investments of, or made by, the InvIT shall be registered in the name of the Trustee (acting on behalf of the InvIT) or the InvIT, if permissible, as soon as possible.

The InvIT shall not (a) carry on any other business or trade; (b) hold an infrastructure asset for a period less than the period stipulated under the InvIT Regulations; and (c) launch schemes under the InvIT in contradiction of restrictions and requirements under Applicable Law.

Fee and expenses

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

The estimated recurring expenses on an annual basis (exclusive of out of pocket expenses and escalations), including but not limited to, are as follows:

Payment by the Trust	Estimated Expenses*
Fee payable to the Credit Rating Agency	Please see Note 1
Fee payable to the Trustee	Please see Note 2
Fee payable to the Valuer	₹ 17 lakhs (Please see Note 3)
Fee payable to the Auditor	₹ 205 lakhs
Fee payable to the Investment Manager	Please see Note 3
Fee payable to the Project Manager	Please see Note 4
Fee payable to the Registrar	₹ 2.5 lakhs
Fee payable to the Stock Exchange and Depositories	₹ 4.22 lakhs

* *The abovementioned expenses relate to the first full year of operation for the Trust. Inclusive of GST and other applicable taxes.*

Note 1:

The Trust has not obtained any credit ratings in relation to its facilities, as of the date of this Draft Placement Memorandum. The Investment Manager on behalf of the Trust will be applying for appointment of the credit rating agency.

Note 2:

*The Trustee shall be entitled to a fee of ₹ 15 lakhs (the "**Trusteeship Fee**"), which includes ₹ 5 lakhs as an acceptance fee (one-time non-refundable payment) and ₹ 10 lakhs as a service charge shall be paid annually to the Trustee for the services rendered to the Trust. Please note that pro-rata charges would apply for the first year from the date of execution till March 31, 2024 (10% escalation after three years). In addition, the Trustee shall be entitled to recover from the Trust any (i) any legitimate out of pocket expenses incurred by it in relation to its trusteeship of the Trust, and (ii) any tax or duty including goods and services tax (other than income tax) which is, or has become as on the date of collection of such tax or duty, leviable under the applicable law on the fee payable to the Trustee by the Trust.*

Note 3:

*The Investment Manager shall be entitled to a fee which shall be cost plus 5% (five percent) (the "**Management Fee**"). The Management Fee will be approved by the Board of the Investment Manager every year. The Investment Manager shall be entitled to recover from the InvIT any tax or duty or levies, including Goods and Services Tax (other than income tax) which is, or may become, leviable under Applicable Law on the fees payable to the Investment Manager by the InvIT. The InvIT will be entitled to deduct or withhold any tax at source on the Management Fee payable to the Investment Manager, in accordance with the tax regulations applicable in India at the time of payment of the Management Fee. The InvIT shall provide the relevant tax deduction or withholding certificate to the Investment Manager in accordance with the timelines provided in the applicable tax regulations in India.*

Note 4:

*The Project Manager shall be entitled to a fee which shall be cost plus 5% (five percent) (the "**Fee**"). The fee will be approved by the Board of the Investment Manager every year. If the Project Manager fails to perform any of its obligations under the Agreement, including carrying out the Services, the Trustee may issue a written notice to the Project Manager, which shall (i) specify the nature of the failure, and (ii) request the Project Manager to remedy such failure within a period not exceeding 60 Business Days or such other period as may be mutually agreed between the Trustee and the Project Manager for curing such breach. If such breach is not cured within the time period specified or mutually agreed, the Trustee may, by written notice to the Project Manager, suspend all or part of the Fee payable to the Project Manager.*

Set-up expenses

In connection with the establishment and registration of the Trust, the Investment Manager has incurred or may incur approximately ₹ [●] lakhs in expenses. Such expenses may be reimbursed by the Trust to the Investment Manager in the future as agreed between the Investment Manager and the Trust in terms of the Investment Management Agreement.

Issue Expenses

The total expenses of this Issue are estimated to be up to ₹ [●] lakhs. For details in relation to the Issue expenses, please see the section titled "*Use of Proceeds*" on page 222.

Details of credit ratings

The Trust has not obtained any credit ratings in relation to its facilities, as of the date of this Draft Placement Memorandum.

FORMATION TRANSACTIONS IN RELATION TO THE TRUST

The initial portfolio of assets of the Trust comprises six Project SPVs to be acquired by the Trust, namely, Welspun Road Infra Private Limited, Nxt-Infra CGRG Highways Limited, Chikhali- Tarsod Highways Private Limited, Welspun Delhi Meerut Expressway Private Limited, Nxt-Infra GSY Highways Limited and Welspun Infrafacility Private Limited*.

** The Trust shall hold 49% of the issued and paid-up equity shareholding in WIPL on listing*

The details of the Project SPVs as of the date of this Draft Placement Memorandum are provided below:

Details of the Project SPVs

The details of Welspun Road Infra Private Limited, Nxt-Infra CGRG Highways Limited, Chikhali- Tarsod Highways Private Limited, Welspun Delhi Meerut Expressway Private Limited, Nxt-Infra GSY Highways Limited and Welspun Infrafacility Private Limited as of the date of the Draft Placement Memorandum are provided below:

1. Welspun Road Infra Private Limited ("WRIPL")

WRIPL was incorporated on September 28, 2018, as a private company limited by shares under the name of "Welspun Road Infra Private Limited" under the Companies Act, 2013 at Delhi. The registered office of WRIPL is situated at Unit No. S-39, 2nd Floor, 'Vasant Square Mall' Plot No. A, Community Centre, Pocket-V, Sector-B, Vasant Kunj, New Delhi-110070. Its CIN is U45209DL2018PTC339650. WRIPL operates to improve the roads joining (i) district place in Akola district (41.59 km) and Akola and Amravati district (26.80 km); (ii) taluka place in Akola and Amravati district (22.42 km) and district place in Amravati (44.15 km); (iii) district place in Amravati district (Amravati Chandur Railway Dhamangaon) ; (iv) Chikhaldara hill station in Amravati district; (v) improvement to Amravati-Bhatkuly-Asara road joining Bhatkul Taluka HQ to Amravati District HQ of (SH-280); and (vi) Warud Gavankund Bahada Jarud Mangruli Kachurna Hatuma and Morshi Pala Salbardi Dongaryavali Dapori. WRIPL was engaged to undertake construction, operation and maintenance of the project on design, build, operate and transfer on annuity basis pursuant to the WRIPL Concession Agreement. The authorised capital of the company is ₹500,000,000 (divided into 50,000,000 equity shares of ₹ 10 each) and its issued subscribed and paid-up capital is ₹395,136,850 (divided into 39,513,685 equity shares of ₹ 10 each). The shareholding pattern of WRIPL as at the date of this Draft Placement Memorandum is provided below:

S. No.	Name of the Shareholder	Number of Equity Shares of ₹ 10 each	Percentage of the issued, subscribed and paid-up capital
1.	Actis Highway Infra Limited	39,513,679	100
2.	Actis Highway Holdings Limited*	6	Negligible
	Total	39,513,685	100

**** As a nominee of AHIL. Following the Formation Transactions, the Trust shall designate one or more nominee shareholders in compliance with applicable law.***

For further details of the WRIPL Concession Agreement, please see the section titled "*Summary of the Key Agreements"* on page 186.

2. Nxt-Infra CGRG Highways Limited ("CGRG")

CGRG was incorporated on May 6, 2016, as a company limited by shares under the Companies Act, 2013 at Delhi. The registered office of CGRG is situated at Unit No. S-39, 2nd Floor, 'Vasant Square Mall' Plot No. A, Community Centre, Pocket-V, Sector-B, Vasant Kunj, New Delhi-110070. Its CIN is U45201DL2016PLC299200. Originally incorporated as MBL (CGRG) Road Limited, the company through certificate of incorporation dated October 30, 2023 changed its name to Nxt-Infra CGRG Highways Limited. CGRG operates, four laning of Chutmalpur, Ganeshpur section of NH-72A (from 0.00 km to 16.00 km) and Roorkee-Chutmalpur – Gagalheri section of NH-73 (from 0.00 km to 33 km) in the state of Uttarakhand and Uttar Pradesh. CGRG was engaged on a design, build, operate and transfer on annuity basis pursuant to the CGRG Concession Agreement, for the development, maintenance and management of NH 72A and 73 including the section from km 0.000 to km 16.000 of NH 72A and from km 0.000 to km 33.000 of NH 73 (approx. 53.300 km). The authorised capital of the company is ₹50,000,000 (divided into 5,000,000 equity shares of ₹10 each) and its issued subscribed and paid-up capital is ₹5,00,000 (divided into 50,000 equity shares of ₹ 10 each). The shareholding pattern of CGRG as at the date of this Draft Placement Memorandum is provided below:

S. No.	Name of the Shareholder	Number of Equity Shares of ₹ 10 each	Percentage of the issued, subscribed and paid-up capital
1.	Actis Highway Infra Limited	49,994	100
2.	Actis Highway Holdings Limited*	1	Negligible
3.	Sowmya Narasimhan*	1	Negligible
4.	Ravi Thanvi*	1	Negligible
5.	Sumit Sen*	1	Negligible
6.	Gaurav Chaturvedi*	1	Negligible
7.	Rishabh Manhot*	1	Negligible

S. No.	Name of the Shareholder	Number of Equity Shares of ₹ 10 each	Percentage of the issued, subscribed and paid-up capital
Total		50,000	100

** As a nominee of AHIL. Following the Formation Transactions, the Trust shall designate one or more nominee shareholders in compliance with applicable law.*

For further details of the CGRG Concession Agreement, please see the section titled "*Summary of the Key Agreements"* on page 186.

3. Chikhali- Tarsod Highways Private Limited ("CTHPL")

CTHPL was incorporated on December 6, 2016, as a private company limited by shares under the Companies Act, 2013 at Nagpur, Maharashtra. Subsequently, its registered office was shifted from Maharashtra to Delhi, and a fresh certificate of incorporation dated August 25, 2018, was issued by the Registrar of Companies, Delhi. The registered office of CTHPL is situated at Unit No. S-39, 2nd Floor, 'Vasant Square Mall' Plot No. A, Community Centre, Pocket-V, Sector-B, Vasant Kunj, New Delhi-110070. Its CIN is U45201DL2016PTC337833. CTHPL operates the four laning of Chikhali-Tarsod section of NH-6 from 360.00 km to 422.70 km in the state of Maharashtra. It was engaged on a design, build, operate and transfer on annuity basis pursuant to the CTHPL Concession Agreement, for the development, maintenance and management of NH 6 including the section from km 360.000 to km 422.700 of NH 6 and from km 359.310 to km 423.680 of NH 6 (approx. 62.700 km). The authorised capital of the company is ₹100 lakhs (divided into 10,00,000 equity shares of ₹ 10 each) and its issued subscribed and paid-up capital is ₹100 lakhs (divided into 10,00,000 equity shares of ₹ 10 each). The shareholding pattern of CTHPL as at the date of this Draft Placement Memorandum is provided below:

S. No.	Name of the Shareholder	Number of Equity Shares of ₹ 10 each	Percentage of the issued, subscribed and paid-up capital
1.	Actis Highway Infra Limited	999,994	100
2.	Actis Highway Holding Limited*	6	Negligible
	Total	1,000,000	100

** As a nominee of AHIL. Following the Formation Transactions, the Trust shall designate one or more nominee shareholders in compliance with applicable law.*

For further details on the CTHPL Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

4. Welspun Delhi Meerut Expressway Private Limited ("DME")

DME was incorporated on February 16, 2016 as a private company limited by shares under the Companies Act, 2013 at Delhi. The registered office of DME is situated at Unit No. S-39, 2nd Floor, 'Vasant Square Mall' Plot No. A, Community Centre, Pocket-V, Sector-B, Vasant Kunj, New Delhi-110070. Its CIN is U45203DL2016PTC291178. DME operates a road from km 0.00 to existing km 8.36 on the Delhi UP Border section of NH 24 in the state of Delhi by six laned expressway and four laned either side of the expressway. It was engaged on a design, build, operate and transfer on annuity basis pursuant to the DME Concession Agreement, for the development, maintenance and management of NH 24 including the section from km 000.000 to km 8.360 (approx. 8.716 km) on the Delhi UP border. The authorised capital of the company is ₹500 lakhs (divided into 5,000,000 equity shares of ₹ 10 each) and its issued subscribed and paid-up capital is ₹500 lakhs (divided into 5,000,000 equity shares of ₹ 10 each). The shareholding pattern of DME as at the date of this Draft Placement Memorandum is provided below:

S. No.	Name of the Shareholder	Number of Equity Shares of ₹ 10 each	Percentage of the issued, subscribed and paid-up capital
1.	Actis Highway Infra Limited	4,999,994	100
2.	Actis Highway Holdings Limited*	6	Negligible
	Total	5,000,000	100

** As a nominee of AHIL. Following the Formation Transactions, the Trust shall designate one or more nominee shareholders in compliance with applicable law.*

For further details of the DME Concession Agreement, please see the section titled "*Summary of the Key Agreements*" on page 186.

5. Nxt-Infra GSY Highways Limited ("GSY")

GSY was incorporated on May 11, 2016, as a company limited by shares under the Companies Act, 2013 at Delhi. The registered office of GSY is situated at Unit No. S-39, 2nd Floor, 'Vasant Square Mall' Plot No. A, Community Centre, Pocket-V, Sector-B, Vasant Kunj, New Delhi-110070. Its CIN is U45202DL2016PLC299464. Originally incorporated as MBL (GSY) Road Limited, the company through certificate of incorporation dated November 9, 2023 changed its name to Nxt-Infra GSY Highways Limited. GSY operates four laning of Gagalheri-Saharanpur-Yamunanagar (UP/Haryana Border) section of NH-73 from km 33.00 (design chainage km 35.40) to km 71.64 (design chainage km 86.86) in the state of Uttar Pradesh. It was engaged on a design, build, operate and transfer on annuity basis pursuant to the GSY Concession Agreement, for the development, maintenance and management of NH 73 including the section from km 33.000 to km 71.640 (approx. 51.455 km). The authorised capital of the company is ₹

500 lakhs (divided into 5,000,000 equity shares of ₹ 10 each) and its issued subscribed and paid-up capital is ₹ 5 lakhs (divided into 50,000 equity shares of ₹ 10 each). The shareholding pattern of GSY as at the date of this Draft Placement Memorandum is provided below:

S. No.	Name of the Shareholder	Number of Equity Shares of ₹ 10 each	Percentage of the issued, subscribed and paid-up capital
1.	Actis Highway Infra Limited	49,994	100
2.	Actis Highway Holdings Limited*	1	Negligible
3.	Sowmya Narasimhan*	1	Negligible
4.	Ravi Thanvi*	1	Negligible
5.	Sumit Sen*	1	Negligible
6.	Gaurav Chaturvedi*	1	Negligible
7.	Rishabh Manhot*	1	Negligible
	Total	50,000	100

***** *As a nominee of AHIL. Following the Formation Transactions, the Trust shall designate one or more nominee shareholders in compliance with applicable law.*

For further details of the GSY Concession Agreement, please see the section titled "*Summary of the Key Agreements"* on page 186.

6. Welspun Infrafacility Private Limited ("WIPL")

WIPL was incorporated on September 13, 2019, as a private company limited by shares under the Companies Act, 2013 at Delhi. The registered office of WIPL is situated at Unit No. S-39, 2nd Floor, 'Vasant Square Mall' Plot No. A, Community Centre, Pocket-V, Sector-B, Vasant Kunj, New Delhi-110070. Its CIN is U45401DL2019PTC355068. Pursuant to endorsement agreement dated June 8, 2020, executed between NHAI, WIPL, Mukarba Chowk-Panipat Toll Road Limited ("**MCPTRL**") and India Infrastructure Finance Company Limited, the business development of the project on DBFOT basis was endorsed in favour of WIPL. Accordingly, WIPL replaced the original concessionaire *i.e.*, MCPTRL and was substituted as a concessionaire under the WIPL Concession Agreement. For further details of the WIPL Concession Agreement, please see the section titled "*Summary of the Key Agreements"* on page 186. WIPL now operates 8 laning of Mukarba Chowk – Panipat section of NH-1 (new NH-44) from km 15.500 to km 86.000 in the state of Haryana under NHDP-IV through PPP on toll basis pursuant to the WIPL Concession Agreement. The authorised capital of the company is ₹250,000,000 (divided into 25,000,000 equity shares of ₹ 10 each) and its issued subscribed and paid-up capital is ₹241,873,810 (divided into 24,187,381 equity shares of ₹ 10 each). The shareholding pattern of WIPL as at the date of this Draft Placement Memorandum is provided below:

S. No.	Name of the Shareholder	Number of Equity Shares of ₹ 10 each	Percentage of the issued, subscribed and paid-up capital
1.	Welspun Enterprises Limited*	12,335,567	51
2.	Actis Highway Infra Limited	11,851,808	49
3.	Actis Highway Holding Limited **	6	Negligible
	Total	24,187,381	100

***** *Presently, 51% of the issued and paid-up equity share capital of WIPL is held by Welspun Enterprises Limited ("**WEL**"). In terms of the securities subscription and purchase agreement dated June 9, 2022 ("**SSPA**") entered into between our Sponsor and WEL, our Sponsor is entitled to acquire 100% of the equity share capital of WIPL. In terms of the requirements prescribed by the NHAI, a change in ownership of WIPL may be undertaken only with the prior approval of the NHAI, and only after a period of two year from the COD of WIPL. Therefore, the proposed acquisition of the equity shares presently held by WEL may only be undertaken after the completion of the period prescribed by the concessioning authority. For further details in relation to the SSPA, please see section titled 'Summary of Key Agreements' on page 186. In accordance with the above, upon the completion of the Formation Transactions, the Project SPVs will only comprise 49% of the issued and paid-up equity share capital of WIPL. Further, the Sponsor, Trustee and the Investment Manager propose to enter into a Deed of Right of First Refusal pursuant to which the Trust will have the ability to acquire the remaining 51% of the issued and paid-up equity share capital of WIPL at a subsequent date. Further, in relation to WIPL, accounting in Special Purpose Combined Financial Statements is as per equity method as per Ind AS 28, hence, only 49% share of profit/ loss is picked up considering joint control. All numbers with respect to WIPL, including in relation to projections, are considered only to the extent of 49% in the document.*

****** *As a nominee of AHIL. Following the Formation Transactions, the Trust shall designate one or more nominee shareholders in compliance with applicable law.*

Acquisition of the Project SPVs by the Trust

Prior to the Allotment, the Trust, acting through the Trustee, proposes to acquire from the Sponsor, and the Sponsor proposes to transfer to the Trust in exchange of Units, the entire equity shareholding of WRIPL, CGRG, CTHPL, DME, GSY and the entire shareholding of the Sponsor in WIPL, pursuant to the Securities Purchase Agreements (the "**Proposed Transfer**"), such that the Trust holds each of the Project SPVs directly.

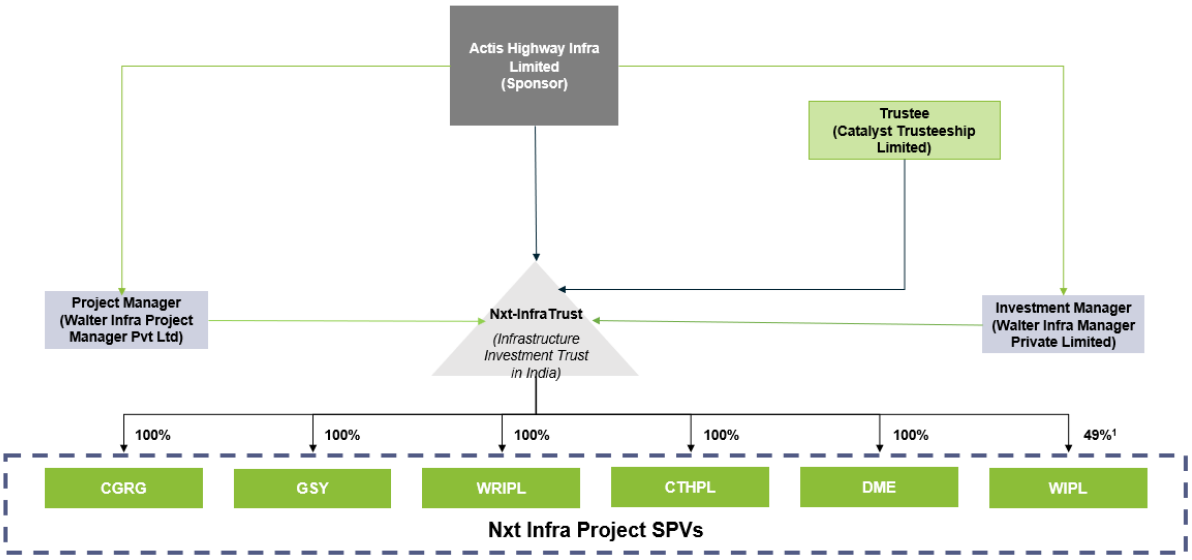
The Sponsor presently holds 100% (directly, and together with its nominee shareholders) of the equity shareholding of each of the Project SPVs except for WIPL, wherein the Sponsor holds 49% of the issued and paid-up equity share capital. Accordingly, following the Proposed Transfer, the Trust shall hold 100% of the equity shareholding of each of the Project SPVs except for WIPL, wherein the Trust shall hold 49% of the issued and paid-up equity share capital.

Utilisation of Issue Proceeds

Upon the Allotment and listing of the Units, the Trust shall utilize the Issue Proceeds as set out in the section titled "*Use of Proceeds*" on page 222.

Proposed post-listing structure

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



1 Presently, 51% of the issued and paid-up equity share capital of WIPL is held by Welspun Enterprises Limited. Upon the completion of the Formation Transactions, the Project SPVs will only comprise 49% of the issued and paid-up equity share capital of WIPL, and the remaining 51% of the issued and paid-up equity share capital of WIPL is proposed to be acquired by the Trust at a subsequent date.

SUMMARY COMBINED FINANCIAL INFORMATION OF THE TRUST

The following tables set forth the summary financial information derived from the Special Purpose Combined Financial Statements of the Project SPVs prepared in accordance with Ind AS and other relevant provisions of the InvIT Regulations, as of and for the six months period ended September 30, 2023, and of the financial years ended March 31, 2023, March 31, 2022 and March 31, 2021.

The degree to which the summary financial information included herein below will provide meaningful information is entirely dependent on the reader's level of familiarity with Indian accounting practices, Ind AS, the Companies Act and the InvIT Regulations. Accordingly, any reliance by persons not familiar with Indian accounting practices, Ind AS, the Companies Act and the InvIT Regulations on the summary financial information presented below should be limited.

The summary financial information derived from the Special Purpose Combined Financial Statements, as presented below, should be read together with the section titled "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPVs of the Trust" on page 237 in conjunction with the the "Special Purpose Combined Financial Statements" attached as Annexure II.

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Nxt-Infra Trust
Summary Combined Balance Sheet

Particulars	As at 30 September 2023 (In ₹ lakhs)	As at 31 March 2023 (In ₹ lakhs)	As at 31 March 2022 (In ₹ lakhs)	As at 31 March 2021 (In ₹ lakhs)
ASSETS				
1. Non-current assets				
(a) Property, plant and equipment	6.80	0.56	0.56	-
(b) Financial assets				
(i) Investment Accounted for using Equity Method	8,078.88	9,257.71	17,533.51	14,826.97
(ii) Receivable Under Service Concession Arrangements	1,88,112.04	1,95,422.07	2,00,282.92	1,37,351.27
(iii) Other financial assets	10,287.50	10,109.90	45.15	2,974.89
(iv) Loans	17,622.30	17,164.11	-	-
(c) Deferred tax assets (net)	7,790.84	6,733.38	150.72	818.99
(d) Non-current tax assets (net)	1,797.88	1,198.61	1,609.20	1,316.21
(e) Other non-current assets	9,670.04	10,567.30	57,755.64	1,22,817.99
Total Non current Assets	**2,43,366.28**	**2,50,453.64**	**2,77,377.70**	**2,80,106.32**
2. Current assets				
(a) Financial assets				
(i) Current investments	7,106.88	6,098.58	7,476.02	1,069.03
(ii) Trade receivables	12,161.11	4,878.37	6,801.54	18,354.29
(iii) Cash and cash equivalents	3,891.90	16,586.50	18,517.25	1,212.67
(iv) Bank balances other than (iii) above	11,724.52	6,977.52	3,974.63	25.28
(v) Receivable Under Service Concession Arrangements	56,486.40	53,604.44	73,995.95	22,252.23
(vi) Other financial assets	6.17	-	938.21	2,724.85
(b) Other current assets	7,569.45	10,120.87	11,137.80	26,155.04
Total current assets	**98,946.43**	**98,266.28**	**1,22,841.40**	**71,793.39**
Total assets	**3,42,312.71**	**3,48,719.92**	**4,00,219.10**	**3,51,899.71**
EQUITY AND LIABILITIES				
Equity				
(a) Equity share capital	4,561.37	4,561.37	4,561.37	4,561.37
(b) Instruments in the nature of equity	-	-	30,321.46	30,321.46
(c) Other equity	8,778.35	15,407.35	49,165.02	38,113.26
Total Equity	**13,339.72**	**19,968.72**	**84,047.85**	**72,996.09**
LIABILITIES				
1. Non-current liabilities				
(a) Financial liabilities				
(i) Borrowings	2,93,013.77	2,98,940.60	2,23,468.40	2,08,915.33
(b) Provisions	25.46	-	-	-
(c) Deferred tax liabilities (net)	3,708.02	3,562.63	6,614.68	4,726.15
Total non-current liabilities	**2,96,747.25**	**3,02,503.23**	**2,30,083.08**	**2,13,641.48**
2. Current liabilities				
(a) Financial liabilities				
(i) Borrowings	24,822.73	18,356.17	42,462.11	43,075.41
(ii) Trade Payables	6,545.11	7,364.53	27,560.33	18,826.64
(iii) Other financial liabilities	3.11	0.83	0.83	136.47
(b) Provisions	0.40	-	-	-
(c) Other current liabilities	555.67	526.44	16,064.90	3,223.62
(d) Current tax liabilities (net)	298.72	-	-	-
Total current liabilities	**32,225.74**	**26,247.97**	**86,088.17**	**65,262.14**
Total equity and liabilities	**3,42,312.71**	**3,48,719.92**	**4,00,219.10**	**3,51,899.71**

Nxt-Infra Trust
Summary Combined Profit and Loss data

Particulars	Six months period ended 30 September 2023 (In ₹ lakhs)	For the Year ended 31 March 2023 (In ₹ lakhs)	For the Year ended 31 March 2022 (In ₹ lakhs)	For the Year ended 31 March 2021 (In ₹ lakhs)
(I) Income				
Revenue from operations	3,981.65	24,898.35	52,504.51	63,840.23
Other Income	17,143.72	34,535.81	31,355.02	29,919.48
Total income	**21,125.37**	**59,434.16**	**83,859.53**	**93,759.71**
(II) Expenses				
Construction and Other Operating Expenses	2,787.12	25,489.77	52,293.64	69,814.35
Finance costs	15,247.09	21,814.95	19,551.44	19,031.68
Employee benefits costs	314.60	-	-	-
Depreciation	2.00	-	-	-
Other expenses	844.47	837.21	1,073.69	1,186.88
Total expenses	**19,195.28**	**48,141.93**	**72,918.77**	**90,032.91**
(III) Profit before share of profit / (loss) of Joint Venture (I-II)	**1,930.09**	**11,292.23**	**10,940.76**	**3,726.80**
(IV) Share of profit / (loss) of Joint Venture (net of tax)	(1,178.84)	(1,396.69)	428.53	274.11
(V) Profit before Tax (IV+III)	**751.25**	**9,895.54**	**11,369.29**	**4,000.91**
(VI) Tax expense / (Income)				
- Current tax	569.72	814.87	37.73	11.55
- Deferred tax expense / (income)	(910.99)	2,157.56	2,557.79	1,001.83
Tax expense/ (Income)	**(341.27)**	**2,972.43**	**2,595.52**	**1,013.38**
(VII) Profit for the period / year (V-VI)	**1,092.52**	**6,923.11**	**8,773.77**	**2,987.53**
(VIII) Other comprehensive income				
Items that will not be reclassified to profit or loss				
- Remeasurement loss on defined benefit plan	(2.37)	-	-	-
- Income tax effect on above	0.60	-	-	-
Other Comprehensive loss for the period / year	**(1.77)**	-	-	-
(IX) Total comprehensive income for the period / year (VII+VIII)	**1,090.75**	**6,923.11**	**8,773.77**	**2,987.53**

Nxt-Infra Trust
Summary Combined Cash Flows Data

Particulars	Six months period ended 30 September 2023 (In ₹ lakhs)	Year ended 31 March 2023 (In ₹ lakhs)	Year ended 31 March 2022 (In ₹ lakhs)	Year ended 31 March 2021 (In ₹ lakhs)
Cash flows from operating activities				
Net Profit before tax and Share of profit / (loss) of Joint Venture (net of tax)	751.25	9,895.54	11,369.29	4,000.91
Adjustments for				
Finance Income on financial assets carried at amortised cost	(15,607.19)	(32,718.29)	(30,945.12)	(26,079.25)
Finance cost	15,247.09	21,814.95	19,551.44	19,031.68
Share of profit / (loss) of Joint Venture (net of tax)	1,178.84	1,396.69	(428.53)	(274.11)
Interest Income on bank deposits and others	(864.92)	(560.42)	(115.61)	(24.67)
Interest income on loan given	(509.10)	(267.07)	-	-
Interest income on Financial assets measured at fair value through profit and loss ('FVTPL')	(140.58)	(543.15)	(52.18)	-
Net loss / (gain) on financial assets measured at fair value through profit and loss ('FVTPL')	(8.28)	130.49	(163.69)	16.80
Loss / (Gain) on sale of Investments	-	75.18	(28.85)	(135.49)
Liabilities Written back	-	(108.87)	-	-
Depreciation	2.00	-	-	-
Operating Profit before working capital changes	**49.11**	**(884.95)**	**(813.25)**	**(3,464.13)**
Decrease/ (Increase) in Service Concession and Trade Receivables	1,058.51	30,744.97	(10,178.80)	14,736.83
Decrease/ (Increase) in other non-current assets	902.26	1,593.34	1,533.63	(16,642.33)
Decrease/ (Increase) in other financial assets	(11.41)	873.47	1,775.77	(2,403.28)
Decrease/ (Increase) in other current assets	2,551.43	1,017.08	1,490.89	(9,965.84)
Increase/(Decrease) in trade and other payables	(819.42)	(20,086.92)	8,733.68	(30,749.53)
Increase/(Decrease) in other current liabilities	29.24	(15,538.46)	12,841.28	(9,503.22)
Increase/(Decrease) in other financial liabilities	2.29	-	(135.65)	(1,279.35)
Increase/(Decrease) in provisions	25.97	-	-	-
Cash flow from/(used in) operating activities	**3,787.98**	**(2,281.47)**	**15,247.55**	**(59,270.85)**
Tax paid / refund received (net)	(869.35)	(404.48)	(330.39)	1,362.70
Net cash flow from/(used in) operating activities (A)	**2,918.63**	**(2,685.95)**	**14,917.16**	**(57,908.15)**
Cash flows from investing activities				
Purchase of Property, plant and equipment	(8.24)	-	-	-
Loans given	-	(16,923.75)	-	-
Proceeds from / (investment in) fixed deposits (net)	(4,924.50)	(12,919.47)	(973.89)	(2,902.08)
Proceeds from sale of current investments	-	12,608.40	4,881.10	10,003.55
Purchase of current investments	(1,000.00)	(11,481.24)	(11,084.74)	(7,744.38)
Interest Income on bank deposits and others	916.27	477.59	115.37	25.09
Interest income on Financial assets measured at fair value through profit and loss ('FVTPL')	140.58	543.15	35.49	-

Particulars	Six months period ended 30 September 2023 (In ₹ lakhs)	Year ended 31 March 2023 (In ₹ lakhs)	Year ended 31 March 2022 (In ₹ lakhs)	Year ended 31 March 2021 (In ₹ lakhs)
Interest Annuity Received	11,692.76	29,148.85	15,059.21	3,974.88
Net cash flow from/ (used in) investing activities (B)	**6,816.87**	**1,453.53**	**8,032.54**	**3,357.06**
Cash flows from financing activities				
Proceeds from long term borrowings	-	2,07,025.17	2,58,734.58	1,09,318.93
Repayment of long term borrowing	(5,983.63)	(2,19,190.98)	(2,42,087.56)	(47,409.54)
Proceeds from short term borrowings	1,158.31	6,951.14	9,280.49	39,341.76
Repayment of short term borrowings	(16.37)	(20,974.34)	(12,993.78)	(34,544.88)
Proceeds from issue of optionally convertible debentures	-	91,907.93	-	-
Redemption of optionally convertible debentures	-	(16,830.60)	-	-
Proceeds from issue of compulsorily convertible debentures	-	-	-	6,333.00
Repayment towards compulsorily convertible debentures	-	(30,321.44)	-	-
Interim Dividend paid	(7,719.75)	-	-	-
Finance cost paid	(9,868.66)	(19,265.21)	(18,578.85)	(20,723.96)
Net cash flow from/ (used in) financing activities (C)	**(22,430.10)**	**(698.33)**	**(5,645.12)**	**52,315.31**
Net increase/(decrease) in cash and cash equivalents (A+B+C)	**(12,694.60)**	**(1,930.75)**	**17,304.58**	**(2,235.78)**
Cash and cash equivalents at the beginning of the year	16,586.50	18,517.25	1,212.67	3,448.45
Cash and cash equivalents at the end of the year	**3,891.90**	**16,586.50**	**18,517.25**	**1,212.67**
Components of cash and cash equivalents as per special purpose combined balance sheet				
Cash and cash equivalent	3,891.90	16,586.50	18,517.25	1,212.67
Total cash and cash equivalents	**3,891.90**	**16,586.50**	**18,517.25**	**1,212.67**

SUMMARY FINANCIAL INFORMATION OF THE SPONSOR

The following tables set forth the summary financial information, in accordance with the InvIT Regulations, derived from the financial statements of the Sponsor prepared in accordance with the International Financial Reporting Standards ("IFRS"), in compliance with the requirements of Mauritius Companies Act 2001, for the period from March 24, 2022 to March 31, 2023.

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Actis Highway Infra Limited
Summary of Financial Position
As at March 31, 2023

Particulars	For the period from March 24, 2022 (date of incorporation) to March 31,2023
	(in US$)
Assets	
Non-current assets	
Financial Assets at fair value through profit or loss	335,325,033
Total Non-current assets	335,325,033
Current assets	
Prepayments	2,205
Cash and Cash equivalents	8,683,310
Total Current assets	8,685,515
Total Assets	**344,010,548**
Equity and Liabilities	
Equity	
Stated capital	64,489,200
Capital contribution	152,836,418
Retained earnings	19,378,110
Total equity	236,703,728
Non-current liabilities	
Deferred tax liabilities	1,043,733
Borrowings	103,331,150
Total Non-current liabilities	104,374,883
Current liabilities	
Other payables	2,923,693
Current tax liability	8,244
Total Current liabilities	2,931,937
Total liabilities	**344,010,548**

Actis Highway Infra Limited.
Summary of Profit or Loss
For the period from March 24, 2022 (date of incorporation) to March 31, 2023

Particulars	For the period from March 24, 2022 (date of incorporation) to March 31,2023
	(in US$)
Revenue	
Interest income	5,599,417
Fair value gain on financial assets at fair value through profit and loss	27,680,364
Expenses	
Management Fees	(3,450)
License Fees	(2,183)
Incorporation Fees	(3,105)
Director's Fees	(3,000)
Service charge	(5,796)
Professional Fees	(1,177,187)
Advisory fees	(2,897,858)
Disbursements	(200)
Deal cost	(876,710)
Bank charges	(3,682)
Audit fees	(3,019)
Signing fees	(150,000)
Utilisation fees	(2,100,000)
Upfront fees	(150,000)
Agency and security agent fees	(50,000)
Registration fees	(20,433)
Administration Costs	(600)
Other expenses	(99,777)
Finance costs	(5,302,514)
Profit before Tax	20,430,087
Income tax expense	(1,051,977)
Profit for the period	19,378,110
Other comprehensive income	-
Total comprehensive income for the period	19,378,110

Actis Highway Infra Limited.
Summary of Changes in Equity
For the period from March 24, 2022 (date of incorporation) to March 31, 2023

Particulars	Stated capital	Share application monies	Capital contribution	Retained earnings	Total
	(in US$)	(in US$)	(in US$)	(in US$)	(in US$)
As at 24 March 2022	-	-	-	-	-
Profit for the period	-	-	-	19,378,110	19,378,110
Total comprehensive income for the period	**-**	**-**	**-**	**19,378,110**	**19,378,110**
Transaction with owner of the company					
Contributions:					
Issue of share	1	-	-	-	1
Share applications money received	-	64,489,199	-	-	64,489,199
Share applications money received	64,489,199	(64,489,199)	-	-	-
Capital contribution received	-	-	150,474,700	-	150,474,700
Interest accrued on capital contribution	-	-	2,361,618	-	2,361,618
Total Contributions	**64,489,200**	**-**	**152,838,418**	**-**	**217,325,618**
As at March 31, 2023	**64,489,200**	**-**	**152,838,418**	**19,378,110**	**236,703,728**

Actis Highway Infra Limited.
Summary of Cash Flows
For the period from March 24, 2022 (date of incorporation) to March 31, 2023

Particulars	For the period from March 24, 2022 (date of incorporation) to March 31,2023
	US$
Cashflow from operating activities	
Profit before tax	20,430,087
Adjustment for:	
Interest Income	(5,599,417)
Fair value gain on financial assets at fair value through profit and loss	(27,680,364)
Finance cost	(5,302,514)
Changes in working capital	
Changes in other receivables	(2,205)
Changes in other payables	2,923,693
Net cashflows used in operating activities	**(4,625,692)**
Cash flow from investing activity	
Purchase of financial assets at fair value through profit or loss	(302,045,252)
Net cash used in investing activity	**(302,045,252)**
Cash flow from financing activities	
Share application monies	64,489,199
Capital contribution	150,474,700
Proceeds from borrowings	103,000,000
Repayment of borrowings	(2,609,745)
Net Cash generated from financing activities	**315,354,254**
Net change in cash and cash equivalents	**8,683,310**
Cash and cash equivalents at the beginning of the period	**-**
Cash and cash equivalents at the end of the period	**8,683,310**

SUMMARY FINANCIAL INFORMATION OF THE INVESTMENT MANAGER

The following tables set forth the summary financial information derived from the audited financial statements of the Investment Manager, which was prepared in accordance with Ind AS, as defined in Rule 2(1)(a) of Companies (Indian Accounting Standards) Rules, 2015, as amended, prescribed under the Section 133 of the Companies Act, as of and for the fiscals 2021.

The degree to which the summary financial information included herein below will provide meaningful information is entirely dependent on the reader's level of familiarity with Indian accounting practices, Ind AS, the Companies Act and the InvIT Regulations. Accordingly, any reliance by persons not familiar with Indian accounting practices, Ind AS, the Companies Act and the InvIT Regulations on the summary financial information presented below should be limited.

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Walter Infra Manager Private Limited
Special Purpose Financial Statements
Summary Balance Sheet as at June 30, 2023

(In ₹ lakhs)

Particular	**As at June 30, 2023**
ASSETS	
Non-current assets	
Other financial asset	-
Total Non-Current Assets	-
Current assets	
Financial Assets	
Cash and cash equivalents	56.64
Other financial asset	1,089.83
Current Tax Assets (Net)	0.00
Other current assets	-
Total Current Assets	**1,146.47**
Total Assets	**1,146.47**
EQUITY AND LIABILITIES	
Equity	
Equity share capital	1,200.00
Other equity	
Reserves and surplus	(70.99)
Total Equity	**1,129.01**
LIABILITIES	
Current Liabilities	
Financial Liabilities	-
Provisions	0.30
Other current liabilities	17.16
Total Current Liabilities	**17.46**
Total Equity and Liabilities	**1,146.47**

Walter Infra Manager Private Limited
Special Purpose Financial Statements
Summary profit and loss for the period from March 13, 2023 to June 30, 2023

(In ₹ lakhs)

Particular	**For the period March 13, 2023 to June 30, 2023**
Other Income	
Other Income	3.87
Total Income	**3.87**
Expenses	
Employee benefits expense	59.82
Other expenses	15.04
Total expenses	**74.86**
Profit / (loss) before exceptional items and tax	**(70.99)**
Exceptional Items	**-**
Profit / (loss) before tax	**(70.99)**
Tax expense	**-**
Profit/(Loss) for the period ended	**(70.99)**
Total income for the period ended	**(70.99)**
Earnings per equity share of Rs. 10 each :	
Basic earnings per share (Not Annualized)	(2.86)
Diluted earnings per share (Not Annualized)	(2.86)

Walter Infra Manager Private Limited
Special Purpose Financial Statements
Summary Condensed Cash Flow Statement for the period from March 13, 2023 to June 30, 2023

(In ₹ lakhs)

Particular	For the period March 13, 2023 to June 30, 2023
Cash Flow from operating activities	
Profit before income tax including discontinued operations	(70.99)
Adjustments for	
Taxes of Earlier Period	-
Interest Income	(3.87)
Change in operating assets and liabilities	
Increase/(decrease) in other financial assets	(1,086.00)
(Increase)/decrease in other non-current assets	
Increase/(decrease) in other financial liabilities-Current	
Increase/(decrease) in short term provisions	0.30
Increase/(decrease) in other current liabilities	17.16
	(1,143.40)
Cash generated from operations	
Income taxes paid	
Net cash inflow from operating activities	**(1,143.40)**
Cash flow from investing activities:	
Interest Income	0.04
Net cash inflow (outflow) from investing activities	**0.04**
Cash flow from financing activities	
Proceeds from issue of Equity Shares	1,200.00
Net cash inflow (outflow) from financing activities	**1,200.00**
Net increase/(decrease) in cash and cash equivalents	56.64
Add: Cash and cash equivalents at the beginning of the financial period	
Cash and cash equivalents at the year end	**56.64**
Reconciliation of Cash Flow statements as per the cash flow statement	
Cash Flow statement as per above comprises of the following	**30 June 2023**
Cash and cash equivalents	56.64
Bank overdrafts	-
Balances as per statement of cash flows	56.64

SUMMARY OF INDUSTRY

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

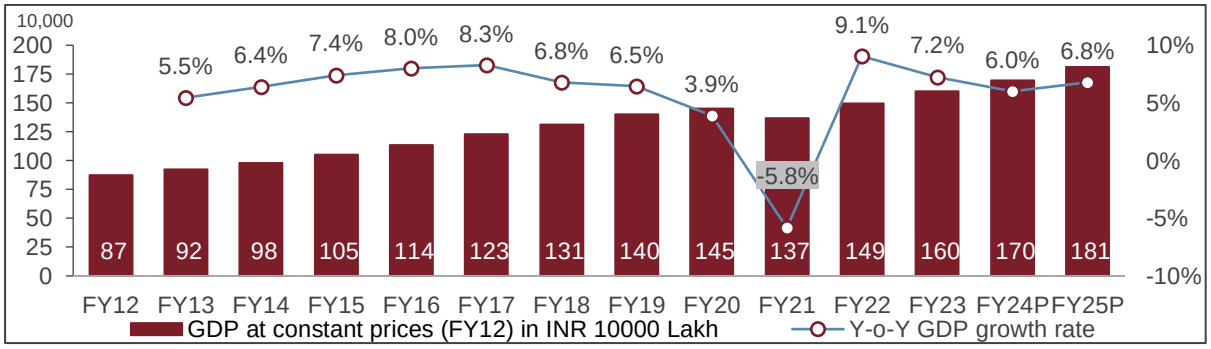
Macroeconomic overview of India

Review of India's GDP growth

GDP logged 5.7% CAGR between fiscals 2012 and 2023

In 2015, the Ministry of Statistics and Programme Implementation (MoSPI) changed the base year for calculating India's gross domestic product (GDP) to fiscal 2012 from fiscal 2005. Based on the change, India's GDP clocked a compound annual growth rate (CAGR) of 5.7% to Rs 1,60,00,00,000 lakh in fiscal 2023 from Rs 87,40,00,000 lakh in fiscal 2012. This was despite the stress inflicted by the pandemic that saw the GDP — which was already experiencing a slowdown and had grown 3.7% in fiscal 2020 — contract 5.7% in real terms in fiscal 2021 to Rs 1,37,00,00,000 lakh. The economy bounced back as the pandemic-related shocks subsided, resulting in growth of 9.1% on-year in real GDP to Rs 1,49,00,00,000 lakh in fiscal 2022.

Real GDP growth in India (new GDP series)



P: Projected
Source: NSO, Second advance estimates of national income 2020-21 and 2022-23, Central Statistics Office (CSO), MoSPI, CRISIL MI&A Consulting

GDP grew 7.2% on-year in fiscal 2023

India's real gross domestic product (GDP) growth rose sharply to 6.1% on-year in the fourth quarter of fiscal 2023 compared with 4.5% in the third • The growth surpassed the number factored in the National Statistics Office's (NSO) second advance estimate of February. Annual growth for fiscal 2023 was revised up to 7.2% (provisional estimate) from 7.0% in the second advance estimate • Fourth-quarter growth was primarily driven by investment and net exports, with the latter less of a drag given rising exports and slowing imports. Fixed investment turned in the strongest growth on the demand side while private consumption growth was more subdued on-quarter.

Review of roads infrastructure in India

Contribution of roads sector to India's GVA

Share of the roads sector in India's GDP stood at 3.2% in fiscal 2022. The share hovered 3.3% from fiscals 2012 to 2022.

GVA share	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Road transport (at constant prices)	3.2%	3.3%	3.3%	3.3%	3.3%	3.2%	3.3%	3.3%	3.3%	2.5%	3.2%

Source: MoSPI, National Accounts Statistics 2023, CRISIL MI&A Consulting

Road network in India

India has the second-largest road network in the world, spanning 63.31 lakh km as of fiscal 2023. Road transportation, the most frequently used mode of transportation in India, accounted for ~86% of passenger traffic and close to ~64% of freight traffic as of fiscal 2022. Although national highways span nearly 1,44,955 km, constituting just 2% of road length, they accounted for about 40% of total road traffic in fiscal 2022. Secondary road system comprises state roads and major district roads, which accounted for the remaining 60% of traffic and 98% of road length.

Road network in India in FY23

Road network	Length ('000 km)	Percentage of total length	Percentage of total traffic	Connectivity to
National highways	145.0	~2%	40%	Union capital, state capitals, major ports, foreign highways
State highways	167.1	~3%	60%	Major centres within the states, national highways
Other roads	6,019.8	~95%		Major and other district roads, rural roads - production centres, markets, highways, railway stations

Source: MoRTH Annual Report 2021-22 & 2022-23, CRISIL MI&A Consulting

Total length and break-up of national, state and rural roads

Break-up of road length across different regions (in km)

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23
National highways	97,991	1,01,011	1,14,158	1,26,350	1,32,500	1,32,995	1,36,440	1,40,995	1,44,955
State highways	1,67,109	1,76,166	1,75,036	1,86,908	1,86,528	1,94,900	1,76,818	1,71,039	1,67,079
Other roads	52,07,044	53,26,116	56,08,477	59,02,539	60,67,269	61,65,660	59,02,539	60,59,813	60,19,757
Total	54,72,144	56,03,293	58,97,671	62,15,797	63,86,297	64,93,555	62,15,797	63,71,847	63,31,791

Source: MoRTH Annual Report 2021-22 & 2022-23, CRISIL MI&A Consulting

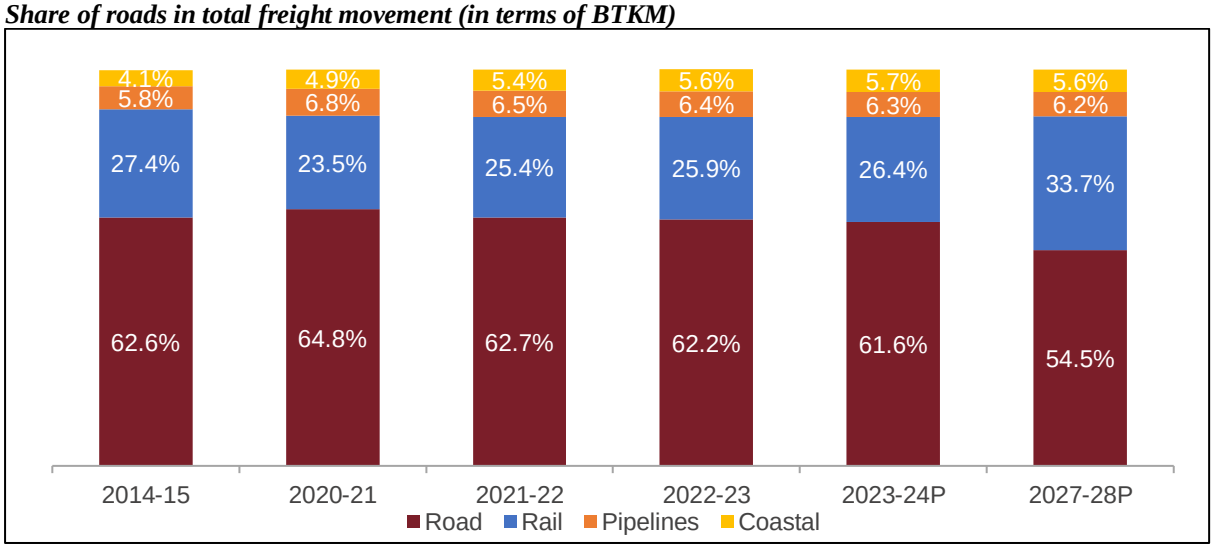
Indian freight traffic scenario

Roads to continue to hold a dominant share in overall freight movement

Road freight traffic is expected to increase at a compounded annual growth rate (CAGR) of 3-5% in BTKM terms between fiscals 2023 and 2028. In the same period, railways is expected to grow at a CAGR of 12-14%, growing faster than roads. Railways gained share in FY21 as rail freight traffic has been more resilient amid COVID-19 outbreak. Rail share further increased in FY22 due to increased rail capacity, partial commissioning of DFC, soaring diesel prices and higher road freight rates. Commissioning of the dedicated freight corridor to aid in increase in rail share. Impact is expected to be witnessed from fiscal 2024 onwards and would help rail to claw back share it had earlier lost owing to capacity constraints.

In fiscal year 2024, road freight movement is projected to experience a growth rate of 5-7%, slightly lower than that of rail freight movement. In fiscal year 2023, road BTKM is estimated to have grown by approximately 7%, mainly attributed to increased production across all sectors and government spending focused on investments. However, it is expected that road transport will lose market share to railways in the upcoming years due to the establishment of dedicated rail freight corridors and comparatively higher road freight rates relative to other modes of transportation.

Share of roads in total freight movement (in terms of BTKM)



E: Estimated; P: Projected (Source: CRISIL MI&A Consulting)

Roads remain the preferred mode for non-bulk transportation

Roads generally account for a significant share in non-bulk commodity transportation, as:

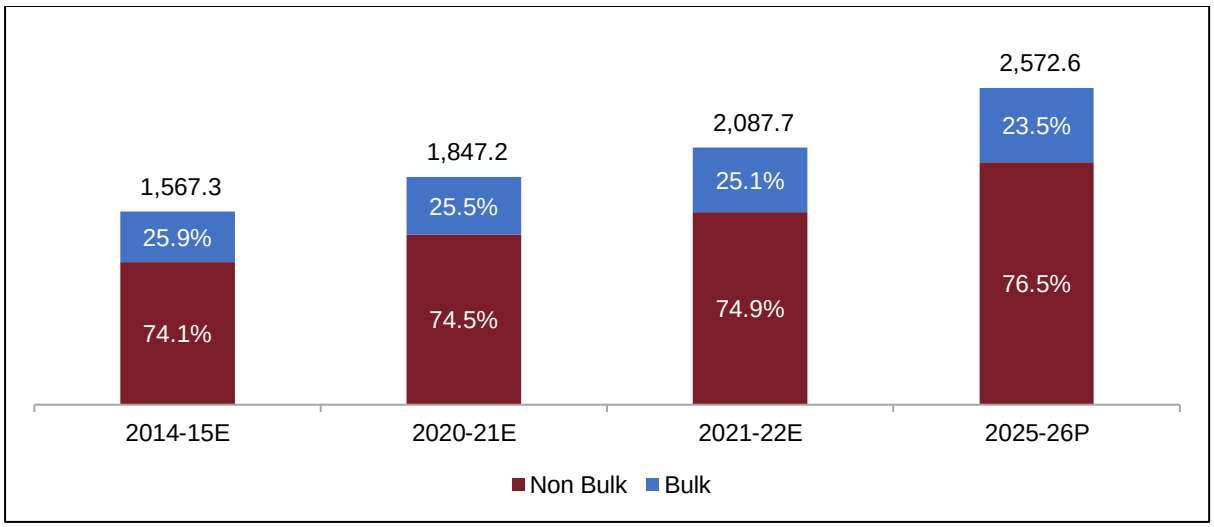
- Rail does not cater to piecemeal freight transportation. Entire rakes are provided for transportation, and not just single wagons (although Indian Railways is looking into multi-point loading, it would still not attract small-sized cargo).
- Road transport has better service quality and is more reliable.

- Road transporters operate on a much smaller scale. Also, given the large number of road transport operators, customers have better bargaining power. These transporters also add a personal touch to their service, which is important, as these commodities are typically expensive and fragile.

- Roads provide end-to-end connectivity and safer handling, which is an important factor while transporting low-volume, but high-value commodities.

Consequently, CRISIL expects the share of non-bulk commodities in the total road primary BTKM to increase to 76.5% by fiscal 2026 from 74.9% in fiscal 2022.

Roads predominantly transfer non-bulk freight (in terms of BTKM)



E: Estimated; P: Projected
Source: CRISIL MI&A Consulting

SUMMARY OF BUSINESS

Overview

Nxt-Infra Trust is a registered Indian infrastructure investment trust which proposes to invest in road infrastructure assets in India. The Trust proposes to have an initial portfolio of six Project SPVs comprising of 14 road stretches spanning an aggregate length of over 2000 lane kilometres, located across Delhi, Haryana, Uttarakhand, Uttar Pradesh and Maharashtra in India. The portfolio is a mix of toll and annuity assets.

The Trust is sponsored by Actis Highway Infra Limited (the "**Sponsor**"), part of the Actis Group, which is a global investor in sustainable infrastructure.

Actis Group formed in 2004 when it spun out from CDC Group plc. It has a 75+ year heritage of investing in global growth markets. Actis Group focuses on sustainable infrastructure, investing globally in energy infrastructure, long life infrastructure, digital infrastructure & real estate. It focuses on ownership to better drive value creation and build sustainability leaders. Actis is a signatory to United Nations Principles for Responsible Investment.

Since its inception, Actis Group has invested over USD 24 billion as of March 31, 2023, and manages assets across a diverse range of sectors globally. The Sponsor presently holds and operates six road assets in India which were acquired from the Welspun group in 2022 and are proposed to be transferred to the Trust pursuant to the Issue.

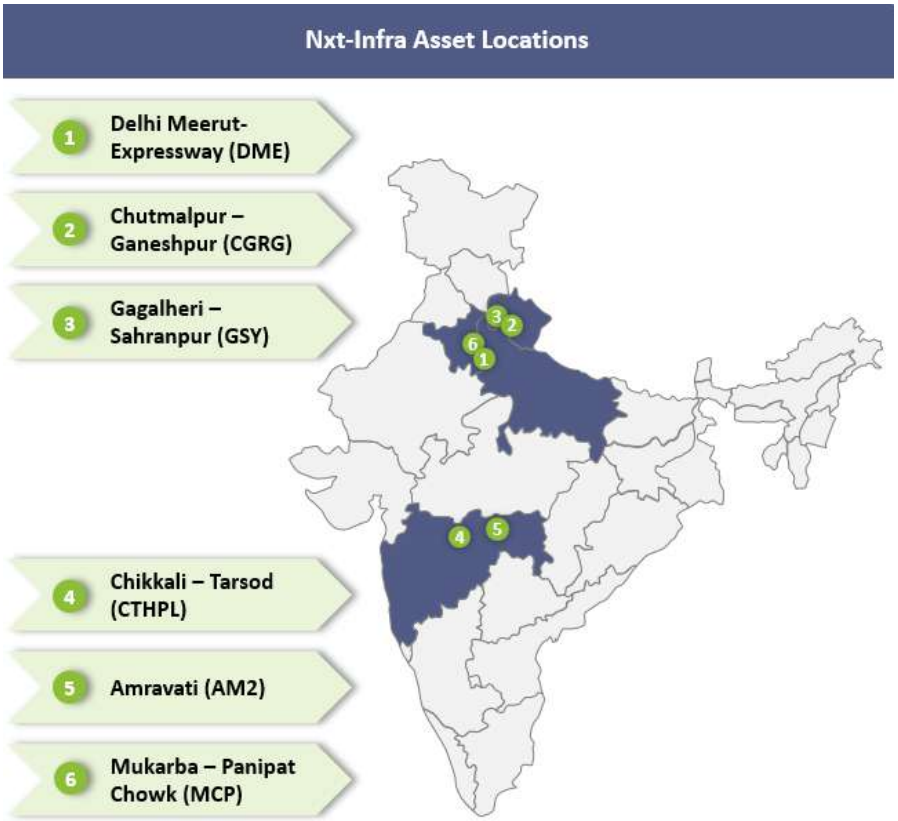
The Trustee, Catalyst Trusteeship Limited is a trusteeship company involved in varied facets of debenture and bond trusteeships, including, advisory functions and management functions. The Trustee also acts as a security trustee and is involved in providing services in relation to security creation, compliance and holding security on behalf of lenders.

Our Investment Manager, Walter Infra Manager Private Limited, will be responsible for managing the Initial Portfolio Assets as well as undertaking investment and management decisions in relation to our assets. Walter Infra Project Manager Private Limited, an associate of the Sponsor, has been appointed as the Project Manager in relation to the Initial Portfolio Assets.

Our Projects

Our Initial Portfolio Assets comprise both national highways and state highways, and are located in the states of Delhi, Haryana, Uttarakhand, Uttar Pradesh and Maharashtra.

The map below illustrates the locations of the Projects:



Some key details in relation to the Initial Portfolio Assets are provided below:

S. No.	Project SPV	Type of project model (Annuity or Toll)	Length (in km)	No. of lanes	State	Authority	COD	End of Concession Period	Residual Concession Period as of March 31, 2023 (in years)	Revenue for Fiscal 2023 (in ₹ lakhs)**
1.	Welspun Infrafacility Private Limited*	Toll	70.500	8	Haryana	NHAI	-	October 26, 2033	10	78,893.88
2.	Nxt-Infra CGRG Highways Limited	Annuity	53.300	4	Uttarakhand and Uttar Pradesh	NHAI	October 7, 2022	August 4, 2035	12	4,530.11
3.	Chikhali- Tarsod Highways Private Limited	Annuity	62.700	4	Maharashtra	NHAI	October 30, 2022	August 24, 2036	13	4,335.07
4.	M/s Welspun Delhi Meerut Expressway Private Limited	Annuity	8.716	14	Delhi and Uttar Pradesh	NHAI	September 26, 2018	June 27, 2033	10	613.39
5.	Nxt-Infra GSY Highways Limited	Annuity	51.455	4	Uttar Pradesh and Haryana	NHAI	February 10, 2022	October 30, 2035	12	2,678.52
6.	Welspun Road Infra Private Limited	Annuity	362.52	2	Maharashtra	PWD, Government of Maharashtra	July 29, 2022	November 10, 2031	8	15,566.67

Presently, 51% of the issued and paid-up equity share capital of WIPL is held by Welspun Enterprises Limited ("WEL**"). In terms of the securities subscription and purchase agreement dated June 9, 2022 ("**SSPA**") entered into between our Sponsor and WEL, our Sponsor is entitled to acquire 100% of the equity share capital of WIPL. In terms of the requirements prescribed by the NHAI, a change in ownership of WIPL may be undertaken only with the prior approval of the NHAI, and only after a period of two years from the COD of WIPL. Therefore, the proposed acquisition of the equity shares presently held by WEL may only be undertaken after the completion of the period prescribed by the concessioning authority. For further details in relation to the SSPA, please see section titled 'Summary of Key Agreements' on page 186. In accordance with the above, upon the completion of the Formation Transactions, the Project SPVs will only comprise 49% of the issued and paid-up equity share capital of WIPL. Further, the Sponsor, Trustee and the Investment Manager propose to enter into a Deed of Right of First Refusal pursuant to which the Trust will have the ability to acquire the remaining 51% of the issued and paid-up equity share capital of WIPL at a subsequent date.*

*** The data in the table above does not reflect the total annuity payment in relation to the annuity assets(including the interest on the balance annuity and O&M) from the NHAI as the financials are prepared under IND AS.*

Competitive Strengths

Sizeable and diversified portfolio of long-term, stable, revenue-generating assets with minimal construction risk

Upon the completion of the Issue, the Trust shall have a sizeable initial portfolio of completed and revenue-generating assets, comprising of six Projects with an aggregate length of over 2000 lane kilometres, located across five states in India, covering key geographies such as Delhi, Haryana, Uttarakhand, Uttar Pradesh and Maharashtra. Each Project SPV has entered into a long-term concession agreement with one of the concessioning authorities, having residual concession periods ranging between 8 and 14 years, with each such concession period commencing from the appointed date of the relevant Project. Project SPVs are comprising of 14 road stretches. On a collective basis, the Projects had a weighted average residual concession period of approximately 10.8 years, as of September 30, 2023. With a balanced combination of HAM and toll assets, the Projects are well positioned to provide long-term cash flows to the Trust. The government launched the National Infrastructure Pipeline ("**NIP**") for fiscals 2020 to 2025, to boost infrastructure, with a projected investment of ₹ 1,11,00,00,000 lakh during the period. (*Source: Crisil Report*).

Stable income through annuity assets and toll income generating assets with high traffic volume

We believe that the diversified revenue streams from our Projects provide us with steady cash flow during the year. Approximately 42.39% of our combined revenue in the financial year ended March 31, 2023 came from HAM projects awarded by the relevant concessioning authorities while approximately 57.61% of our combined total revenue in the financial year ended March 31, 2023 was generated from toll collections.

Our toll-based Project is located in strategic areas and directly connecting Delhi and Panipat, and is dominated by traffic from the passenger segment. (*Source: Traffic Report*). This allows our toll linked Project SPV to exhibit a stable growth in toll collections. Road transportation is the most frequently used mode of transportation in India, accounted for 86% of passenger traffic and close to 64% of freight traffic as of fiscal 2022. Although national highways constitute just 2% of road length, they accounted for about 40% of total road traffic in fiscal 2022. Road freight traffic is expected to increase at a CAGR of 3%-5% in BTKM terms between fiscals 2023 and 2028. MNCs and domestic companies setting up manufacturing plants in India will facilitate increase in passenger as well as freight traffic on roads (*Source: Crisil Report*). For further details, please see the section titled "*Discussion and analysis by the Directors of the Investment Manager of the financial condition, results of operations and cash flows of the Project SPVs of the Trust*" on page 237 and the Traffic Report attached as Annexure V.

Our annuity-based Project SPVs have received semi-annual annuities until September 30, 2023. As per the concession agreements, the relevant concessioning authorities are required to make payments on the dates set out in the concession agreements. Our annuity-based Project SPVs have predictable cash flows and bring stable income to the Trust. Annuity based projects will lower project risk for developers because the NHAI will bear the risk of traffic volume and the developer earns through fixed annuity payments. The elimination of traffic risk will provide stable cash flows to developers and ensure timely debt servicing for bankers. (*Source: Crisil Report*).

Diversified portfolio in terms of business models and geographies

The Projects comprise five hybrid annuity projects and one toll project across five states of India. We believe that the diversified revenue streams from our Projects place us in an advantageous position in the Indian roads sector providing us with steady cash flow during the course of the year.

Revenue streams: A significant portion of our revenue is derived from and is expected to continue in the future from annuities payable by the relevant concessioning authorities from our HAM Projects, which will ensure steady income for the Trust. Further, the toll revenue from our toll project comprising approximately 57.61% as per fiscal 2023 of our combined revenue from operations provides necessary growth to the revenue. Toll projects give an opportunity to have a growing in income in line with traffic growth. The electronic toll collection on national highways is estimated to have reached ₹ 46,30,000 lakh in the Fiscal Year 2023. Further, toll collections are expected to grow at a CAGR of 9.5%-10.0% between Fiscal Years 2023 and 2028 on a like-to-like basis and to grow at 18%-19% considering new road additions and subsequent tolling on them over the same period. A growth of 49% is expected in AADT between Fiscal 24 and Fiscal 30. The growth will be driven by factors such as improvement in overall economic activity, efficiency gains due to removal of check posts post implementation of GST, increase in both passenger and commercial vehicles, strong execution pipeline of road and highway projects, better compliance and blocking of leakages due to electronic toll collection. (*Source: Crisil Report*)

Annuity Track Record: The Project SPVs have received an aggregate of 23 regular semi-annual annuities till March 31, 2023. We have been receiving regular semi-annual annuities from NHAI since December 2018 and PWD Maharashtra since May 2022. The residual terms of the concession agreements range between 8 years and 14 years as of September 30, 2023. We believe that our temporally and geographically diverse project portfolio and our expertise leveraged from existing projects provides us with an advantage in capitalizing on new opportunities available in the Indian roads and highways sector. We believe that this diversification strengthens our business by reducing our reliance on any specific project and reducing the potential impact on our business of any economic slowdown or Project-specific *force majeure* event or with respect to any particular project.

Strong support from the Sponsor, Project Manager and Investment Manager

We intend to leverage the experience and expertise of our Sponsor and its affiliates, to gain a competitive advantage within the road infrastructure industry. Our Sponsor is engaged in investment activities primarily with an objective of generating stable returns and earning long term capital appreciation. Our Sponsor is affiliated with funds, vehicles and/or entities managed and/or advised by the Actis Group.

Our Sponsor is part of the Actis Group, which is a global investor in sustainable infrastructure. Since its inception, Actis Group has invested over USD 24 billion as of March 31, 2023, and manages assets across a diverse range of sectors globally. The Sponsor presently holds and operates six road assets in India which were acquired from the Welspun group in 2022 and are proposed to be transferred to the Trust pursuant to the Issue.

Drawing upon this depth of experience, our Sponsor, Investment Manager, Project Manager and their management teams have established a strong track record of operating and managing largescale projects, which will benefit us across all stages of project operations and acquisitions within India's complex regulatory framework (including, for example, strategic acquisition, O&M, and receivables management). Our Sponsor also provides us the ability to leverage its parentage and long-term industry relationships with stakeholders to gain cost efficient access to financing from institutions and capital markets. Further, our Investment Manager and Project Manager are also affiliates of the Sponsor. We believe our affiliation to Actis will allow us to pursue marque and high-quality road infrastructure assets and engage effectively with regulators and concessioning authorities.

Hedge against adverse interest rate movements

The HAM Projects have a natural hedge against the risk of adverse interest rate movement. In addition to the annuity payments due under such concession agreements during the operations period, the relevant concession agreements for HAM Projects require the relevant concessioning authority to pay interest on the reducing balance of the completion cost (equivalent to 60% of the BPC) throughout the operation period at the rate of three per cent above the prevailing RBI Bank Rate. Accordingly, any increase in operating and financing costs is likely to be offset by the increased revenues earned by us on such HAM Projects. Similarly, our toll project has a natural hedge against any indirect reduction in traffic volumes on account of high WPI-based inflation, as a high WPI mandatorily requires the toll rates to be revised on an annual basis, depending on the variation in WPI. Further, we also benefit from the mix of HAM and toll projects and are able to adopt a yield focused strategy which has a combination of hedged fixed income from our HAM Projects, and growth income from our toll project.

Attractive industry sector with favourable government policies

Further development of the infrastructure sector, in particular road infrastructure, is a priority for the GoI and many state governments and has been the subject of enhanced investment from the public sector through traditional means of public investment and new channels such as PPPs. Roads have been the key focus area for budget allocations over the years. Under Union Budget 2022-23, the Government has allocated ₹ 1,99,107.71 crore under the Ministry of Road Transport and Highways. Between FY2016-17 and FY2022-23, budget allocation for road transport and highways increased at a robust CAGR of 24.90%. CRISIL expects private construction investments in national highways to increase 2x to Rs 2,70,00,000 lakh over fiscals 2023-2027 compared with the previous five years. This is expected to be mainly through the (HAM) mode, as the BOT toll mode may have only a few takers. About Rs 70,00,000-80,00,000 lakh has already been invested through these models. CRISIL's analysis of BOT and HAM projects indicates a potential of Rs 2,00,00,000-2,50,00,000 lakh in terms of enterprise value. (*Source: Crisil Report*). Overall road sector capex, comprising of National Highways, State Highways & rural roads is estimated to have grown at a CAGR of 14% between Fiscal 2018 and Fiscal 2023 (*Source: Crisil Report*).

The roads sector registered a strong pace of constructions by NHAI, growing 6,003 km (16.4 km per day) in fiscal 2023 from 3,071 km (8.4 km per day) in fiscal 2018. Investments in the roads and highways sector rose from Rs 1,70,00,000 lakh in fiscal 2018 to Rs 2,90,00,000 lakh in fiscal 2022, registering 1.7x growth. Bharatmala Pariyojana is an umbrella project introduced by the central government in 2015 to improve the efficiency in the roads sector. It is expected to supersede the NHDP and envisages the construction of 65,000 km of highways under the following categories: national corridor roads (north-south, east-west and Golden Quadrilateral), economic corridor roads, inter-corridor roads and feeder roads. Phase I of the scheme envisages development of 24,800 km of national highways/roads as well as 10,000 km of residual roads between fiscals 2018 and 2022 under NHDP. Awarding under Bharatmala Pariyojana began in fiscal 2018, with Phase 1 expected to stretch till fiscal 2025 (*Source: Crisil Report*). Among the sectors, infrastructure continues to be in focus, with a 30% hike in budgetary support. Through the PPP model, among others, we believe that the Nxt-Infra Trust has acquired, and will continue to capture through further acquisitions, a healthy share in the PPP format of the road infrastructure sector. For further details in relation to the industry sector, please see the section titled "*Industry Overview*" on page 134.

Skilled and experienced management team with industry experience

We have an experienced management team with several years of experience in the infrastructure sector providing us an ability to pursue our growth strategies in a seamless manner. We draw on the knowledge of our Board of Directors and key personnel, who bring us expertise in the areas of business strategy and operational and financial capabilities, amongst others. We believe this will be key to the execution of our growth strategies. Our Board comprises six directors as on the date of this Draft Placement Memorandum, with extensive experience in management, finance and infrastructure.

We believe that the experience of our management team (Investment Manager and Project Manager) in the infrastructure sector will ensure that the Project SPVs and the Trust are operated and managed in an efficient manner. With the aim of enshrining principles of good corporate governance, effective management and operations of the Nxt-Infra Trust, the Investment Manager has constituted various committees and adopted corporate governance policies to manage the activities of the Nxt-Infra Trust. The Investment Manager has further created separate audit committee and risk management committee for managing the decision-making process for the Nxt-Infra Trust. For details in relation to the corporate governance framework of the Investment Manager, please see the section titled "*Corporate Governance*" on page 123.

We believe that our governance process will ensure adherence and enforcement of principles of sound corporate governance with the objectives of fairness, transparency, professionalism, trusteeship and accountability, while facilitating effective management of the businesses and efficiency in operations.

Business Strategies

Future acquisition of completed, steady, and revenue- generating annuity road infrastructure assets

The Investment Manager may in the future expand our initial portfolio by identifying and acquiring additional operational revenue generating projects such as toll projects and hybrid annuity or annuity projects which meet our Investment Objectives in accordance with the provisions of the Trust Deed. For further details of the Investment Objectives, please see the section titled "*Overview of the Trust*" on page 19.

In addition, the Investment Manager believes that due to trends in the industry, a number of acquisition opportunities may be available. These trends include the potential divestment of assets by government entities, reputed Infrastructure developers, and by financial and private equity investors seeking to exit their investments. The Investment Manager hopes to take advantage of these opportunities by actively sourcing and acquiring quality assets from such third parties on a case-by-case basis which is value accretive to existing unitholders. The acquisitions shall be done only after a detailed technical and financial due diligence from independent third parties and will consider factors such as access to important locations in the vicinity, connecting roads, industrial and manufacturing hubs, connectivity with raw materials, ports, availability of the relevant approvals, ease of complying with laws and also evaluating competing modes of transportation.

Institute and maintain prudent capital management policies

We focus on achieving an optimal capital structure for our projects and will continue to draw upon the experience, relationship and expertise of our Sponsor and its affiliates in sourcing funds from multiple sources, both from domestic and international markets. The Nxt-Infra Trust's total external outstanding consolidated net debt after full utilization of the Issue Proceeds, will be within the regulatory requirement of 49% of the value of the InvIT Assets upon completion of the Issue (net of cash and cash equivalents) as specified under the InvIT Regulations and shall not, in accordance with the InvIT Regulations, exceed 70% of the value of the InvIT Assets (or such other limit as may be prescribed form time to time) on an ongoing basis.

We also intend to optimize our leverage to retain enough flexibility to provide sustainable and predictable cash flows while also evaluating potential acquisition opportunities in the future. We will aim to optimize our debt and maintain a healthy credit rating at all times. We will plan to add debt after the issue to maintain an optimal capital structure. After the completion of the Issue, we believe that we will institute robust acquisition policies to support acquisition of additional assets while maintaining an optimum capital structure. Fixed / benchmark linked floating rate debt to partially/fully hedge HAM Projects and Toll Projects cashflows. We will seek to employ appropriate financing policies and also diversify our funding sources with an objective of minimizing our overall cost of capital. We will seek to optimizing our debt and equity mix in such a manner that the aggregate consolidated borrowings and deferred payments of the Nxt-Infra Trust, net of cash and cash equivalents does not exceed such value of the Nxt-Infra Trust Assets, at any time subject to the approval of the unitholders, as provided in accordance with the SEBI InvIT Regulations.

Further, any additional debt beyond 49% of the value of the Nxt-Infra Trust Assets will be raised only upon compliance with the conditions set out in the SEBI InvIT Regulations. In accordance with the Trust Deed, and subject to the Applicable Law permitting such additional debt, any additional debt will be raised only with the consent of such number of Unitholders of the Nxt-Infra Trust, as prescribed under the SEBI InvIT Regulations. If it is in the interests of the Unitholders, the Investment Manager may also pursue growth opportunities that require raising additional capital through the issuance of new Units.

Continue to ensure efficient and active asset management

We intend to continue to manage our road assets through the services of the Project Manager and the O&M Contractor with guidance from the Investment Manager. The Project Manager and the O&M Contractor will be responsible for providing routine O&M services pursuant to the provisions of the Project Implementation and Management Agreements and O&M Agreements. For further details in respect of our O&M arrangements, please see the section titled "*Business – Key O&M Agreements*" on page 184.

RISK FACTORS

An investment in the Units involves a high degree of risk. Investors should carefully consider all the information in this Draft Placement Memorandum, including the risks and uncertainties described below, before making an investment in the Units. If any of the following risks actually occurs, the business, results of operations, cash flows, and financial condition of the Nxt-Infra Trust could suffer, the price of the Units could decline, and investors may lose all or part of their investment. The risks and uncertainties described below are not the only risks that the Nxt-Infra Trust faces or may face. Additional risks and uncertainties not presently known to the Investment Manager and the Nxt-Infra Trust or that are currently believed to be immaterial may also have an adverse effect on the business, results of operations, cash flows, and financial condition of the Nxt-Infra Trust and as a result, the returns on investments of the Unitholders. If any of the following risks, or other risks that are not currently known or are currently considered 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 investment. Unless specified or quantified in the relevant risk factors below, the Investment Manager and the Sponsor are not in a position to quantify or specify the financial or other implications of any of the risks described in this section.

In making an investment decision, prospective investors must rely on their own examination of the Nxt-Infra Trust and the terms of the Issue, including the merits and risks involved. To obtain a complete understanding, this section should be read in conjunction with the sections titled "Business", "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPVs of the Nxt-Infra Trust" and "Rights of Unitholders" on pages 163, 237, and 287, respectively and "Special Purpose Combined Financial Statements" attached as Annexure II, as well as other financial information and other information included elsewhere in this Draft Placement Memorandum.

The Trust will own 49% equity interest in WIPL which holds the 8 laning of Mukarba Chowk – Panipat section of NH-1 (new NH-44) from km 15.500 to km 86.000 in the state of Haryana under NHDP-IV through PPP on toll basis pursuant to the WIPL Concession Agreement, and which is accounted for as an investee under the equity method of accounting. The interest of the Trust in WIPL is accounted for using the equity method in accordance with Ind AS 28, after initially being recognized at the net book value as at April 1, 2020. For details of accounting policies as required by Ind AS (read with Ind AS 28) relating to the accounting of WIPL as equity accounted investee, please refer to the sections titled "Presentation of Financial Data and Other Information" and "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPVs of the Trust" on pages 12 and 237 respectively.

In relation to WIPL, accounting in Special Purpose Combined Financial Statements is as per equity method as per Ind AS 28, hence, only 49% share of profit/ loss is picked up considering joint control. All numbers with respect to WIPL, including in relation to projections, are considered only to the extent of 49% in the document.

This Draft Placement Memorandum also contains forward-looking statements that involve risks and uncertainties and assumptions. The Nxt-Infra Trust's actual results could differ materially from those anticipated in these forward looking statements as a result of certain factors, including considerations described below and in the section titled "Forward-Looking Statements" on page 16.

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, and investors could lose all or part of their original investment.

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

RISKS RELATING TO THE NXT-INFRA TRUST'S BUSINESS AND INDUSTRY

1. ***The Nxt-Infra Trust is a newly settled trust with no established operating history and no historical financial information and, as a result, investors may not be able to assess prospects of the Trust on the basis of past records or accurately assess future growth prospectus of the Trust.***

   The Nxt-Infra Trust was settled on October 26, 2023 and registered with SEBI pursuant to certificate of registration dated November 8, 2023. The Trust proposes to acquire 100% of the issued and paid-up equity share capital in each of the Project SPVs (excluding WIPL wherein the Nxt-Infra Trust proposes to initially acquire 49% of the issued and paid-up equity share capital), pursuant to the Securities Purchase Agreements, immediately prior to the Closing Date. For further details, please see the section titled "*Formation Transactions in relation to the Trust*" on page 22. Accordingly, the Nxt-Infra Trust, as an infrastructure investment trust, does not have an operating history or historical financial information by which our past performance may be judged. This will make it difficult for investors to assess our future performance. Growth prospects as an infrastructure investment trust can be affected by a wide variety of factors, including, inability to raise funds required for our operations, adverse developments in taxation regulations affecting our Unitholders, operational performance, distribution, and acquiring new assets. Any inability to meet these challenges could cause disruptions to our operations and could be detrimental to our long-term business outlook. There can be no assurance that we will be able to generate sufficient revenue from our operations or that the Project SPVs will be able to generate sufficient cash flows from the operations of

the InvIT Assets to make distributions to our Unitholders or that such distributions will be in line with those set out in "*Projections of Revenue and Operating Cash Flow*" attached as Annexure I.

Additionally, the historical financial information of the Project SPVs on a combined basis has been included in this Offer Document in "*Special Purpose Combined Financial Statements*" attached as Annexure II. There can be no assurance that our future performance will be consistent with the historical financial information on a combined basis included in this Offer Document.

2. ***Consummation of the Formation Transactions pursuant to which we will acquire the Project SPVs is subject to receipt of approval from NHAI or the relevant concessioning authority and timely release of certain security created over the InvIT Assets***

Certain terms and conditions in the Concession Agreements require NHAI/relevant concessioning authorities review and prior written approval to be obtained for, among others, one or more of the following actions:

- undertaking or permitting any change in the ownership from national security and public interest perspective;
- review, amendment, modification or replacement by the Project SPV of any project agreements (including financing agreements) relating to the operation of the InvIT Assets to which the Project SPV is a party if the amendment, modification or replacement of such agreement increases or imposes any financial liability or obligation on the NHAI/concessioning authority;
- the creation of any encumbrance or security interest over, or transfer of rights and benefits of the Project SPVs under, the Concession Agreements or any project agreements; and
- refinancing of a certain portion of the outstanding indebtedness of the Project SPVs, as described in this Offer Document.

The Project SPVs (except WRIPL) have made applications dated August 21, 2023 to NHAI and WRIPL has made an application dated August 22, 2023 to the PWD–Maharashtra, in connection with undertaking Formation Transactions and other related actions. While receipt of such approvals is pending as on date of this Draft Placement Memorandum, the transfer of the Project SPVs to the InvIT, may be subject to certain conditions as specified by NHAI/concessioning authorities in their approvals. We cannot assure you that the approval from the NHAI/concessioning authorities will be received in a timely manner or that we will be able to comply with the conditions provided under NHAI/concessioning authorities approval, which may adversely impact our ability to complete the Issue within the anticipated time frame or at all.

Further, the lenders of the respective Project SPVs have created certain charges over the InvIT Assets. The security that has been created in favor of the lenders will required to be released within an agreed period of time in order to consummate the Formation Transactions. If such security is not released by the lenders within the contemplated timeline, we may not be able to consummate the Formation Transaction in a timely manner or at all.

3. ***Our failure and inability to identify and acquire new infrastructure assets that generate comparable revenue, profits or cash flows may have an adverse effect on our business, financial condition, cash flows and results of operations and our ability to make distributions.***

The InvIT Assets will comprise six road assets, of which five are operating on a hybrid annuity model and one is operating in the toll model, that the Project SPVs operate and maintain pursuant to concessions granted by the NHAI. The Concession Agreements of the Project SPVs stipulate a limited concession period at the end of which the operation of the relevant project will be transferred to NHAI/concessioning authorities. As at March 31, 2023, the residual periods for the concessions of the InvIT Assets ranged from approximately eight to 14 years. For further details on the residual concession period of each of the InvIT Assets, please see the section titled "*Business*" on page 163.

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

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

We cannot assure you that we will be able to acquire new infrastructure assets upon the expiry of the term of the Project SPVs' existing Concession Agreements or at any time thereafter. Accordingly, the number of assets forming part of our portfolio and the revenue generated by them may vary. Further, even if new infrastructure assets are added to our portfolio,

we cannot assure you that such infrastructure assets will be able to generate comparable cash flows, revenues and profits. If we are unable to acquire new road assets that generate comparable cash flows, revenue or profits, our business, financial condition, cash flows and results of operations and our ability to make distributions to Unitholders may be adversely affected. For further details on the terms of each of the Concession Agreements, see "*Summary of Key Agreements*" on page 186.

4. ***We may be subject to penalties and claims from the concessioning authorities and third parties during the course of operations of the projects and may not be able to recover all operational losses from the Project Manager and/ or other contractors providing operations and maintenance services to the projects.***

   The Project SPVs may, from time to time, receive letters and notices from NHAI/the concessioning authorities or other third parties imposing penalties and seeking claims for any alleged deficiencies or non-compliance with the terms of the underlying concession agreement or other project agreements or a claim or compensation under the terms of the concession agreements. A Project SPV may contest such claims or invoke any indemnifications provided by the Project Manager and/ or any O&M contractor or EPC contractor that have been appointed or may be appointed in relation to the project. However, in the event that a claim is decided against the Project SPV, there could be an adverse impact on the operations and financial condition of such Project SPV. Ongoing claims by the Project SPVs against the concessioning authorities, if any, have been disclosed in the section titled "*Legal and other information*" on page 280.

   Further, the maximum aggregate liability of the Project Manager for any breach of any of the terms of the Project Implementation and Management Agreement by the Project Manager in a particular year, shall be limited to the amount equivalent to one month's fee payable to the Project Manager in such financial year. Accordingly claims exceeding the amount limits, which are not the liability of the Project Manager, may have an adverse effect on the financial performance of the Project SPVs. Similarly, the limitation of liability of the O&M Contractors under the relevant O&M Agreements of each Project SPVs (except partly owned Project SPV *i.e.* WIPL) is calculated at the higher of 2% of the performance security as prescribed in the respective concession agreement or 0.1% of the cost of such repairs or rectification as estimated by the independent engineer. The limitation of liability of a contractor under O&M Agreement of partly owned Project SPV (*i.e.* WIPL), may be up to 100% of the contract price.

5. ***The Valuation Report by S. Sundararaman a registered valuer (the "Valuer") is not an opinion on the commercial merits and structure of the Issue nor is it an opinion, express or implied, as to the future trading price of Units or the financial condition of Nxt-Infra Trust upon Listing, and the valuation of the Project SPVs contained in such Valuation Report may not be indicative of the actual underlying value of the Project SPVs.***

   S. Sundararaman, a registered valuer was appointed as the independent valuer (the "**Valuer**") to undertake independent appraisals of the Project SPVs. The Valuer issued a report (the "**Valuation Report**"), which sets out its opinion as to the fair enterprise value of the Project SPVs as of March 31, 2023. The Valuation Report is based on various assumptions with respect to the Project SPVs, including, amongst others, their revenue cash flows, O&M expenses, major maintenance and repairs costs, depreciation and amortization, capital expenditure and working capital. Further, the Valuation Report is based on estimates of future financial performance or opinions, which represent reasonable expectations at a particular point of time, but such information, estimates or opinions are not offered as predictions or as assurances that a particular level of income or profit will be achieved, a particular event will occur or that a particular price will be offered or accepted.

   The Valuation Report is neither an opinion on the commercial merits and structure of the Issue, nor is it an opinion, express or implied, as to the future trading price of Units or the financial condition of the Nxt-Infra Trust upon Listing. The Valuation Report does not purport to contain all the information that may be necessary or desirable to fully evaluate the commercial or investment merits of the Issue or the Nxt-Infra Trust. 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 Nxt-Infra Trust or the Project SPVs. Further, the Valuation Report is necessarily based on financial, economic, monetary, market and other conditions as of the date of the Valuation Report. The Valuation Report has not been updated since the date of its issue and does not take into account any developments subsequent to the date of its issue.

   There can be no assurance that the Valuation Report reflects the actual underlying value of the Project SPVs or that other independent valuers would arrive at the same valuation. Accordingly, investors should not rely unduly on the Valuation Report in making an investment decision to purchase Units in the Issue. For details, please see the Valuation Report attached as Annexure III to this Draft Placement Memorandum.

6. ***The accuracy of statistical and other information with respect to the road infrastructure sector and the Technical Reports and Traffic Report commissioned by the Investment Manager for the projects contained in this Draft Placement Memorandum cannot be guaranteed.***

   Statistical and other information in this Draft Placement Memorandum relating to India, the Indian economy or the road infrastructure sector have been derived from various government publications, research reports from reputable institutions and communications with various Indian government agencies that are believed to be reliable. However, there can be no guarantee as to the quality or reliability of such information.

One of the projects (being the DBFOT (Toll) SPV) is exclusively toll based, whilst the remaining five projects are predominantly hybrid annuity based. In relation to the DBFOT (Toll) SPV, the information reflected in the Technical Report and Traffic Report is subject to various limitations and is based upon certain estimates and assumptions that are subjective in nature. The Technical Reports and Traffic Report reflect current expectations and views regarding future events, and contain forecasts, projections and other forward-looking statements that relate to future events. The future events referred to in the Technical and Traffic Reports are subject to risks, uncertainties and factors such as gross domestic product growth, current and future traffic mix and per capita income changes, which may cause the actual traffic volumes to be materially different from any future traffic volumes expressed or implied by the Technical and Traffic Reports.

While reasonable care has been taken in the reproduction of the information, no assurance can be made as to the accuracy of such assumptions, facts and statistics, which may not be consistent with other information compiled within or outside India. Due to possible inconsistent or ineffective collection methods or discrepancies between published information and market practice, the statistics contained in the Technical and Traffic Reports may be inaccurate or may not be comparable to statistics produced for other economies and should not be unduly relied upon. Further, there is no assurance that the statistics are stated or compiled on the same basis or with the same degree of accuracy as may be the case with information from elsewhere.

Further, the Technical Consultant has prepared the Technical Reports concerning the Project SPVs which are contained in this Draft Placement Memorandum and the Traffic Consultant has prepared the Traffic Report. We commissioned the Technical Reports and Traffic Reports for the purposes of conducting an assessment of the Project SPVs. Further, the Technical and Traffic Reports have been prepared based on information as of specific dates and may no longer be current or reflect current trends. Opinions in the Technical and Traffic Reports based on estimates, projections, forecasts and assumptions may prove to be incorrect. The Technical and Traffic 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 us and the Investment Manager. There can be no assurance that the bases, estimates and assumptions adopted by the consultants for the purposes of preparing the Technical and Traffic Reports will prove to be accurate. Future reports for the Project SPVs could be materially different from those that are set forth in the Technical and Traffic Reports and this Draft Placement Memorandum. The Technical and Traffic Reports are not a recommendation to invest or disinvest in the Project SPVs. Prospective investors are advised not to unduly rely on the Technical Reports when making their investment decision.

7. ***A significant portion of our projected revenue will be derived from the toll project which can vary significantly basis the actual traffic.***

As per the Projections of Revenue from Operations and Cash Flow from Operating Activities, the revenue from operations for Fiscals 2024, 2025 and 2026 arising from the toll project is projected to constitute approximately 71.67%, 63.32% and 70.45% respectively, of our overall projected revenue from operations for Fiscals 2024, 2025 and 2026.

For further details of the Projections of Revenue from Operations and Cash Flow from Operating Activities and assumptions on the same, please see "*Projections of Revenue from Operations and Cash Flow from Operating Activities*" and "*Special Purpose Combined Financial Statements* attached as Annexure I and Annexure II, respectively.

For our Toll Project, the principal source of revenue is the collection of toll fees from users of the toll roads. The level of toll collections may be affected by seasonal fluctuations in the traffic, competing routes and alternative modes of transportation, such as adjacent free roads, new or existing toll roads, railways or air transport. Any adverse impact on the revenue from operations of the toll project will have an adverse impact on the business, cash flows and revenue from operations of the Trust. For further details please see the *'Traffic Consultant Report'* attached as Annexure V.

8. ***The Special Purpose Combined Financial Statements and Projections of Revenue from Operations and Cash Flow from Operating Activities presented in this Draft Placement Memorandum may not be indicative of the future financial condition, cash flows, and results of operations of the Nxt-Infra Trust.***

The Special Purpose Combined Financial Statements of the Project SPVs constitute a different presentation of information and may not necessarily reflect the consolidated financial position, results of operations or cash flows of the Nxt-Infra Trust, and nor will they necessarily give an indication of the financial position, results of operations or cash flows of the Nxt-Infra Trust or the Project SPVs in the future. Furthermore, the future consolidated financial statements of the Nxt-Infra Trust will be prepared on the basis of Ind AS (including (Ind AS 103) "Business Combinations"), which is different from the accounting treatment used for the preparation of the Special Purpose Combined Financial Statements.

After the Listing, there may be certain changes to the Nxt-Infra Trust's cost structure, levels of indebtedness and operations, and these could differ materially from the historical combined cost structure and levels of indebtedness presented in the Special Purpose Combined Financial Statements. For example, there are certain costs, such as the Investment Manager's fee as contemplated under the Investment Management Agreement, the Project Manager's fee as contemplated in the Project Implementation and Management Agreement and other costs relating to the Nxt-Infra Trust, that will be incurred by the Nxt-Infra Trust going forward, some of which were not incurred by the Project SPVs historically. For details of recurring expenses, please see the section titled *"Overview of the Trust"* on page 19.

The financial projections contained in this Draft Placement Memorandum are based on historical financial information and certain estimates and assumptions. There can be no assurance that the Project SPVs will be able to generate sufficient cash from the operations of the Projects for the Nxt-Infra Trust to make distributions to Unitholders or that such distributions will be in line with those set out in the *"Projections of Revenue from Operations and Cash Flow from Operating Activities"* attached as Annexure I. The future financial performance of the Nxt-Infra Trust could vary materially from the financial projections and some of the underlying assumptions of such projections may change or not materialise as expected. Further, unfavourable events or circumstances not presently anticipated may also arise, which may have an impact on the future financial performance of Nxt-Infra Trust.

9. ***The Project SPVs have entered into concession agreements which contain certain onerous provisions and any failure to comply with such concession agreements could result in adverse consequences including penalties and the substitution of the concessionaire.***

The Project SPVs have entered into concession agreements which may contain terms that may be onerous to the Project SPVs in relation to, among other matters, the compliance with and monitoring of O&M requirements. The O&M requirements include, among other things, procuring and ensuring safe, smooth and uninterrupted use of the project during normal operating conditions, operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the project, minimizing disruption in the event of accidents or other incidents affecting the safety and use of the project by providing rapid and effective responses and maintaining liaison with emergency services of the state, undertaking routine maintenance, including prompt repairs of potholes, cracks, joints, drains, embankments, structures, markings, lighting, signage and other control devices, undertaking major maintenance such as resurfacing, repairs to structures and repairs and refurbishment of system and equipment, carrying out periodic preventive maintenance to the project, preventing, with the assistance of concerned law enforcement agencies, any unauthorized use of the project, preventing, with the assistance of the concerned law enforcement agencies, encroachments on or unauthorized use of the project, protection of the environment and provision of equipment and materials thereof, maintaining a public relations unit to interface with and attend to suggestions from users of the project, the media, government agencies and other agencies and complying with the safety requirements as set out in the concession agreement. Failure to comply with these requirements could result in adverse consequences, including the Project SPVs being liable for compensating the relevant concessioning authorities for such breach or termination.

There are terms in the concession agreements which require the relevant concessioning authority's prior written approval before a Project SPV can create encumbrance or security interest over, or transfer its rights and benefits under, the respective concession agreement. The terms of the concession agreements limit the creation of security interest to secure the loans taken by the Project SPVs to finance the project cost of the respective project only. There is no assurance that a concessioning authority will approve the actions of any Project SPV in time or at all. Even if approval from a concessioning authority is obtained, there is no assurance that the transfer of the rights and benefits under the respective concession agreement would have no adverse effect on the Unitholders. The restrictions and uncertainties may therefore impose constraints on the flexibility of the Nxt-Infra Trust to conduct our business. Further, compliance with the terms of the concession agreements may sometimes be beyond our control due to external factors such as unavailability of land, etc. This may result in pendency of punch list items under the concession agreements. As a result, our business, results of operations, cash flows and financial condition could be materially and adversely affected.

In addition, the concession agreements also contain clauses which will allow a concessioning authority to step in, in place of a Project SPV, in the event of a suspension or termination of the concession agreement. Further, the concessioning authorities, on the request of the lenders of such Projects, may substitute the Project SPV in the event that the Project SPV is in financial default under the terms of the relevant concession agreement. The concessioning authorities may also impose a penalty on the defaulting Project SPV or can also terminate the concession agreements, in case the substitution is not feasible or accepted by the concessioning authority. In the past, there have been instances where the concessioning authority have awarded/ assigned portion of the concession agreement to a third party contractor in accordance with concession agreements. There can be no assurance that such situations will not arise in the future and in such cases the Trust will have no control over the third party. As a result, our business, results of operations, financial condition and cash flows could be materially and adversely affected.

The concession agreements also require the Project SPVs to indemnify the concessioning authorities, including for losses arising out of, or with respect to, the failure of the concessionaire to comply with applicable laws and permits, payment of taxes payable by the concessionaire or the non-payment of amounts arising out of materials or services provided to the relevant Project SPV, among others.

Further, the GoI or the State Governments where the DBFOT (Toll) SPV is located, may, on the occurrence of certain events, suspend toll collection at the DBFOT (Toll) SPV. For example, toll collections have been suspended or exempted for identified periods on account of external factors, such as the COVID-19 pandemic. The lockdowns and these instances resulted in revenue losses and other work constraints (such as availability of labour and spare parts) for entities operating in the road sector. There is no assurance that if such situations occur in the future, to the extent the Nxt-Infra Trust faces any loss of revenue, it would be able to claim for such loss of revenue and any such claim would be successful.

In the event that any change in law under a Project's concession agreement imposes a financial burden on the affected Project SPV, the Project SPV may be entitled to approach the relevant concessioning authority to amend its concession

agreement or seek compensation such that the Project SPV is placed in its former financial condition. The Project SPV have, in the past, raised claims for compensation against the concessioning authorities, under the concession agreement, some of which are still pending. The claims raised by the Project SPVs include, amongst others, claims in relation to change of scope, change of law and force majeure claims. Further, there may have been instances where the relief provided by the concessioning authorities pursuant to a claim may not be as per the claim, and the Project SPV may not have made, or propose to make, further counterclaims against the concessioning authorities. If compensation is sought under such provisions in the concession agreements, there is no assurance that the affected Project SPV will receive such compensation from the relevant concessioning authority in the amounts claimed, in a timely manner, or at all.

10. The flexibility of the Nxt-Infra Trust and the Project SPVs to utilise available funds may be restricted by the escrow arrangements they are required to maintain under the concession agreements.

Under the terms of the concession agreements, the Project SPVs are required to establish escrow accounts. The Project SPVs are required to deposit all their cash inflows and receipts into the escrow accounts, including, among other things, tolls collected (i.e. from the DBFOT (Toll) SPV and any payments (including termination payments) by the concessioning authorities. The funds in such escrow accounts are to be utilised only in the manner prescribed in the escrow agreements and the concession agreements. The escrow arrangements typically prioritise the payment of all taxes due and payable by the Project SPV, followed by the payment of expenses in connection with, amongst others, (i) the construction of the Projects, (ii) O&M expenses and other costs and expenses incurred by the relevant concessioning authority, (iii) any payments and dues payable to the relevant concessioning authority, and (v) debt servicing of the project lenders. The balance, if any, will be in accordance with the instructions of the Project SPVs.

Any withdrawals from the escrow accounts by the Project SPVs during the concession periods must be made strictly in accordance with the terms of the concession agreements, debt documentation and escrow agreements, thereby limiting the flexibility of the Project SPVs in utilising available funds to plan for, or react to, changes in their business needs, which could have an adverse effect on their business, financial condition, cash flows, and results of operations.

With respect to withdrawals on termination of the concession agreements, the escrow arrangements typically prioritize the payment of all taxes due, followed by, amongst other things, the payment of outstanding concession fee, payment due to the concessioning authorities, the payment of damages in relation to the concession, retentions and payments arising out of liability for any defects, accrued debt service payment and accrued O&M expenses and any other payment required to be made under the concession agreements. The loans/advances by the shareholders will be classified as subordinated debt and equity under the concession agreements, unless the same is otherwise approved by the concessioning authorities.

Accordingly, the ability of the Nxt-Infra Trust to access such termination payments will be subordinated to the payment of, among other things, any outstanding concession fees, outstanding dues of the senior lenders and damages. Any shortfall in the termination payments received from the concessioning authorities may prevent us from recovering our investments or returns in the relevant Project SPVs adequately or at all. Also, on termination of the concession agreements and/or default under the financing documents executed with the project lenders, the payments/withdrawals from the escrow accounts of the respective Project SPVs may be entirely controlled by the discretion of the concessioning authorities and/or the project lenders.

11. The concession agreements may be terminated prematurely under certain circumstances.

Under the terms of concession agreements entered into by the Project SPVs, we have obligations to maintain our road projects in good working order and maintain the roads periodically. Our road projects require repair or maintenance due to natural disasters, accidents and other factors beyond our control. The concessioning authorities will periodically carry out tests through one or more engineering firms to assess the quality of roads and their maintenance. If we fail to maintain the roads to the standards set forth in the relevant concession agreements, the concessioning authorities may impose penalties, withhold annuity payments and demand remedies within cure periods. If we fail to cure our defaults in a timely manner within such time as may be prescribed under the concession agreement, our concession agreements may be terminated.

The contracts for our road projects typically specify certain operation and maintenance standards and specifications to be met by us while undertaking our operation and maintenance activities and develop a maintenance manual. These specifications and standards require us to incur operation and maintenance costs on a regular basis. The operation and maintenance costs of our projects may increase due to factors beyond our control, including but not limited to:

- standards of maintenance or road safety applicable to our projects prescribed by the relevant regulatory authorities;
- requirement for restoration of our projects in the event of any landslides, floods, road subsidence, other natural disasters accidents or other events causing structural damage or compromising safety;
- unanticipated increases in material and labour costs, higher axle loading, traffic volume or environmental stress leading to more extensive or more frequent heavy repairs or maintenance costs. The cost of major repairs may be substantial and repairs may adversely affect traffic flows;
- increase in electricity or fuel costs resulting in an increase in the cost of energy; or

- other unforeseen operational and maintenance costs.

Any failure by a Project SPV to maintain the relevant project according to the terms of the concession agreement will entitle the concessioning authorities to terminate the concession agreement or take remedial actions at the risk and cost of the Project SPV and recover such cost and damages from the Project SPV from the escrow account as if such costs and damages were O&M expenses.

If a concession agreement is terminated by the concessioning authority due to a default by a Project SPV, the Project SPV may be exposed to additional liability as it is obliged to repair or rectify, at its own cost, any defects or deficiencies identified by the independent engineer of the project for a period specified in the concession agreement upon such termination. In addition, the termination payment by the concessioning authority due to a default by a Project SPV, will be calculated according to the terms of the concession agreement, which may be less than the actual cost incurred by a Project SPV on its Project. Consequently, not only would the Project SPV recover less than the costs incurred, but such an occurrence would also have an adverse effect on the Nxt-Infra Trust's financial performance. Unless otherwise approved by the concessioning authorities, the termination payments to the Project SPVs, pursuant to a default by a Project SPV, may be contested by the concessioning authorities on the ground of the same being in nature of loans/advances by the shareholders of the Project SPV and the absence of the concessioning authority's approval to recognize the Nxt-Infra Trust as a senior lender.

In addition, our operations may be adversely affected by interruptions or failures in the technology and infrastructure systems that we use to support our operations, including toll road collection and traffic measurement systems. Furthermore, accidents and natural disasters may also disrupt the construction, operation or maintenance of our projects and concessions. Any significant increase in operations and maintenance costs beyond our budget and any failure by us to meet quality standards may reduce our profits and could expose us to regulatory penalties and could adversely affect our business, financial condition, cash flows, and results of operations.

If a concession agreement is terminated by the concessioning authorities due to a default by a Project SPV, or by the Project SPV due to a default by the concessioning authorities, such Project SPV is entitled to termination payments or otherwise from the concessioning authorities in accordance with the terms of the relevant concession agreement. In the future, if the Project SPVs avail financing from the Nxt-Infra Trust, the loans/advances from Nxt-Infra Trust may be for a maturity term that exceeds the maturity term of the original facilities obtained from the project lenders. There can be no assurance that the concessioning authorities will recognize such amounts as outstanding after the term of the original facilities obtained by the Project SPVs from their respective senior lenders or allow creation/enforcement of security interest over the assets/shares of the respective Project SPVs to secure such financing. There can also be no assurance that the concessioning authorities will pay the termination payments promptly or at all or that any termination payments will be adequate to enable us to recover our investments or returns in the relevant Project SPVs.

If any concession agreement is terminated prematurely, the business, financial condition, cash flows, and results of operations of the relevant Project SPV could be adversely affected. Please see the section titled "*Summary of Key Agreements*" on page 186.

12. The financing agreements of the Project SPVs and Sponsor entail interest at variable rates, and any increases in interest rates may adversely affect our results of operations, financial condition and cash flows. Further, the Project SPVs are subject to restrictive covenants under their financing agreements that could limit our flexibility in managing our business or to use cash or other assets.

The Trust proposes to avail a loan aggregating up to ₹ 3,50,000 lakhs, after the Closing Date (the "**InvIT Loan**" for the purpose of pre-payment or repayment, in whole or part, of the existing outstanding secured or unsecured loans of the Project SPVs (including principal amounts, interest thereon and any other fees or charges payable in connection thereto) as may be permitted under the SEBI InvIT Regulations and any other purpose as may be agreed between the relevant Project SPV and the InvIT as specified in the relevant disbursement request submitted by the relevant Project SPV. For the indicative terms in relation to the InvIT Loan, please see the section titled "*Financial Indebtedness*" on page 226. Further, the financing agreements entered into by the Project SPVs with certain banks and financial institutions contain certain restrictive covenants and cross default provisions. The financing agreements restrict the Project SPVs from, amongst other things, (i) make any amendments or alter the constitutional documents; (ii) make any changes in the management or control of the board without prior consent of the lenders; and (iii) effecting changes in its ownership without prior approval of the lenders. In addition, these restrictive covenants may also affect some of the Nxt-Infra Trust's rights as the shareholder of the relevant Project SPV and the Project SPV's ability to pay dividends if it is in breach of its obligations under the applicable financing agreement. Further, our Sponsor is a party to financing arrangements which may impose certain onerous conditions including in relation to interest rate, in case the listing of the Nxt-Infra Trust is not completed in accordance with the timeline prescribed under the financing agreement, or if the proceeds of the Issue are not utilized in the manner as provided for under the agreement. These may restrict our ability to conduct business and any breach thereof may adversely affect our results of operations, cash flows, and financial condition. In the event of any breach of any covenant contained in these financing agreements, apart from other consequences, the security trustee may enforce the security under the financing agreements which may adversely affect our business, financial condition, cash flows, and results of operations. We may also be required to immediately repay our borrowings either in whole or in part, together with any related costs.

In addition, our ability to meet the debt service obligations and repay the outstanding borrowings of the Project SPVs will depend primarily on the cash generated by our business. We cannot assure you that we will generate sufficient cash to service existing or proposed borrowings or fund other liquidity needs, which could have an adverse effect on our business, cash flows and results of operations. We may be required to refinance our outstanding borrowings in the future. There is no assurance that we will be able to obtain such financing, on favorable terms, or at all, which may have a material adverse effect on our business, financial condition, cash flows, and results of operations.

For further details in relation to the financing arrangements entered into by the Project SPVs, please see the section titled "*Financial Indebtedness*" on page 226.

13. The acquisition by the Nxt-Infra Trust of the Project SPVs from the Sponsor, or of any other asset from third parties in the future, may be subject to certain risks, which may result in damages and losses. We may not be able to recover losses arising from the acquisition of the Project SPVs from the Sponsor or third parties under relevant contractual arrangements.

The Project SPVs were not originally owned by the Sponsor and were acquired by the Sponsor from Welspun Enterprises Limited ("**Original Seller**") in 2022 pursuant to securities purchase agreements executed with the Original Seller ("**Welspun SPAs**"). The Sponsor does not have an extended history of operating the Project SPVs and despite pre-acquisition due diligence, we do not believe that it is possible to fully understand an asset before it is owned and operated for an extended time. We have relied on certain information and management representations provided by the Original Sellers until the date of acquisition of the Project SPVs by the Sponsor and accordingly any adverse impact pursuant to such information or representations may affect the earnings and cash flows of the Nxt-Infra Trust. Whilst the Welspun SPAs has been be assigned to the Nxt-Infra Trust, there is no assurance of enforcement and full recovery of losses arising on account of defects or deficiencies or any other issues in the Projects SPVs from the Original Sellers. There is no assurance that in the event any of defects or deficiencies in the Project SPVs, we will be able to raise any claim or fully recover any losses from the Sponsor or the Original Seller, in a timely manner, or at all.

Further, there is no assurance that special purpose vehicles or infrastructure assets will not have defects or deficiencies that are unknown or unquantified and that may require additional capital expenditure or obligations to third parties, including to the relevant concessioning and statutory authorities, which may have an adverse effect on the earnings and cash flows of the Nxt-Infra Trust, and the distributions to the Unitholders, upon acquisition. The acquisition of the Project SPVs from the Sponsor may also entail integration and management of these future assets to realize economies of scale and control costs, as well as other risks, including diversion of management resources otherwise available for ongoing development of our business.

In accordance with the Welspun SPAs and the Securities Purchase Agreements, certain claims of the Project SPVs are required to be passed through to the Original Seller. In addition, the Project SPVs may be subject to unknown or contingent liabilities for which the Nxt-Infra Trust may have limited or no recourse against the Sponsor or the Original Seller. Such unknown or contingent liabilities may also include tax liabilities and other liabilities whether incurred in the ordinary course of business or otherwise.

The Project SPVs have applied to the concessioning authorities for their consent in relation to, amongst others, the transfer of the Project SPVs to the Nxt-Infra Trust. There can be no assurance that the concessioning authorities will grant such consent, or that while granting such consent, the concessioning authority will not impose any conditions in relation to such transfer. Further, the Project SPVs have availed certain borrowings from banks and other institutions accordingly have obtained clarification certificates from certain lenders for the purposes of transfer of the Project SPVs to the Nxt-Infra Trust. If such clarifications are not received from certain lenders, conditions are not fulfilled, or in the event of a dispute with the lenders in relation to such debt financing, the Nxt-Infra Trust may not be able to acquire all of the Project SPVs from the Sponsor which could have an adverse effect on the Nxt-Infra Trust's business and results of operations. The Project SPVs may require consents from other third parties (including regulatory authorities) in relation to the transfer of shareholding from Sponsor to the Trust. Additionally, WIPL requires consent from the NHAI in relation to transfer of balance shareholding (*i.e.* 51% of total shareholding of WIPL) from the Original Seller. While, the Project SPVs have applied and WIPL shall further apply (for transfer of balance 51% shareholding) to the concessioning authority for a consent at the appropriate stage, we cannot assure you that the consent will be received in time, or at all. If these consents are not received, the Nxt-Infra Trust may not be able to acquire all of the Project SPVs from the Sponsor which could have an adverse effect on the Nxt-Infra Trust's business and results of operations.

14. The utilisation of Issue Proceeds towards redemption of Project SPV OCDs is subject to pre/repayment of loans

We propose to utilize the Issue Proceeds to infuse debt in the Project SPVs, for redemption of optionally convertible debentures including any accrued interest, in whole or part, issued by the Project SPVs ("**Project SPV OCDs**"). For further details, see the section titled "*Use of Proceeds*" and "*Financial Indebtedness*" on page 222 and 226, respectively. Pursuant to the financing documentations entered into by and amongst the Project SPVs and third-party/external lenders, redemption of these Project SPV OCDs requires prior consent of the external lenders in the event that the OCDs are proposed to be redeemed prior to repayment, in full, to the external lenders. While the Issue Proceeds are presently proposed to be utilised towards redemption of Project SPV OCDs, only after the complete prepayment/ repayment of the credit facilities/loans availed by the Project SPVs, we cannot assure you that the Project SPVs will be able to undertake the repayments to the

external lenders in a timely manner, or at all, which may impact our ability to utilize the Issue proceeds in the manner set out in this Draft Placement Memorandum.

15. ***The lenders of the Project SPVs may not release the pledge of shares or waive the obligations under non-disposal undertakings of certain Project SPVs, that have been created pursuant to loan agreements that have been entered into between the Project SPVs and their lenders.***

    The shares of all Project SPVs are pledged or fall under certain non-disposal undertakings with their lenders as part of the security for borrowings availed by them from their respective lenders. Whilst the respective lenders have been intimated of the release of shares under pledge or non-disposal undertakings, as of the date of this Draft Placement Memorandum, we have not received any acknowledgement or no objection certificate from the lenders for the release of such securities. If such security is not released by the lenders in a timely manner, or at all, it could have an adverse impact on the ability of the Nxt-Infra Trust to acquire the shareholding in such Project SPVs in a timely manner, or to not acquire at all.

16. ***Lower than expected returns on our investment in our Projects may adversely affect our financial results.***

    Our Projects are predominantly hybrid annuity-based projects, where the revenue depends on the fixed amounts paid to us semi-annually by our government clients, as adjusted for WPI and CPI. The amount of annuity is not necessarily linked to investment and will only be calculated pursuant to the relevant concession agreements.

    There are no provisions in our concession agreements protecting us against increases in interest rates or cost of raw materials. Our lenders may have the right to periodically adjust our interest rates and our applicable interest rates may increase based on their review of our credit profile and perceived risks in our operations. Our operational costs may also increase substantially during the operation of our toll-based project due to shortage of raw materials or substantial increases in prices of raw materials required for operation and maintenance beyond the permitted scope of adjustment due to occurrence of certain events under the relevant provisions of the concession agreements. Many factors causing such adverse changes are beyond our control and we are usually not able to demand matching increases in our tolling fees over and above certain fixed increases, in accordance with the concession agreements.

    Under the relevant concession agreements, our Project SPVs have rights to operate the road projects exclusively for fixed periods of time and we receive annuities and/or collect tolls, as the case may be, for the use of our roads. However, we may be faced with competition from new roads developed by NHAI and/or State Governments, which are not within our control. For example, MPRDC has the right to construct competing roads after a prescribed period of time, pursuant to the terms of the concession agreements. State Governments may not always charge for the use of these roads. There can be no assurance that our road projects will compete effectively against such roads that connect the same locations. Any material decrease in the actual traffic volume as compared to our forecasted traffic volume could have a material adverse effect on our cash flows from our Toll Project, which in turn can adversely affect our business, prospects, financial condition and results of operation.

    As our Projects often require significant capital investment with potential returns spread over a long period of time, inadequate toll revenues and annuities collected from our projects may result in a low return or even loss on our investment, which may adversely affect our liquidity, business, financial condition and results of operation.

17. ***The terms of the Project Implementation and Management Agreements may change subject to comments provided by concessioning authorities***

    Pursuant to the terms of the respective concession agreements, the Project SPVs are required to submit to their respective concessioning authorities, drafts of all project agreements and documents or any amendments or replacements, pursuant to which the relevant concessioning authorities have the right to review and provide comments within specified time periods. Accordingly, the Project SPVs have submitted drafts of the Project Implementation and Management Agreements to the relevant concessioning authorities for comments. We cannot assure you that, (i) the concessioning authorities may not have any further comments on the Project Implementation and Management Agreement, and (ii) such comments may not have an impact on the business and operations of the Project SPVs and their financial operations.

18. ***Our Investment Manager has not executed any binding agreements with respect to the Securities Purchase Agreements, Trust Loan Agreement, the Project Implementation and Management Agreement and the ROFR Agreement. Our Investment Manager's inability to consummate transactions in relation to these agreements will impact the Issue and its ability to complete the Issue within the anticipated time frame or at all.***

    Our Investment Manager has not executed binding agreements with respect to (i) the Securities Purchase Agreements; (ii) Trust Loan Agreement; (iii) Project Implementation and Management Agreement, and (iv) ROFR Agreement, amongst others. These agreements will be executed prior to the filing of the Placement Memorandum, and the underlying transactions, will be consummated or become effective, as applicable, after the closing date. While the agreed forms of these agreements have been taken on record by the IM Board (through a relevant committee thereof), and the broad terms of these agreements have been disclosed in this Draft Placement Memorandum, the scope of these agreements are indicative in nature and consequently, subject to change. For further details, see "*Parties to the Trust*" and "*Related Party Transactions*" on pages 85 and 265.

19. ***Our operating expenses are dependent on the routine and periodic major maintenance obligations contained in the concession agreements and are subject to fluctuations.***

The Project SPVs are required to operate and maintain the Projects in accordance with the respective concession agreements. Accordingly, the Project SPVs prepare a maintenance manual and a maintenance program in consultation with an independent engineer appointed by the NHAI or other concessioning authority for each project and are required to abide by the same. The Project SPVs' maintenance obligations are primarily to operate and maintain the Projects in order to permit the safe, smooth and uninterrupted flow of traffic and the related work and maintenance that they are required to undertake in order to fulfil such obligations. Such maintenance obligations include the repair of wear and tear of roads including overlaying the surface of the roads, among other things. Please see the section titled "*Summary of the Key Agreements*" on page 186 for details on the Project SPVs' O&M obligations.

Routine and periodic major maintenance costs mainly comprise costs of raw materials and other items including fuel, equipment costs and labour expenses, besides maintenance and replacement of hardware, software, tolling expenses and equipment. The prices and supply of raw materials depend upon factors that are beyond our control, including, but not limited to, general economic conditions, transportation costs, global and domestic market prices, competition, production levels and import duties, which could be cyclical in nature. Unanticipated increases in the price of materials, fuel costs, labour or other inputs will affect the results of operations of the Project SPVs, especially if the wear and tear on the relevant project requires major work. The ability of the Project SPVs to absorb increases in the purchase price of materials, fuel and other inputs is limited.

Further, our operational costs may also increase substantially, if the any O&M Contractors engaged by the Project SPV or the Project Manager fail to perform their duties as per the O&M Agreements.

20. ***The revenues of our toll project are subject to significant fluctuations due to changes in traffic volumes and the mix of traffic and a decline in traffic volumes could adversely affect our business prospects, financial condition, results of operations and their ability to make distributions.***

One of our Projects is exclusively toll based and the remaining five Projects are hybrid annuity projects. Toll revenues depend on toll receipts and are affected by changes in traffic volumes and the mix of traffic. Our total revenue from DBFOT (Toll) SPV for six-month period ended September 30, 2023, and the Financial Years 2023 was ₹16,919.35 lakhs and ₹ 25,410.17 lakhs, respectively. No revenue was generated by the DBFOT (Toll) SPV revenue in the Financial Years 2022 and 2021. Traffic volumes are directly or indirectly affected by a number of factors, many of which are outside the control of DBFOT (Toll) SPV, including toll rates, fuel prices, the affordability of automobiles, the quality, convenience and travel time on alternate routes, industrial growth and development and the availability of alternate means of transportation, including rail networks and air transport. Moreover, the cash flows of DBFOT (Toll) SPV are affected by seasonal factors, which may adversely affect traffic volumes. India experiences monsoon rains each year, which can affect the volume of traffic on such projects. During such periods of curtailed activity, DBFOT (Toll) SPV may continue to incur operating expenses but receive reduced toll revenues. Such fluctuations may adversely affect the business, financial condition or results of operations of DBFOT (Toll) SPV.

The toll revenues of this Project SPV may also be affected by various regulatory and statutory conditions and restrictions. On May 26, 2021, the NHAI issued guidelines to ensure service time of not more than 10 seconds per vehicle even at peak hours at the toll plazas on the National Highways. In accordance with these guidelines, queues of vehicles at toll plazas must not exceed 100 meters, and in the event of queues longer than 100 meters the vehicles will be allowed to pass without paying toll till the queue comes within 100 meters from the toll booth. Such conditions on the payment of toll may adversely affect the business, financial condition or results of operations of DBFOT (Toll) SPV.

Traffic volumes are also influenced by the convenience and extent of a toll road's connections with other parts of the state and national highway and toll road network, as well as the cost, convenience and availability of other means of transportation and alternative routes. There can be no assurance that future changes affecting the road network in India, through road additions and closures or through other traffic diversions or redirections, or the development of other means of transportation, such as air or rail transport, will not adversely affect traffic volume on toll roads.

21. ***Leakage of the tolls collected on the toll-linked Projects may adversely affect the relevant Project SPVs' revenues and earnings.***

One of the Projects is exclusively toll based and five of the Projects are hybrid annuity projects. Toll receipts are primarily dependent on the integrity of toll collection systems. The Project SPVs that have a toll component generate revenues from the Projects through the collection of tolls. On Indian toll roads, each motorist generally pays a one-time entry tariff to the toll operator at the point of entry to the toll road based on the average trip distance calculated for all users of the toll road. Such Project SPVs employ toll management software to monitor their operations.

The level of revenues derived from the collection of tolls may be affected by reduction in toll rates as determined by the concessioning authorities. Toll revenues may also be affected by leakage through toll evasion, theft, fraud or technical faults in the toll systems or forced violations by users of toll roads. At times, there may be a need to allow users of tolls roads to pass through without paying applicable tolls due to heavy traffic build up, or there may be an inability to collect tolls due to

political protests or agitations relating to tolling. Although DBFOT (Toll) SPV has systems in place to minimise leakage through fraud and pilfering, any significant failure to control leakage in toll collection systems could have an adverse effect on our business, prospects, financial condition, cash flows, and results of operations.

22. ***We may be required to record significant charges/expenses to earnings in the future when we review our financial assets for potential impairment.***

Under Ind AS, we are required to review our financial assets for impairment whenever circumstances indicate that the carrying value may not be recoverable. Various uncertainties, including deterioration in the global economic conditions that result in upward changes in cost of capital, the occurrence of natural disasters that impact our financial assets, adverse weather conditions, labour disputes, disputes with contractors, accidents, changes in government priorities and policies, changes in applicable legislation, regulations and rules, changes in market or economic conditions, delays in obtaining the requisite licenses, unavailability of spare parts and equipment, and other unforeseeable problems and circumstances, could impact expected cash flows to be generated by such assets, and may result in impairment of these financial assets in the future.

We may be required in the future to record a significant charge to earnings in our financial statements during the period in which any impairment of our financial assets is determined. While no such impairment has occurred in respect of the Project SPVs, notwithstanding that any such impairment would be a non-cash expense, any such charges will likely have a material adverse effect on our results of operations.

23. ***We may be subject to inflation/deflation and interest rate risks.***

There are no specific provisions in our concession agreements protecting us against increases in interest rates or cost of raw materials. Our lenders may have the right to periodically adjust our interest rates and our applicable interest rates may increase based on their review of our credit profile and perceived risks in our operations. Many factors causing such adverse changes are beyond our control, and we are usually not able to demand matching increases in our annuities.

24. ***The Project SPVs have a limited period to operate the Projects as the concession periods granted to the Project SPVs are fixed.***

Each of the concession agreements entered into by the Project SPVs provides for a fixed term concession, subject to some variations and extension as permitted under the concession agreements or as may be granted by the concessioning authorities, at the end of which the operation of the relevant project will be transferred to the relevant concessioning authority. On a collective basis, the Projects had a weighted average residual project life of approximately 10.8 years, as of September 30, 2023. For details of the concession periods of the Project SPVs, please see the section titled "*Business*" on page 163. We have, in the past, sought and been granted extensions for the concession periods. However, there is no assurance that concessioning authorities will grant any similar extensions in the future. In addition, there can be no assurance that the Nxt-Infra Trust will be able to successfully acquire new assets to replenish our portfolio once the existing concession agreements expire. Further, if the operating periods of the Projects are shortened or disrupted or the rights of the Project SPV to operate the Projects are terminated before the expiry of the concessions, the business, financial condition, cash flows, and results of operations of the Nxt-Infra Trust may be adversely affected.

25. ***The Project SPVs, which are responsible for the operation and maintenance of the Projects under the respective concession agreements, may be directed by the relevant concessioning authority to undertake, and the Project SPVs will be obliged to perform, additional construction work.***

Under the terms of the concession agreements, the Project SPVs are responsible for the operation and maintenance of the Projects during the applicable concession periods. A concessioning authority may require a Project SPV to provide additional work and services not included in the original scope of the concession agreement. For example, if a Project SPV is required to construct additional fast tag lanes, in addition to the construction, it needs to facilitate electronic toll lanes and build weigh-in motion equipment to check for the overloading of vehicles, among other things. While we believe that the concessionaire can apply for reimbursement for change of scope works, there is no assurance that the money spent on complying with change of scope orders will be reimbursed in a timely or complete manner by the concessioning authority.

Further, in accordance with the concession agreement, the concessioning authorities may require the Project SPVs to procure capacity augmentation in relation to the Projects which may result in significant capital expenditure for the Project SPVs. On refusal or non-acceptance by the Project SPVs to undertake such augmentation, or on the failure of the Project SPVs to undertake such augmentation as per the timelines set out by the concessioning authority, the concessioning authorities may in their discretion terminate the concession agreement.

26. ***Newly constructed roads or existing alternative routes may compete with the project of WIPL and result in the diversion of the vehicular traffic and a reduction of tolls that the Project SPV can collect.***

WIPL is exclusively toll based and five of the Projects SPVs are hybrid annuity projects. Under the terms of the concession agreements entered into by WIPL with a toll component, NHAI is entitled to construct an additional tollway for use by traffic which may serve as alternate routes to the Project SPVs after the expiry of determined time period, depending on the

terms of the concession agreements such as completion of the 10th anniversary of the appointed date as defined under the concession agreement and average traffic on the project highway in any year exceeds 90% of its designed capacity. Notwithstanding that, the development of such an additional tollway during the subsistence of the concession agreement could compete with the relevant project and attract users (who would have otherwise used the Project) to use the additional tollway and divert vehicular traffic from WIPL, thereby reducing toll collections by the Project SPV which could have an adverse effect on their business, financial condition, cash flows, or results of operations. Please see the section titled "*Summary of Key Agreements*" on page 186.

There is no assurance that any alternative roads built or improved will not compete with the Project SPV and have an adverse effect on the Nxt-Infra Trust's business, financial condition, revenues and operations.

27. Systems failures, cyber security breaches and attacks and resulting interruptions in our toll-linked project could adversely affect our business, financial condition, cash flows and results of operations.

The proper functioning of our technology infrastructure is essential to the conduct of our business. As the Project SPV is reliant on an electronic toll collection system, our transaction-processing systems and our network infrastructure are critical to our success.

To the extent of our Toll Project, our electronic toll collection systems may experience service interruptions or degradation or other performance problems because of, amongst other, hardware and software defects or malfunctions, unexpected high volume of transactions, cyberattacks and cyber-security breaches, infrastructure changes, human error, natural disasters, power losses, disruptions in telecommunications services, unauthorized access, fraud, military or political conflicts, terrorist attacks, legal or regulatory takedowns, computer viruses, ransomware, malware, or other events. In some instances, we may not be able to identify the cause or causes of these performance problems within an acceptable period of time. Further, as techniques used to obtain unauthorized access to or sabotage systems change frequently and may not be known until launched against us, we may be unable to anticipate, or implement adequate measures to protect against, these attacks.

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

28. An inability to obtain, renew or maintain the required statutory and regulatory permits and approvals or to comply with the applicable laws may have an adverse effect on the business of the Project SPVs.

The Project SPVs require certain approvals, licenses, registrations and permissions under regulations, guidelines, circulars and statutes regulated by the Indian regulatory and government authorities to be obtained at various stages and by a number of parties. There can be no assurance that the relevant authorities will issue these approvals or licenses, or renewals thereof, in a timely matter, or at all. In addition, the Project SPVs are required to comply with a wide variety of Indian laws and regulations. There can be no assurance that the Project SPVs are in compliance with such laws and regulations or as requested by the regulatory authorities, have obtained all necessary approvals or that they will continue to obtain the necessary approvals or have been and will continue to be in compliance with all applicable laws and regulations. For example, in the case of our Project SPVs, while we have applied for approval of concessioning authority in relation to the transfer of shareholding from Sponsor to the Trust, we have not received the same. For further details, please see the section titled *"Regulatory Approvals"* on page 277. In the event of any failure to obtain or renew the approvals or if there is a delay in the obtaining of such approvals, the business and financial condition of the Project SPVs could be adversely affected. Further, there may be instances where approvals/licenses may have been obtained in the name of the erstwhile seller, or the erstwhile name of a Project SPV, and not in the current name of the Project SPV. Permits, licenses and approvals could be subject to several conditions, and we cannot assure investors that the Project SPVs have complied with all such conditions and will be able to continuously meet such conditions or be able to prove compliance with such conditions to the authorities. Any non-compliance may lead to cancellation, revocation or suspension of relevant permits, licenses or approvals, which may result in the interruption of the operations of the Project SPVs and may adversely affect the business, financial condition, cash flows, and results of operations of the Project SPVs.

29. The Project SPVs may be required to pay additional stamp duty if any concession agreement is subject to payment of stamp duty as a deed creating leasehold rights, or as a development agreement.

Currently, concession agreements are treated as agreements which are not lease deeds and stamp duty ranging between ₹100 to ₹500 is typically paid for such concession agreements. 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 concessioning authorities. The stamp authorities allege that since the 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. Accordingly, concession agreements that have not been stamped as such could be considered to be inadequately stamped. The High Courts of Allahabad and Madhya Pradesh 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.

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 10 times the amount of the stamp duty payable.

We believe we have adequately discharged our obligation in relation to the stamp duty of the concession agreements. However, if any of the concession agreements were determined to be inadequately stamped, then such agreements would be inadmissible as evidence in any legal action, until the deficient amount of stamp duty together with penalties, if any, was paid. Any deficiently stamped documents can also be impounded by any person having authority, by law or consent, to receive evidence or every person who is in-charge of a public office. Such persons impounding the deficiently stamped documents can either levy the appropriate stamp duty and penalty or send them to revenue authorities for that purpose. In addition, a person who signs an instrument chargeable with stamp duty will be subject to a fine if such instrument is not duly stamped.

Concession agreements contain change in law provisions which extend to a change in the interpretation or application of any Indian law by a court of record after the date of the concession agreement or the submission of the bid documents, as the case may be. Under the terms of the concession agreements, if any financial burden exceeding a certain prescribed threshold is imposed on a concessionaire as a result of such change in law, then it may be entitled to approach the concessioning authority to amend the concession agreement or seek compensation to place the concessionaire in its former financial condition. However, relief under the concession agreements may be limited in nature. There can be no assurance that the relevant concessioning authority will consider additional stamp duty on the concession agreements as a change in law for which they will amend the concession agreement or agree to provide compensation to the concessionaire. Any disagreement between the relevant concessionaire and the concessioning authority may result in arbitration proceedings between the parties which could lead to increased costs.

Any imposition of a demand for payment of a higher stamp duty or imposition of penalty would increase the costs of the Projects, to the extent such additional costs are not recoverable from the concessioning authorities, and could adversely affect the business, cash flows, results of operations and prospects of the Project SPVs.

30. Failure to comply with and changes in, safety, health and environmental laws and regulations in India may adversely affect the business, prospects, financial condition, cash flows, and results of operations of the Project SPVs.

The Project SPVs are required to adhere to various environmental, health and safety laws and regulations and various labour, workplace and related laws and regulations in India as per the requirements of the concession agreements they have entered into or as may have been adopted by the Investment Manager, as applicable. Please see the section titled "*Regulations and Policies*" on page 269. If any of the Project SPVs fail to meet environmental, health or safety requirements, they may also be subject to administrative, civil and criminal proceedings by government authorities, as well as civil proceedings by environmental groups and other individuals, which could result in substantial fines and penalties against the Project SPVs as well as orders that could limit or halt the operations of the Project SPVs. In the past, monetary penalties have been imposed on certain Project SPVs for not maintaining the prescribed air quality index. As a result, our business, results of operations, financial condition and cash flows could be materially and adversely affected. The Trust cannot assure investors that the Project SPVs have been and will continue to be in compliance with all environmental, health and safety and labour laws and regulations.

Further, any changes in, or amendments to, these standards or laws and regulations could further regulate the operations of the Projects and could require the Project SPVs to incur additional, unanticipated expenses in order to comply with these changed standards. The scope and extent of any new environmental, health and safety regulations, including their effect on the operations of the Projects and the cash flows of the Project SPVs, cannot be predicted with certainty. The costs and management time required to comply with these requirements could be significant. The measures taken in order to comply with these new laws and regulations may not be deemed sufficient by government authorities and compliance costs may significantly exceed estimates.

There can be no assurance that the Project SPVs will not become involved in future litigation or other proceedings or be held responsible in any such future litigation or proceedings relating to safety, health and environmental matters in the future. Clean-up and remediation costs, as well as damages, payment of fines or other penalties, other liabilities and related litigation, could adversely affect the business, prospects, financial condition, cash flows, and results of operations of the Project SPVs.

31. The current insurance coverage for the Projects may not protect the Project SPVs from all forms of losses and liabilities associated with their businesses.

Road infrastructure development project contracts are subject to various risks including:

- political, regulatory and legal actions that may adversely affect a project's viability;
- changes in government and regulatory policies;
- design and engineering defects;

- breakdown, failure or substandard performance of equipment;
- improper installation or operation of equipment;
- labour disturbances;
- terrorism and acts of war;
- inclement weather and natural disasters, including earthquakes, flooding, tsunamis and landslides and pandemics; and
- adverse developments in the overall economic and capital financing environment in India.

The Project SPVs have in place various project-specific insurance policies covering the Project SPVs against material damage, burglary, terrorism and all-risk policies against risk of fire and natural calamities. While the relevant Project SPVs have made insurance claims in relation to such losses, the claims remain pending, and there is no assurance that such insurance claims will be approved by the insurers, in their entirety, in part, or at all. For further details, please see the section titled "*Business*" on page 163. In the past, some of our Project SPVs have experienced damages to road and toll plaza due to farmers agitation, canopy incident, floods, seasonal factors, natural calamities and the insurance claims in respect of losses incurred by these Project SPVs are pending. Any reduction or non-receipt of applied insurance claim may adversely affect our business, prospects, financial condition, cash flows and results of operations. However, there can be no assurance that all risks are adequately insured against or that the Project SPVs will be able to procure adequate insurance coverage at commercially reasonable rates in the future. Natural disasters in the future may disrupt traffic, thereby adversely affecting toll collections and causing significant disruption to the operations of the Projects and causing damage to the Projects and the environment that could have an adverse impact on the business and operations of the Project SPVs. In addition, not all of the above risks may be insurable on commercially reasonable terms, or at all. For example, the Project SPVs are required, under the concession agreements, to maintain the quality of the roads and to repair the roads in the event of damage to the roads on account of accidents or other reasons. Accordingly, there may be significant expenditure incurred by a Project SPVs to repair damaged roads and maintain the Projects in good condition, particularly if the damage is major, unanticipated or uninsured. The insurance obtained in relation to the Project SPVs may not provide adequate coverage in certain circumstances and is subject to certain deductibles, exclusions and limits on coverage.

In addition, insurance policies are typically subject to annual review by insurers, and there can be no assurance that they will be renewed on similar or otherwise acceptable terms, if at all. To the extent that the Project SPVs suffer any damage or loss which is not covered by insurance, or exceeds the insurance coverage, the loss would have to be borne by the Project SPVs. The proceeds of any insurance claim may also be insufficient to cover rebuilding costs as a result of inflation, changes in regulations regarding infrastructure projects, environmental and other factors. The resulting costs could have an adverse effect on the Nxt-Infra Trust's business, prospects, financial condition, cash flows, or results of operations and no assurance can be given that losses in excess of insurance proceeds will not occur in the future.

32. The cost of repairing and refurbishing existing equipment for operating, maintaining and monitoring the Projects could be significant and could adversely affect the results of operations, cash flows and financial condition of the Project SPVs.

Some of the equipment used by the Project SPVs at the Projects have pre-determined useful lives and the Project SPVs are required to repair or refurbish such equipment at periodical intervals, pursuant to the terms of the concession agreements. These obligations may be undertaken by the O&M Contractors pursuant to O&M Agreements. There can be no assurance that such replacement or refurbishment will be undertaken in a timely or efficient manner by such O&M Contractors, and any increased costs to the Project SPVs as a result of such replacement or refurbishment by the O&M Contractors will not affect the profit margins of the Project SPVs and adversely affect their cash flows.

33. The business and financial performance of the Nxt-Infra Trust, the operations of the Projects and any future projects that the Nxt-Infra Trust may acquire, are significantly dependent on the policies of, and relationships with, various government entities in India and could be affected if there are adverse changes in such policies or relationships.

The operations of the Projects and any future projects that the Nxt-Infra Trust may acquire, are and will be significantly dependent on various central and state government entities, in terms of policies, incentives, budgetary allocations and other resources provided by these entities for the surface transportation industry, as well as the terms of the contractual arrangements, concessions and other incentives available from these government entities for the projects. Sustained increases in budgetary allocations by the GoI and various state governments for investments in the infrastructure sector, the development of structured and comprehensive infrastructure policies that encourage greater private sector participation and increased funding by international and multilateral development financial institutions in infrastructure projects in India have resulted in, and are expected to continue to result in, an increase in the amount of transportation infrastructure projects undertaken in India. Any adverse change in the focus or policy framework regarding infrastructure development or the surface transportation industry, of or change in the Nxt-Infra Trust's relationships with the GoI or various government entities in India, could adversely affect the Projects, the opportunities for the Nxt-Infra Trust to secure new projects and the business, financial condition and results of operations of the Nxt-Infra Trust.

In addition, the projects in which government entities participate 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 government entities are responsible for awarding concessions and are parties to the development and operations of projects, projects are directly and significantly dependent on their support. Any withdrawal of support or adverse changes in their policies may lead to the agreements being renegotiated and could also adversely affect the financing, capital expenditure, revenues, development or operations relating to the Projects.

34. The Project SPVs and Projects may be subject to legal or regulatory action and the Nxt-Infra Trust may be required to incur substantial expenses in defending any such actions and there is no assurance that the Project SPVs will be successful in defending such actions.

Certain Project SPVs are involved in legal proceedings which are pending at different levels of adjudication before various courts, tribunals and regulatory authorities. In addition, arbitration and litigation proceedings in India can be time consuming and the Project SPVs may have to incur costs and devote considerable resources towards defending the outstanding legal proceedings. There is no assurance that the legal proceedings will be decided in favour of the relevant Project SPVs. The legal proceedings may be decided against the relevant Project SPV or changes in the relevant laws and regulations may adversely affect the outcome of such legal proceedings. For more details, please see the section titled "*Legal and other information*" on page 280.

Under the Project Implementation and Management Agreement, the Project Manager will be indemnified the Nxt-Infra Trust against certain identified matters. Further, under certain of the O&M Agreements, the O&M Contractors will provide indemnities to the Project SPVs. However, the aggregate liability from such claims is limited under each contract. Further, there can be no assurance that the Nxt-Infra Trust will be able to successfully bring a claim and invoke the indemnity obligations against the Project Manager or the O&M Contractors. Any substantial costs incurred by the relevant Project SPV towards defending the outstanding legal proceedings or any unfavourable outcome in relation to such proceedings could have an adverse effect on the Nxt-Infra Trust's business, financial condition, results of operations and prospects.

35. The Sponsor, the Sponsor Group, Investment Manager, Project Manager and/or their respective associates, and the Trustee are or may, from time to time, be involved in legal proceedings, which if determined against such parties, may have an adverse effect on the reputation, business and results of operations of the Nxt-Infra Trust.

The Sponsor, the Sponsor Group, Investment Manager, Project Manager and/or their respective associates, and the Trustee are or may, from time to time, be involved in certain legal proceedings, including in relation to criminal matters, tax matters, civil and arbitration proceedings, which are or may be pending at different levels of adjudication before various courts, tribunals and appellate authorities. 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 the Nxt-Infra Trust's or the Project SPVs' interests may have an adverse effect on our business, future financial performance and results of operations. For more details, please see the section titled "*Legal and other information*" on page 280.

36. The independent auditor report on the InvIT's Projections of Revenue from Operations and Cash Flow from Operating Activities and Underlying Assumptions contains restrictions with respect to the purpose and use of the report by investors in the United States.

The independent auditors' report on the InvIT's Projections of Revenue from Operations and Cash Flow from Operating Activities and Underlying Assumptions, contains restrictions to indicate that the report is required by the SEBI InvIT Regulations requiring the independent auditor to issue a report on the Projections of Revenue from Operations and Cash Flow from Operating Activities and Underlying Assumptions and is issued for the sole purpose of the Issue in accordance with the SEBI InvIT Regulations. The independent auditor's work has not been carried out in accordance with auditing or other standards and practices generally accepted in jurisdictions outside India, including in the United States, and accordingly should not be relied upon as if it had been carried out in accordance with those standards and practices. U.S. securities regulations do not require profit forecasts to be reported by a third party and the report should not be relied upon by anyone in such jurisdictions. The independent auditors accept no responsibility and deny any liability to any person who seeks to rely on the report and who may seek to make a claim in connection with any offering of securities on the basis that they had acted in reliance of such information under the protections afforded by the law of the United States.

37. The Project SPVs depend on the O&M Contractors to operate and maintain the Projects. Any delay, default or unsatisfactory performance by the O&M Contractors could adversely affect the Project SPVs' ability to effectively operate or maintain the Projects.

The Project SPVs are obligated to maintain the Projects according to standards specified in the concession agreements. In this regard, the Project SPVs have entered into the O&M Agreements with the O&M Contractors. Under such O&M Agreements, the O&M Contractors are required to discharge the obligations of the Project SPVs under the concession agreements relating to operation and maintenance. The Project SPVs may have limited control over the timing or quality of services, equipment or supplies provided by the O&M Contractors. Inefficiencies or operational failures on the part of the Project SPVs or the O&M Contractors, as a result of defects in design, quality of construction or maintenance, could result in the Project SPVs incurring increased costs, loss of revenue and penalties, thereby causing adverse impact on the financial position of the Project SPVs.

The Project SPVs may also be exposed to risks relating to inability of the O&M Contractors or other sub-contractors to obtain requisite approvals for operation and maintenance activities, as well as risks relating to the quality of their services, equipment and supplies. The O&M Agreements only provide for damages in case of default by the O&M Contractor in performance of its obligations and do not provide for any kind of security/guarantee from the O&M Contractors. Further, the aggregate liability from such claims is limited under each contract. For example, in the past some of our Project SPVs have experienced withholding of annuity installments by the respective concessioning authority due to delay in completion of punch list as per the concession agreements. There can be no assurance that such instances will not happen in the future, which may have a material adverse impact on our financial and operational performance.

In addition, under certain of the concession agreements, the consent of the concessioning authority is required for any selection or replacement of an operation and maintenance contractor. Any delay, default or unsatisfactory performance by the O&M Contractors or other sub-contractors could adversely affect the ability of the Project SPVs to effectively operate or maintain the Projects. This may result in increased costs as well as losses of revenue for the Project SPVs and thereby have an adverse effect on the financial condition and results of operations of the Nxt-Infra Trust.

38. The Project SPVs may be held liable for the payment of wages to the contract labourers engaged indirectly in the operations of the Nxt-Infra Trust.

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

39. The results of operations of the Project SPVs could be adversely affected by strikes, work stoppages or increased wage demands by the employees of the Project SPV, O&M Contractors or other sub-contractors.

In the event of any strikes or work stoppages by employees of the Project SPV itself, the O&M Contractors or other sub-contractors due to increased wage demands or the inability of the Project SPV, O&M Contractors or other sub-contractors to either retain or recruit employees and sub-contractors with suitable credentials, the ability of the Project SPVs to collect tolls and maintain and operate the Projects will be adversely affected. In addition, any disruption to the services provided by the employees of the Project SPV, the O&M Contractors or other sub-contractors will have an adverse effect on the operations of the Project SPVs. There can be no assurance that future disruptions will not be experienced due to disputes or other problems with the work force, which may adversely affect the business and results of operations of the Project SPVs.

40. The Project SPVs have experienced losses in previous years and any losses in the future could adversely affect Nxt-Infra Trust's business, financial condition and the results of its operations, its ability to make distributions and the trading price of the Units.

The Project SPVs have experienced losses for one or more Fiscals in the last three Fiscals. Under the Companies Act, 2013, companies that do not generate "distributable profits" are not permitted to pay dividends. Accordingly, any Project SPV that fails to generate such distributable profits will not be permitted to pay dividends to the Nxt-Infra Trust which will adversely affect the quantum of distributions made by the Project SPVs to the Nxt-Infra Trust. Such change may adversely affect the Nxt-Infra Trust's ability to make distributions to Unitholders.

The detailed break up of cash flows is summarized in below mentioned table and we have reported negative operating cash flows in the Financial Year 2021 and Financial Year 2023.

(in ₹ lakhs)

Particulars	*Six months period ended September 30, 2023*	*Year ended March 31, 2023*	*Year ended March 31, 2022*	*Year ended March 31, 2021*
Net cash flow from/ (used in) operating activities	2,918.63	(2,685.95)	14,917.16	(57,908.15)
Net cash flow from/ (used in) investing activities	6,816.87	1,453.53	8,032.54	3,357.06
Net cash flow from/ (used in) financing activities	(22,430.10)	(698.33)	(5,645.12)	52,315.31

There can be no assurance that we will not experience periods of negative cash flow in the future. If the negative cash flow trend persists in future, we may not be able to generate sufficient amounts of cash flow to finance working capital and capital expenditure requirements of our business, which would have a material adverse effect on our business and results of operations. Further, sustained negative cash flow could adversely impact our business, financial condition and results of operations.

41. We have entered into material related party transactions and may continue to do so in the future, which may potentially involve conflict of interests with the Unitholders.

The transactions resulting from the Project Implementation and Management Agreement, the Investment Management Agreement, and the Securities Purchase Agreements are related party transactions and their terms may not be deemed as favourable to us as if they had been negotiated solely amongst unaffiliated third parties. Furthermore, it is likely that we will enter into additional related party transactions in the ordinary course of our business. The terms of such future transactions may not be as favourable to us as those negotiated solely amongst unaffiliated third parties and may involve conflicts of interest. Such future transactions, individually or in the aggregate, could have a material adverse effect on our business, prospects, financial condition, results of operations and cash flows. For additional details, please see the sections titled "*Related Party Transactions*", "*Formation Transactions in Relation to the Trust*" and "*Parties to the Trust*" on pages 265, 22 and 85, respectively.

42. There may not be any eligible acquisition opportunities from the Sponsor or third parties in the future, which may adversely affect the Nxt-Infra Trust's business, financial condition, results of operations and prospects.

The Nxt-Infra Trust aims to achieve portfolio growth through our acquisition growth strategy. Accordingly, in respect of future acquisitions, the Nxt-Infra Trust may depend on third parties as a source of attractive acquisition opportunities. Further, the Nxt-Infra Trust may also wish to acquire certain assets from the Sponsor in the future.

Eligible acquisition opportunities from third parties may also not materialise or the Nxt-Infra Trust may face increased competition from other InvITs and third parties, which may cause the price at which the Nxt-Infra Trust is able to acquire a given asset to not be financially desirable.

An inability to grow through prudent acquisitions may adversely affect the Nxt-Infra Trust's business, financial condition and results of operations.

Further, we cannot assure you 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 adversely affect our profits, financial condition and distributions. The concession agreements for future road projects may also contain terms and conditions that are more restrictive than those under the existing Concession Agreements for the InvIT Assets. These restrictions may restrict our flexibility in managing our business or projects and could in turn adversely affect our business prospects, financial condition and results of operation. Further, if the operating periods of InvIT Assets are shortened or disrupted or the Project SPVs right to operate the InvIT Assets is terminated before the expiration of the concessions, the business, financial condition, cash flows and results of operations of the InvIT may be adversely affected.

43. The Nxt-Infra Trust may not be able to successfully fund future acquisitions of new projects due to the unavailability of equity financing on acceptable terms, which could impede the implementation of our acquisition strategy and negatively affect our business.

The Nxt-Infra Trust may fund the consideration (in whole or in part) for future acquisitions through the issuance of additional Units. Such issuances may result in the dilution of the interests in the Nxt-Infra Trust held by existing Unitholders. The Nxt-Infra Trust may not be able to complete the issuance of the required number of Units on short notice or at all due to a lack of investor demand for the Units at prices that it considers to be in the interests of then-existing Unitholders. As a result of a lack of funding, the Nxt-Infra Trust may not be able to pursue our acquisition strategy successfully. Potential vendors may also view the prolonged time frame and lack of certainty generally associated with the raising of equity capital to fund any such purchase negatively and may prefer other potential purchasers.

Further, in addition to compliance with the provisions of the SEBI InvIT Regulations, due to the Sponsor being a non-resident entity, any future investment by us in holding companies or Project SPVs may also be subject to the investment conditions prescribed under the extant foreign exchange regulations for investment in infrastructure sector. For example, any downstream or other investments made by us are subject to conditions under the extant foreign exchange regulations for investment in infrastructure sector, both in terms of investments and divestments.

44. The use of additional leverage by the Investment Manager and the Nxt-Infra Trust are subject to risks. Further, the Nxt-Infra Trust may not be able to successfully fund future acquisitions of new projects due to the unavailability of debt financing, which could impede the implementation of our acquisition strategy and negatively affect our business

The Nxt-Infra Trust's total outstanding consolidated net debt after full utilization of the Issue Proceeds, will be within the regulatory requirement as specified under the SEBI InvIT Regulations. Presently, under the terms of the InvIT Regulations, the consolidated borrowings and deferred payments of the Nxt-Infra Trust, net of cash and cash equivalents, cannot exceed 49% of the value of the assets of Nxt-Infra Trust until certain conditions are met, and cannot exceed 70% of the value of the assets of Nxt-Infra Trust until, amongst others, the Nxt-Infra Trust has made six consecutive distributions to Unitholders. Further, if the consolidated borrowings of the Nxt-Infra Trust exceed 25% of the value of the assets of the Nxt-Infra Trust, further borrowings, up to 49% of the value of the assets of the Nxt-Infra Trust, would be subject to: (i) obtaining a credit rating from a credit rating agency registered with SEBI; and (ii) approval of the Unitholders, in accordance with the InvIT Regulations and Trust Deed. There is no assurance that the relevant approvals can be obtained in a timely manner, or at all. The Nxt-Infra Trust may want to rely on debt to expand our portfolio of projects through acquisitions, which may not be

available on favourable terms or at all.

Although the Investment Manager will seek to use leverage in relation to the Nxt-Infra Trust in a manner it believes is prudent and manage the Nxt-Infra Trust according to the Investment Objectives, the use of leverage will generally magnify both the opportunities for gain and risk of loss from any given asset. The cost and availability of leverage is variable and it is not always possible to obtain or maintain the desired degree of leverage. The use of leverage will also result in interest expense and other costs that will limit distributions made by the Nxt-Infra Trust or appreciation of our investments. An increase in interest rates may decrease the profitability of the Nxt-Infra Trust or any of the Project SPVs. If a Project SPV is not able to generate adequate cash flow to meet debt service, the Nxt-Infra Trust may suffer a partial or total loss of capital invested in such Project SPV.

Further, debt financing to fund the acquisition of a project may not be available in accordance with applicable law, or may not be available on acceptable terms. Restrictions imposed by the Reserve Bank of India may limit the Nxt-Infra Trust's ability to borrow overseas for projects under development and hence could constrain our ability to obtain financing on competitive terms and refinance existing indebtedness. In addition, there can be no assurance that any required regulatory approvals or borrowing in foreign currencies will be granted to the Nxt-Infra Trust without onerous conditions, or at all. In addition to compliance with the provisions of the SEBI InvIT Regulations, due to the Sponsor being a non- resident entity and the Investment Manager being considered foreign owned and controlled in accordance with the extant regulation, any future debt acquired may also be subject to the investment conditions prescribed under the extant foreign exchange regulations for investment in infrastructure sector.

Any financing agreements entered into by the Nxt-Infra Trust may contain certain restrictive covenants and cross default provisions. These may restrict our ability to conduct business and any breach thereof may adversely affect our results of operations and financial condition. In the event of any breach of any covenant contained in these financing agreements, apart from other consequences, the security under the financing agreements may be enforced which may adversely affect our business, financial condition and results of operations.

Debt financing may increase the Nxt-Infra Trust's vulnerability to general adverse economic and industry conditions by limiting our flexibility in planning for or reacting to changes in our business and industry. The Nxt-Infra Trust will also be subject to the risk that certain covenants in connection with any future borrowings may limit or otherwise adversely affect our operations and our ability to make distributions to our Unitholders. Such covenants may also restrict the Nxt-Infra Trust's ability to acquire additional projects or undertake other capital expenditure by requiring it to dedicate a substantial portion of our cash flows from operations to interest and principal payments on our debt.

45. The actual performance of the Nxt-Infra Trust is subject to significant business, regulatory, and tax risks, uncertainties and contingencies that could cause actual results to differ materially from the forward-looking statements in this Draft Placement Memorandum.

This Draft Placement Memorandum contains forward-looking statements including the Projections of Revenue from Operations and Cash Flow from Operating Activities. These forward-looking statements are based on a number of assumptions, many of which are outside the control of the Nxt-Infra Trust. The assumptions underlying the Projections of Revenue from Operations and Cash Flow from Operating Activities are inherently uncertain and are subject to significant business, regulatory, and tax risks, uncertainties and contingencies that could cause actual results to differ materially from the forecast results. In addition, the revenue of the Nxt-Infra Trust is dependent on a number of factors, including the toll receipts and receipt of annuities from the Projects, which may decrease for a number of reasons. This may adversely affect the ability of the Nxt-Infra Trust to achieve the landmarks set out in the Projections of Revenue from Operations and Cash Flow from Operating Activities as some or all of the events and circumstances assumed may not occur as expected, or events and circumstances, which are not currently anticipated, may arise. While the Nxt-Infra Trust currently expects to meet the Projections of Revenue from Operations and Cash Flow from Operating Activities based on the assumptions set out in the *"Projections of Revenue from Operations and Cash Flow from Operating Activities"* attached as Annexure I, no assurance can be given that the assumptions will remain true or relevant and that the actual profit and cash flow will be achieved as forecasted or projected.

The Projections of Revenue from Operations and Cash Flow from Operating Activities should be reviewed in conjunction with the description of the business of the Project SPVs, the section titled *"Discussion and analysis by the Directors of the Investment Manager of the financial condition, results of operations and cash flows of the Project SPVs of the Trust"* on page 237 and other information contained in this Draft Placement Memorandum, including the information set forth in this *"Risk Factors"* section.

The Investment Manager does not intend to provide any updated or otherwise revised profit and cash flow forecast or profit and cash flow projection in the event that any assumptions differ from actual results.

46. The ability of the Nxt-Infra Trust to make or maintain consistency in distributions to Unitholders depends on the financial performance of the Project SPVs and their profitability.

The amount of future distributions, if any, will depend upon various factors including future earnings, financial condition, cash flows, working capital requirements and capital expenditures of the Project SPVs and the dividends, interest payments

and repayments of indebtedness that are distributed to the Nxt-Infra Trust. The income earned from the Projects depends on, among other things, the amount of income generated from toll receipts and annuities and the level of operating and other expenses incurred. If the Projects do not generate sufficient operating profit, the income of the Nxt-Infra Trust, cash flows and ability to make distributions or level of distributions made to Unitholders will be adversely affected.

The ability of the Project SPVs to make dividend payments is subject to, among other things, applicable laws and regulations in India and other contractual restrictions that they may be bound by Under the terms of the InvIT Regulations, in the event any assets are sold by the Nxt-Infra Trust, the Holding Companies or any Project SPV or if the equity shareholding or interest in any Holding Company or Project SPV is disposed of by the Nxt-Infra Trust and the proceeds of such sale are proposed to be reinvested in another infrastructure asset, then the Nxt-Infra Trust is not obligated to make any distributions from such proceeds to the Unitholders.

In addition, the InvIT Regulations provide that the Nxt-Infra Trust must distribute not less than 90% of net distributable cash flows of each Project SPV in proportion of our holding in each of the Project SPV level, subject to the applicable provisions of the Companies Act, 2013. The distributions to the Unitholders must be declared and made not less than once every financial year and must not be made later than 15 days from the date of such declaration. There is no assurance that the Nxt-Infra Trust will be able to make distributions to the Unitholders or that such distributions will be consistent across various periods.

Further, the method of calculating the net distributable cash flows of a Project SPV is subject to change and any change in the applicable laws in India or elsewhere may limit the Nxt-Infra Trust's ability to pay or maintain consistency in distributions to Unitholders. There is also no assurance that the expansion of the Nxt-Infra Trust's portfolio of infrastructure assets will increase the Nxt-Infra Trust's cash flows and thereby result in an increase in the level of distributions to Unitholders over time.

47. It may be difficult for us to dispose of our non-performing assets.

The Projects may be illiquid as a result of the current market condition or the limited residual life of the Projects, among other things. In the event that the Projects are performing poorly, the Nxt-Infra Trust may experience difficulty in realising, selling or disposing our shareholding in a project at the appropriate time or at all or at an attractive price, and this may have an adverse effect on the business, prospects, financial condition, cash flows, and results of operations of the Nxt-Infra Trust.

48. The Nxt-Infra Trust does not own the trademark "Nxt-Infra Trust" and the associated logo to be used by us for our business and our ability to use the trademark may be impaired.

Nxt-Infra Trust has not made an application for the use of the trademark "*Nxt-Infra Trust*" and the associated logo. Nxt-Infra Trust's ability to use the trademark and the associated logo may be impaired if it does not make a trademark application, or if such an application is made and the application is rejected. Consequently, Nxt-Infra Trust could be required to cease using "*Nxt-Infra Trust*" and the associated logo, which may have an adverse effect on our operations.

Although we believe that our intellectual property rights do not infringe the intellectual property rights of any other party, we cannot assure you that infringement claims will not be asserted against us in the future. If we become liable to third parties for infringing their intellectual property rights, we could be required to pay a substantial damage award and be forced to immediately restrict our usage of such intellectual property. For instance, our certain Project SPVs' name reflect brand usage and intellectual property of Welspun Enterprises Limited. There can be no assurance that such Project SPVs will not be subject to alleged infringement of intellectual property rights by third party.

RISKS RELATING TO OUR ORGANISATION AND STRUCTURE

49. The Nxt-Infra Trust must maintain certain investment ratios which may pose additional risks.

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 SPVs. In addition, we must not invest more than 20% of the value of our assets in certain financial instruments prescribed under the InvIT Regulations. Such regulations may prevent us from acquiring additional assets to achieve our growth strategy.

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 Unitholder 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, cash flows, and results of operations.

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

The success of our business and growth strategy and the operational success of our assets will depend significantly upon the managers' satisfactory performance of these services. Our recourse against the Project Manager, the Trustee and Investment Manager is limited.

The aggregate maximum liability of the Project Manager under the Project Implementation and Management Agreement will be limited to the amount equivalent to one month's fee payable to the Project Manager in such financial year in accordance with the terms of the Project Implementation and Management Agreement except in the event that such liability arises out of any gross negligence, wilful default or fraud on the part of the Project Manager.

If the Trustee is required by the InvIT Regulations or any applicable law to provide information regarding the Nxt-Infra Trust or the Sponsor or the Unitholders, the investments made by the Nxt-Infra Trust and income therefrom and provisions of such presents, and complies with such request in good faith, whether or not it was in fact enforceable, the Trustee shall not be liable to the Unitholders or to any other party as a result of such compliance or in connection with such compliance. The Trustee is also not liable on account of anything done or omitted to be done or suffered by the Trustee in good faith in accordance with, or in pursuance of any request or advice of the Investment Manager. Further, the Trustee is not liable for any act or omission which may result in a loss to a Unitholder (by reason of any depletion in the value of the fund of the Nxt-Infra Trust or otherwise), except in the event that such depletion is a result of fraud, gross negligence or misconduct on the part of the Trustee or results from a breach by the Trustee of the Trust Deed, as determined by a court of competent jurisdiction. The liability of the Trustee shall be limited to the extent of the fees received by it, in all circumstances whatsoever except, amongst others, in case of any negligence or misconduct or fraud on the part of the Trustee as may be determined by a court of competent jurisdiction.

The Investment Manager's liability to Trustee, its directors, employees and officers for breach of its obligations under the Investment Management Agreement in each financial year is limited to the aggregate fees paid to the Investment Manager for that financial year under the agreement. Further, the Investment Manager is not personally liable for any losses (including indirect or consequential losses), costs, damages or expenses incurred in any way arising from anything which the Investment Manager does or fails to do during the course of discharge of its duties as an Investment Manager to the InvIT, except in the event that such loss is a result of any disabling conduct on part of the Investment Manager.

Accordingly, the Unitholders may not be able to recover claims against the Project Manager, the Trustee or the Investment Manager.

If the management agreements were to be terminated or if their terms were to be altered, our business could be adversely affected, as the Trustee may not be able to immediately replace such services, and even if replacement services were immediately available, the terms offered or obtained with the new managers could be less favourable than the ones currently offered by the Investment Manager and the Project Manager.

Additionally, our ability to make consistent distributions to our Unitholders depends on the continued service of management teams and personnel of the Investment Manager and Project Manager. Each of the Investment Manager and Project Manager may face challenges in recruiting and retaining a sufficient number of suitably skilled personnel. Generally, there is significant competition for management and other skilled personnel in our industry in India, and it may be difficult to attract and retain the skilled personnel that the Investment Manager and Project Manager need for our operations. Furthermore, the Investment Manager and Project Manager may not be able to adequately re-deploy and re-train their employees to keep pace with evolving industry standards and changing customer preferences. The loss of key personnel of either of the Investment Manager or the Project Manager, may have a material adverse effect on our business, prospects, financial condition, cash flows, results of operations and cash flows of the Nxt-Infra Trust

51. The Investment Manager may become the investment manager of another InvIT.

The Investment Manager is not prohibited from providing management services to investment trusts sponsored by other persons. However, to ensure good governance and clear segregation of the management and operations of the different InvITs being managed by the Investment Manager from time to time, the Investment Manager is required to implement appropriate systems for efficient management of such InvITs. We cannot assure you that such systems will be effectively implemented by the Investment Manager or prevent the actions of the Investment Manager from adversely affecting the levels of service that Nxt-Infra Trust requires, which may have an adverse effect on our business.

52. The Investment Manager has limited experience in investment management activities for an InvIT and may not be able to successfully implement its investment strategy for and Investment Objectives of the Nxt-Infra Trust or to manage the Nxt-Infra Trust's growth effectively.

The Investment Manager, and its directors and employees have limited experience in investment management activities for

an InvIT. There can be no assurance that the Investment Manager will be able to implement its investment strategy or Investment Objectives successfully or that it will be able to expand the portfolio of the Nxt-Infra Trust at all, or at any specified rate or to any specified size or make distributions as projected. The results of the operations of the Nxt-Infra Trust will depend on many factors, including but not limited to, its ability to operate and manage the Projects efficiently, changes in the regulatory framework, competition for assets or macro-economic condition. These factors will, in turn, affect the availability of further opportunities for the acquisition of road assets and the availability of finance to achieve leverage. The Nxt-Infra Trust will be relying on external sources of funding to expand its asset portfolio, which may not be available on favourable terms, or at all. Even if the Nxt-Infra Trust is able to successfully acquire additional road assets, portfolio growth and expansion could place significant demands on the management and administrative resources of the Investment Manager and the capital resources of the Nxt-Infra Trust and there can be no assurance that the Nxt-Infra Trust will be able to efficiently manage such assets and achieve its intended return on such acquisitions.

The Investment Manager can also stop acting as the Investment Manager by providing notice under the Investment Management Agreement or the Nxt-Infra Trust may replace the Investment Manager in accordance with the terms of the Trust Deed. There is no assurance that the financial performance of the Nxt-Infra Trust would not be affected upon the appointment of a new investment manager.

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

Under the InvIT Regulations, upon completion of the Issue, the Sponsor must continue to own all of its Units for one year and must own 15% of the outstanding Units for three years from the date of listing of the Units, subject to the conditions specified in the InvIT Regulations. Further, the Unitholder(s), holding not less than 10% of the total outstanding Units, either individually or collectively, shall be entitled to nominate one director on the board of directors of the Investment Manager. As a result, the Sponsor, may be able to control the outcome of matters on which Unitholders are entitled to vote and for which the Sponsor or its Associates or related parties is not prohibited from voting due to a conflict of interest. The interests of the Sponsor may be different from those of the Unitholders.

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

55. The Nxt-Infra Trust may be dissolved, and the proceeds from the dissolution thereof may be less than the amount invested by the Unitholders.

The Nxt-Infra Trust is an irrevocable trust registered under the Indian Registration Act, 1908 and it may only be extinguished: (i) if it is impossible to continue with the Nxt-Infra Trust or if the Trustee, on the advice of the Investment Manager, deems it impracticable to continue; (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 our Units are delisted from the Stock Exchanges; (iv) if the SEBI passes a direction to wind up the Nxt-Infra Trust or the delisting of the Units; (v) in the event SEBI revokes the registration granted to the Nxt-Infra Trust; or (vi) in the event our activities are rendered illegal. Should the Nxt-Infra Trust be dissolved, depending on the circumstances and the terms upon which our assets are disposed of, there is no assurance that our Unitholder will recover all or any part of its investment.

If a default is triggered under the financing documents the Nxt-Infra Trust is a party to, the Trustee will take steps to cure such default and/or to repay the affected lender by appropriate means, including divesting or liquidating the assets of the Nxt-Infra Trust or raising additional financing, in accordance with such financing documents and applicable laws. If such default is not cured, and the affected lender initiates proceedings against the Nxt-Infra Trust, the Nxt-Infra Trust will be terminated immediately in accordance with applicable laws. In the event of a termination of the Nxt-Infra Trust, the net assets which will be paid to the Unitholders will take into account the debt, liabilities and obligations of the Nxt-Infra Trust. There is no assurance that Unitholders will recover all or any part of their investments.

56. As a proposed shareholder of the Project SPVs, the rights of Nxt-Infra Trust are subordinated to the rights of creditors, debt holders and other parties specified under Indian law in the event of insolvency or liquidation of the Project SPVs.

In the event of liquidation of any of the Project SPVs, the secured and unsecured creditors of the relevant Project SPV will be entitled to payment from the liquidation proceeds in priority to us in our capacity as an equity shareholder of the Project SPV. Under the Insolvency and Bankruptcy Code, 2016, in the event of winding-up of any Project SPV, workmen's dues and debts due to secured creditors which rank *pari passu* are required to be paid in priority over all other outstanding debt, followed by wages and salaries of employees, debts due to unsecured creditors, any amounts due to the central or state government, any other debts, preference shareholders and equity shareholders. Further, amounts payable to us in respect of any unsecured debt issued by the Project SPV will be subordinated in the manner set forth above.

57. 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 the Nxt-Infra Trust's affairs. Legal principles relating to these matters and the validity of procedures, fiduciary duties and liabilities, and Unitholders' rights may differ from those that would apply to a company in India or a trust in another jurisdiction. Unitholders' rights and disclosure standards under Indian law may also differ from the laws of other countries or jurisdictions. For details, please see the section titled "*Rights of Unitholders*" on page 287.

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

Each of the Parties to the Nxt-Infra Trust is required to satisfy the eligibility conditions specified in 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 ₹ 10,000 lakhs and the Sponsor or its associate 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 ₹ 1000 lakhs and has not less than five years' experience in fund management or advisory services or development in the infrastructure sector 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, member of the Sponsor Group, Investment Manager, Project Manager and Trustee are "fit and proper persons" as defined under Schedule II of the Securities and Exchange Board of India (Intermediaries) Regulations, 2008 on an ongoing basis. We may not be able to ensure such ongoing compliance by the Sponsor, members of the Sponsor Group, the Investment Manager, the Project Manager and the Trustee, which could result in the cancellation of the registration of the Nxt-Infra Trust.

59. We are governed by the provisions of, amongst others, the InvIT Regulations and the Securities Contracts (Regulation) Act, 1956 ("SCRA"), the implementation and interpretation of which, is evolving. The evolving regulatory framework governing infrastructure investment trusts in India 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 the Unitholders.

The Nxt-Infra Trust has been constituted under the InvIT Regulations which were issued in 2014, as 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 of infrastructure investment trusts have not yet been issued. For example, and 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.

The InvIT Regulations and other corresponding changes to applicable law, are largely untested in their implementation. Uncertainty in applicability, interpretation or implementation of any amendment to, or change in, law, regulation or policy, including due to an absence, or a limited body, of administrative or judicial precedent may be time consuming and 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 and consequently, our ability to make distributions to the Unitholders. Changes to our organizational structure, changes to our agreements, cost increases, fines, legal fees or business interruptions may result from changes to regulations, from new regulations, from new interpretations by courts or regulators of existing regulations or from stricter enforcement practices by regulatory authorities of existing regulations. In addition, new costs may arise from audit, certification and/or self-

assessment standards required to maintain compliance with new and existing InvIT Regulations, which may render it economically unviable to continue conducting business as an infrastructure investment trust or otherwise have a material, adverse effect on our business, financial condition, cash flows, results of operations and cash flows.

Further, SEBI has the right to, with or without prior notice, order inspection of the books of accounts, records and other documents pertaining to our operations, either on its own or, upon receipt of complaint. Upon review of the inspection report, SEBI is entitled to, if it so deems appropriate (in the interest of the securities markets or our investors) (a) to require us to surrender our certificate of registration; (b) to wind-up our operations; (c) to sell our assets; (d) direct us to not operate or access the capital markets for a specified period or (e) direct us to not do such things as SEBI may deem appropriate in the interest of our investors. Any such occurrence may have a material adverse effect on our business, result of operations, financial conditions and cash flows.

Additionally, with effect from April 1, 2021, units and other instruments issued by an InvIT have been included in the definition of '*securities*' under section 2(h) of the SCRA. However, the applicability of several regulations (including regulations relating to intermediaries, underwriters, merchant bankers, takeover, insider trading and fraudulent and unfair trade practices) to the Nxt-Infra Trust is unclear and evolving, and subject to the interpretation and clarifications issued by regulatory bodies such as SEBI from time to time.

There can be no assurance that the legal framework for infrastructure trusts will not impose additional regulations and policies which could impact our operations and it is difficult to forecast how any new laws, regulations or standards or future amendments to the InvIT Regulations, the SCRA and other applicable law will affect infrastructure trusts and the infrastructure sector in India. Such changes may adversely affect our business, cash flows, results of operations and prospects, to the extent that we are unable to suitably respond to and comply with any such changes in applicable law and policy. We may incur increased costs and other burdens relating to compliance with such new regulations, which may also require significant time and other resources, and any failure to comply with these changes may adversely affect our business, cash flows, results of operations and prospects.

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

The InvIT Regulations, along with the guidelines and circulars issued by the SEBI from time to time, govern the infrastructure investment trusts in India. However, as compared with the statutory and regulatory framework governing companies that have listed their equity shares or debt securities on recognised stock exchanges in India, the regulatory framework applicable to infrastructure investment trusts is relatively nascent and thus, still evolving.

Accordingly, the ongoing disclosures made to our Unitholders under the InvIT Regulations may differ from those made to shareholders of a company that has listed its equity shares on a recognised stock exchange in India in accordance with the Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015. Further, the rights of our Unitholders may not be as extensive as the rights of shareholders of a company that has listed its equity shares on a recognised stock exchange in India, and accordingly, the protection available to our Unitholders may be more limited than those available to such shareholders.

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

Under the InvIT Regulations, the Trustee or the Investment Manager cannot be removed without the prior approval of Unitholders where the votes cast in favour of the resolution shall not be less than one and a half times the votes cast against such resolution. Accordingly, the Unitholders may face difficulties in removing and replacing the Trustee or the Investment Manager. Further, under the InvIT Regulations, prior approval of SEBI is required for change in the Investment Manager of the Nxt-Infra Trust.

***62.* The Trust shall only hold 49% of the issued and paid-up equity shareholding in WIPL on listing and may not be able to acquire 100% of the equity shareholding in WIPL in the future.**

We intend to acquire 100% of the equity share capital of each of the Project SPVs from the Sponsor, including WIPL, which is currently an under-construction project wherein the Sponsor holds only 49% of the equity shareholding. The balance 51% of the equity shareholding is held by Welspun Enterprises Limited, due to a change in ownership restriction under the WIPL Concession Agreement. Presently, upon completion of the Formation Transactions, we propose to acquire 49% of the equity shareholding of WIPL. We also propose to acquire the balance 51% equity shareholding in WIPL in line with the ROFR Agreement entered into between the Sponsor, Trustee (on behalf of the Trust) and the Investment Manager, upon completion of the specified period under the WIPL Concession Agreement and applicable laws, and after obtaining appropriate statutory and regulatory approvals, including from the NHAI. For details of the ROFR Agreement, see *"Related Party Transactions – Acquisition of WIPL by the Trust"* on page 268. In the past, certain of our Project SPVs failed to obtain the completion certificate in a timely manner as per the concession agreements, due to pendency of forest clearances, punch list items, etc. There is no assurance that WIPL will achieve its COD on time, or at all. This may result in a delay in applications, for

instance, the change in ownership application before the concessioning authority and the proposed acquisition of the balance 51% equity shares of WIPL by the Trust.

In relation to WIPL, accounting in Special Purpose Combined Financial Statements is as per equity method as per Ind AS 28, hence, only 49% share of profit/ loss is picked up considering joint control. All numbers with respect to WIPL, including in relation to projections, are considered only to the extent of 49% in the document.

Further, pursuant to the terms of Welspun SPA read with Deed of Assignment and the WIPL Concession Agreement, the Sponsor is entitled to acquire the remaining 51% equity share capital of WIPL. However, there can be no assurance that the Sponsor and subsequently the InvIT will acquire the remaining 51% shareholding in WIPL in a timely manner. Further, WIPL shall apply for consent from the concessioning authority for transfer of the remaining 51% shareholding of WIPL at the appropriate stage, and there is no assurance that the consent will be received within the timelines contemplated or received at all. In the absence of the consents, Nxt-Infra Trust will not be able to acquire the remaining 51% share holding of WIPL from Welspun Enterprises Limited which could have an adverse effect on the Nxt-Infra Trust's business, cash flows, and results of operations.

RISKS RELATING TO THE UNITS

63. The sale or possible sale of a substantial number of Units by the Sponsor in the public market following the reduction of lock-in requirements at various stages as prescribed under the InvIT Regulations could adversely affect the price of the Units.

Under the InvIT Regulations, the Sponsor and the Sponsor Group, collectively, is required to hold a minimum of 15% of our Units for a minimum period of three years from the date of listing pursuant to this Issue and the balance of its unitholding in the Trust is required to be locked in for a period of one year from the date of listing of the Units. Further, in accordance with the InvIT Regulations, the Sponsor and the Sponsor Group, collectively, are required to lock-in our Units as follows:

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

The Units are proposed to be listed on NSE. If the Sponsor, subsequent to the end or lapse of any of the aforesaid lock-in periods or thresholds directly or indirectly sells or is perceived as intending to sell a substantial number of its Units, or if a secondary offering of the Units is undertaken, the market price for the Units could be adversely affected.

64. No investors are permitted to withdraw or lower their Bids (in terms of quantity of Units or the Bid Amount) at any stage after submitting a Bid.

Pursuant to the InvIT Regulations and SEBI guidelines, investors are required to pay the Bid Amount on submission of the Bid, and are not permitted to withdraw or lower their Bids (in terms of quantity of Units or the Bid Amount) at any stage after submitting a Bid, notwithstanding adverse developments in international or national monetary policy, financial, political or economic conditions, our business, cash flows, results of operations, or otherwise, at any stage after the submission of their Bids.

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

Under foreign exchange regulations currently in force in India, transfers of units between non-residents and residents are permitted, subject to certain exceptions, if they comply with the pricing and reporting requirements specified by RBI. If a transfer of units is not compliant with such pricing or reporting requirements and does not fall under any of the exceptions specified by RBI, then RBI's prior approval is required.

Additionally, unitholders who seek to convert Indian rupee proceeds from a sale of units in India into foreign currency and repatriate that foreign currency from India require a no-objection or a tax clearance certificate from the Indian income tax authorities.

We cannot assure you that any required approval from RBI or any other Governmental agency can be obtained on any particular terms or in a timely manner, or at all.

Our Unitholders will not have the right to redeem or request the redemption of our Units while our Units are listed on NSE. In terms of the InvIT Regulations, an infrastructure investment trust may redeem units only by way of a buyback or at the time of delisting of units and may be subject to additional conditions and restrictions under Indian regulations.

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

There is no market for the Units prior to the Issue and an active market for the Units may not develop or be sustained after the Issue. Moreover, the listing and quotation do not guarantee that a trading market for the Units will develop or, if a market does develop, the liquidity of that market for the Units. As the Units will be sold through a private placement in a Minimum Bid Size, there may be a lack of liquidity and a limited market for the Units. The price of the Units may be volatile, and investors may be unable to resell the Units at or above the Issue Price, or at all. Although it is currently intended that the Units will remain listed on NSE, there is no guarantee of the continued listing of the Units. There is no assurance that the Nxt-Infra Trust will continue to satisfy the listing requirements for InvITs. Further, it may be difficult to assess the Nxt-Infra Trust's performance against domestic benchmarks.

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

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

68. There is no assurance that our Units will remain listed on the stock exchange.

Although it is currently intended that the Units will remain listed on NSE, there is no guarantee of the continued listing of the Units. Among other factors, we may not continue to satisfy the listing requirements of NSE. Accordingly, Unitholders will not be able to sell their Units through trading on NSE if the Units are no longer listed on NSE. While the InvIT Regulations state that we must provide Unitholders with an exit prior to delisting, the specific mechanism of such delisting and related exit offer has not yet been finalised by the SEBI. Further, under the InvIT Regulations, we are required to maintain a minimum of five Unitholders (other than the Sponsor, its related parties and its associates) at all times after the listing of the Units pursuant to the Issue and certain minimum public holding requirements. Failure to maintain such minimum number of Unitholders or public holding may result in action being taken against us by the SEBI and NSE, including the compulsory delisting of our Units.

69. The Issue Price of the Units may not be indicative of the market price of the Units after the Issue.

The Units may trade at prices significantly below the Issue Price after the Issue. The trading price of the Units will depend on many factors, including:

- the perceived prospects of our business and the road sector;
- differences between our actual financial and operating results and those expected by investors and analysts;
- changes in 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 equity or debt securities, including those not in the infrastructure industry;
- the balance of buyers and sellers of the Units;
- the future size and liquidity of the Indian infrastructure investment trust market;
- any future changes to the regulatory system, including the tax system, both generally and specifically in relation to Indian infrastructure investment trusts;
- the ability on our part to successfully implement our investment and growth strategies;
- foreign exchange rates; and
- broad market fluctuations, including weakness of the equity markets and increases in interest rates.

For these reasons, among others, the price of Units may fluctuate. 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. Any failure on our part to meet market expectations with regard to future earnings and cash distributions may adversely affect the market price for the Units.

In addition, the Units are not capital-protected products and there is no guarantee that Unitholders can regain the amount invested. If the Nxt-Infra Trust is terminated or liquidated, it is possible that investors may lose all or a part of their investment in the Units.

70. Any future issuance of Units by us may dilute investors' Unitholding. The sale or possible sale of a substantial number of Units by the Sponsor or another significant Unitholder could adversely affect the 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 Nxt-Infra Trust.

Further, under the InvIT Regulations, the Sponsor and Sponsor Group, collectively, is required to lock-in units from the date of listing pursuant to the initial offer. The Units are listed on NSE. If the Sponsor, following the lapse of either of the aforesaid lock-in period directly or indirectly sells or is perceived as intending to sell a substantial number of its Units, or if a significant Unitholder other than the Sponsor directly or indirectly sells or is perceived as intending to sell a substantial number of its Units, the market price for the Units could be adversely affected.

71. Rights of Unitholders under Indian law may be more limited than under the laws of other jurisdictions.

Indian legal principles related to corporate procedures, directors' fiduciary duties and liabilities, and unitholders' rights may differ from those that would apply to a company in another jurisdiction. Unitholders' rights under Indian law may not be as extensive as Unitholders' rights under the laws of other countries or jurisdictions. Investors may have more difficulty in asserting their rights as unitholder in an Indian entity than as unitholder of a corporation in another jurisdiction.

RISKS RELATING TO INDIA

72. We are exposed to risks associated with the road sector in India.

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

73. Our performance and growth are dependent on the factors affecting the Indian economy.

Our performance and the growth are dependent on the performance of the Indian economy, which, in turn, depends on various factors. The Indian economy has been affected by the recent global economic uncertainties, volatility in interest rates, currency exchange rates, commodity and electricity prices, adverse conditions affecting agriculture and various other macroeconomic factors.

Conditions outside India, such as a slowdown or recession in the economic growth of other major countries and regions, especially in U.S., Europe and China, have an impact on the growth of the Indian economy, and GoI policy may change in response to such conditions. While recent Indian governments have been focused on encouraging private participation in the industrial sector, any adverse change in policy could result in a further slowdown of the Indian economy. The rate of economic liberalisation could decrease, and specific laws and policies affecting foreign investment, currency exchange rates and other matters affecting investment in India could change as well. In the road sector, there can be no assurance that the GoI's engagement with and outreach to private sector operators, including the Nxt-Infra Trust, will continue in the future. A significant change in India's economic liberalisation and deregulation policies, in particular, those relating to the road sector, could disrupt business and economic conditions in India generally and our business in particular. In addition, adverse developments in the Indian economy could also impact companies and banks that provide services to us. For example, on March 5, 2020 and November 17, 2020, respectively, the GoI, in consultation with RBI placed Yes Bank Limited and Lakshmi Vilas Bank under moratorium, imposed limitations on their operations as well as on withdrawals by depositors and payments to creditors over certain specified amounts for a limited period of time from the date of such moratorium coming into effect. The limitations on operations and the moratorium were subsequently lifted in both cases. The occurrence of any such development in the future may impact our banking channels, and we may or may not be able to recover our deposits, in part or in full. This could result in potential write-offs on our books of accounts, and materially and adversely affect the business, prospects, financial condition, results of operations and cash flows.

Additionally, an increase in trade deficit or a decline in India's foreign exchange reserves could negatively impact interest rates and liquidity, which could adversely impact the Indian economy and our business. Any downturn in the macroeconomic environment in India could materially and adversely affect the business, prospects, financial condition, results of operations and cash flows.

74. Changing laws, rules and regulations, including changes in legislation or the rules relating to tax regimes, legal uncertainties and the political situation in India may adversely affect our business, financial condition, cash flows, results of operations and ability to make distributions to our Unitholders.

Our business, financial condition, cash flows, and results of operations could be 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. We cannot assure you that the Government or the state governments will not implement new regulations and policies which will require the Nxt-Infra Trust and Project SPVs to obtain additional approvals and licenses from governmental and other regulatory bodies or impose onerous requirements and conditions on our operations. Regulatory changes in India, particularly in respect of the InvIT Regulations and other taxation legislations, could expose us to greater tax liability than what our financial projections assume. The application of various Indian sales, value-added and other tax laws, rules and regulations to our services, currently or in the future, may be subject to differing or stricter interpretation by applicable authorities, which could result in an increase in our tax payments (prospectively or retrospectively) and/or subject us to penalties, which could affect our business operations and affect our ability to make distributions to our Unitholders. For further details, please see section titled "*Risk Factors - Changes in legislation or the rules relating to tax regimes could materially and adversely affect our business, prospects and results of operations*" and "*Regulations and Policies*" on pages 76 and 269, respectively.

75. We may be exposed to variations in foreign exchange rates. Fluctuations in the exchange rate of the Indian Rupee with respect to the U.S. Dollar or other currencies could affect the foreign currency equivalent of the value of the Units and any distributions.

Our revenues are in Indian rupees, and currently there are no interest payments and loan repayments in foreign currency in relation to debt availed for utilisation at the Project SPVs. The Indian rupee has depreciated in recent years, and in the future may continue to depreciate, against the U.S. dollar, leading to increases in the Indian rupee cost for us to service and repay foreign currency borrowings. In addition, in the event of disputes under any of our foreign currency borrowings, if we raise foreign currency debt in future, we may be required by the terms of those borrowings to defend ourselves in foreign courts or arbitration proceedings, which could result in additional costs. A depreciation of the Indian rupee would also increase the costs of imports and may have a material adverse effect on our business, prospects, financial condition, results of operations and cash flows.

Fluctuations in the exchange rates between the Indian Rupee and other currencies could also affect the foreign currency equivalent of the Indian Rupee price of the Units. The fluctuations could also affect the amount that Unitholders will receive in foreign currency upon conversion of any cash distributions or other distributions paid in Indian Rupees by the Nxt-Infra Trust on the Units, and any proceeds paid in Indian Rupees from any sale of the Units in the secondary trading market. Further, a decline in India's foreign exchange reserves may reduce liquidity and increase interest rates in India, which could have an adverse impact on us. Further, a decline in India's foreign exchange reserves may reduce liquidity and increase interest rates in India, which could have an adverse impact on us.

76. Social, economic and political conditions and natural disasters could have a negative effect on our business.

Each of the Project SPVs is incorporated in India and they derive all of their revenue from India. In addition, all of our assets are located in India. Consequently, our business and the trading price of our Units may be adversely affected by the social, economic and political conditions in India and its neighbouring countries. Specific risks, such as the following could adversely influence the Indian economy, thereby having a material adverse effect on our business, financial condition, results of operations and cash flows:

- political instability, riots or other forms of civil disturbance or violence;
- war, terrorism, invasion, rebellion or revolution;
- Government interventions, including expropriation or nationalisation of assets, increased protectionism and the introduction of tariffs or subsidies;
- changing regulatory regimes;
- underdeveloped industrial and economic infrastructure;
- changes in exchange rates and controls, interest rates, government policies, taxation and economic and political developments;

- changes in policies such as, the fiscal and economic policy, industrial policy, direct and indirect taxes and the export-import policy; and

- changes in state specific regulation and conditions.

Pandemics, such as the outbreak of the COVID-19, and natural disasters such as floods, earthquakes or famines, events and conditions linked to climate change have in the past had a negative impact on the Indian economy. Potential effects may include damage to infrastructure and the loss of business continuity and business information. If our facilities are affected by any of these events, our operations may be significantly interrupted, which could materially and adversely affect our business, prospects, financial condition, results of operations and cash flows.

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

Our borrowing costs and our access to the debt capital markets depend significantly on the credit ratings of India. India's sovereign rating has been affirmed to Baa3 with a "stable" outlook by Moody's and BBB with a "stable" outlook (Fitch); and BBB (low) "stable" by Dominion Bond Rating Service ("**DBRS**"). India's sovereign ratings from S&P is BBB-with a "stable" outlook. Any adverse revisions to India's credit ratings for domestic and international debt by international rating agencies may adversely impact our ability to raise additional financing and the interest rates and other commercial terms at which such financing is available, including raising any overseas additional financing. A downgrading of India's credit ratings may occur, for example, upon a change of government tax or fiscal policy, which are outside our control. This could have an adverse effect on our ability to fund our growth on favourable terms or at all, and consequently adversely affect our business, cash flows and financial performance and the price of the Units.

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

The Indian market and the Indian economy are influenced by economic and market conditions in other countries, including conditions in the United States, Europe and certain emerging economies in Asia. Financial turmoil in Asia, Russia and elsewhere in the world in recent years has adversely affected the Indian economy. Any such financial instability may cause increased volatility in the Indian financial markets and, directly or indirectly, adversely affect the Indian economy and financial sector and us.

Conditions outside India, such as the Israel-Gaza conflict, Russia-Ukraine crisis resulting in a slowdown or recession in the economic growth of other major countries and regions, especially in U.S., Europe and China, have an impact on the growth of the Indian economy, and GoI policy may change in response to such conditions.

Although economic conditions vary across markets, loss of investor confidence in one economy may cause increased volatility across other economies, including India. Financial instability in other parts of the world could have a global influence and thereby negatively impact the Indian economy. Financial disruptions could materially and adversely affect our business, prospects, financial condition, results of operations and cash flows.

The global credit and equity markets have experienced substantial dislocations, liquidity disruptions and market corrections. The dislocation of the sub-prime mortgage loan market in the United States since September 2008, and the more recent European sovereign debt crisis, has led to increased liquidity and credit concerns and volatility in the global credit and financial markets. These and other related events have had a significant adverse impact on the global credit and financial markets as a whole, including reduced liquidity, greater volatility, widening of credit spreads and a lack of price transparency in the global credit and financial markets. Further, economic developments globally can have a significant impact on our principal markets. Following the United Kingdom's exit from the European Union ("**Brexit**"), there remains significant uncertainty around the terms of their future relationship with the European Union and, more generally, as to the impact of Brexit on the general economic conditions in the United Kingdom and the European Union and any consequential impact on global financial markets. For example, Brexit could give rise to increased volatility in foreign exchange rate movements and the value of equity and debt investments.

In addition, China is one of India's major trading partners and there are rising concerns of a possible slowdown in the Chinese economy as well as a strained relationship with India, which could have an adverse impact on the trade relations between the two countries. In response to such developments, legislators and financial regulators in the United States and other jurisdictions, including India, implemented a number of policy measures designed to add stability to the financial markets. However, the overall long-term effect of these and other legislative and regulatory efforts on the global financial markets is uncertain, and they may not have the intended stabilizing effects. Any significant financial disruption could have a material adverse effect on our business, financial condition, results of operation, and cash flows. These developments, or the perception that any of them could occur, have had and may continue to have a material adverse effect on global economic conditions and the stability of global financial markets, and may significantly reduce global market liquidity, restrict the ability of key market participants to operate in certain financial markets or restrict our access to capital. This could have a material adverse effect on our business, financial condition, results of operations, and cash flows, and reduce the price of the Units.

79. If inflation rises in India, increased costs may result in a decline in profits.

Inflation rates in India have been volatile in recent years, and such volatility may continue. Increasing inflation in India could cause a rise in the price of transportation, wages, raw materials and other expenses. There can be no assurance that increased toll charges will sufficiently offset our increased costs due to inflation which could have a material adverse effect on our business, prospects, financial condition, results of operations and cash flows. Inflation may also have an impact on interest rates, which can affect our profitability.

80. Significant differences exist between Ind AS and other accounting principles, such as IFRS, Indian GAAP and U.S. GAAP, which may be material to investors' assessments of our financial condition, result of operations and cash flows.

The Special Purpose Combined Financial Statements included in this Draft Placement Memorandum are prepared in accordance with Guidance Note on Reports in Company Prospectuses (Revised 2019), and the Guidance Note on Combined and Carve Out Financial Statements issued by the Institute of Chartered Accountants of India (the "**Guidance Notes**") using the recognition and measurement principles of Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 read with Section 133 of the Companies Act, 2013 ("**Ind AS**") , except Ind AS 33 earnings per share and other generally accepted accounting principles and other provisions relating to disclosures required as per of the InvIT Regulations and the SEBI Circular on Financial Disclosures, and consistently applied during the periods stated in those reports, except as otherwise provided therein, and no attempt has been made to reconcile any of the information given in this Draft Placement Memorandum to any other principles or to base the information on any other standards. Ind AS differs from other accounting principles with which prospective investors may be familiar in, such as IFRS, Indian GAAP and U.S. GAAP. Accordingly, the degree to which the Special Purpose Combined Financial Statements included in this Draft Placement Memorandum will provide meaningful information is entirely dependent on the reader's level of familiarity with Indian accounting practices. Persons not familiar with Indian accounting practices should limit their reliance on the financial disclosures presented in this Draft Placement Memorandum.

81. We may be affected by competition law in India and any adverse application or interpretation of the Competition Act, 2002 ("Competition Act") could 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 in a relevant market.

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.

In the event, the Project SPVs or the Trust enters into any agreements or transactions that have an appreciable adverse effect on competition in the relevant market in India, the provisions of the Competition Act will be applicable. Consents may also be required from the CCI in relation to the Offer and failure to obtain such consents may adversely affect the Offer. 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, cash flows, results of operations and prospects and our ability to make distributions to the Unitholders.

RISKS RELATING TO TAXATION

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

Tax and other levies imposed by the Government and state governments may include: (i) income tax (including withholding tax and tax collection at source); (ii) goods and service tax; (iii) stamp duty; and (iv) other special taxes and surcharges that are introduced on a temporary or permanent basis from time to time. In some cases, these taxes and other levies may be changed from year to year Also, the Government, in certain situations, has the authority to change tax laws retrospectively.

The GoI *vide* the Finance Act, 2021, amongst others, amended the Securities Contracts (Regulation) Act, 1956 ("**SCRA")** recognise pooled investment and recognise the units, debentures, other marketable securities and other instruments issued by InvITs as "*securities*". The Finance Act, 2021 exempted the payment of tax deducted at source on dividends paid to InvITs. For further details, please see the sections titled "*Risk Factors – Investors may be subject to Indian taxes arising out of capital gains on the sale of Units and on any dividend or interest component of any returns from the Units*" and "*Risk*

*Factors – We are governed by the provisions of, amongst others, the InvIT Regulations and the Securities Contracts (Regulation) Act, 1956 ("**SCRA**"), the implementation and interpretation of which, is evolving. The evolving regulatory framework governing infrastructure investment trusts in India 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 the Unitholders*" on pages 78 and 69, respectively.

There have been two major 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. Given the limited availability of information in the public domain concerning GST, we cannot assure you as to the tax regime following implementation of the GST. Further, any application of existing law or future amendments may affect our overall tax efficiency and may result in significant additional taxes becoming payable.

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.

The GAAR regime came into effect on April 1, 2017. The GAAR provisions can be invoked once an arrangement is regarded as an "impermissible avoidance arrangement", which is any arrangement the main purpose of which is to obtain a tax benefit and which satisfies at least one of the following 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 Income-tax Act, 1961 ("**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. The tax consequences of the GAAR provisions being applied to an arrangement could result in denial of a tax benefit, amongst other consequences, including on the interest paid by the Project SPVs on the debt from the Nxt-Infra Trust or claim of any relief under a tax treaty. In the absence of any significant precedents on the subject, the application of these provisions is uncertain. If the GAAR provisions are made applicable to the Nxt-Infra Trust or any member of the Nxt-Infra Trust, it may have a material adverse tax impact on the Nxt-Infra Trust.

The rules notified with respect to GAAR prescribe that these shall not be applicable to Foreign Portfolio Investors, subject to the fulfilment of certain conditions. GAAR may have a material adverse tax impact on the Nxt-Infra Trust, the Sponsor and the Unitholders.

Further, the GoI, by way of the Finance Act, 2022, has extended the applicability of section 94(7) of the IT Act to the units of business trust (with effect from Financial Year 2022-23), which provides that where:

(1) any person buys or acquires any securities or unit within a period of three months prior to the record date in relation to the dividend;

(2) 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; and

(3) 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.

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 that where:

(i) any person buys or acquires any units within a period of three months prior to the record date;

(ii) such person is allotted additional units without any payment on the basis of holding of such units on such record date;

(iii) 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 (ii) 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 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. We may incur increased costs relating to compliance with any new requirements, which may also require management time and other resources, and any failure to comply may adversely affect our business, cash flows, results of operations and prospects.

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.

83. 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 subject to payment of securities transaction tax ("**STT**"), any gain arising in excess of ₹ 1 lakh 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 same shall be subject to long term capital gains tax at the rate of 20% (plus applicable surcharge and cess) with indexation benefit (subject to satisfaction of certain prescribed conditions).

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 the tax rates applicable to 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. Further, the applicable taxes on the sale of Units and on any dividend or interest component of any returns from the Unit will also depend on the category of investor holding or selling the Units.

The Finance Act, 2020 amended the IT 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 a shareholder. As per the IT Act, a distribution made by a business trust, being in nature dividend income received from a special purpose vehicle, will not be subject to tax in the hands of a unitholder, so long as the special purpose vehicle has not opted to pay corporate tax under the beneficial regime introduced under section 115BAA of the IT Act. Similarly, a business trust (which includes an infrastructure investment trust) will not be required to withhold tax on any distributions which are in the nature of dividend income received from a special purpose vehicle, so long as such special purpose vehicle has not opted to pay corporate tax under the beneficial regime introduced under section 115BAA of the IT Act. However, where the special purpose vehicle opts to pay tax under section 115BAA of the IT Act, dividend income distributed by the business trust would be taxed in the hands of a non-resident unitholder at 20% (plus applicable surcharge and cess) or the applicable treaty rate and at the ordinary tax 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 Nxt-Infra Trust will depend on the taxation regime opted by the Project SPVs. 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 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, subject to any beneficial rate available under an applicable treaty. The final tax rate for the resident/ non-resident unit holder may also depend on other considerations.

Further, the Finance Act, 2021 has included a definition of "pooled investment vehicle" which comprises business trusts as defined under the IT Act. The IT Act defines business trusts as trusts registered with SEBI as an InvIT. This amendment has come into effect from April 1, 2021. The Finance Act, 2021 recognises units, debentures and other instruments issued by infrastructure investment trusts as "securities" under the SCRA. This amendment may also 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 and the Securities and Exchange Board of India (Prohibition of Insider Trading) Regulations, 2015. As announced in previous budgets, the dividend distribution tax applicable on InvITs was abolished and replaced with dividend withholding tax. The Finance Act, 2021 has also exempted payment of tax deducted at source on dividend paid to InvITs, with effect from April 1, 2020.

The Finance Act, 2023 has also amended section 56 of the IT Act (with effect from Financial Year 2023-24) such that in addition to interest or dividend, unitholders are also subject to tax on other distributions received from a business trust such as amount received on repayment of debt/ return of capital or amount received on redemption of unit held by unitholder provided such distributions are not chargeable to tax in the hands of the business trust under section 115UA(2) of the IT Act. Such distributions will be taxed at the rates applicable to the taxpayer.

Furthermore, the Nxt-Infra 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 Nxt-Infra 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.

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

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

The Investment Manager intends to take measures to ensure that it is in compliance with all relevant tax laws. However, the tax authorities might take a position that differs from the position taken by us with regard to our tax treatment of various items. For instance, our Asset SPVs are subject to tax assessments and notices from time to time which if determined against us may result in an adverse impact on our financial position and prospects. For details of such actions, please see the section titled "*Legal and Other Information - Taxation Proceedings"* on page 282.

85. The Nxt-Infra Trust and the Project SPVs may be subject to certain tax related risks under the provisions of the IT Act.

Shortfall in the determination of fair market value of the equity shares at the time of transfer of the Project SPVs to the Nxt-Infra Trust may be subject to taxation in the hands of the acquirer. The equity shares of the Project SPVs are proposed to be transferred to the Nxt-Infra Trust. Under the provisions of section 56(2)(x) of the IT Act, where a purchase of shares is undertaken at a value which is lower than the fair market value of the shares, such shortfall in value is subject to be taxed as income from other sources in the hands of the acquirer. The manner of determination of fair market value as provided under the Income Tax Rules, 1962, includes the value determined by net asset method, subject to the prescribed adjustments.

The Nxt-Infra Trust is under an obligation to distribute to the Unitholders, the surplus of the income earned from receipt of cash flows from the interest and dividend received from the Project SPVs, after the deduction of the various expenses incurred in connection with earning such income and general-purpose expenses. The provisions of the IT Act provide that the Nxt-Infra Trust should disclose the nature of the amount distributed to the Unitholders, i.e., whether from dividends received from the Project SPVs, interest income earned, etc. However, there is lack of clarity on the method to be adopted by the Nxt-Infra Trust for the allocation of various expenses incurred towards earning each specific stream of income by the Nxt-Infra Trust.

86. Certain of our Project SPVs enjoy certain benefits under Section 80-IA of the IT Act in relation to the special purpose vehicles and any change in these tax benefits applicable to the Nxt-Infra Trust may adversely affect our results of operations.

Under the provisions of section 80-IA of the IT Act, certain of our Project SPVs, being, DME, and WIPL are eligible for tax holiday for any 10 consecutive assessment years out of 20 years beginning from the year in which the undertaking or enterprise develops and begins to operate any infrastructure facility. As a result of the tax holiday available by such Project SPVs, the taxable profits derived by the Project SPVs from developing, operating and maintaining any infrastructure facility (including toll roads) will not be taxable under the normal provisions of the IT Act during the tax holiday period. Any other taxable income (for example, interest income, profit on sale of mutual funds) from deployment of temporary funds or otherwise would also be taxable under the terms of the IT Act. The Project SPVs will only be subject to Minimum Alternate Tax ("**MAT**") if the Project SPVs have a book profit as required to be computed under section 115JB of the IT Act. Any change in the tax benefits under section 80-IA and/or the provisions of MAT may have an impact on the income tax liability of the Project SPVs and may consequently affect the amount available for distribution by the Project SPVs to the Nxt-Infra Trust. Furthermore, if the relevant conditions under section 80-IA of the IT Act are not met and the manner of computation of profits and gains are not as permitted, the Project SPVs will not be able to enjoy the benefits of such tax holiday.

Benefits under section 80-IA of the IT Act shall not be available to any of the other Project SPVs being, DME, and WIPL who have opted to pay corporate tax under the beneficial regime introduced under section 115BAA of the IT Act. For instance, DME, and WIPL have opted for tax holiday wherein the taxable profits derived by the Project SPVs from developing, operating and maintaining any infrastructure facility (including toll roads) will not be taxable under the normal provisions of the IT Act during the tax holiday period Further, in such case, provisions of MAT shall not be applicable.

87. The income of the Nxt-Infra 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 Nxt-Infra Trust other than capital gain, interest and dividend income from the Project SPVs would be tax chargeable 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 Nxt-Infra Trust, a separately assessable resident entity, is 30.0% (plus applicable surcharge and cess). However, the relevant authorities may view the Nxt-Infra Trust as a "pass through" entity and the applicable tax rate will be the MMR applicable to beneficiaries of the Trust. If any beneficiary is chargeable to MMR at a rate higher than the rate applicable to other beneficiaries, the income of the Nxt-Infra 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 two divergent views, there is a possibility that the matter may be litigated if the latter view is taken up by the tax authorities of India.

88. 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 IT 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 not clear. Any new direct tax legislation may materially and adversely affect our business, prospects, financial condition, results of operations and cash flows.

GENERAL INFORMATION

The Trust has been set up by the Sponsor, as a contributory, determinate and irrevocable trust under the provisions of the Indian Trusts Act, 1882 in Mumbai, India pursuant to the Trust Deed. The Trust has been registered with the SEBI as an infrastructure investment trust under the InvIT Regulations on November 8, 2023 having registration number IN/INVIT/23-24/00028. The Settlor has settled the Trust for an initial sum of ₹10,000. The Sponsor shall not have any beneficial interest in such initial sum of the Trust and such sum shall not be distributed to Sponsor under any circumstances.

For further details, please see the sections titled "*Formation Transactions in relation to the Trust*" and "*Business*" on pages 22 and 163.

Principal place of business and correspondence address of the Trust:

Nxt-Infra Trust

501, 5th Floor, Vikas Hub, Vikas Centre
Dr. C G Road, Wadavali Village
Chembur East, Mumbai 400 074
Maharashtra, India
Tel: +91 9867088529
E-mail: nxt-infra@nxt-infra.com
SEBI registration number: IN/INVIT/23-24/00028
Date of certificate of registration: November 8, 2023

Contact Person and Compliance Officer

Pratik Desai has been designated by the Investment Manager as the Compliance Officer with respect to the Trust and is the relevant contact person with respect to the Trust. The contact details are as follows:

Pratik Desai
501, 5th Floor, Vikas Hub, Vikas Centre
Dr. C G Road, Wadavali Village
Chembur East, Mumbai 400 074
Maharashtra, India
Tel: +91 9867088529
E-mail: pratik@nxt-infra.com

Bidders can contact the Compliance Officer or the Lead Manager in case of any pre-Issue or post-Issue related problems such as non-credit of Allotted Units in the respective beneficiary account of Bidders after Allocation or non-receipt of refunds.

Sponsor

Actis Highway Infra Limited

Registered Address and Correspondence Address:
C/o IQ EQ Corporate Services (Mauritius) Ltd
33, Edith Cavell Street Port-Louis, 11324 Mauritius
Tel: +230 212 9800
Fax: +230 212 9833
Email: actis@iqeq.com
Contact person: Ravindranath Santosh Kumar Hazareesing

Project Manager

Walter Infra Project Manager Private Limited

Registered Address:
Unit No. S-39, 2nd Floor
'Vasant Square Mall' Plot No. A
Community Centre, Pocket-V, Sector-B
Vasant Kunj, New Delhi 110070

Correspondence Address:
Office no. 501, 5th Floor
Vikas Hub, Vikas Centre
Dr. C G Road, Wadavali Village
Chembur East, Mumbai 400 074
Maharashtra, India
Tel: +91 9176628328

Email: gaurav@walter-india.com
Contact person: Gaurav Chaturvedi

Trustee

Catalyst Trusteeship Limited

GDA House, Plot No. 85,
Bhusari Colony (Right)
Paud Road, Pune 411 038, Maharashtra, India
Tel: +91 1143029101
Email: ComplianceCTL-Mumbai@ctltrustee.com
Contact Person: Sameer Trikha
SEBI registration number: IND00000034

Trustee Correspondence Office

Catalyst Trusteeship Limited

910-911, 9th Floor,
Kailash Building, 26,
Kasturba Gandhi Marg,
New Delhi 110001, India

Investment Manager

Walter Infra Manager Private Limited

Registered Address:
Unit No. S-39, 2nd Floor
'Vasant Square Mall' Plot No. A
Community Centre, Pocket-V
Sector-B, Vasant Kunj
New Delhi 110070

Correspondence Address:
501, 5th Floor
Vikas Hub, Vikas Centre
Dr. C G Road, Wadavali Village
Chembur East, Mumbai 400 074
Maharashtra, India
Telephone: : +91 9867088529
Attention: Pratik Desai
Email: im@walter-india.com

Other Parties involved in the Trust

Lead Manager to the Issue

Axis Capital Limited

1st Floor, Axis House
Wadia International Centre
Pandurang Budhkar Marg, Worli
Mumbai 400 025
Maharashtra, India
Tel: +91 22 4325 2183
E-mail: nxt-infra.invit@axiscap.in
Website: www.axiscapital.co.in
Investor grievance mail: compliants@axiscap.in
Contact Person: Sagar Jatakiya/Pavan Naik
SEBI Registration No: INM000012029

Escrow Collection Bank

[●]

Legal Advisor to the InvIT, the Investment Manager and the Sponsor as to Indian Law

Cyril Amarchand Mangaldas

6th Floor, Peninsula Chambers
Peninsula Corporate Park
Ganpatrao Kadam Marg
Mumbai 400 013
Maharashtra, India
Tel: +91 22 2496 4455
Fax: +91 22 2496 3666

Legal Counsel to the Lead Manager as to Indian law

J Sagar Associates

Vakils House, 18 Sprott Road
Ballard Estate, Mumbai 400 001
Maharashtra, India

Auditor to the Trust

S R B C & Co LLP

Chartered Accountants
ICAI Firm registration number: 324982E/E300003

Valuer

S Sundararaman

5B, A Block, 5th Floor
Mena Kampala Arcade, New#18 & 20
Thiagaraya Road, T. Nagar
Chennai 600 017, India
Tel: +91 44281 54192
E-mail: chennaissr@gmail.com
IBBI Registration Number: IBBI/RV/06/2018/10238

Technical Consultant

Samarth Infraengg Technocrats Pvt. Ltd.

Address: #6-3-1100/5, Raj Bhavan Road,
Somajiguda, Hyderabad 500 082,
Telangana, India
Tel: +91 4023412731/23412730
Email: core@samarth-infraengg.com

Traffic Consultant

Steer Davies & Gleave India Private Limited
Address: Steer Davies & Gleave India Private Limited
Registered Office: Suite No. S3, Vatika Business Centre,
Vatika Triangle, MG Road,
Gurgaon, Haryana- 122002
Tel: +91 124 441 8650
Email: Indiainfo@steergroup.com

Registrar and Unit Transfer Agent

Link Intime India Private Limited

Address: C-101, 247 Park
LBS Marg, Vikhroli (West)
Mumbai 400083
Tel: +91 810 811 4949
Email: Nxtinfra.invit@linkintime.co.in
SEBI registration number: INR000004058
Contact person: Shanti Gopalakrishnan
Website: www.linkintime.co.in

Credit rating

The Trust has not obtained any credit ratings in relation to its facilities, as of the date of this Draft Placement Memorandum.

PARTIES TO THE TRUST

The summaries of the key terms of certain material contracts and agreements included in this section are not complete and are subject to, and are qualified in their entirety by reference to, the provisions of the respective material contracts and agreements. Copies of the material contracts and agreements described in this section will be available for inspection at the principal place of business of the Trust. For further details, please see the section titled "Material Contracts and Documents for Inspection" on page 314.

A. The Sponsor

Actis Highway Infra Limited

History and Certain Corporate Matters

Actis Highway Infra Limited is the Sponsor of the Trust. The Sponsor was incorporated on March 24, 2022 in the Republic of Mauritius with registration number 186465 GBC. The Sponsor is a private company limited by shares. The Sponsor's registered office is situated at C/o IQ EQ Corporate Services (Mauritius) Ltd, 33, Edith Cavell Street Port-Louis, 11324 Mauritius. For further details, please see the section titled "*General Information*" on page 81.

Background and Past Experience of Sponsor

The Sponsor is part of the Actis Group, which is a global investor in sustainable infrastructure. Since its inception, Actis Group has invested over USD 24 billion as of March 31, 2023, and manages assets across a diverse range of sectors globally. The Sponsor presently holds and operates six road assets in India which were acquired from the Welspun group in 2022 and are proposed to be transferred to the Trust pursuant to the Issue.

The consolidated net worth of the Sponsor as at September 30, 2023 stood at approximately USD 2,678.78 lakhs. The Sponsor shall continue to comply with the minimum net worth requirement set out in Regulation 4(2)(d)(ii) of the InvIT Regulations.

The Sponsor is a newly incorporated company. Accordingly, in terms of the Regulation 4(2)(d) of the InvIT Regulations, it is relying on its Associate, namely Actis Infrastructure India PCC Limited ("**Actis PCC**"), to fulfil the eligibility criteria in relation to a sound track record of at least five years in the development of infrastructure or fund management in the infrastructure sector, under the InvIT Regulations. Since its incorporation on March 10, 2010, Actis PCC has been engaged in managing investments of funds received from entities associated or affiliated with Actis LLP in the infrastructure space in India, specifically in the power & energy sectors, and highways.

Board of directors of the Sponsor

The board of directors of the Sponsor is entrusted with the overall management of the Sponsor. Please see below the details in relation to the board of directors of the Sponsor:

Sr. No.	*Name*	*Designation*
1.	Ravindranath Santosh Kumar Hazareesing	Director
2.	Kishore Sunil Banymandhub	Director

Sponsor Group

In addition to the Sponsor, Actis PCC shall also form a part of the Sponsor Group.

Other Confirmations

As of the date of this Draft Placement Memorandum, the Sponsor and the Sponsor Group are in compliance with the eligibility criteria provided under Regulation 4 of the InvIT Regulations and are "fit and proper persons" as prescribed under SEBI Intermediaries Regulations.

Details of the Holding or the Proposed Holding by Sponsor in the Trust

For details please see the sections titled "*Information Concerning the Units*" on pages 221.

B. The Trustee – Catalyst Trusteeship Limited

History and Certain Corporate Matters

Catalyst Trusteeship Limited is the trustee of the Trust. The Trustee is a registered intermediary with SEBI under the Securities and Exchange Board of India (Debenture Trustees) Regulations, 1993, as a debenture trustee since April 13, 2022, having registration number IND00000034 and its registration as a debenture trustee is valid until suspended or cancelled by SEBI. For further details, please see the section titled "*General Information*" on page 81.

Background of the Trustee

Catalyst Trusteeship Limited is a public company incorporated on August 22, 1997 at Pune under the Companies Act, 1956, having CIN U74999PN1997PLC110262.

The Trustee is a trusteeship company, which has been registered with SEBI on April 13, 2022 as a 'debenture trustee'. The Trustee is involved in varied facets of debenture and bond trusteeships, including, advisory functions and management functions. The Trustee also acts as a security trustee and is involved in providing services in relation to security creation, compliance and holding security on behalf of lenders.

The Trustee confirms that it has and undertakes to ensure that it will, at all times, maintain adequate infrastructure personnel and resources to perform its functions, duties and responsibilities with respect to the Trust, in accordance with the InvIT Regulations, the Trust Deed and other applicable law.

The Trustee is not an Associate of the Sponsor, or the Investment Manager. Further, neither the Trustee nor any of the promoters or directors of the Trustee (i) are debarred from accessing the securities market by SEBI; (ii) is a promoter, director or person in control of any other company or a sponsor, investment manager or trustee of any other infrastructure investment trust or an infrastructure investment trust which is debarred from accessing the capital market under any order or direction made by SEBI; or (iii) are persons who are categorized as wilful defaulters by any bank or financial institution, as defined under the Companies Act, 2013, or consortium thereof, in accordance with the guidelines on wilful defaulters issued by the RBI.

Other Confirmations

The Trustee is not an Associate of the Sponsor or the Investment Manager. Further, as of the date of this Draft Placement Memorandum, the Trustee is in compliance with the eligibility criteria provided under Regulation 4 of the InvIT Regulations and is a "fit and proper person" as prescribed under SEBI Intermediaries Regulations.

Board of Directors of the Trustee

The board of directors of the Trustee 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	Age (years)	DIN	Designation
1.	Ravindra Prabhakar Marathe	64	07271376	Chairman and Director
2.	Umesh Manohar Salvi	40	09167199	Managing Director
3.	Jayesh Dharmendra Pandit	58	02294644	Director
4.	Pravin Hari Kutumbe	63	01629256	Director
5.	Rewati Sudhir Paithankar	61	00239059	Director

Brief profiles of the Directors of the Trustee

1. **Ravindra Prabhakar Marathe,** aged 64, is the director and chairman of Catalyst Trusteeship Limited.

2. **Umesh Manohar Salvi**, aged 40, is a managing director on the board of Catalyst Trusteeship Limited.

3. **Jayesh Dharmendra Pandit**, aged 58, is a non-executive director on the board of Catalyst Trusteeship Limited.

4. **Pravin Hari Kutumbe**, aged 63, is a director on the board of Catalyst Trusteeship Limited.

5. **Rewati Sudhir Paithankar**, aged 61, is a director on the board of Catalyst Trusteeship Limited.

Key Terms of the Trust Deed

The Trustee has entered into the Trust Deed, in terms of the InvIT Regulations, the key terms of which, are provided below:

1. *Powers of the Trustee*

   The Trustee has been provided with various powers under the Trust Deed in accordance with the Indian Trusts Act, 1882 and the InvIT Regulations, including but not limited to:

   (a) ***General powers***: Without prejudice to the scope and generality of the powers and authority conferred upon the Trustee under the Indian Trusts Act, 1882, the Trustee shall, in relation to the InvIT, have every and all powers that a person competent to contract and acting as a legal and beneficial owner of such property has, and such powers shall not be restricted by any principle of construction or rule or requirement, but shall operate according to the widest generality of which the foregoing words are capable, notwithstanding that certain powers are more specifically set forth herein.

(b) The Trustee shall have the power to appoint the Investment Manager as the investment manager of the InvIT and shall have the power to delegate all or any of the powers of the Trustee, as set out in the Deed and as permitted under Applicable Law, to the Investment Manager. The Trustee shall have the power to execute the Investment Management Agreement with the Investment Manager, the Project Implementation and Management Agreement with the Project Manager and any other agreement or arrangement, from time to time, with the Investment Manager or any of its nominees.

(c) The Trustee shall have the power to determine, in accordance with the Investment Management Agreement and the Investment Objectives, distributions to Unitholders and other rights attached to the Units in compliance with the InvIT Regulations and Applicable Law.

(d) The Trustee shall oversee voting of Unitholders in accordance with the InvIT Regulations.

(e) ***Power to accept subscription to Units of the InvIT***: The Trustee shall have the power to do the following, in accordance with the InvIT Regulations which power may be delegated to the Investment Manager in terms of the Investment Management Agreement:

(i) cause the offering of the Units through any Offer Document;

(ii) cause any Offer Document to be provided to the investors;

(iii) issue and allot Units or debt securities (as defined under the InvIT Regulations) in accordance with Applicable Law;

(iv) summon and conduct meetings of the Unitholders in accordance with the relevant InvIT Documents and the InvIT Regulations;

(v) subject to, and only in accordance with, the terms of the InvIT Documents and the InvIT Regulations, approve transfer of the Units; and

(vi) all such acts, deeds and actions as may be necessary in relation to the exercise of any of the powers specified under paragraphs (i) to (v) above.

(f) ***Power to make decisions regarding investments and disinvestments****:* The Trustee shall invest and hold the InvIT Assets in the name of the InvIT for the benefit of the Unitholders in accordance with the provisions of the InvIT Regulations, the InvIT Documents, the Deed and the Investment Objectives. The Trustee shall be empowered to make investment decisions as provided below, with respect to the underlying assets or projects of the InvIT including any further investments or divestment, subject to InvIT Regulations and in accordance with the Offer Document. Provided such power is delegated to, and exclusively exercised by, the Investment Manager pursuant to the Investment Management Agreement, the Investment Manager is also empowered to:

(i) acquire, subscribe, hold, manage, trade, transfer and dispose of shares, stocks, convertibles, debentures, mutual funds, bonds or other equity or equity-related securities or other debt or mezzanine securities of all kinds issued by any Holding Company or any SPV, whether in physical or dematerialised form, including power to hypothecate, pledge or create Encumbrances of any kind on such securities held by the InvIT in such Holding Companies or SPVs, to be used as collateral security for any borrowings by the InvIT or any Holding Company or any SPV;

(ii) avail commercial loans, including the power to hypothecate, pledge or create Encumbrances of any kind on the InvIT Assets as collateral security for any such loans availed by the InvIT, in accordance with the InvIT Regulations and Applicable Law;

(iii) keep the capital and monies of the InvIT, the Holding Companies and the SPVs in deposit with banks or mutual funds or other institutions whatsoever, in accordance with the InvIT Regulations and other Applicable Law;

(iv) undertake lending to Holdcos, SPVs and any other Persons permitted under Applicable Law;

(v) accept Capital Contributions;

(vi) collect and receive the profit, interest, repayment of principal of debt or debt like, or equity or equity like, mezzanine securities, dividend, return of capital of any type by the Holding Companies, or SPVs, and income of the InvIT as and when the same may become due and receivable;

(vii) invest in securities or in units of mutual funds in accordance with the InvIT Regulations and other Applicable Law by the InvIT, the Holding Companies and the SPVs;

(viii) invest in money market instruments including government securities, treasury bills, certificates of deposit and commercial papers in accordance with Applicable Law by the InvIT, the Holding Companies and the SPVs;

(ix) to give, provide and agree to provide to any Holding Companies or SPVs, financial assistance in the form of investment in its debt securities or share capital of any class including ordinary, preference, participating, non-participating, voting, non-voting or other class, and in the form of investment in securities convertible into share capital;

(x) to invest, acquire, purchase, hold, divest, sale, hypothecate, pledge or otherwise transfer movable property or immovable property of any kind including any rights and interest therein of the Holding Companies and the SPVs;

(xi) provide guarantee, security or other collateral facility in connection with any financing, borrowings or otherwise, undertaken by the InvIT, Holdcos, SPVs or other investment entities; and

(xii) to appoint advisors and service providers in connection with the foregoing.

(g) ***Power to apportion between income and capital***: Subject to the provisions of the InvIT Regulations, the Trustee, in consultation with the Investment Manager, shall have the power to make such reserves out of the income or capital as the Trustee may deem proper in order to meet the expenses, liabilities (including potential tax liability) or contingent liabilities of the InvIT including to address any event of force majeure and any decisions of the Trustee whether made in writing or implied from its acts, so far as the Applicable Law may permit, shall be conclusive and binding on the Unitholders and all Persons actually or prospectively interested under the Deed. Any distribution made by the Trustee from such reserves shall be in the manner set out in the relevant provisions of the Deed.

(h) ***Power to employ agents****:* In addition to acting in its capacity as trustee, the Trustee shall subject to the InvIT Regulations, have the power to employ and pay at the expense of the InvIT, any agent in any jurisdiction whether attorneys, solicitors, brokers, banks, trust companies or other agents whether associated or connected in any way with the Trustee or not, without being responsible for the default of any agent if employed in good faith to transact any business, including without limitation, the power to appoint agents to raise funds, or do any act required to be transacted or done in the execution of the trusts hereof including the receipt and payment of moneys and the execution of documents.

(i) ***Power to employ an Investment Manager****:* The Trustee shall, on behalf of the InvIT, within a reasonable time from the date of execution hereof and subject to the InvIT Regulations, appoint the Investment Manager as the investment manager to the InvIT, by execution of the Investment Management Agreement, on behalf of the InvIT, to manage the assets and investments of the InvIT and undertake activities of the InvIT in accordance with the terms and conditions set out in the Deed and the Investment Management Agreement and Applicable Law.

(j) ***Oversee activities of the Investment Manager***: The Trustee shall oversee the activities of the Investment Manager in the interest of the Unitholders, ensure that the Investment Manager complies with the InvIT Regulations and Applicable Law and shall obtain a compliance certificate or such other reports and information as may be prescribed under the InvIT Regulations from time to time from the Investment Manager on a quarterly basis, or such other time period as prescribed by Applicable Law, in the form prescribed by SEBI, if any.

(k) ***Power to employ a Project Manager****:* The Trustee shall, on behalf of the InvIT, within a reasonable time from the date of execution hereof, appoint the Project Manager as the project manager for the InvIT, by execution of the Project Implementation and Management Agreement, for the operation and management of the InvIT Assets, in accordance with the terms and conditions set out in the Deed, the Project Implementation and Management Agreement and Applicable Law.

(l) ***Oversee activities of the Project Manager***: The Trustee shall oversee activities of the Project Manager with respect to compliance with the InvIT Regulations and the Project Implementation and Management Agreement and shall obtain a compliance certificate from the Project Manager on a quarterly basis or such other time period as prescribed by Applicable Law, in the form prescribed by SEBI, if any.

(m) ***Power to appoint nominees and custodians**:* The Trustee may, in consultation with the Investment Manager, appoint any custodian in order to provide custodian services, and may permit any property comprised in the InvIT to be and remain deposited with a custodian or with any Person or Persons in India or in any other jurisdiction subject to such deposit being permissible under the Applicable Law.

(n) ***Power to pay duties and taxes**:* In the event of any capital gains tax, income tax, stamp duty or other duties, fees or taxes (and any interest or penalty chargeable thereon) whatsoever becoming payable in any jurisdiction in respect of the InvIT or any part thereof or in respect of documents issued or executed in pursuance the Deed in any circumstances whatsoever, the Trustee shall have the power and duty to pay all such duties, fees or taxes (and any interest or penalty chargeable thereon) as well as to create any reserves for future potential tax liability out of the income of the InvIT, or to the extent of the amount invested in the Units by the Unitholders, as may be permitted under Applicable Law and the advice of tax consultants, and the Trustee may pay such duties, fees or taxes (and any such interest or penalty) on behalf of the InvIT. For avoidance of doubt, it is clarified that, pursuant to this Article, no Unitholder will be required to make a contribution as a capital commitment to the InvIT (other than the value for Units already paid). The Trustee may, on the recommendation of the Investment Manager, file tax returns with the relevant Governmental Agencies, in accordance with Applicable Law and the advice of tax consultants.

(o) ***Power to expend on behalf of the InvIT***: The Trustee shall, subject to the advice of the Investment Manager and the InvIT Regulations, have the power to pay InvIT Expenses (including taxes and statutory charges) out of the funds held by the InvIT.

(p) ***Power to take counsel's opinion**:* The Trustee shall, in discharge of its duties, have the power to take the opinion of legal or tax counsel in any jurisdiction concerning any disputes or differences arising under the Deed or any matter relating to the InvIT and the fees of such counsel shall be paid out of the funds held in the InvIT.

(q) ***Power to appear before relevant authorities:*** The Trustee shall, in discharge of its duties , have the power to appear before the relevant authorities, submit information, seek clarifications from any regulatory authority and complete, sign and submit any applications or documents for any approvals, permissions, or actions that may be necessary or desirable on behalf of the InvIT.

(r) ***Power to conduct activities with trustees of other trusts**:* The Trustee may, in execution of the InvIT hereof or in exercise of any of the powers hereby or by law given to the Trustee sell, rent or buy any property, or borrow property from or carry out any other transaction with the trustees of any other trust or the executors or administrators of any estate notwithstanding that the Trustee is the same Person as those trustees, executors or administrators or any of them and where the Trustee is the same Person as those trustees, executors or administrators, the transaction shall be binding on all Persons then or thereafter interested hereunder though effected and evidenced only by an entry in the books of accounts of the Trustee, provided such power is delegated to, and exclusively exercised by, the Investment Manager pursuant to the Investment Management Agreement. The Trustee shall ensure that no conflicts of interest shall arise whilst conducting such activities.

(s) ***Power to effect compromises***: Subject to Applicable Law, the Trustee (acting on behalf of the InvIT) shall have the power to:

(i) accept any property before the time at which it is transferable or payable;

(ii) pay or allow any claim on any evidence that it thinks sufficient;

(iii) accept any security movable or immovable in lieu of any amounts payable to it;

(iv) alter the dates for payment of any amounts payable to it; and

(v) subject to such approval (if any) as may be required from the Unitholders, compromise, compound, abandon or otherwise settle any claim or thing whatsoever relating to the InvIT or the Deed.

(t) ***Power to borrow**:* The Trustee shall, subject to the advice of the Investment Manager, have the power to borrow funds any subordinated equity, bonds, commercial papers, long-term loans, short term loans, bonds or other loans or funds from any Person or authority (whether Government or otherwise, whether Indian or overseas) for the purpose of the InvIT on such terms and conditions and for such periods and subject to approval of the Unitholders in accordance with and as may be required in terms of the InvIT Regulations and Applicable Law. The Trustee shall, subject to the advice of the Investment Manager, also have the power to create Encumbrances of any kind on the InvIT Assets as collateral security for any such borrowings. Further, the Trustee (acting in capacity

of the trustee of the InvIT) shall have the power to create charge, security interest and/or lien over any or all of the assets of the InvIT (both present or future), to secure and/or guarantee the performance or any of the obligations of the Holdcos/SPVs or investment entity, as it may deem fit, subject to compliance with Applicable Law.

(u) ***Power to re-invest***: Subject to the conditions laid down in any Offer Document, InvIT Documents, and the InvIT Regulations and Applicable Law, the Trustee may, subject to any advice of the Investment Manager, retain any proceeds received by the InvIT from Holding Companies or SPVs or infrastructure projects, including through the sale of or any Holding Company or SPV or infrastructure projects .

(v) ***Power to make rules****:* The Trustee may, make rules to give effect to, and carry out the Investment Objectives, subject to Applicable Law. In particular, and without prejudice to the generality of such powers, the Trustee may provide, in a manner not inconsistent with the provisions of the Deed and the InvIT Regulations, for all or any of the following matters, namely:

(i) manner of maintaining of the records and particulars of the Unitholders;

(ii) norms of investment by the InvIT in accordance with the Investment Objectives of the InvIT and in accordance with the powers and authorities of the Trustee as set out herein;

(iii) matters relating to entrustment/deposit or handing over of any securities or shares of the SPVs of the InvIT to any one or more custodians and the procedure relating to the holding thereof by the custodian;

(iv) such other administrative, procedural or other matters relating to the administration or management of the affairs of the InvIT and which matters are not, by the very nature required to be included or provided for in the Deed or by the management thereof and which matters are not inconsistent with the Investment Objectives, the Deed and Applicable Law;

(v) procedure for seeking the vote of the Unitholders either by calling a meeting or through postal ballot or otherwise;

(vi) procedure for summoning and conducting meetings of Unitholders; and

(vii) The aforementioned power to make rules may be delegated by the Trustee to the Investment Manager subject to the InvIT Regulations and in terms of the Investment Management Agreement.

(w) ***Power to maintain register****:* The Trustee shall cause the Depository to maintain the Depository Register.

(x) ***Power to appoint intermediaries***: The Trustee shall advise the Investment Manager in relation to the appointment of Valuer, Auditors, registrar and transfer agent, merchant bankers, custodian, Credit Rating Agency and any other intermediary or service provider or agent as may be applicable with respect to the activities pertaining to the InvIT, in a timely manner, in accordance with the InvIT Regulations and Applicable Law. The Investment Manager shall ensure that the activities of, and the services provided by, any of the intermediaries set out above are as per the provisions of the InvIT Regulations and Applicable Law.

(y) ***Power to review reports****:* The Trustee shall review the reports required in terms of InvIT Regulations and Applicable Law, as submitted by the Investment Manager, including, without limitation, in relation to Eligible Unitholder(s), as prescribed from time to time. In the event such reports are not submitted in a timely manner, the Trustee, after due follow-up, shall intimate the same to SEBI as required in terms of the InvIT Regulations and Applicable Law.

(z) ***Power to open and operate bank accounts****:* The Trustee shall have the power to open one or more bank accounts for the purposes of the InvIT, to deposit and withdraw money and fully operate the same.

(aa) ***Other matters authorised by the Unitholders****:* The Trustee shall have the power to take up with SEBI or with the designated stock exchange(s) as applicable, any matter which has been approved in any meeting of Unitholders, if the matter requires such action.

(bb) ***Other powers:*** Without prejudice to any other provisions of the Deed, the Trustee shall also have the following powers and authorities:

(i) to institute, conduct, compromise, compound, or abandon any legal proceedings for or on behalf of or in the name of the InvIT or the Trustee, and to defend, compound or otherwise

deal with any such proceedings against the InvIT or Trustee or the officers of the Trustee or concerning the affairs of the InvIT, and also to compound and allow time for payment or satisfaction of any equity due and of any claims or demands by or against the InvIT and to refer any differences to arbitration and observe and perform in relation to any decisions thereof;

(ii) to make and give receipts, releases and other discharges for moneys payable to the InvIT and for the claims and demands of the InvIT;

(iii) to vary, alter, postpone, extend or cancel the terms and conditions of agreements, in relation to investments, as entered into with the relevant SPVs/Holdcos/investment entities, as applicable;

(iv) to enter into all such negotiations and contracts, and, execute and do all such acts, deeds and things for or on behalf of or in the name of the InvIT as the Trustee may consider expedient for or in relation to any of the matters or otherwise for the purposes of the InvIT;

(v) to sign, seal, execute, deliver and register according to law all deeds, documents, agreements, and assurances in respect of the InvIT;

(vi) to negotiate, sign, seal, execute and deliver the InvIT Documents, including but not limited to, any issue agreement, share purchase agreement, services agreement, deed of right of first offer, debenture subscription agreement, escrow agreement, underwriting agreement, loan documentation, Offer Document or any other deed, agreement or document in connection with the InvIT or the Units, including any amendments, supplements or modifications thereto;

(vii) take into their custody and/or control all the capital, assets, property of the InvIT and hold the same in trust for the Unitholders in accordance with the Deed, the InvIT Regulations and Applicable Law; and

(viii) generally to exercise all such powers as it may be required to exercise under the InvIT Regulations and Applicable Law for the time being in force and do all such matters and things as may promote the InvIT or as may be incidental to or consequential upon the discharge of its functions and the exercise and enforcement of all or any of the powers and rights under the Deed, the Applicable Law and the InvIT Regulations.

(cc) ***Power to buy-back Units***: Subject to Applicable Law, the Trustee may at any time, buy-back the Units from the Unitholders.

(dd) ***Power to repay debt***: Subject to Applicable Law and the advice of the Investment Manager, the Trustee may cause the InvIT to pay, prepay or repay any and all debt raised from any Person in accordance with the terms therein and to redeem any debt securities or other securities, obligations or instruments in accordance with the terms thereof issued to such Persons in compliance with the InvIT Regulations and other Applicable Law.

(ee) ***Power to determine fees***: The Trustee shall have the power, whether directly (in consultation with or on the recommendation of the Investment Manager) through the Investment Manager where the Investment Manager has been so authorised by the Trustee under the Investment Management Agreement, to appoint, determine the fees of and enter into, execute, deliver, perform, modify or terminate all documents, agreements and instruments containing customary terms including contractual indemnities with valuers, auditors, registrar and transfer agents, merchant bankers, credit rating agencies, search agents, custodians, property consultants, brokers, legal, financial and tax consultants or any other intermediary or professional service provider or agent as may be required in connection with the activities of the InvIT in a timely manner and as per the provisions of the InvIT Regulations and other Applicable Law.

(ff) ***Power to delegate****:* The Trustee may, delegate to the Investment Manager or the Project Manager, any powers set out above and the duties set out below, or as available to it under the InvIT Regulations and Applicable Law, including, *inter alia*, management of the assets and investments of the InvIT vested in it under the Deed, taking investment decisions, issue, listing and allotment of Units and making distributions in accordance with the InvIT Regulations. Further, for administrative and operational convenience, the Trustee may delegate to any committee or Person with consent of the Investment Manager, any administrative duties as set out below, provided, however, the Trustee shall remain responsible and liable for any such Persons' acts of commission or omission as determined by a court of competent jurisdiction whose decision is final, binding and non-appealable, except the roles and responsibilities delegated by the Trustee to Investment Manager, Project

Manager or any third party expert, or any sub-delegation by the Investment Manager or the Project Manager.

2. *Duties of the Trustee*

(a) The Trustee shall use best endeavours to carry on and conduct the business of the InvIT in a proper and efficient manner in the best interest of the Unitholders.

(b) The Trustee, on behalf of the InvIT, shall appoint an Investment Manager and Project Manager in accordance with the InvIT Regulations and Applicable Law.

(c) ***Investment Management Agreement***: The Trustee shall, on behalf of the InvIT, within a reasonable time from the date of execution of the Deed, enter into the Investment Management Agreement with the Investment Manager.

(d) ***Ensure that the Investment Manager performs its obligations****:*

(i) The Trustee shall ensure that the Investment Manager complies with reporting and disclosure requirements in accordance with the InvIT Regulations and in case of any delay or discrepancy, require the Investment Manager to rectify such delay or discrepancy on an urgent basis.

(ii) The Trustee shall review the transactions carried out between the Investment Manager and its Associates and, where the Investment Manager has advised that there may be a conflict of interest, it shall obtain a certificate from a practising chartered accountant or valuer, as applicable, that such transaction is on arm's length basis.

(iii) The Trustee shall review the Valuation Report submitted by the Investment Manager.

(iv) The Trustee shall require the Investment Manager to set up such systems and procedures and submit such reports to the Trustee, as may be necessary for effective monitoring of the functioning of the InvIT.

(v) The Trustee may maintain, or cause the Investment Manager or the registrar and transfer agent to maintain a register of the Units of the InvIT.

(vi) The Trustee shall ensure that the Investment Manager convenes meetings of the Unitholders in accordance with the InvIT Regulations and oversee the voting by Unitholders and declaration of such results of such meetings, provided that where there (i) is a change or removal of the Investment Manager, or a Change in Control of the Investment Manager, and the Trustee will be required to obtain approval of the Unitholders of the Trustee shall be responsible for convening and conducting of the meetings of the Unitholders; and (ii) any issue pertaining to the Trustee such as change in the Trustee, the Trustee shall not be involved in any manner in the conduct of the meetings of the Unitholders. The Trustee shall ensure that the Investment Manager convenes meetings of Unitholders in the manner as prescribed under the InvIT Regulations, from time to time.

(e) ***Providing information to SEBI and the stock exchange(s)***: The Trustee shall provide SEBI and the stock exchange(s), where applicable, such information as may be sought by SEBI or by the stock exchange(s) pertaining to the activity of the InvIT. The Trustee shall comply with intimation requirements under the InvIT Regulations and Applicable Law, including in relation to intimating SEBI in case of any discrepancy in the operation of the InvIT with the Deed, the InvIT Regulations and any Offer Document. The Trustee shall also immediately inform SEBI in case any act which is detrimental to the interest of the Unitholders is noted.

(f) ***Interests of the Unitholders****:* The Trustee shall, at all times, exercise due diligence in carrying out its duties and protecting the interests of the Unitholders.

(g) ***Delegation to Investment Manager and Project Manager***:

(i) The Trustee shall delegate all such powers to the Investment Manager, as may be required by the Investment Manager, to carry out its obligations under the Investment Management Agreement and under Applicable Law.

(ii) The Trustee shall delegate all such powers to the Project Manager, as may be required by the Project Manager, to carry out its obligations under the Project Implementation and Management Agreement and under Applicable Law.

(h) ***Change in, or Change in Control of, the Investment Manager***: The Trustee shall obtain prior approval from the Unitholders in accordance with the InvIT Regulations before any change in, or Change in Control of, the Investment Manager due to removal or otherwise. In this regard, the Trustee shall also obtain prior approval from SEBI prior to any change in or Change in Control of the Investment Manager, in the event that such approval is required in terms of the InvIT Regulations. In case of change in Investment Manager due to removal or otherwise, the Trustee shall appoint a new investment manager in accordance with the InvIT Regulations and Applicable Law, within the time period prescribed under the InvIT Regulations. The previous investment manager shall continue to act as such at the discretion of the Trustee until such time as the new investment manager is appointed. The Trustee shall ensure that the new investment manager shall stand substituted as a party in all the documents to which the earlier Investment Manager was a party. The Trustee shall also ensure that the earlier Investment Manager continues to be liable for all its acts of omissions and commissions for the period during which it served as investment manager, notwithstanding its termination.

(i) ***Change in Project Manager***: In case of change in Project Manager due to removal or otherwise, the Trustee shall appoint a new project manager in accordance with the InvIT Regulations and Applicable Law. The Trustee shall, appoint a new project manager within the time period prescribed under the InvIT Regulations. The Trustee may appoint an administrator in connection with an infrastructure project for such terms and on such conditions as it deems fit. The previous project manager shall continue to act as the project manager at the discretion of the Trustee till such time as a new project manager is appointed. All costs and expenses in this regard will be borne by the new project manager. The Trustee shall ensure that the new project manager shall stand substituted as a party in all the documents to which the earlier Project Manager was a party. The Trustee shall also ensure that the earlier Project Manager continues to be liable for all its acts of omissions and commissions for the period during which it served as project manager, notwithstanding its termination.

(j) ***Change in Control of Project Manager***: The Trustee shall ensure that in case of Change in Control of the Project Manager, the Trustee shall, in consultation with the Investment Manager, take such actions as may be required in terms of the InvIT Documents, written consent is obtained from the counter parties in terms of the concession agreements or agreements of a similar nature entered into by the Holding Company(ies) or SPVs, prior to such change, if applicable.

(k) ***Subscription monies***: The Trustee shall ensure that subscription amount is kept in a separate bank account in name of the InvIT and is only utilised for adjustment against allotment of Units or refund of money to the applicant till the time such Units are listed and the same will be utilised for objectives of the offering as will be mentioned in the relevant Offer Document.

(l) ***Books of account***: The Trustee shall cause the books of accounts of the InvIT to be in accordance with Article

(m) ***Attainment of objects of the InvIT***: The Trustee shall ensure that all acts, deeds and things are done for the attainment of the Investment Objectives of the InvIT and in compliance with the InvIT Regulations and Applicable Law and to secure the best interests of the Unitholders.

(n) ***Reports to be filed by the InvIT***: The Trustee, either by itself or through the Investment Manager, shall, from time to time, file such reports as may be required by SEBI or any other regulatory authority or as required under the InvIT Regulations and Applicable Law with regard to the activities carried on by the InvIT.

(o) ***Review of complaint status:*** The Trustee shall periodically review the status of the Unitholders' complaints and their redressal undertaken by the Investment Manager, in accordance with the InvIT Regulations.

(p) ***Confidentiality***: The Trustee and its directors, officers, employees and agents shall at all times maintain the greatest amount of confidentiality as regards the activities and assets of the InvIT and such other matter connected with them and the InvIT generally and shall not disclose any confidential information to any other Person, other than the Investment Manager, or the Project Manager, unless such information is required to be disclosed to some regulatory authority, court or any other Person under any order of court or any law in force in India.

(q) ***Segregation of assets and liabilities***: The assets and liabilities of the InvIT shall at all times be segregated from the assets and liabilities of the Trustee and the assets and liabilities of other trusts managed by the Trustee. The assets held under the InvIT shall be held for the exclusive benefit of the Unitholders and such assets shall not be subject to the claims of any creditor or any Person claiming under any other fund administered by the Trustee or by the Investment Manager.

(r) ***Valuer***: The Trustee shall ensure through the Investment Manager that a detailed valuation is undertaken of the InvIT Assets by a Valuer at such intervals and in the manner as may be prescribed under the InvIT Regulations and Applicable Law. The Trustee shall ensure that the remuneration of the Valuer is not linked to or based on the value of the asset(s) being valued.

(s) ***Investment by Trustee***: The Trustee of the InvIT shall not invest in Units of the InvIT.

(t) ***Compliance with InvIT Regulations***: The Trustee shall fulfil its obligations in terms of the InvIT Regulations.

(u) The Trustee shall ensure that the activity of the InvIT is being operated in accordance with the provisions of the Deed, the InvIT Regulations, Applicable Law and the InvIT Documents and if any discrepancy, it shall inform SEBI immediately in writing.

(v) ***Adoption of Policies***: The Trustee shall ensure that the InvIT, the Investment Manager, the Project Manager, the Holding Companies and the SPVs adopt policies, including corporate governance policies, policies in relation to acquisition of assets from the Sponsors and third parties, policies in relation to related party transactions, policies in relation to appointment of auditors and valuers, policies in relation to the Net Distributable Cash Flows, leverage policies, ("**Policies**"), as applicable, prior to filing of the relevant Offer Document for the initial offer. The terms, such as, manner or requirement of Unitholders' approval for each of these Policies, applicability, amendment and termination, of the respective Policies shall be set out in each of the Policies.

(w) ***Maintenance of records***: The Trustee shall maintain records in relation to the InvIT in accordance with the InvIT Regulations and Applicable Law.

(x) ***Winding up of the InvIT***: The Trustee shall wind up the InvIT in accordance with the InvIT Regulations and Applicable Law. Upon winding up of the InvIT, the Trustee shall surrender the certificate of registration to SEBI.

(y) ***Suspension of Trustee's registration***: The Trustee shall promptly, on occurrence, inform the Sponsor of a cancellation, revocation, suspension, non-renewal of its registration to act as a trustee under Applicable Law or a breach of the terms of such registration that will materially impair its ability to perform its obligations and exercise its powers under the Deed.

3. Rights of the Trustee

(a) ***Right to receive advice***: The Trustee may, in the discharge of its duties, act upon any advice obtained in writing from any bankers, accountants, brokers, lawyers, professionals, consultants, or other experts acting as advisers to the Trustee.

(b) ***Restriction on right to inspect***: Subject to Applicable Law, no Unitholder shall be entitled to inspect or examine the InvIT's premises or properties (including any Holding Company and SPVs) without the permission of the Trustee, who shall give such permission, if necessary, in consultation with the Investment Manager. Further, no Unitholder shall be entitled to require discovery of any information respecting any detail of the InvIT's activities or any matter which may relate to the conduct of the business of the InvIT and which information may, in the opinion of the Trustee and the Investment Manager adversely affect the interest of the Unitholder.

(c) ***Right to reimbursement of expenses, outgoings, taxes etc.***: Without prejudice to any other provisions of the Deed, but save as otherwise provided for in any InvIT Document, the Trustee shall be entitled to reimburse itself and shall be entitled to charge the InvIT, with the expenses, taxes, levies, and liabilities (including indemnity obligations of the InvIT, if any) as set out in Schedule I hereto.

(d) ***Right to accept value or price of the investment***: The Trustee may accept as sufficient evidence for the value of any investment or for the cost price or sale price thereof or for any other fact within its competence, a certificate by a Valuer or any other professional Person appointed by the Investment Manager for the purpose.

4. Liabilities of The Trustee

(a) ***Assets received by the Trustee***: The Trustee shall only be held chargeable for such monies, stocks, funds, shares, assets, investment, property or securities as the Trustee shall have actually received and shall not be liable or responsible for any banker, broker, custodian or other Person in whose hands the same may be deposited or placed, nor for the deficiency or insufficiency in the value of any investments of the InvIT nor otherwise for any involuntary loss. Any receipt signed by the Trustee for any monies, stocks, funds, shares, securities, investment or property, paid, delivered or

transferred to the Trustee under or by virtue of the Deed or in exercise of the duties, functions and powers of the Trustee shall effectively discharge the Trustee or the Person or Persons paying, delivering or transferring the same therefrom or from being bound to see to the application thereof, or being answerable for the loss or misapplication thereof provided that the Trustee and such Persons shall have acted in good faith, without negligence and shall have used their best efforts in connection with such dealings and matters.

(b) ***Acts done in good faith***: The Trustee shall not be under any liability on account of anything done or omitted to be done or suffered by the Trustee in good faith in accordance with, or in pursuance of any request or advice of the Investment Manager.

(c) ***Suits, proceedings or claims against the InvIT***: The Trustee shall not be under any obligation to institute, acknowledge the service of, appear in, prosecute or defend any action, suit, proceedings or claim in respect of the provisions hereof or in respect of the InvIT Assets or any part thereof or any corporate action which in its opinion would or might involve it in expense or liability unless the Investment Manager shall so request in writing and the Trustee in consultation with the Investment Manager is satisfied that the value of the investment is sufficient to provide adequate indemnity against costs, claims, damages, expenses or demands to which it may be put as Trustee as a result thereof. The costs in relation to such action, suit, proceedings or claims (whether undertaken upon request of Investment Manager or otherwise) incurred by the Trustee in connection with or arising out of the InvIT, shall be borne by the InvIT.

(d) ***Bona fide action by the Trustee***: The Trustee shall not be liable in respect of any action taken or damage suffered by it on reliance upon any notice, resolution, direction, consent, certificate, affidavit, statement, certificate of stock, plan of reorganization or (without being limited in any way by the foregoing) other paper or document believed to be genuine and to have been passed, sealed or signed by appropriate authorities or entities.

(e) ***Acts or things required to be done by the Trustee under law***: The Trustee shall not be liable to the Unitholders for doing or failing to do any act or thing which it is directed or requested to do or perform or to forbear from doing or performing by reason of any provision of any present or future law or regulation made pursuant thereto, or of any decree, order or judgment of any court, or by reason of any request announcement or similar action (whether of binding legal effect or not) which may be taken or made by any Person or body acting with or purporting to exercise the authority of any government (which legally or otherwise). If, for any reason, it becomes impossible or impracticable to carry out any of the provisions of these presents, the Trustee shall not be under any liability therefore or thereby.

(f) ***Obligations as per the Indian Trusts Act***: Nothing in the Deed, exempts or indemnifies the Trustee against liability for: (i) breach of trust under the Indian Trusts Act, 1882; (ii) fraud, misconduct or gross negligence by the Trustee as conclusively determined by a court of competent jurisdiction; (iii) violation of Applicable Laws by the Trustee (to the extent that such violation adversely effects the InvIT and/or the Unit Holders); or (iv) failure to show the degree of care and diligence required of them as Trustee under the Indian Trusts Act, 1882, while carrying out the duties described in the Deed as determined by a court of competent jurisdiction, whose decision is final and non-appealable.

(g) ***Authenticity of signature***: The Trustee shall not be responsible to any Unitholder for the authenticity of any signature affixed to any document or be, in any way, liable for any forged or unauthorized signature on or for acting upon or giving effect to any such forged or unauthorized signature. The Trustee shall be entitled but not bound to require that the signature of any Unitholder to any document required to be signed by him under or in connection with these presents shall be verified to the Trustee's reasonable satisfaction.

(h) ***Trustee may act as trustee of other trusts****:* Nothing herein contained shall be construed so as to prevent the Trustee from acting as trustee of other trusts or alternate investment funds or venture capital funds or private equity funds or real estate investment trusts or infrastructure investment trusts or private trusts or customised fiduciary trusts separate and distinct from the InvIT, and retaining for its own use and benefit all remuneration, profits and advantages which it may derive therefrom, as permitted under Applicable Law.

(i) ***Information regarding the InvIT, etc.***: If the Trustee is required by the InvIT Regulations or any other Applicable Law to provide information regarding the InvIT or the Unitholders, the investments made by the InvIT and income therefrom and provisions of these presents and complies with such request in good faith, whether or not it was in fact enforceable, the Trustee shall not be liable to the Unitholders or to any other party as a result of such compliance or in connection with such compliance.

(j) ***Depletion in the value of the InvIT corpus***: The Trustee shall not incur any liability for any act or omission or (as the case may be) failing to do any act or thing which may result in a loss to a Unitholder (by reason of any depletion in the value of the InvIT assets or otherwise), except in the event that such loss is a direct result of fraud, gross negligence or wilful default on the part of the Trustee or results from a breach by the Trustee of the Deed, as determined finally by a court of competent jurisdiction.

(k) ***Trustee to not risk its monies***: If the Trustee engages any external advisors or experts (in accordance with the Deed), to discharge its obligations under the Deed, or undertakes any work (in consultation with the Investment Manager, in the interest of the Unitholders) which is not covered within the scope of work of the Trustee under the Deed and such additional work is beyond the obligations of the Trustee under Applicable Law, the Trustee shall be entitled to recover such costs, charges and expenses which the Trustee may incur in this regard, from the funds of the InvIT. Further, it is clarified that, the Trustee will not be required to utilize funds held by the Trustee for any other trust for which it is appointed as a trustee, for discharging its obligations as the Trustee under the Deed.

5. Term and Discharge of the trustee and Appointment of new trustee

(a) The Trustee shall hold the office of the Trustee until the dissolution of the InvIT or the discharge of the Trustee in accordance with Article 8.2, whichever is earlier.

(b) The Trustee shall stand discharged as the Trustee of the InvIT on the happening of any of the following events:

(i) The Board passes a resolution for the Trustee to be voluntarily wound up or any order of winding up against the Trustee is passed by any court of competent jurisdiction, in which case the Sponsor shall, within 90 Business Days of the notice appoint a new trustee;

(ii) In the event that the Trustee desires to resign, it may submit its resignation to the Investment Manager and all the Unitholders setting out reasons for the same and may nominate a new trustee, which has consented in writing to serve as the new trustee. The Unitholders with required majority (as set out in the InvIT Regulations) may approve the aforesaid resignation. A new trustee may be appointed in its place by execution of a deed of appointment between the Investment Manager (acting on behalf of the unitholders) and the new trustee, to hold office in its place from the date of acceptance of the resignation. The date of acceptance of the Trustee's resignation shall be deemed to be the date of discharge of the Trustee. On such appointment, the InvIT shall vest with the new trustee;

(iii) If SEBI or any other governmental or regulatory authority passes a direction to remove the Trustee; or

(iv) Removal of the Trustee in accordance with Article 8.3 below.

Provided that the Trustee shall, upon it becoming aware, promptly intimate the Investment Manager (on behalf of the InvIT) of any event or potential event which may result in any of the foregoing events set out in Articles 8.2 of the Deed.

6. Removal and appointment of Trustee by Unitholders

(a) Post listing of the Units on a recognised stock exchange(s), the Unitholders may, by passing a resolution with required majority as set out in the InvIT Regulations, remove the Trustee if the Unitholders have sufficient reason to believe that the acts of the Trustee are detrimental to the interests of the Unitholders. Upon such removal, a new trustee may be appointed as the trustee of the InvIT as prescribed in the InvIT Regulations.

(b) The Investment Manager shall appoint a successor Trustee within 75 Business Days of acceptance of resignation of the Trustee or date of the Unitholders' resolution passed for removal of the Trustee or any resolution being passed by the Board for winding up of the Trustee. In the event no successor Trustee is appointed within 75 Business Days, the Trustee may recommend a successor trustee for appointment by the Sponsor or Investment Manager, in accordance with Applicable Law.

(c) In any event, the Trustee shall not be discharged unless a new trustee is appointed in its place and the new trustee assumes the responsibilities of the Trustee under the InvIT Documents and Applicable Law. The Trustee shall be deemed to have vacated office as Trustee of the InvIT on the day on which the new trustee is appointed and assumes responsibilities.

(d) Notwithstanding the discharge of the Trustee in accordance with the provisions of Article 8.2 and Article 8.3, the Trustee shall continue to be responsible and liable for all its past acts and deeds,

whether by way of commission or omission, subject to the indemnity of the Trustee as provided in the Deed, during its tenure as Trustee.

(e) Every new trustee shall have the same powers, authorities and discretion, and shall in all respects act and be liable as if originally appointed as a Trustee under the Deed.

7. Indemnity

It is hereby expressly provided that, in addition to the fees, distributions and expense reimbursements herein described, the InvIT Assets shall be utilized to indemnify and hold harmless the Trustee, Sponsor and any of their respective officers, directors, shareholders, sponsors, partners, members, employees, advisors and agents ("Indemnified Parties") from and against any claims, losses, costs, damages, liabilities and expenses, including legal fees ("Losses") suffered or incurred by them by reason of their activities on behalf of the InvIT, unless such Losses resulted from fraud, gross negligence, wilful default or wilful misconduct or breach of any obligations or duties under Applicable Law by the relevant Indemnified Party, as determined by a court of competent jurisdiction.

8. Distributions by the Trust

(a) Such percentage of the Net Distributable Cash Flows of the Holding Companies and SPVs shall be distributed to the InvIT in proportion to its holding in the Holding Companies and SPVs, as prescribed in the InvIT Regulations and in accordance with the policy on Net Distributable Cash Flows adopted by the IM Board.

(b) The Distributions shall be made within the time period prescribed by the InvIT Regulations and in accordance with the policy on distribution adopted by the IM Board.

(c) The Trustee shall make Distribution and ensure that the Investment Manager makes timely declaration of Distribution to the Unitholders in accordance with the policy on distribution adopted by the IM Board in relation to the InvIT, subject to compliance with the InvIT Regulations, Income Tax Act, 1961 and other Applicable Laws.

(d) The Trustee shall ensure that the withholding of taxes (if any) on the Distributions, shall be made in accordance with the provisions of the Income Tax Act, 1961. Any tax withheld/paid by the InvIT on behalf of the Unitholders shall be considered to be amounts distributed under Article 10.3.

(e) If the distributions are not made within the period prescribed in the InvIT Regulations, the Investment Manager shall be liable to pay interest to the Unitholders at the rate as may be specified in the InvIT Regulations till the Distribution is made and such interest shall not be recovered in the form of fees or any other form payable to the Investment Manager by the InvIT.

(f) Subject to the InvIT Regulations and Applicable Law, if the equity shares or interest in the InvIT Assets are sold by the InvIT:

(i) if the InvIT or the InvIT Assets propose to re-invest the sale proceeds into another infrastructure asset, it shall not be required to distribute any sale proceeds to the InvIT or to the Unitholders.

(ii) if the InvIT or the InvIT Assets propose not to invest the sales proceeds into any other infrastructure asset, the InvIT acting through the Investment Manager, shall distribute the sale proceeds, as soon as reasonably practicable and at such times as the Investment Manager may determine, in accordance with the InvIT Regulations and the InvIT Documents, provided that such sale proceeds shall not be used in contravention of the InvIT Regulations.

(g) Subject to the provisions of the Applicable Law, the Trustee, in consultation with the Investment Manager, may, at any time during the life of the InvIT, make in-specie distributions of the InvIT Assets on such terms and conditions as it may deem appropriate and in a manner that is in accordance with the InvIT Documents and Applicable Law.

(h) Any amount remaining unclaimed or unpaid out of the distributions declared by the InvIT in terms of this Clause 10, shall be transferred to the 'Investor Protection and Education Fund', in terms of the InvIT Regulations.

9. Issue, Listing and Delisting of Units

(a) No Units shall be issued without complying with the requirements of Applicable Law.

(b) There shall not be multiple classes of Units of the InvIT, other than as permitted under Applicable Law.

(c) The Trustee shall cause the Depository to effect the book entry of Units to be issued to a Depositor into such Depositor's securities account.

(d) The Trustee shall ensure that the Units are offered and issued in accordance with and within the time period specified under Applicable Law. The InvIT shall also comply with the minimum public holding for the Units and minimum number of Unitholders as prescribed under the InvIT Regulations.

(e) If the Units of the InvIT are proposed to be delisted, the Trustee shall ensure that the Investment Manager applies for delisting of the Units, as applicable, to SEBI and the designated stock exchanges in accordance with the provisions of Applicable Law.

(f) The InvIT shall redeem Units only by way of a buy-back, time of delisting of Units or any other method as may be permitted under Applicable Law, as applicable, in accordance with Applicable Law.

10. Provisions Related to Unitholders

(a) Notwithstanding anything to the contrary contained in any of the InvIT Documents, the aggregate liability (including any taxes, duties, fines, levies, liabilities, costs or expenses) of each Unitholder in the Trust shall be limited to making the Capital Contribution payable by it in respect of the Units subscribed by it. For the avoidance of doubt, the Unitholders shall not be responsible or liable, directly or indirectly, for acts, omissions or commissions of the Trustee, the Investment Manager, the Sponsor, or any other Person, whether or not such act, omission or commission, has been approved by the Unitholders in accordance with the InvIT Regulations or not. Further, the Sponsor shall not be responsible or liable, directly or indirectly, for acts, omissions or commissions of the Trustee, the Investment Manager or any other Person, whether or not such act, omission or commission, has been approved by the Unitholders in accordance with the InvIT Regulations or not.

(b) Each Unit allotted to the Unitholders shall have one vote for any decisions requiring a vote of Unitholders.

(c) No Unitholder shall enjoy preferential voting or any other rights over another Unitholder subject to subordinate Units being issued to the Sponsor and its Associates, where such subordinate Units shall carry only inferior voting or any other rights compared to other Units, in accordance with the InvIT Regulations and Applicable Law.

(d) In no event shall the Trustee or the Investment Manager be bound to make payment to any Unitholder, except out of the funds held by it for that purpose under the provisions of the Deed.

(e) A Unitholder, whose name and account details are entered in the Depository Register, shall be the only Person entitled to be recognised by the Trustee as having a right, title, interest in or to the Units registered in his name and the Trustee shall recognise such holder as an absolute owner and shall not be bound by any notice to the contrary and shall also not be bound to take notice of or to see to the execution of any trust, express or implied, save as expressly provided or as required by any court of competent jurisdiction to recognise any trust or equity or interest affecting the title of the Units.

(f) The Unitholders (acting in their capacity as unitholders of the Trust) shall not give any directions to the Trustee or the Investment Manager (whether in a meeting of Unitholders or otherwise), if it would require the Trustee or the Investment Manager to do or omit doing anything which may result in:

(i) the Trust or the Trustee, in its capacity as the trustee of the Trust or the Investment Manager, in its capacity as the investment manager of the Trust ceasing to comply with Applicable Law;

(ii) interference with the exercise of any discretion expressly conferred on the Trustee by the Deed or the Investment Manager by the Investment Management Agreement, or the determination of any matter which requires the agreement of the Trustee or the Investment Manager, provided that nothing in this shall limit the right of the Unitholder to require the due administration of the Trust in accordance with the Deed.

(g) The Depository Register shall (save in case of manifest error) be conclusive evidence of the number of Units held by each Depositor and in the event of any discrepancy between the entries of the Depository Register and any statement issued by the Depository, the entries in the Depository Register shall prevail unless the Depositor proves to the satisfaction of the Trustee and the Depository that the Depository Register is incorrect.

(h) The Unitholders shall have the right to call for certain matters to be subject to their consent, in accordance with the InvIT Regulations and Applicable Law.

(i) The Eligible Unitholders shall have the right to appoint Unitholder Nominee Directors on the board of directors of the Investment Manager from time to time, in the manner prescribed under the InvIT Regulations.

(j) The Unitholders may, in accordance with the provisions of the InvIT Documents and Applicable Law, transfer any of the Units to an investor where such investor accepts all the rights and obligations of the transferor and the Trustee or the Investment Manager shall give effect to such transfer in accordance with Applicable Law.

(k) The Unitholders shall be entitled to receive the Distributions made by the Trust in the proportion of their respective Beneficial Interest. The Beneficial Interest of each Unitholder shall be equal and limited to the proportion of the number of Units held by that Unitholder to the total number of Units issued by the Trust as on a relevant date.

(l) After the initial offer, no Person, other than the Sponsor, their related parties and associates ("**Investor**"), shall acquire or receive Units, which when taken together with Units held by the Investor and by persons acting in concert with the Investor, exceeds such value of the outstanding Units as prescribed under the InvIT Regulations, unless prior approval of the Unitholders is obtained in accordance with the InvIT Regulations. In the event such approval is not received, the Investor shall provide an exit option to the dissenting Unitholders in terms of the InvIT Regulations and in the manner specified by SEBI.

(m) The Trustee shall obtain and shall ensure that the Investment Manager obtains, as applicable the consent of the Unitholders for the matters prescribed under the InvIT Regulations in accordance with the provisions of the InvIT Regulations.

11. Termination

The Trust is subject to dissolution and termination in accordance with and subject to the InvIT Regulations and Applicable Law:

(a) if the InvIT fails to make any offer of Units, whether by way of Public Issue or Private Placement, within the time period stipulated in the InvIT Regulations or any other time period as specified by SEBI, the InvIT shall surrender its certificate to SEBI and cease to operate as an investment infrastructure trust, unless the period is extended by SEBI;

(b) upon the liquidation of all InvIT Assets;

(c) if there are no projects having valid concession agreements remaining under the InvIT and the InvIT does not invest in any project for six months thereafter;

(d) delisting of the Units in accordance with the InvIT Regulations unless in accordance with the InvIT Regulations, the InvIT retains its certificate of registration and continues to undertake the activity of a privately placed and unlisted InvIT; or

(e) illegality of the InvIT.

C. The Investment Manager – Walter Infra Manager Private Limited

History and Certain Corporate Matters

Walter Infra Manager Private Limited is the investment manager of the Trust. Investment Manager was incorporated in India as a private limited company on March 13, 2023, under the Companies Act, 2013 with corporate identification number U42101DL2023FTC410968. For further details, please see the section titled "*General Information"* on page 81.

Background and Past Experience of the Investment Manager

The Investment Manager has been constituted in accordance with the InvIT Regulations and is owned by the Sponsor. The Investment Manager is newly incorporated and has received its certificate of incorporation on March 13, 2023. The cumulative experience of the key personnel (i.e. directors/ partners or employees, as applicable) of the Investment Manager in fund management or advisory services or development in the infrastructure sector is in compliance with the requirement of the InvIT Regulations.

The net worth of the Investment Manager as on September 30, 2023, was ₹ 1102.73 lakhs. The Investment Manager shall continue to comply with the minimum net worth requirement set out in Regulation 4(2)(e)(i) of the InvIT Regulations.

The equity shareholding pattern of the Investment Manager is as follows:

S. No.	Name of the shareholder	No. of equity shares held	Percentage (%)
1.	Actis Highway Infra Limited	1,19,88,000	99.90
2.	Actis Highway Holdings Limited	12,000	0.10
Total		**1,20,00,000**	**100**

Key Terms of the Investment Management Agreement

The Investment Manager has entered into the Investment Management Agreement, in terms of the InvIT Regulations, the key terms of which, are provided below.

1. *Powers of the Investment Manager*

The Trustee (on behalf of the InvIT) hereby confers to the Investment Manager, the powers as per the Investment Management Agreement. The Investment Manager's exercise of such powers shall always be subject to the overall supervision and direction of the Trustee as well as the restrictions/ requirements contained within the InvIT Documents, the Investment Management Agreement and Applicable Law.

(a) ***Power to manage and administer the Trust and the Trust Assets****:* The Investment Manager shall take all decisions in relation to the management and administration of InvIT Assets and the investments of the Trust as may be incidental or necessary for the advancement or fulfilment of the Investment Objectives of the InvIT in accordance with the InvIT Regulations and other Applicable Law.

(b) ***Power to make investment and divestment decisions****:* The Investment Manager shall, subject to such approval as may be required from the Unitholders, make, originate, negotiate, acquire, manage, monitor, oversee the investment decisions with respect to the underlying assets or projects of the InvIT and the InvIT Assets, including any further investments or divestments, subject to InvIT Regulations and in accordance with the Offer Document, and in this regard, is also empowered to do the following acts on behalf of the InvIT, including:

(i) make all decisions, concerning the investigation, selection, development, negotiation, structuring, restructuring, monitoring, investment, divestment of investments (including any additions or accretions thereto) and the appointment of various advisors and service providers in connection with such investments;

(ii) direct and approve the formulation of investment policies and strategies for the InvIT;

(iii) acquire, subscribe, hold, manage, trade, transfer and dispose of shares, stocks, convertibles, debentures, mutual funds, bonds or other equity or equity-related securities or other debt or mezzanine securities of all kinds issued by any Holding Company or any SPV or any infrastructure project, whether in physical or dematerialised form, including power to hypothecate, pledge or create encumbrances of any kind on such securities held by the InvIT in such Holding Companies or SPVs, or infrastructure projects to be used as collateral security for any borrowings by the InvIT or any Holding Company or any SPV or any infrastructure project;

(iv) avail commercial loans, including the power to hypothecate, pledge or create Encumbrances of any kind on the InvIT Assets as collateral security for any such loans availed by the InvIT, or any Holding Company or SPV, in accordance with the InvIT Regulations and Applicable Law;

(v) keep the capital and monies of the InvIT, the Holding Companies and the SPVs in deposit with banks or mutual funds or other institutions, whatsoever, in accordance with the InvIT Regulations and other Applicable Law;

(vi) accept Capital Contributions;

(vii) collect and receive the profit, interest, repayment of principal of debt or debt like, or equity or equity like, mezzanine securities, dividend, return of capital of any type by the Holding Companies, or SPVs, or infrastructure projects and income of the InvIT as and when the same may become due and receivable;

(viii) invest in securities or in units of mutual funds in accordance with the InvIT Regulations and other Applicable Law by the InvIT, the Holding Companies and the SPVs;

(ix) invest in money market instruments including government securities, treasury bills, certificates of deposit and commercial papers in accordance with Applicable Law by the InvIT, the Holding Companies and the SPVs;

(x) without limiting the generality of the foregoing to decide, in the manner set out in the InvIT Documents and Investment Objectives and in compliance with the InvIT Regulations, (a) the amounts to be invested in each new entity or InvIT Asset that is to form part of the InvIT and the mode, manner, terms, and conditions for making such investment; and (b) to realise such investments and the income therefrom and distribute the same to the Unitholders or reinvest the same, as may be decided by the Investment Manager as per the terms contained herein and the InvIT Documents and in compliance with InvIT Regulations;

(xi) undertake lending to Holdcos, SPVs and any other Persons permitted under Applicable Law;

(xii) enter into, execute and/or terminate any investment pooling agreements, agreements related to strategic investments, co-investment agreements, and any and all documents and instruments of a similar nature in the name of the InvIT or its Holdcos, SPVs or other investment entities;

(xiii) provide guarantee, security or other collateral facility in connection with any financing, borrowings or otherwise, undertaken by the InvIT, Holding Companies, SPVs or other investment entities;

(xiv) to appoint advisors and service providers in connection with the foregoing (including affiliates and associates of the Investment Manager, Sponsor or the InvIT);

(xv) to give, provide and agree to provide to any Holding Companies, or SPVs financial assistance in the form of investment in the InvIT's debt securities or share capital of any class including ordinary, preference, participating, non-participating, voting, non-voting or other class, and in the form of investment in securities convertible into share capital; and

(xvi) to invest, acquire, purchase, hold, divest, sale, hypothecate, pledge or otherwise transfer movable property or immovable property of any kind including any rights and interest therein of the Holding Companies and the SPVs.

(c) ***Power to appoint a Project Manager****:* The Investment Manager, along with the Trustee, shall, within a reasonable time from the date of execution hereof, appoint a Project Manager for the InvIT, by execution of the Project Implementation and Management Agreement, for the operation and management of the InvIT Assets, in accordance with the terms and conditions set up in the Deed, the Project Implementation and Management Agreement and Applicable Law.

(d) ***Oversee activities of the Project Manager****:* The Investment Manager shall oversee activities of the Project Manager with respect to compliance with the InvIT Regulations and the Project Implementation and Management Agreement and in terms of the InvIT Regulations and Applicable Law. The Investment Manager shall obtain a compliance certificate from the Project Manager in the form as may be specified by SEBI, on a quarterly basis or such other intervals as may be prescribed under Applicable Law.

(e) ***Objects of the InvIT****:* The Trustee hereby authorizes the Investment Manager to do all such other acts, deeds and things as may be incidental or necessary for the advancement or fulfilment of the Investment Objectives of the InvIT, as set out in the Offer Document.

(f) ***Power to issue and to accept subscription to Units of InvIT****:* The Investment Manager shall have the power to issue and allot Units in accordance with the InvIT Regulations and within such time period as may be prescribed under Applicable Law. The Investment Manager shall have the power to accept subscriptions to Units of the InvIT and issue and allot Units to Unitholders or such other Persons and undertake all related activities under Applicable Law. The Investment Manager shall also have the power to refund subscription money and pay necessary interest thereon, in accordance with Applicable Law. Further, the Investment Manager shall, subject to and only in accordance with the terms of the InvIT Documents and Applicable Law, have the power to transfer the Units.

The power of the Investment Manager is subject to the condition that, after the initial offer no Person, other than the Sponsor, its related parties and associates ("**Investor**") shall acquire or receive Units,

which when taken together with Units held by the Investor and by persons acting in concert with the Investor exceeds (twenty five percent) of the value of the outstanding Units, unless prior approval of the Unitholders is obtained in accordance with the InvIT Regulations. In the event such approval is not received, the Investor shall provide an exit option to the dissenting Unitholders in terms of the InvIT Regulations and in the manner specified by SEBI.

(g) ***Power to maintain register of Unitholders:*** The Investment Manager shall cause the Depository to maintain a Depository Register.

(h) ***Power to apportion between income and capital****:* Subject to the provisions of the InvIT Regulations, the Investment Manager, in consultation with the Trustee, shall make such reserves out of the income or capital as it may deem proper in order to meet the expenses, liabilities (including potential tax liability) or contingent liabilities of the InvIT including to address any event of force majeure, and any directions of the Trustee in this behalf whether made in writing or implied from their acts shall, so far as the Applicable Law may permit, be conclusive and binding. Any distribution made from such reserves shall be in accordance with the InvIT Regulations.

(i) ***Power to borrow****:* The Investment Manager shall have the power to cause the InvIT to have the power to borrow funds, including any subordinated equity, commercial papers, long term loans, short term loans, bonds or other loans or funds from any Person or authority (whether government or otherwise, whether Indian or overseas) for the purpose of the InvIT and the InvIT Assets on such terms and conditions and for such periods and subject to any approval of the Unitholders in accordance with and as may be required in terms of the InvIT Regulations and Applicable Law in case of a listed InvIT. The Investment Manager shall also have the power to cause the InvIT to create Encumbrances of any kind on the InvIT Assets as collateral security for any such borrowings. Further, the Investment Manager shall have the power to create charge, security interest and/or lien over any or all of the assets of the InvIT (both present or future), to secure and/or guarantee the performance or any of the obligations of the Holdcos/SPVs, as it may deem fit, subject to compliance with Applicable Law.

(j) ***Power to exercise rights in respect of the Project SPVs****:* The Investment Manager shall have the power to exercise all rights of the InvIT in the Project SPVs, including voting rights, rights to appoint directors, whether pursuant to securities held by the InvIT, or otherwise, in such manner as it deems to be in the best interest of the InvIT, and in accordance with the InvIT Regulations and Applicable Law. Additionally, if the InvIT has invested in infrastructure projects through the Holding Company or SPVs, then the Investment Manager, in consultation with the Trustee, shall appoint the majority of the directors of the Holding Company(ies) and/or the SPV(s), in accordance with the Applicable Law, as well as ensure that in every general meeting including the annual general meeting of any SPV or Holding Company, the voting of the InvIT is exercised, in accordance with the InvIT Regulations and Applicable Law.

(k) ***Power to appoint external advisors****:* The Investment Manager or the Team may use the services of external advisors and rely on the information provided in the due diligence process of assessing investment proposals as it deems necessary in its sole discretion.

(l) ***Power to repay debt***: Subject to Applicable Law and the advice provided by the Investment Manager to the Trustee, the Investment Manager (through the Trustee) may cause the InvIT to pay, prepay or repay any and all debt raised from any Person in accordance with the terms therein and to redeem any debt securities or other securities, obligations or instruments in accordance with the terms thereof issued to Persons in compliance with the InvIT Regulations and other Applicable Law, if so directed by the Trustee.

(m) ***Power to appoint nominees/representatives***: The Investment Manager, in consultation with the Trustee, shall appoint such number of nominees on the board of directors or the governing board of the SPVs and Holdcos, as applicable, which is in proportion to the shareholding or holding interest of the InvIT in such SPVs/Holdcos, or as may be permitted or required under the InvIT Regulations.

(n) ***Power to employ agents****:* The Investment Manager shall have the power to employ and pay at the expense of the InvIT, any agent in any jurisdiction whether attorneys, solicitors, brokers, banks, trust, companies or other agents, without being responsible for the default of any agent if employed in good faith to transact any business, including without limitation, the power to appoint agents to raise funds, or do any act required to be transacted or done in the execution of the responsibilities hereof including the receipt and payment of moneys and the execution of documents.

(o) ***Power to appoint nominees and custodians****:* The Investment Manager may appoint a Custodian in order to provide such custodian services as may be authorised by the Trustee, and may permit any property comprised in the InvIT to be and remain deposited with a custodian or with any Person or

Persons in India or in any other jurisdiction subject to such deposit as authorised by the Trustee and permissible under the Applicable Law.

(p) ***Power to appoint intermediaries**:* The Investment Manager, in consultation with the Trustee, shall appoint and have the power to appoint, determine the remuneration and enter into, execute, deliver and terminate all documents and agreements, any contracts, agreements, including share purchase agreement, deed of right of first offer and refusal, escrow agreements, debt documentation, underwriting agreements and other InvIT Documents, any investment pooling agreement, agreement relating to strategic investments, co-investment agreements and other any and all documents and instruments containing customary terms including contractual indemnity with Valuers, Auditors, registrar and transfer agent, merchant banker, credit rating agency or any other intermediary or service provider or agent including any amendments or supplements thereto as may be applicable with respect to the activities pertaining to the InvIT in a timely manner as per the provisions of the InvIT Regulations and Applicable Law. The Investment Manager shall appoint an Auditor for a period of not more than one term of five consecutive years, if the auditor is an individual and not more than two terms of five consecutive years, if the auditor is an audit firm, or such period as may be provided in the InvIT Regulations from time to time. The Investment Manager shall have the power to determine the remuneration of the Auditors in consultation with the Trustee. Provided that in the event the Investment Manager is required to take any approval of the Unitholders for approval of remuneration of the Auditors or appointment of the Auditors, the same shall be obtained in accordance with the requirements as set out in the InvIT Regulations. The Investment Manager shall also have the power to determine the remuneration of the Valuer. The remuneration of the Valuer shall be in accordance with the InvIT Regulations.

(q) ***Power to pay duties and taxes**:* In the event of any capital gains tax, income tax, stamp duty or other duties, fees or taxes (and any interest or penalty chargeable thereon) whatsoever becoming payable in any jurisdiction in respect of the InvIT or any part thereof or in respect of documents issued or executed in pursuance of the Agreement and the Deed in any circumstances whatsoever, the Investment Manager shall have the power and duty to pay all such duties, fees or taxes (and any interest or penalty chargeable thereon) as well as to create any reserves for future potential tax liability (and any such interest or penalty) out of the InvIT's income, or to the extent of the amount invested in the Unites by the Unitholders, as may be permitted under Applicable Law and the advice of tax consultants, and the Trustee may pay such duties, fee or taxes (and any such interest or penalty) on behalf of the InvIT. For avoidance of doubt, it is clarified that, pursuant to this Clause, no Unitholder will be required to make a contribution as a capital commitment to the InvIT (other than the value for Units already paid). The Investment Manager shall exercise due care and prudence in payment of duties and taxes of the InvIT and shall endeavour to ensure that there are no material outstanding dues in that behalf, except for any claim or demand made by any tax department or authority subsequently, or any amounts disputed in good faith. The Investment Manager may, on the recommendation of the Trustee, file tax returns with the relevant Governmental Agencies, in accordance with Applicable Law and the advice of tax consultants.

(r) ***Power to expend on behalf of the InvIT and seek reimbursement**:* The Investment Manager shall have the power to pay InvIT Expenses out of the funds of the InvIT, or from any or all of the InvIT Assets on behalf of the InvIT and the Project SPVs, in such proportion as may be determined from time to time, and the Investment Manager shall be entitled to reimbursement of any such expenditure duly incurred, subject to Clause 5.1 of the Investment Management Agreement.

(s) ***Power to take counsel's opinion**:* The Investment Manager, in discharge of its duties, shall have the power to take the opinion of legal / tax counsel in any jurisdiction concerning any disputes or difference arising under the Agreement or any matter in any way relating to the InvIT and the fee of such counsel shall be paid out of the funds held in the InvIT.

(t) ***Power to effect compromises**:* Subject to Applicable Law, the Investment Manager shall have the power, on behalf of the InvIT, to:

(i) accept any property before the time at which it is transferable or payable;

(ii) pay or allow any equity or claim on any evidence that it thinks sufficient;

(iii) accept any compensation or any security, movable or immovable, for any equity or other property, in lieu of any amounts payable to it;

(iv) alter the dates for payment of any amounts payable to it; and

(v) institute, conduct, compromise, compound, or abandon any legal proceedings for or on behalf of or in the name of the InvIT, including its SPVs, Holding Companies, InvIT Assets or the Investment Manager (in its capacity as investment manager of the InvIT) and to

defend, compound or otherwise deal with any such proceedings against the InvIT, Investment Manager (in its capacity as manager of the InvIT) or the officers of the Investment Manager or concerning the affairs of the InvIT, and also to compound and allow time for payment satisfaction of any equity due and of any claims or demands by or against the InvIT and to refer any differences to arbitration and observe and perform any awards thereof;

(vi) allow any time for payment of any equity; and

(vii) subject to such approval (if any), as may be required from the Unitholders, compromise, compound, abandon, submit to arbitration or otherwise settle any equity account, claim or thing whatsoever relating to the InvIT or the Agreement.

(u) ***Power to re-invest:*** Subject to the conditions laid down in any InvIT Documents, and the InvIT Regulations and Applicable Law, the Investment Manager may retain any proceeds received by the InvIT from any Holding Company or SPV or infrastructure projects, including through the sale of or any Holding Company or SPV or infrastructure projects.

(v) ***Power to lend***: Subject to restrictions contained in the InvIT Documents and Applicable Laws (including the limits and restrictions prescribed under the InvIT Regulations), the Investment Manager may cause the InvIT to extend loans to the Holding Company/ SPVs/ (subject to disclosures required to be made in accordance with the InvIT Regulations) and any other Persons permitted under Applicable Law and also to subscribe to debt securities or quasi debt securities or any similar kind of securities issued by the Holding Company/SPVs or any other Person permitted under the Applicable Law. Provided that, investment in debt securities shall not be considered as lending.

(w) ***Power to make rules:*** The Investment Manager may make rules to give effect to, and carry out the Investment Objectives, subject to Applicable Law. In particular, and without prejudice to the generality of such power, the Investment Manager may provide for all or any of the following matters, namely:

(i) manner of maintaining of the records and particulars of Unitholders;

(ii) norms of investment by the InvIT in accordance with the Investment Objectives of the InvIT and in accordance with the powers and authorities of the Trustee as set out in the Trust Deed;

(iii) matters relating to entrustment, deposit or handing over of any securities or shares of the SPVs of the InvIT to any one or more custodians and the procedure relating to the holding thereof by the custodian;

(iv) such other administrative, procedural or other matters relating to the administration or management of the affairs of the InvIT and which matters are not, by their very nature, required to be included or provided for in the Deed or by the management thereof and which matters are not inconsistent with the Investment Objectives, the Deed and the Applicable Law;

(v) procedure for seeking the vote of the Unitholders either by calling a meeting or through postal ballot or otherwise; and

(vi) procedure for summoning and conducting of meetings of Unitholders.

(x) ***Power to appear before relevant authorities***: The Investment Manager shall, in discharge of its duties, have the power to appear before the relevant authorities, submit information, seek clarifications from any regulatory authority and complete, sign and submit any applications or documents for any approvals, permissions, or actions that may be necessary or desirable on behalf of the InvIT.

(y) ***Power to restrict right to inspect:*** Subject to Applicable Law, no Unitholder shall be entitled to inspect or examine the InvIT's premises or properties (including any Holding Company, SPVs and infrastructure projects) without the prior permission of the Trustee, who shall give such permission, if necessary, in consultation with the Investment Manager. Further, no Unitholder shall be entitled to require discovery of any information in respect of any detail of the InvIT's activities or any matter which may be related to the conduct of the business of the InvIT and which information may, in the opinion of the Trustee and the Investment Manager, adversely affect the interest of other Unitholders.

(z) ***Power to buyback Units:*** In the event the InvIT is listed, the Investment Manager may buyback the Units from the Unitholders at the end of the term of the InvIT or any other time or in any other manner in accordance with Applicable Law, if so directed by the Trustee.

(aa) ***Extension of Loans:*** The Investment Manager (on behalf of the InvIT) shall provide the Trustee with advice and recommendations regarding the extension of loans from the InvIT to the Holding Company or the SPVs and also subscription to debt securities or quasi-debt securities or any similar kind of securities issued by the Holding Company and SPV from the InvIT or extension of loans from the InvIT in compliance with Applicable Law.

(bb) ***Other powers***: The Investment Manager shall also have the following powers and authorities:

(i) to vary, alter, postpone, extend or cancel the terms and conditions of agreements, in relation to investments, as entered into with the relevant SPVs/ Holdcos, as applicable;

(ii) to ascertain, appropriate, declare, carry forward and distribute or reinvest/ the surplus or otherwise deal with any surplus in compliance with the InvIT Regulations, to determine and allocate income, profits and gains and expenses in respect of the InvIT to and amongst the Unitholders and to transfer such sums as the Investment Manager may, deem fit to one or more reserve funds which may be established by the Investment Manager;

(iii) to sign and verify all written statements, petitions, appeals, declarations, revisions and applications in connection with any proceedings and have the power to refer any claim to arbitration and to perform, observe and challenge the awards;

(iv) to open, maintain and close one or more bank accounts and demat accounts, for the purposes of the InvIT, to deposit and withdraw money and fully operate and manage any such account;

(v) to make and give receipts, releases and other discharges for monies payable to the InvIT and for the claims and demands of the InvIT;

(vi) to enter into all such negotiations and contracts, and, execute or terminate and do all such acts, deeds and things for or on behalf of or in the name of the InvIT as it may consider expedient for or in relation to any of the matters or otherwise for the purposes of the InvIT;

(vii) to ascertain, appropriate, declare and distribute or reinvest the surplus generally or under the InvIT, to determine and allocate income, profits and gains in respect of the InvIT to and amongst the Unitholders, to carry forward, reinvest or otherwise deal with any surplus and to transfer such sums, as it may deem fit, to one or more reserve funds which may be established by it;

(viii) to retain and pay to the relevant Governmental Agencies, any amounts that the Trustee or the Investment Manager is required to, or may deem prudent to, withhold from the amounts to be distributed to the Unitholders;

(ix) to exercise its powers and undertake its duties with respect to the operation of the SPVs and Holdcos in accordance with the provisions of the InvIT Regulations and all other Applicable Laws as may be applicable to the respective SPVs and Holdcos;

(x) to sign, seal, execute, deliver and register according to Applicable Law all deeds, documents, and assurances in respect of the InvIT;

(xi) to ascertain, assess and calculate the Net Distributable Cash Flows of the InvIT in accordance with the Deed, the policy adopted by the InvIT, the InvIT Regulations and Applicable Law;

(xii) pay out of the income of the InvIT, after deducting all expenses, the income and other distributions in accordance with the Deed, the InvIT Regulations and Applicable Law;

(xiii) take into their custody or control all the capital, assets, property of the InvIT and hold the same in trust for the Unitholders in accordance with the Deed, Applicable Law and the InvIT Regulations;

(xiv) generally to exercise all such powers as it may be required to exercise under the InvIT Regulations and Applicable Law for the time being in force and do all such matters and things as may promote the Investment Objectives of the InvIT or as may be incidental to or consequential upon the discharge of its functions and the exercise and enforcement of all

or any of the powers and rights under the Agreement, Applicable Law and the InvIT Regulations

(xv) in accordance with Applicable Law, together with the Trustee, initiate, prosecute or defend any action or other proceedings in any court of law or through arbitration or in any other manner for recovery of debts or sums of money, right, title or interest, property, claim, matter or thing whatsoever now or hereafter to become due or payable or in any way and belonging to the InvIT by any means or on any account whatsoever in respect of and pertaining to the investments made by it and the same actions or proceedings or suits to discontinue or settle, as it shall in its best judgment or discretion deem fit;

(xvi) to issue statement of accounts or Unit certificates (if requested) to the Unitholders on behalf of the Trustee in accordance with Applicable Law. To submit Units for dematerialisation and to make all applications and execute all documents with the Depositories and Depository participants as may be necessary in this regard;

(xvii) to set up such systems and procedures, and submit such reports, as may be required by the Trustee as necessary for effective monitoring of the functioning of the InvIT; and

(xviii) The Investment Manager shall exercise all such powers as prescribed under Applicable Law and are subject to changes in the Applicable Law.

2. *Duties of the Investment Manager*

The Trustee (on behalf of the InvIT) hereby confers to the Investment Manager, the duties set out under the Investment Management Agreement. The Investment Manager's performance of such duties shall always be subject to the overall supervision and direction of the Trustee as well as the restrictions/ requirements contained within the InvIT Documents, Investment Management Agreement and Applicable Law.

(a) ***Interest of the Unitholders***: The Investment Manager shall use best endeavours to carry on and conduct its business in a proper and efficient manner in the best interest of the Unitholders. Further, it shall at all times maintain high standards of integrity and fairness in all its dealings and in the conduct of its business.

(b) ***Duty to co-ordinate with Trustee****:* The Investment Manager shall coordinate with the Trustee, as may be necessary, with respect to the operations of the InvIT.

(c) ***Duty to undertake valuation****:* The Investment Manager shall appoint an eligible Valuer and ensure that the valuation of the InvIT Assets is done by the Valuer(s) in accordance with the InvIT Regulations and at the frequency as required under the InvIT Regulations. The Investment Manager shall submit the Valuation Reports to the Trustee as required under the InvIT Regulations and within the timelines prescribed in the InvIT Regulations. To the extent applicable, the Investment Manager shall also submit the Valuation Reports to the stock exchange(s) in accordance with the InvIT Regulations and Applicable Law.

(d) ***Insurance****:* The Investment Manager shall arrange for adequate insurance coverage for the InvIT Assets in accordance with the InvIT Regulations. Provided that this shall not apply in case the InvIT assets are required to be insured by any other person under any agreement including a concession agreement or under any Act or regulations or circulars or guidelines of any concessioning authority or government or local body. Further, the Investment Manager shall ensure that InvIT Assets held by the Holding Companies or the SPVs are adequately insured.

(e) ***Accounts, audit and reporting****:* The Investment Manager shall maintain proper books of accounts, documents and records with respect to the InvIT, and Holding Companies/SPVs in the manner set out in the Deed, to give a true, fair and accurate account of the investments, expenses, earnings, profits, receipts, payments etc. of the InvIT. The financial year of the InvIT shall begin from the date of the Deed and shall end on the immediately succeeding 31st of March and on the 31st of March in each succeeding year, unless otherwise determined. The Investment Manager shall ensure that audit of the accounts of the InvIT by the Auditors is undertaken in accordance with the InvIT Regulations and other Applicable Law and such report is submitted to the stock exchange(s) within the time stipulated by the stock exchange(s), if any, and in accordance with the InvIT Regulations.

(f) ***Reviewing and monitoring appointment of Unitholder Nominee Directors***: The Investment Manager shall facilitate the appointment of Unitholder Nominee Directors by Eligible Unitholders in the manner prescribed under the InvIT Regulations, from time to time, and shall take all actions as may be required under the InvIT Regulations and Applicable Law in relation to the review, monitoring and reporting of the nomination rights. In this regard, the Investment Manager shall comply with all obligations prescribed under the InvIT Regulations or Applicable Law from time to

time, including, inter alia, informing Unitholders on a periodic basis of the right to nominate Unitholder Nominee Directors, evaluating notices from Eligible Unitholder(s) in relation to the proposed appointment of a Unitholder Nominee Director, evaluating eligibility of Unitholder Nominee Directors, review of unitholding of Eligible Unitholder(s) on an ongoing basis, taking requisite actions in relation to the withdrawal of nomination or vacation of office of Unitholder Nominee Directors, and submitting such information and reports to the Trustee in relation to Eligible Unitholder(s) and Unitholder Nominee Directors, as may be prescribed from time to time.

(g) ***Distributions****:* The Investment Manager shall declare distributions to Unitholders in accordance with the InvIT Regulations, the Deed and in accordance with the policy adopted by the InvIT. Subject to Applicable Law, such percentage of the Net Distributable Cash Flows of the SPVs shall be distributed to the InvIT/Holdco in terms of the InvIT Regulations, the Deed and in accordance with the policy adopted by the InvIT. Such declared distributions shall be made within the time period prescribed by the InvIT Regulations, the Deed and in accordance with the policy adopted by the InvIT.

(h) ***Meeting of Unitholders****:* The Investment Manager shall convene meetings of the Unitholders and maintain records pertaining to the meetings in accordance with the InvIT Regulations. The Investment Manager acknowledges that matters brought to vote at a meeting of the Unitholders shall require approval of such percentage of Unitholders, present and voting, in accordance with the InvIT Regulations. The Investment Manger shall be responsible for all the activities pertaining to conducting the meetings of the Unitholders, subject to overseeing by the Trustee other than where the meetings are on issues pertaining to the Trustee. Provided that, for meetings on issues related to the Investment Manager, such as change, removal or Change in Control of the Investment Manager, the meeting shall be convened and conducted by the Trustee.

(i) ***Change in control****:* The Investment Manager shall intimate the Trustee prior to any change in control of the Investment Manager to enable the Trustee to seek prior approval from the Unitholders as required in accordance with the InvIT Regulations, and prior approval from SEBI, if required under Applicable Law, and shall ensure that no such change is given effect to until such prior approval has been obtained, or the Agreement is terminated and a new investment manager has been appointed in accordance with the terms hereof, or in compliance with any other requirement under the InvIT Regulations and Applicable Law.

(j) ***Monitoring****:* The Investment Manager will monitor the InvIT, including monitoring current and projected financial position of the InvIT and the InvIT Assets, including the Project SPVs. The Investment Manager shall place before its board of directors, a report on the activity and performance of the InvIT in accordance with the InvIT Regulations. The Investment Manager shall designate an employee from the Team or a director as the compliance officer for monitoring of compliance with the InvIT Regulations and any circulars or guidelines issued thereunder and intimating SEBI in case of non-compliance.

(k) ***Maintenance of records****:* The Investment Manager shall maintain records pertaining to the activity of the InvIT in terms of the InvIT Regulations.

(l) ***Adoption of Policies***: The Investment Manager shall adopt, as applicable, and shall ensure that, the InvIT, the Project Manager, the Holding Companies and the SPVs adopt, policies, including corporate governance policies, policies in relation to acquisition of assets from the Sponsor and third parties, policies in relation to related party transactions, policies in relation to appointment of auditors and valuers, policies in relation to the Net Distributable Cash Flows, appointment and eligibility of Unitholder Nominee Directors, leverage policies ("**Policies**"), as applicable, prior to filing of the relevant Offer Document for the initial offer. The terms, such as, manner or requirement of Unitholders' approval for each of these Policies, applicability, amendment and termination, of the respective Policies shall be set out in each of the Policies.

(m) ***Duty in relation to the Investment Objectives****:* The Investment Manager shall manage the InvIT in accordance with the InvIT Regulations and the Investment Objectives of the InvIT, and shall ensure that the investments made by the InvIT are in accordance with the investment conditions enumerated in the InvIT Regulations, Applicable Law and in accordance with the Investment Objectives.

(n) ***Related Party Transactions:*** The Investment Manager (along with the Trustee) shall ensure that all related party transactions in relation to the InvIT are on an arms-length basis as per the InvIT Regulations and are consistent with the investment strategy to be set out in the offer documents to be filed by the InvIT and the Investment Objectives. Further, the Investment Manager shall ensure that related party transactions in relation to the InvIT after an initial public offering (if any), shall be in accordance with the InvIT Regulations.

(o) ***Transactions entered into by the Project Manager:*** The Investment Manager shall review the transactions carried out between the Project Manager and its Associates and where the Project Manager has advised that there may be a conflict of interest, shall obtain confirmation from a practising chartered accountant or a Valuer, as applicable, that such transaction is on an arm's length basis.

(p) ***Complaint status:*** The Investment Manager shall ensure adequate and timely redressal of all Unitholders' grievances pertaining to the activities of the InvIT in accordance with the InvIT Regulations and Applicable Law.

(q) ***Submissions to Trustee***: The Investment Manager shall submit to the Trustee:

(i) quarterly reports on the activities of the InvIT including receipts for all funds received by it and for all payments made, status of compliance with the InvIT Regulations, specifically Regulations 18, 19 and 20 of the InvIT Regulations, performance report, status of development of under-construction projects, within the time period specified under the InvIT Regulations;

(ii) Valuation Reports as required under the InvIT Regulations within the time period specified under the InvIT Regulations;

(iii) proposal or decision to acquire, sell or develop, or bid for any asset or project or expand existing completed assets or projects along with rationale for the same;

(iv) details of any action which requires approval from the Unitholders as may be stipulated under the InvIT Regulations;

(v) details of transactions it enters into with its Associates;

(vi) details of any other material fact including change in its directors, change in its shareholding, any legal proceedings that may have a significant bearing on the activity of the InvIT, within such period as stipulated under Applicable Law;

(vii) details, including reports and any other information, in relation to Eligible Unitholders or Unitholder Nominee Directors, as stipulated under the InvIT Regulations and Applicable Law, from time to time;

(viii) such information, document and records as pertaining to the activities of the InvIT as may be required under the InvIT Regulations and as may be reasonably necessary for the Trustee with respect to its responsibilities under the Deed, the InvIT Regulations and Applicable Law; and

(ix) such other information, document and records as pertaining to its activities, obligations, duties and responsibilities under the Agreement, the InvIT Regulations and Applicable Law, as may be reasonably necessary for, and sought by, the Trustee.

In the event of failure of the Investment Manager to submit information or reports as specified above in a timely manner and in terms of the InvIT Regulations, the Trustee shall intimate SEBI.

(r) ***Submissions to Unitholders***: The Investment Manager shall submit to the Unitholders such information, document and records as pertaining to the activities of the InvIT or having bearing on the operation or performance of the InvIT as may be required under the InvIT Regulations.

(s) ***Offer, Issue and Listing of Units***: The Investment Manager, together with the merchant banker appointed in the relation to the InvIT shall be responsible for all activities pertaining to the offer, issue and listing of the Units of the InvIT, as applicable, in accordance with Applicable Law, including:

(i) filing of Offer Document with SEBI;

(ii) filing the Offer Document with the stock exchange(s), in the event the InvIT is listed or proposes to be listed, within the prescribed time period;

(iii) dealing with all matters up to the allotment of Units to the Unitholders

(iv) obtaining in-principle approval and final listing and trading approvals from the designated stock exchange, in the event the InvIT is listed or proposes to be listed; and

(v) dealing with all matters relating to the issue and listing of the Units as specified under Chapter IV of the InvIT Regulations and all matters relating to the offer and issue of Units under Chapter VIA of the InvIT Regulations and any guidelines as may be issued by SEBI in this regard, as applicable. In the event the InvIT is listed, the InvIT shall also comply with the minimum public holding for the Units and minimum number of Unitholders as prescribed under the InvIT Regulations.

The Investment Manager together with the merchant banker appointed in relation to the InvIT shall also ensure that all relevant provisions of the InvIT Regulations and Applicable Law have been complied with and all statements and disclosures made in any Offer Document are material, true, correct, not misleading and are adequate disclosures in order to enable the investors to make an informed decision and are in accordance with the InvIT Regulations and Applicable Law, and such Offer Document should not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading.

(t) ***Delisting of units and winding up of the InvIT***: In the event the InvIT is listed and in case of occurrence of any event specified in Regulations 17(1)(a) to 17(1)(g) of the InvIT Regulations, the Investment Manager shall apply for delisting of units of the InvIT to SEBI and the designated stock exchange in accordance with the InvIT Regulations and Applicable Law.

(u) ***Submission of quarterly, half-yearly and annual report****:* The Investment Manager shall, within the time period prescribed under the InvIT Regulations, submit quarterly, half-yearly and annual report, as may be applicable and Valuation Reports of the InvIT as required under the InvIT Regulations to all the Unitholders electronically or provide physical copies, and to the designated stock exchange, as prescribed.

(v) ***Compliance Certificate:*** The Investment Manager shall provide a compliance certificate to the Trustee on a quarterly basis in accordance with InvIT Regulations.

(w) ***Title to the Trust Assets:*** The Investment Manager shall ensure that the InvIT Assets have proper legal title, if applicable, and that all material contracts entered into on behalf of the InvIT or the Holdco/SPV are legal, valid, binding and enforceable by and on behalf of the InvIT or the Holdco/SPV.

(x) ***Continuous disclosures to the stock exchange(s)****:* In the event the InvIT is listed, the Investment Manager shall, in accordance with the requirements of the InvIT Regulations and other Applicable Law, including any requirements prescribed by SEBI or the stock exchange(s) from time to time, disclose quarterly and half-yearly annual reports, as may be applicable and such other disclosures as may be prescribed under the InvIT Regulations, including the valuation reports, within the time period prescribed under the InvIT Regulations to the stock exchange(s) and provide any information having bearing on the operation or performance of the InvIT, as well as price sensitive information and other information that is required in terms of the InvIT Regulations and Applicable Law.

(y) ***Other Duties****:* Without prejudice to any other provision of the Agreement, the Investment Manager will also have the following duties and obligations:

(i) ensure compliance with, and implement, all corporate governance requirements as per the InvIT Regulations and other Applicable Law;

(ii) ensure that computation and declaration of Net Asset Value of the InvIT is based on the valuation done by the Valuer in accordance with the InvIT Regulations and Applicable Law and is disclosed to the stock exchanges in accordance with the InvIT Regulations and Applicable Law, if applicable;

(iii) maintain regular interaction with the Trustee regarding performance of the InvIT and providing the Trustee with any information in relation to the operations of the InvIT as maybe required under Applicable Law;

(iv) conducting its affairs and the affairs of the InvIT in such a manner that no Unitholder will have any personal liability (except to the extent of their Unitholding, where such Unit is partly paid) with respect to any liability or obligation of the InvIT;

(v) keeping the Unitholders of the InvIT informed and updated on investment activities of the InvIT in accordance with the terms of the InvIT Documents;

(vi) collecting all dividends, fees, property and other payments due and receivable by the InvIT for declaring distribution to the Unitholders in the manner set out in the Deed and in terms of the InvIT Regulations and Applicable Law;

(vii) ensure that no commission or rebate or any other remuneration, arising out of transactions pertaining to the InvIT is collected by it or its Associates, other than as specified in the Offer Document or any other document as may be specified by SEBI for the purpose of the issue of the Units of the InvIT;

(viii) ensure that the InvIT Assets including the Holding Companies and SPVs, have proper legal titles, to the extent applicable, and that all the material contracts entered into on behalf of the InvIT or the InvIT Assets are legal, valid, binding and enforceable by and on behalf of the InvIT are legal, valid, binding and enforceable by and on behalf of the InvIT;

(ix) ensure that the activities of the intermediaries or agents or service providers appointed by it are in accordance with the InvIT Regulations or any guidelines or circulars issued thereunder;

(x) ensure that any possible conflict of interest involving its role as Investment Manager is reported to the Trustee;

(xi) ensure that disclosures or reporting to Unitholders, SEBI, the Trustee and the designated stock exchange are in accordance with the InvIT Regulations and Applicable Law and rectify any delay or discrepancy or non-compliance of reporting or disclosure requirements under the InvIT Regulations and Applicable law on an urgent basis;

(xii) provide SEBI, the designated stock exchange and Trustee, where applicable, such information as may be sought by SEBI or by the designated stock exchange(s) or Trustee pertaining to the activity of the InvIT;

(xiii) ensure that it does not take or refrain from taking any measures, that will adversely impact the benefits available to the InvIT, including on account of being an infrastructure investment trust registered with SEBI

(xiv) to inform the Trustee in writing about any change in the representations and warranties provided by it under the Investment Management Agreement during its term;

(xv) taking any other actions reasonably incidental to any of the foregoing, or necessary or convenient in order to fully effect or evidence any action or transaction contemplated under the Agreement; and

(xvi) agrees to undertake/ assist Trustee in undertaking all the compliances including signing and verifying any Tax returns that the InvIT may be required to file under the Applicable Law.

(z) The Investment Manager shall provide to the Trustee such assistance as may be required by the Trustee in fulfilling its obligation towards the InvIT under Applicable Law or as may be required by any regulatory authority with respect to the InvIT.

3. *Liabilities of the Investment Manager*

The liabilities of the Investment Manager in terms of the Investment Management Agreement are as follows:

(a) ***Bona fide action by the Investment Manager****:* The Investment Manager shall not be liable in respect of any action taken or damage suffered by it on reliance upon any notice, resolution, direction, consent, certificate, affidavit, statement, certificate of stock, plan of reorganization or, without being limited in any way by the foregoing, other paper or document believed to be genuine and in good faith and to have been passed, sealed or signed by appropriate government authorities, authorised Persons or entities.

(b) ***Acts or things required to be done by the Investment Manager under law****:* The Investment Manager shall not be liable to the Unitholders for doing or failing to do any act or thing which by reason of any provision of any present or future law or regulation made pursuant thereto, or of any decree, order or judgment of any court, or by reason of any request, announcement or similar action, whether of binding legal effect or not, which may be taken or made by any Person or body acting with or purporting to exercise the authority of any government (legally or otherwise) it shall be directed or requested to do or perform or to forbear from doing or performing. If for any reason it becomes impossible or impracticable to carry out any of the provisions of the Agreement, the Investment

Manager shall not be under any liability. However, it shall duly inform the Trustee and the Unitholders of the same.

(c) ***Information regarding the InvIT, etc***.: If the Investment Manager is required or reasonably believes that it is required, by the InvIT Regulations or any other Applicable Law to provide information regarding the InvIT or the Unitholders, the InvIT investments and income therefrom and provisions of these presents and complies with such request in good faith, whether or not it was in fact enforceable, the Investment Manager shall not be liable to the Unitholder or any of them or to any other party as a result of such compliance or in connection with such compliance.

(d) ***Depletion in the value of the InvIT corpus****:* The Investment Manager shall not incur any liability for any act or omission which may result in a loss to a Unitholder by reason of any depletion in the value of the InvIT Assets or otherwise, except in the event that such loss is a result of fraud or gross negligence or wilful default on the part of the Investment Manager, or where the Investment Manager fails to exercise due care in relation to its obligations under the Agreement.

(e) ***Distribution***: If the Distributions, after being declared, are not made within the period prescribed in the InvIT Regulations, the Investment Manager shall be liable to pay interest to the Unitholders at the rate as may be prescribed in the InvIT Regulations until the distribution is made, and such interest shall not be recovered in the form of fees or any other form payable to the Investment Manager by the InvIT.

(f) The Investment Manager shall not be liable to any Unitholder for the authenticity of any signature or of any seal affixed to any endorsement or other document affecting the title to or the transmission of Units or interests in the InvIT or of any investments of the InvIT or be in any way liable for any forged or unauthorized signature or seal affixed to such endorsement, transfer or other document, or for acting upon or giving effect to any such forged or unauthorized signature or seal. The Investment Manager shall be bound to require that the signature of any Unitholder to any document required to be signed by such Unitholder, under or in connection with these presents shall be verified to its reasonable satisfaction.

(g) The Investment Manager shall continue to be liable for all of its acts of omission and commission with respect to the activities of the InvIT, notwithstanding surrender of registration of the InvIT to SEBI.

(h) ***Suits, proceedings or claims against the Trust***: The Investment Manager shall not be under any obligation to institute, acknowledge the service of, appear in, prosecute or defend any action, suit, proceedings or claim (including Tax proceedings) in respect of the provisions of the Agreement or other InvIT Documents in respect of the Investments or any part of such Investments or any corporate or shareholders' action which in its opinion would or might involve expense or liability unless it is satisfied that the value of the Investment is sufficient to provide adequate indemnity against costs, claims, damages, expenses or demands to which it may be put as the trustee as a result thereof.

4. *Indemnity*

The Investment Manager, and its respective officers, directors, shareholders, partners, members, employees, advisors and agents ("**Indemnified Parties**") shall be indemnified (by the Trustee), from and against any claims, losses, costs, damages, liabilities, suits, proceedings, taxes and expenses, including legal fees ("**Losses**") suffered or incurred by them by reason of their activities on behalf of the InvIT, unless such Losses have resulted from fraud, gross negligence, wilful default or wilful misconduct or breach of any obligations or duties under Applicable Law by the relevant Indemnified Party, as determined by a court of competent jurisdiction.

The Trustee, its directors, employees and officers ("**Trustee Party**") shall be indemnified by the Investment Manager against any and all direct and actual losses, actions, claims, suits, proceedings, damages, liabilities, costs and expenses including legal fees, incurred or suffered by the Trustee Party in connection with the breach of any of the terms of the Investment Management Agreement by the Investment Manager, or failure in furnishing information required by SEBI or any regulatory authority with respect to the InvIT, or furnishing incorrect information by the Investment Manager under the InvIT Regulations or related to InvIT including in any Offer Document, if arising out of gross negligence, wilful default or misconduct or fraud on part of the Investment Manager, in carrying out its obligations under the Agreement, Deed, the other InvIT Documents, any information memorandum, Offer Document and Applicable Law.

The aggregate maximum liability of the Investment Manager in each financial year under the Investment Management Agreement, shall be limited to the aggregate fees paid to the Investment Manager for the immediately preceding one financial year, in accordance with the terms of the Agreement.

5. *Termination*

(a) The Investment Management Agreement, subject to approval of Unitholders (if required) and compliance with Applicable Law, may be terminated:

(i) by the Investment Manager, by delivery of a written notice of 30 (thirty) business days to the Trustee, subject to appointment of new Investment Manager as per the terms of the Investment Management Agreement;

(ii) if it is impossible to continue with the InvIT or if the Trustee on advice of the Investment Manager deems it impracticable to continue the InvIT;

(iii) where SEBI has passed a direction for the winding up of the InvIT or if the InvIT is required to be wound up pursuant to the InvIT Regulations;

(iv) by the Trustee by delivery of a written notice to the Investment Manager at any time, upon breach of any of the terms, covenants, conditions or provisions the agreement by the Investment Manager and a failure of the Investment Manager to cure the said breach within a period that is earlier of: (a) the period stipulated under Applicable Law, or (b) 60 (sixty) business days; or such other period as may be mutually agreed to cure such breach; or

(v) by any party by delivery of a written notice to the other party upon the bankruptcy of such other party, or if winding up or liquidation proceedings are commenced against such other Party, and such proceedings persist for a period of more than three months.

(b) The Investment Management Agreement shall automatically terminate without any liability on any Party:

(i) if the offer of Units does not occur within the time period stipulated in the InvIT Regulations or such other date as may be mutually agreed to between the Investment Manager and the Trustee; or

(ii) upon cancellation of registration of the InvIT by SEBI; or

(iii) winding up of the InvIT.

(c) After prior approval from the Unitholders and SEBI (in the event the InvIT is listed) in accordance with the InvIT Regulations, for the change in the Investment Manager due to removal or otherwise, the Trustee shall appoint a new investment manager and execute a new investment management agreement within three months from the termination of the previous investment management agreement in accordance with Applicable Law, and the terms of such appointment and agreement shall not be on more favourable terms and conditions. The Trustee shall also ensure that the new investment manager stands substituted as a party in all documents to which the Investment Manager was a party, in relation to the InvIT in its capacity as the Investment Manager. The Investment Manager shall remain in office until the appointment of a new investment manager. The Investment Manager shall continue to be liable for all of its acts, omissions and commissions during its tenure as Investment Manager, notwithstanding the termination.

(d) Upon removal or replacement of the Investment Manager in accordance with the InvIT Regulations, the Investment Manager shall, within a period of 30 (thirty) Business Days, transfer custody of the InvIT to the Trustee and give the Trustee all books of accounts, correspondence, documents and records relating to the InvIT which the Investment Manager has in its possession. In the event of removal or resignation of the Investment Manager, the Investment Manager shall be entitled to receive Management Fees only up to the date of effectiveness of such removal or resignation.

Board of Directors of the Investment Manager

The board of directors of Investment Manager is entrusted with the responsibility for the overall management of the Investment Manager. Please see below the details in relation of the board of directors of the Investment Manager:

Sr. No.	Name	Age (years)	DIN	Designation
1.	Sumit Sen	43	06734410	Non-Independent Director
2.	Ralf Nowack	62	09518088	Non-Independent Director
3.	Rakshit Jain	56	06858141	Non-Independent Director
4.	Jyoti Davar	54	09757889	Independent Director
5.	Rajat Kumar Mishra	55	03199515	Independent Director
6.	Anil Kumar Chaudhary	63	03256818	Independent Director

Brief profiles of the Directors of the Investment Manager

Please see below brief profiles of the directors of the Investment Manager:

Sumit Sen is a non-independent director on the board of the Investment Manager since its incorporation. He is a qualified chartered accountant from The Institute of Chartered Accountants of India. Sumit has over 20 years' experience across accounting, investment banking and investing in energy, infrastructure, and other sectors. He has been involved with the infrastructure sector in various roles for most his career with a specific focus on investments in the infrastructure sector. Sumit joined the Actis Long Life Infrastructure team in 2017, and is a director with Actis Advisers Private Limited. As a Partner at Actis, he is responsible for Actis' infrastructure activities in India and South East Asia. Prior to joining Actis, Sumit worked for more than a decade at Goldman Sachs, most recently as executive director, where he was responsible for investments across sectors with a specific focus on energy, infrastructure, TMT, and healthcare.

Ralf Nowack is a non-independent director on the board of the Investment Manager since June 2, 2023. He joined the Actis Group in 2019. Prior to joining the Actis Group, Ralf worked at Contour Global for more than two years as chief operations officer renewables and head of projects and he was also the global director for health and safety. Ralf has worked with RWE Power Aktiengesellschaft (a public company) and handled overall management of the "*Hard Coal Convoy*" project and reported to the board of directors of "*Fossil Fired Power Plants*". He has also worked with RWE Power AG (a public company) and RWE Technology GmbH. He is a mechanical engineer holding a PhD degree from Aachen University of Technology in Germany on "CO2-Emissions from hard coal-fired power plants". He has completed his diploma and been conferred with '*Engineering Diploma degree*' in the scientific course of mechanical engineering by Rheinian-Westphal Technical University. Ralf has passed the examination held in the training occupation on '*Industrial Merchant*' organised by Chamber of Commerce and Industry, Essen – Germany.

Rakshit Jain is a non-independent director on the board of the Investment Manager since June 2, 2023. He is a chartered accountant, and completed his Master of Business Administration from the University of Jodhpur. Rakshit has also worked with Autostrade India Infrastructure Development Private Limited, a subsidiary of Atlantia SPA, for approximately 14 Years and left the organisation at the designation of chief executive officer and director. He also worked with Mumbai International Airport Private Limited as vice-president-project finance, where his role involved scouting and development for new business opportunities for the GVK group in the areas of infrastructure development including power, roads, railways, seaports and airports.

Jyoti Davar is an independent director on the board of the Investment Manager since August 9, 2023. Jyoti Davar is currently working with FICCI as an additional director general and she has been associated with FICCI for approximately 29 years. Jyoti Davar has completed her Master of Arts in Business Economics degree from University of Delhi.

Rajat Kumar Mishra is an independent director on the board of the Investment Manager since August 9, 2023**.** He is currently the director at EFKON India Private Limited. He was also associated with Steria (India) Limited as country director, Siemens IT Solutions and Services Private Limited as vice-president. Rajat holds a Bachelor of Technology in electrical engineering from the Indian Institute of Technology, Delhi and Master of Business Administration (International Business) from Indian Institute of Foreign Trade.

Anil Kumar Chaudhary is an independent director on the board of the Investment Manager since October 10, 2023. Anil holds degree of Bachelor of Commerce, Bachelor of Laws and Post-Graduate Diploma in Personnel Management from University of Delhi. He is a qualified Company Secretary and Cost and Works Accountant. He has worked with Steel Authority of India Limited ("**SAIL**") for approximately 35 years and retired as chairman of SAIL.

Other Confirmations

The Investment Manager confirms that it has, and undertakes to ensure that it will, at all times, maintain, adequate infrastructure, personnel and resources to perform its functions, duties and responsibilities with respect to the management of the Trust, in accordance with the InvIT Regulations, the Investment Management Agreement and applicable law. None of the directors of the Investment Manager hold or propose to hold any Units in this Issue.

Further, as of the date of this Draft Placement Memorandum, the Investment Manager is in compliance with the eligibility criteria provided under Regulation 4 of the InvIT Regulations and is a "fit and proper person" as prescribed under SEBI Intermediaries Regulations.

Brief profiles of the key personnel of the Investment Manager

The details of the other key personnel of the Investment Manager are set forth below:

Rakshit Jain, aged 56 years, is the director and Chief Executive Officer of the Investment Manager. He was appointed as the Chief Executive Officer with effect from June 10, 2023. For further details, kindly refer the paragraph above titled *"Parties to the Trust - Brief profiles of the Directors of the Investment Manager*" on page 113.

Kiran Kakkar aged 46 years, is the financial controller of the Investment Manager. He was appointed as the financial controller with effect from June 10, 2023. He is a chartered accountant from Institute of Chartered Accountants of India. He was previously associated with HCC Concessions Limited as a general manager in the accounts team. Kiran has worked with Reliance Infrastructure Limited as a manager in the accounts and finance department for approximately 5 years.

Pratik Desai aged 37 years, is the compliance officer of the Nxt-Infra Trust. He is a qualified Company Secretary and holds a Bachelor of Commerce from University of Mumbai. He was associated with Pan India Infraprojects Private Limited (member of the Essel group) as a manager. He has worked for approximately three years with Pipeline Infrastructure Limited as general manager for secretarial and compliance.

D. The Project Manager – Walter Infra Project Manager Private Limited

History and Certain Corporate Matters

Walter Infra Project Manager Private Limited, an associate of the Sponsor, is the project manager of the Trust and will enter into a project implementation and management agreement with the Trustee, the Investment Manager and the Project SPVs. The Project Manager was incorporated as a private limited company in India on March 25, 2023 under the provisions of the Companies Act, 2013 with the corporate identification number U42101DL2023FTC411597. For further details, please see the section titled "*General Information*" on page 81.

Background and past experience of the Project Manager

The Project Manager is a private limited company incorporated on March 25, 2023 under the Companies Act, 2013 for providing development, infrastructure and construction services in the infrastructure sector.

The Project Manager has a well-equipped team of professionals to oversee and manage the routine operations and maintenance of the road SPVs. This team has a collective experience of over 40 years in the infrastructure sector.

Other Confirmations

As of the date of this Draft Placement Memorandum, The Project Manager is in compliance with the eligibility criteria provided under Regulation 4 of the InvIT Regulations and is a "fit and proper person" as prescribed under SEBI Intermediaries Regulations.

Key terms of the Project Implementation and Management Agreement

The Project Manager shall enter into a Project Implementation Management Agreement with the Trustee (acting on behalf of the Trust), Investment Manager, and Project SPVs effective from the date on which the Trust acquires one or more of the Project SPVs, in accordance with the Securities Purchase Agreements, to provide project operations and maintenance services in relation to the Project SPVs. The key terms of the Project Implementation and Management Agreement are provided below:

1. ***Services***: The Trustee and the Investment Manager intends to appoint Walter Infra Project Manager Private Limited as the Project Manager to the InvIT and set out the obligations of the Project Manager with respect to execution and management of the Project SPVs in accordance with the provisions of the InvIT Regulations and the Agreement.

2. ***Covenants***:

   The Project Manager has agreed to certain covenants, including:

   (a) at all times act in good faith;

   (b) provide continuous access to the Trustee (acting on behalf of the InvIT) and the Investment Manager to all data and information pertaining to the InvIT Assets (as defined in the Agreement);

   (c) exercise the level of skill, care, attention and diligence as may reasonably be expected of an experienced, professional, prudent and competent third party skilled in providing project management services such as the services in relation to the InvIT Assets;

   (d) not do or cause to be done any act in violation of the InvIT Documents, Applicable Law or the Agreement;

   (e) at all times act within the parameters laid down in the Agreement;

   (f) ensure that all services and other obligations under the Agreement are performed in a manner that does not infringe any Applicable Law; and

(g) In the event of a change in control of the Project Manager, the Trustee (on behalf of the InvIT), in consultation with the Investment Manager, shall ensure that it has obtained the requisite consents of regulatory, statutory, legal or government authorities, lenders and any contractual counter parties, as applicable, in accordance with the Agreement prior to such change in control.

3. ***Duties:*** The Project Manager has agreed to undertake certain duties, including:

(a) The Project Manager shall, either directly or through the appointment and supervision of agents, provide services in relation to the InvIT Assets as may be necessary for the discharge of its duties under the terms of the Agreement and under the InvIT Regulations.

(b) The Project Manager shall, either directly or through agents, oversee the progress of development, approval status and other aspects of the InvIT Assets that may be under development or is to be established until its completion in accordance with any agreement that may be entered into in this regard and discharge all obligations in respect of achieving timely completion of the infrastructure projects, wherever applicable, including the supervision of agents appointed for such purpose.

(c) The Project Manager shall, either directly or through agents, discharge all obligations in respect of the maintenance, operation and management of the infrastructure projects which have achieved the commercial operations date in terms of the respective concession agreements in accordance with the Agreement and the InvIT Regulations.

(d) The Project Manager acknowledges that the Trustee and the Investment Manager will oversee the activities undertaken by the Project Manager in accordance with the InvIT Regulations and accordingly, the Project Manager shall extend complete co-ordination to enable the Trustee and the Investment Manager to perform such obligations in accordance with the InvIT Regulations. The Project Manager shall provide compliance certificate(s), as may be specified, to the Investment Manager and the Trustee in accordance with the InvIT Regulations, in the form prescribed by SEBI, if any.

(e) The Project Manager shall at all times ensure that the transactions or arrangements entered into by the Project Manager with a related party are on an arm's-length basis and shall provide the Investment Manager with details of transactions carried out between itself and its associates and disclose any conflict of interest in such cases to the Investment Manager, in accordance with the InvIT Regulations.

(f) The Project Manager shall intimate the Trustee prior to any change in control of the Project Manager to enable the Trustee to seek requisite approval from regulatory, statutory, legal or government authorities, lenders and any contractual counter parties in accordance with any documents pertaining to the InvIT Assets, if applicable.

(g) The Project Manager shall, either by itself or through its Agents provide to the Trustee and the Investment Manager or to such other person as the Trustee and/or the Investment Manager may direct, all information that may be necessary for each of them to maintain the records of the InvIT and as may be required for making submissions to SEBI or any other governmental authority, including with respect to relevant approvals, consents and other documents required in relation to the InvIT Assets and the reporting requirements under the InvIT Regulations, in a proper and timely manner, and in the format prescribed (if any), as required by the Trustee and /or the Investment Manager. Further, the Project Manager shall, either by itself or through its agents provide reasonable assistance to the Project SPVs to apply for, obtain and maintain all necessary approvals (and renewals of the same) that each of the Project SPVs is required to obtain from or file relevant applications for approvals with any governmental authority in connection with InvIT Assets or as may be required under any third party agreement entered into by the Project SPVs.

(h) The Project Manager shall appoint one of its qualified employees reasonably acceptable to the Investment Manager and the Project SPVs with adequate and appropriate experience as a principal contact for the board of directors of the Project SPVs, the Trustee and the Investment Manager in relation to the services. The Project Manager shall have full authority, to receive directions and instructions from each of the Project SPVs and to take actions in relation to and ensure compliance with such directions and instructions and report back to each Project SPV, the Trustee and the Investment Manager.

(i) The Project Manager shall promptly inform the Parties in writing of any act, occurrence or event, which the Project Manager believes is reasonably likely to increase the cost of or the time for implementation taken in relation to any InvIT Asset, or materially change the financial viability, quality or function of any InvIT Asset.

(j) If any defects are found in the maintenance, materials and workmanship of the services provided under the Agreement by the Project Manager and/or by the team members, the Project Manager shall promptly, in consultation and agreement with the other parties to the Agreement regarding appropriate remedying of the defects, and at its own cost, repair, replace or otherwise make good such defects as well as any damage caused by such defect.

(k) The Project Manager shall be liable to the other Parties for any direct loss or damage attributable to the non-performance or breach of the obligations of the Project Manager including those of the team members, under the Agreement. The Trustee and the Investment Manager acknowledge and agree that the aggregate maximum liability of the Project Manager in each financial year shall be limited to an amount equivalent to one month's fee payable to the Project Manager in such financial year in accordance with the terms of the Agreement, as applicable unless the loss or damage caused is due to gross negligence, fraud or wilful default of the Project Manager.

(l) The duties of Project Manager shall also include the following:

i. supervision of revenue streams from the InvIT Assets and providing the necessary certification as may be required under the Applicable Law and the InvIT Regulations;

ii. execution and completion of activities in relation to the InvIT Assets under development or to be developed in accordance with and in the manner contemplated in any agreement entered into by the relevant Project SPV in this regard;

iii. exercising diligence and vigilance in carrying out its duties and protecting the InvIT Assets;

iv. keeping the Investment Manager informed on all matters which have a material bearing on the operations of the InvIT Assets;

v. liaising with governmental authorities in respect of its obligations under the Agreement;

vi. taking appropriate measures to mitigate the risks which may be encountered by the InvIT in respect of the InvIT Assets;

vii. keeping proper records for actions taken in respect of the InvIT Assets; and

viii. complying with the instructions of the Investment Manager and the Trustee and the provisions of the InvIT Regulations.

(m) The parties to the Agreement may, from time to time, agree to provisions for additional services to be rendered by the Project Manager. If, in the assessment of the Project Manager, additional services are required for the purposes of carrying out its duties and obligations under the Agreement and Applicable Law, the Project Manager shall notify the parties to the Agreement in writing of such requirement and obtain prior written approval of the parties to the Agreement in this regard.

(n) Notwithstanding anything to the contrary contained in the Agreement, nothing contained in the Agreement shall be construed to limit or restrict the performance of any duties or obligations of the Project Manager, Investment Manager or the Trustee contained in the InvIT Regulations and other Applicable Law.

(o) During the term of the Agreement, in the event the representations provided by the Project Manager under the Agreement, become untrue or incorrect or incomplete in any respect, the Project Manager shall, within a reasonable time, inform the Trustee and Investment Manager of such event.

4. ***Obligations of the Project SPVs***: Each Project SPVs shall ensure that all information reasonably required by the Project Manager from such Project SPV for the performance of services by the Project Manager, including with respect to relevant approvals, consents, powers of attorney, authorizations and other documents required in relation to the operation and maintenance of the InvIT Assets, is provided to the Project Manager, in a timely manner when required, without charge to enable the Project Manager to carry out its obligations under the Agreement.

5. ***Compensation****:* In consideration of the services to be rendered by the Project Manager, either directly or through the appointment and supervision of agents, in accordance with and subject to the terms of the Agreement and applicable law, the Trustee agrees to pay fees from the funds of the InvIT, either to the Project Manager or directly to any agent appointed in this regard, as the case may be, as per the terms of the Agreement

6. ***Representations and Warranties**:*

Each party to the Agreement represents and warrants to the other party that:

(a) it has the full power and authority to enter into, execute and deliver the Agreement and to perform the transactions contemplated hereby and is duly incorporated or organized and validly existing under the laws of the jurisdiction of its incorporation or organization;

(b) the execution and delivery by it of the Agreement and the performance by it of the obligations contained herein has been duly authorized by all necessary corporate or other action;

(c) the Agreement constitutes legal, valid and binding obligations, enforceable against it in accordance with its terms, except to the extent such enforceability may be limited by (i) applicable bankruptcy, insolvency, reorganization, moratorium or other laws of general application affecting the enforcement of creditors' rights generally; and (ii) general principles of equity;

(d) the execution, delivery and performance of the Agreement by such party to the Agreement and the consummation of the transactions contemplated in the Agreement will not result in:

i. a breach of, or constitute a default under, any, agreement or instrument to which it is a party or by which it is bound; or

ii. violation of its constitutional documents or contravene any provision of any applicable law, or any order, writ, injunction or decree of any court or governmental authority to which such party may be subject; and

(e) no liquidation, dissolution, winding up, commencement of bankruptcy, insolvency, liquidation or similar proceedings, whether voluntary or involuntary, with respect to it is pending or has been pending, or to the knowledge of such party, threatened.

7. ***Representations and Warranties by the Parties to the Agreement Other Than the Project SPVs:***

Each party to the Agreement, other than the Project SPVs, represents and warrants to the other party that:

(a) it is a fit and proper person based on the criteria specified in Schedule II of the Securities and Exchange Board of India (Intermediaries) Regulations, 2008;

(b) except as disclosed in the application for registration as an infrastructure investment trust and may be disclosed in any Offer Document, no disciplinary action has been taken against it by SEBI or any other regulatory authority;

(c) neither it nor any of its promoter(s) or directors is debarred from accessing the securities market by SEBI;

(d) neither it nor any of its promoter(s) or directors is a promoter, director or person in control of any other company or a sponsor, investment manager or trustee of any other InvIT or InvIT which is debarred from accessing the capital market under any order or directions made by SEBI;

(e) neither it nor any of its promoter(s) or directors is in the list of wilful defaulters published by the Reserve Bank of India;

(f) to the best of its knowledge, there are no claims, investigations or proceedings before any court, tribunal or governmental authority, body or agency in progress or, pending against or relating to the Project Manager, which could reasonably be expected to prevent the Project Manager from fulfilling its obligations set out in the Agreement or arising from the Agreement;

(g) it has no knowledge of any existing ground on which any such claim, investigation or proceeding might be commenced with any reasonable likelihood of success;

(h) it shall comply, at all times, with the code of conduct, as specified in the InvIT Regulations; and

(i) there are no previous application for grant of certificate made by them or its directors or members or the governing board that has been rejected by SEBI.

8. ***Term & Termination***:

The Agreement shall remain valid and effective, unless terminated by the parties to the Agreement in accordance with the provisions hereto or extended by mutual consent expressed in writing by the parties to

the Agreement ("**Validity Period**"), for the period that the Project Agreements are in force. Prior to the expiry of its Validity Period, the Agreement, may be terminated:

(a) by the Investment Manager after consultation with the Trustee by delivery of a prior written notice of 15 days to the Project Manager, subject to appointment of new project manager in accordance with the Agreement and the InvIT Regulations; or

(b) by the Investment Manager after consultation with the Trustee by delivery of a written notice to the Project Manager at any time, upon breach of any of the terms, covenants, conditions or provisions of the Agreement by the Project Manager and a failure of the Project Manager to remedy the said breach within a period of 60 days or such other period as may be mutually agreed to cure such breach;

(c) by any Party by delivery of a written notice to the other Party upon the bankruptcy of such other party or if winding up or liquidation proceedings whether voluntary or involuntary are commenced or admitted against such other party (and such proceedings persist for a period of more than three months).

Notwithstanding anything contained hereinabove:

(a) in the event that the offer of the Units does not occur within the time period stipulated in the InvIT Regulations or such other date as may be mutually agreed to between the parties to the Agreement; or

(b) in the event of cancellation of registration of the InvIT by SEBI; or

(c) winding up of the InvIT, then the Agreement shall automatically terminate without any liability to any party to the Agreement.

9. ***Indemnity:***

The Trustee, the Investment Manager and the Project SPVs and their respective directors, employees, officers and the InvIT ("**Indemnified Parties**") shall be indemnified by the Project Manager against any claims, losses, costs, damages, liabilities and expenses, including legal fee from and incurred or suffered by the Indemnified Parties in connection with the breach of any of the terms of the Agreement by the Project Manager, or failure in furnishing information required by SEBI or any regulatory authority with respect to the InvIT, or furnishing wrong information by the Project Manager under the InvIT Regulations or related to InvIT including in any offer documents, or arising out of gross negligence, wilful default or fraud on part of the Project Manager, in carrying out its obligations under the Agreement, the other InvIT documents any information memorandum / offer documents and applicable law. The Trustee, the Investment Manager and the Project SPVs acknowledge and agree that the aggregate maximum liability of the Project Manager in each financial year shall be limited to an amount equivalent to one month's fee payable to the Project Manager in such financial year in accordance with the terms of the Agreement.

Details of the holding or the proposed holding by Project Manager in the Trust

The Project Manager does not propose to hold any Units in the Trust.

OTHER PARTIES INVOLVED IN THE TRUST

The Auditors

Background and terms of appointment

The Investment Manager, in consultation with the Trustee, pursuant to a resolution passed by its Board dated December 14, 2023, has appointed S R B C & Co. LLP, Chartered Accountants as the Auditor of the Trust for a period of one year. The Auditor has audited the Special Purpose Combined Financial Statements and has examined in accordance with Standard on Assurance Engagement 3400 "The Examination of Prospective Financial Information", issued by the Institute of Chartered Accountants of India, the Projections of Revenue from Operations and Cash Flow from Operating Activities, and their report in relation to such Special Purpose Combined Financial Statements dated December 29, 2023 and Projections of Revenue from Operations and Cash Flow from Operating Activities dated December 29, 2023, has been included in this Draft Placement Memorandum.

Functions, Duties and Responsibilities

The Investment Manager has appointed the Auditor of the Trust for a period of one year.

The Investment Manager shall ensure that the auditor carries out an audit of the accounts of the Trust, not less than once a year and such report is submitted to the Unitholders and the Trustee, either electronically or through physical copies.

In accordance with the InvIT Regulations, the auditor of the Trust shall:

- conduct an audit of the accounts of the Trust and draft the audit report based on the accounts examined by him, and after taking into account the relevant accounting and auditing standards, as may be specified by SEBI;
- to the best of its information and knowledge, ensure that the accounts and financial statements give a true and fair view of the state of the affairs of the Trust, including profit or loss and cash flow for the period and such other matters as may be specified;
- have a right of access at all times to the books of accounts and vouchers pertaining to activities of the Trust;
- have a right to require such information and explanation pertaining to activities of the Trust, as it may consider necessary for the performance of its duties as an auditor from the employees of Trust or Parties to the Trust or the Project SPVs or any other person in possession of such information; and
- undertake a limited review of the audit of all the entities or companies whose accounts are to be consolidated with the accounts of the Trust as per the applicable Indian Accounting Standards and any addendum thereto as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015, in such manner as may be specified by SEBI

The Valuer

Background and terms of appointment

The Investment Manager, in consultation with the Trustee, pursuant to a resolution passed by its Board dated December 14, 2023 has appointed S. Sundararaman, a registered valuer, as the Valuer of the Trust. In accordance with the InvIT Regulations, the Valuer has undertaken a full valuation of the Project SPVs which are proposed to be acquired by the Trust pursuant to the formation transactions and his report in relation to such valuation dated December 27, 2023 has been included in this Draft Placement Memorandum.

The Valuer is not an Associate of the Sponsor, the Investment Manager or the Trustee, and has not less than five years of experience in the valuation of infrastructure assets.

Functions of the Valuer

The functions, duties and responsibilities of the Valuer will be in accordance with the InvIT Regulations. Presently, in terms of the InvIT Regulations, the Valuer is required to comply with the following conditions at all times:

- the Valuer shall ensure that the valuation of the Trust Assets is impartial, true and fair and is in accordance with Regulation 21 of the InvIT Regulations;
- the Valuer shall ensure adequate and robust internal controls to ensure the integrity of its valuation reports;
- the Valuer shall ensure that it has sufficient key personnel with adequate experience and qualification to perform valuations;

- the Valuer shall ensure that it has sufficient financial resources to enable it to conduct its business effectively and meet its liabilities;

- the Valuer and any of its employees involved in valuing of the assets of the Trust, shall not, (i) invest in Units of the Trust or in the assets being valued; and (ii) sell the assets or Units of Trust held prior to being appointed as the Valuer, till the time such person is designated as Valuer of the Trust and not less than six months after ceasing to be valuer of the Trust;

- the Valuer shall conduct valuation of the Trust Assets with transparency and fairness and shall render, at all times, high standards of service, exercise due diligence, ensure proper care and exercise independent professional judgment;

- the Valuer shall act with independence, objectivity and impartiality in performing the valuation;

- the Valuer shall discharge its duties towards the Trust in an efficient and competent manner, utilising its knowledge, skills and experience in best possible way to complete given assignment;

- the Valuer shall not accept remuneration, in any form, for performing a valuation of the Trust Assets from any person other than the Trust or its authorised representative;

- the Valuer shall before accepting any assignment, from any related party of the Trust, disclose to the Trust any direct or indirect consideration which the Valuer may have in respect of such assignment;

- the Valuer shall disclose to the Trust any pending business transactions, contracts under negotiation and other arrangements with the Investment Manager or any other party whom the Trust is contracting with and any other factors that may interfere with the Valuer's ability to give an independent and professional valuation of the assets;

- the Valuer shall not make false, misleading or exaggerated claims in order to secure assignments;

- the Valuer shall not provide misleading valuation, either by providing incorrect information or by withholding relevant information;

- the Valuer shall not accept an assignment which interferes with its ability to do fair valuation; and

- the Valuer shall, prior to performing a valuation, acquaint itself with all laws or regulations relevant to such valuation.

Policy on Appointment of Auditor and Valuer

The Investment Manager has adopted a policy on the appointment of auditor and valuer of the Trust, pursuant to its resolution dated December 27, 2023. The key terms of the Appointment of Auditor and Valuer Policy are set out below:

Appointment and role of the auditor of the Trust

(i). The Investment Manager, in consultation with the trustee to the Trust (the "**Trustee**") and pursuant to the recommendation of the Audit Committee, shall appoint the auditor of the Trust (the "**Auditor**"), in a timely manner and in accordance with the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended or supplemented, including any guidelines, circulars, notifications and clarifications framed or issued thereunder (the "**InvIT Regulations**").

(ii). The Investment Manager pursuant to the recommendation of the Audit Committee, shall ensure that the appointment of the Auditor and the fees payable to the Auditor is approved by the unitholders of the Trust (the "**Unitholders**") in accordance with the InvIT Regulations.

(iii). The Investment Manager shall ensure that if the removal of the Auditor and appointment of another auditor to the Trust is taken up at a meeting of the Unitholders at the request of the Unitholders, such removal of the Auditor shall be approved by the Unitholders in accordance with the InvIT Regulations.

(iv). The Investment Manager shall appoint an individual or a firm as the Auditor, who shall hold office from the date of conclusion of the annual meeting in which the Auditor has been appointed till the date of conclusion of the sixth annual meeting of the Unitholders in accordance with the procedure for selection of auditors, in terms of the InvIT Regulations.

(v). The Investment Manager shall not appoint or re-appoint:

a. an individual as the Auditor for more than one term of five consecutive years, provided that such individual, upon completion of one term of five consecutive years, shall not be eligible for re-appointment as the auditor in the Trust for a period of five years from the date of completion of the term; and
b. an audit firm as the Auditor for more than two terms of five consecutive years, provided that, upon completion of two terms of five consecutive years, such audit firm shall not be eligible for re-appointment as the auditor in the Trust for a period of five years from the date of completion of its term.

(vi). The Investment Manager shall ensure that the audit of accounts of the Trust by the Auditor is done not less than once in a year and such report is submitted to the stock exchanges within the timelines prescribed under the InvIT Regulations.

(vii). The Auditor shall conduct the audit of the accounts of the Trust and draft the audit report based on the accounts examined by it after taking into account the relevant accounting and auditing standards under applicable law, including the InvIT Regulations and any guidelines, circulars, notifications and clarifications framed or issued by the Securities and Exchange Board of India ("**SEBI**"), as may be specified from time to time.

(viii). The Auditor shall undertake a limited review of the audit of all the entities or companies whose accounts are to be consolidated with the accounts of the Trust as per the relevant auditing standards under applicable law and in accordance with the InvIT Regulations.

(ix). The Auditor shall comply with the conditions prescribed under the InvIT Regulations at all times, including the following:

a. the accounts of the Trust shall be subjected to audit by the Auditors and shall be accompanied by a report of the Auditors in such manner and at such intervals as may be prescribed under applicable law, including the InvIT Regulations;
b. the Auditor shall, to the best of his information and knowledge, ensure that the accounts and financial statements give a true and fair view of the state of the affairs of the Trust, including profit or loss and cash flow for the period and such other matters as may be specified by SEBI;
c. the Auditor shall have a right of access at all times to the books of accounts and vouchers pertaining to activities of the Trust; and
d. the Auditor shall have a right to obtain such information and explanation pertaining to activities of the Trust as he may consider necessary for the performance of his duties as auditor from the employees of Trust or any holding company or parties to the Trust or any holding company or the special purpose vehicle(s) or any other person in possession of such information.

(x). The Investment Manager, in consultation with the Trustee, shall have the right to take all necessary steps to remove the Auditor who ceases to comply with the eligibility criteria required under the InvIT Regulations and applicable law. In case of removal of the auditor and appointment of another auditor to the Trust, approval from the Unitholders shall be required in accordance with the InvIT Regulations.

Appointment and role of the Valuer of the Trust

(i). The Investment Manager, in consultation with Trustee, shall appoint the valuer of the Trust ("**Valuer**"), in a timely manner and shall determine the remuneration of such Valuer, in accordance with the InvIT Regulations. A 'Valuer' shall have the meaning provided under the InvIT Regulations.

(ii). The remuneration of the Valuer shall not be linked to or based on the value of the assets being valued.

(iii). The Valuer shall not be an associate of any of the Sponsor or the Investment Manager or Trustee. The Valuer shall have the minimum number of years of experience in valuation of infrastructure assets as may be required under the InvIT Regulations.

(iv). The Valuer shall be eligible to act as a valuer in accordance with the InvIT Regulations or any clarifications, guidelines, notifications or exemptions issued by SEBI.

(v). A Valuer shall undertake valuation of the same project in accordance with the InvIT Regulations and applicable law.

(vi). The Valuer shall not undertake valuation of any assets in which it has either been involved with the acquisition or disposal within the last twelve months other than such cases where the Valuer was engaged by the Trust for such acquisition or disposal.

(vii). The Valuer shall comply with the following conditions at all times:

a. the Valuer shall ensure that the valuation of the Trust assets is impartial, true and fair and is in accordance with the InvIT Regulations;
b. the Valuer shall ensure adequate and robust internal controls to ensure the integrity of its valuation reports;
c. the Valuer shall ensure that it has sufficient key personnel with adequate experience and qualification to perform valuations;
d. the Valuer shall ensure that it has sufficient financial resources to enable it to conduct its business effectively and meet its liabilities;

e. the Valuer and any of its employees involved in valuing of the assets of the Trust, shall not: (a) invest in units of the Trust or in the assets being valued; and (b) sell the assets or units of the Trust held prior to being appointed as the Valuer,
f. until the time such person is designated as Valuer of the Trust and not less than six months after ceasing to be Valuer of the Trust;
g. the Valuer shall conduct valuation of the Trust assets with transparency and fairness and shall render, at all times, high standards of service, exercise due diligence, ensure proper care and exercise independent professional judgment;
h. the Valuer shall act with independence, objectivity and impartiality in performing the valuation;
i. the Valuer shall discharge its duties towards the Trust in an efficient and competent manner, utilizing its knowledge, skills and experience in best possible way to complete given assignment;
j. the Valuer shall not accept remuneration, in any form, for performing a valuation of the Trust assets from any person other than the Trust or its authorized representative;
k. the Valuer shall before accepting any assignment, from any related party of the Trust, disclose to the Trust, by disclosing to the Investment Manager or the Trustee, any direct or indirect consideration which the Valuer may have in respect of such assignment;
l. the Valuer shall disclose to the Trust, through the Investment Manager, any pending business transactions, contracts under negotiation and other arrangements with the Investment Manager or any other party whom the Trust is contracting with and any other factors that may interfere with the Valuer's ability to give an independent and professional valuation of the assets, and other necessary disclosures required under the InvIT Regulations;
m. the Valuer shall not make false, misleading or exaggerated claims in order to secure assignments;
n. the Valuer shall not provide misleading valuation, either by providing incorrect information or by withholding relevant information;
o. the Valuer shall not accept an assignment which interferes with its ability to do fair valuation; and
p. the Valuer shall, prior to performing a valuation, acquaint itself with all laws or regulations relevant to such valuation.

(viii). The Investment Manager in consultation with the Trustee shall have the right to take all necessary steps to remove the Valuer who ceases to comply with the eligibility criteria required under the InvIT Regulations and applicable law. If the removal of the Valuer and appointment of another valuer to the Trust is taken up at a meeting of the Unitholders at the request of the Unitholders, such removal of the Valuer shall be approved by the Unitholders in accordance with the InvIT Regulations.

CORPORATE GOVERNANCE

The section below is a summary of the corporate governance framework in relation to Trust, implemented by or to be implemented by the Investment Manager, and the Project SPVs, as applicable and as specified in this section.

The Investment Manager

Walter Infra Manager Private Limited is the investment manager of the Trust. For further details on the background of the Investment Manager, please see the section titled "*Parties to the Trust – The Investment Manager – Walter Infra Manager Private Limited"* on page 99.

Board of Directors

Composition of the Board of Directors of the Investment Manager

In addition to the applicable provisions of the Companies Act and Listing Regulations (as applicable), the composition of the IM Board shall adhere to the following:

(i). the IM Board shall comprise at least six directors;

(ii). Not less than 50% of the IM Board shall comprise independent directors, who are not directors or members of the governing board of an investment manager of another InvIT registered under the InvIT Regulations. The IM Board shall also have not less than one woman independent director. The other directors shall be appointed in accordance with the provisions of the Companies Act and the Listing Regulations;

(iii). The chairman, if any, of the board of directors should be a non-executive director;

(iv). the independence of directors shall be determined in accordance with the InvIT Regulations and other applicable law; and

(v). collective experience of the directors should cover a broad range of commercial experience, particularly experience in infrastructure sector (including the applicable sub-sector), including development, investment/fund management or advisory and financial matters.

For details of the current composition of the board of directors, please see the section titled "*Parties to the Trust – The Investment Manager – Walter Infra Manager Private Limited – Board of Directors of the Investment Manager*" on page 112.

Quorum

The quorum shall be one-third of the total strength of the board of directors or three directors, whichever is higher, including at least one independent director.

Frequency of meetings

The IM Board should meet at least four times every year, with a maximum gap of 120 days between any two meetings. Additionally, the IM Board shall meet prior to any meeting of the Unitholders and approve the agenda for Unitholders' meetings.

Sitting fee

The independent directors of the Investment Manager will receive sitting fee for attending board meetings and meetings of the committees, in accordance with the provisions of the Companies Act, the nomination and remuneration policy, and other applicable law.

Articles of Association of the Investment Manager

The articles of association should not include any affirmative rights for the Sponsors in relation to the Trust.

Committees of the board of directors

Name of the committee	Composition	Present Members	Quorum	Frequency of meetings
Nomination and Remuneration Committee	The Nomination and Remuneration committee shall consist of at least three directors. All the directors should be independent directors. The chairperson of the committee should be an independent	(a)Anil Kumar Chaudhary;	The quorum for the nomination and remuneration committee shall be either two members or one third of	The Nomination and Remuneration Committee shall meet at least once a year, or at such intervals as

Name of the committee	Composition	Present Members	Quorum	Frequency of meetings
	director and shall not be the chairperson on the IM Board. The committee at its discretion shall invite, as experts, the other non-executive directors or sponsor representatives, including the members of the Finance & Investment Committee to be present at the meetings of the committee.	(b)Rajat Kumar Mishra; and (c)Jyoti Davar	the members of the committee, whichever is greater.	may be prescribed from time to time.
Stakeholders' Relationship Committee	The Stakeholders' Relationship Committee shall consist of at least three directors, including at least one independent director and any member of this committee ceasing to be a director shall also cease to be a member of the Committee. The chairperson shall be an independent director.	(a)Rajat Kumar Mishra; (b)Sumit Sen, and (c)Rakshit Jain	The quorum for a meeting of the committee shall be either two members or one third of the members of the committee, whichever is greater.	The Stakeholders' Relationship Committee shall meet at least once in a year.
InvIT Committee	The InvIT committee shall consist of at least two directors and if deemed fit by the Committee, independent director/s may be invited in any meeting as members of the Committee with voting power and any member of the committee ceasing to be a director shall also cease to be a member of the Committee. The executive director shall act as the chairperson.	(a)Sumit Sen; and (b)Rakshit Jain	The quorum for a meeting of the committee shall be either two members or one third of the members of the committee, whichever is greater.	The InvIT Committee shall meet at the request of the members, as required.
Finance and Investment Committee	The Finance and Investment Committee shall consist of four members with one authorised representative of Sponsor and at least three non-independent directors and if deemed fit by the Committee, independent director/s may be invited in any meeting as members of the Committee with voting power and any member of this committee ceasing to be a director shall also cease to be a member of the Committee. The members shall elect a non-executive non-independent director or the authorised representative of sponsor as the chairperson. At its discretion may invite non-board members to be present at the meetings of the committee. Provided that such invitees shall not be allowed to vote on any matter of the committee	(a)Sumit Sen; (b) Ralf Nowack; (c)Rakshit Jain; and (d) Sponsor representative	The quorum for a meeting of the committee shall be either three members including one non-independent non-executive director, executive director and authorised representative of sponsor with one third of the members of the committee being present	The Finance and Investment Committee shall meet at the request of the members, as required.
Audit Committee	The Audit Committee shall consist of at least three directors. At least two-thirds of the members of the committee shall be independent directors. All members of the audit committee should be financially literate, having the ability to read and understand basic financial statements i.e. balance sheet, profit and loss account, and statement of cash flows. and at least one member should have accounting or related financial management expertise, wherein he shall be considered to have accounting or related financial management expertise if he or she possesses experience in finance or accounting, or requisite professional certification in accounting, or any other comparable experience or background which results in the individual's financial sophistication, including being or having been a chief executive officer, chief financial officer or other senior officer with financial oversight responsibilities.	(a)Anil Kumar Chaudhary; (b)Rajat Kumar Mishra; and (c)Sumit Sen	The quorum shall be either three members or one third of the members of the committee, whichever is greater, with at least two independent directors and one non-executive director.	The Audit Committee shall meet at least four times every year, with a maximum gap of 120 days between any two meetings. The audit committee shall have powers to investigate any activity within its terms of reference, seek information from any employee, obtain outside legal or other professional advice and secure attendance of outsiders with relevant expertise, if it considers necessary.

Name of the committee	Composition	Present Members	Quorum	Frequency of meetings
	The audit committee at its discretion shall invite the finance director or head of the finance function, head of internal audit and a representative of the statutory auditor and any other such executives, including members of the Finance and Investment Committee to be present at the meetings of the committee. Provided that occasionally the audit committee may meet without the presence of any executives of the Investment Manager of the Trust			
Risk Management Committee	The Risk Management Committee shall consist of at least three members, including at least one independent director and any member of this committee ceasing to be a director shall also cease to be a member of the Committee. The committee shall elect the chairperson amongst themselves and the chairperson shall be member of the Board. The senior executives of the Investment Manager may be members of the RMC.	(a)Jyoti Davar ; (b)Sumit Sen; and (c)Rakshit Jain	The quorum for a meeting of the committee shall be either two members or one third of the members of the committee, whichever is greater	The Risk Management Committee shall meet at least twice in a year, or at such intervals as may be prescribed from time to time. The meetings shall be conducted in such a manner that on a continuous basis not more than 180 days shall elapse between any two consecutive meetings.

Nomination and Remuneration Committee

The Board has constituted the Nomination and Remuneration Committee pursuant to a resolution dated December 27, 2023, for the purpose of formulation of the criteria for determining qualifications, positive attributes and independence of a director and recommend to the board of directors a policy relating to, the remuneration of the directors, key managerial personnel and other employees.

The key terms of reference of the Nomination and Remuneration Committee include the following:

(i) formulation of the criteria for determining qualifications, positive attributes and independence of a director and recommend to the IM Board a policy relating to, the remuneration of the directors, key managerial personnel and other employees;

(ii) for every appointment of an independent director, evaluation of the balance of skills, knowledge and experience on the IM Board and on the basis of such evaluation, prepare a description of the role and capabilities required of an independent director. The person recommended to the IM Board for appointment as an independent director shall have the capabilities identified in such description. For the purpose of identifying suitable candidates, the Nomination and Remuneration Committee may:

a) use the services of external agencies, if required;

b) consider candidates from a wide range of backgrounds, having due regard to diversity; and

c) consider the time commitments of the candidates

(iii) formulation of criteria for evaluation of performance of independent directors and the board of directors and the senior management including the key managerial personnel after taking into consideration inputs from Finance and Investment Committee;

(iv) devising a policy on diversity of board of directors;

(v) identifying persons who are qualified to become directors and who may be appointed in senior management in accordance with the criteria laid down, and recommend to the IM Board their appointment and removal;

(vi) whether to extend or continue the term of appointment of the independent director, on the basis of the report of performance evaluation of independent directors; and

(vii) recommend to the board, after taking into consideration inputs from the Finance and Investment Committee, all remuneration, in whatever form, payable to senior management (if any).

Stakeholders' Relationship Committee

The Board has constituted the Stakeholders' Relationship Committee pursuant to a resolution dated December 27, 2023, to specifically look into the various aspects of interest of unitholders.

The key terms of reference of the Stakeholders' Relationship Committee include the following:

(i) resolving the grievances of the security/ unit holders of the Trust and/or the Investment Manager (as applicable) including complaints related to transfer/transmission of Units, non-receipt of annual report, non-receipt of declared distributions, issue of new/duplicate certificates, general meetings etc.;

(ii) review of measures taken for effective exercise of voting rights by unitholders of the Trust and/or shareholders of the Investment Manager (as applicable);

(iii) review of adherence to the service standards adopted by the Trust and/or the Investment Manager in respect of various services being rendered by the Registrar;

(iv) review of the various measures and initiatives taken by the Trust and/or the Investment Manager for reducing the quantum of unclaimed distributions, as applicable, and ensuring timely receipt of annual reports/statutory notices by the Unitholders of the Trust.

InvIT Committee

The Board has constituted the InvIT Committee pursuant to a resolution dated December 27, 2023, for the purpose of managing, operating and supervising the functioning of the Trust.

Amongst others, the Board has delegated to the InvIT Committee the authority and responsibility of performing all activities in relation to the proposed Issue by the Trust and any future issues that may be undertaken by the Trust. The InvIT Committee shall perform and discharge (under the overall supervision of the Board) the authority and responsibility so granted to it, in the manner it may deem fit and proper, in the best interest of the Trust, and in accordance with the policies adopted by the Investment Manager from time to time. The key terms of reference of the InvIT Committee are set out below

(i) To decide and finalise the issue opening and issue closing dates of the Issue and any future issues that the Trust may undertake;

(ii) To decide and finalise the issue price in relation to the Issue and any future issues that the Trust may undertake;

(iii) To decide on all matters in relation to allotment of units to investors;

(iv) To decide on any other matter that may be routed through the InvIT Committee in relation to any fund raising by the Trust;

(v) declaring distributions to the Unitholders in accordance with the InvIT Regulations, after taking into consideration the inputs from the Finance and Investment Committee;

(vi) ensuring that the disclosures or reporting to the Unitholders of the Trust, SEBI and Trustee are in accordance with the InvIT Regulations and guidelines or circulars issued under the applicable law;

(vii) coordinating with the Trustee, as may be necessary, with respect to operations of the Trust;

(viii) convening meetings of the Unitholders and maintaining records pertaining to the meetings in accordance with the InvIT Regulations;

(ix) making applications, where necessary, to such authorities or entities as may be required and accept on behalf of the Company such conditions and modifications as may be prescribed or imposed by any of them while granting such approvals, consents, permissions and sanctions as may be required in relation to the Issue;

(x) deciding on the timing, pricing and all the terms and conditions in relation to the Issue, including the pricing, allotment, etc. and to accept any amendments, modifications, variations or alterations thereto, after taking into consideration the inputs from the Finance and Investment Committee;

(xi) appointing and entering into arrangements with the trustee, sponsor, lead manager and any other agencies or persons or intermediaries in relation to the Issue and to negotiate and finalise the terms of their appointment, subject to SEBI (InvIT) Regulations and after taking into consideration the inputs from the Finance and Investment Committee;

(xii) negotiating, authorising and settling, and executing where applicable and delivering or arranging the delivery of the draft placement memorandum, placement memorandum and final placement memorandum, the preliminary and final international wraps, the agreements and all other documents, deeds, agreements and instruments and any notices, supplements and corrigenda thereto, as may be required or desirable in relation to the Issue;

(xiii) dealing with all matters up to allotment of Units to the Unitholders as per applicable laws;

(xiv) accepting and utilizing the proceeds of the Issue in the manner provided under the placement memorandum and final placement memorandum and the applicable law, after taking into consideration the inputs from the Finance and Investment Committee;

(xv) opening with the bankers to the Issue such accounts as may be required by the regulations issued by SEBI and to authorise one or more officers of the Investment Manager to execute all documents / deeds as may be necessary in this regard;

(xvi) authorising and approving the incurring of expenditure and payment of fees, commission, remuneration and expenses in connection with the Issue, after taking into consideration the inputs from the Finance and Investment Committee;

(xvii) issuing all documents and authorising one or more officers of the Investment Manager to sign all or any of the aforementioned documents;

(xviii) settling all questions, difficulties or doubts that may arise in regard to the Issue including such issues or allotment and matters incidental thereto as it may deem fit, and to delegate such of its powers as may be deemed necessary to the officials of the Investment Manager; and

(xix) and doing all such acts, deeds, matters and things and execute all such other documents, etc. deemed necessary or desirable for such purpose in relation to any issuance of the units/securities.

Finance and Investment Committee

The Board has constituted the Finance and Investment Committee pursuant to a resolution dated December 27, 2023, for the purpose of formulating the strategic investments plan, to review every investment and divestment decision of the Trust and the Project SPVs, to evaluate, analyse and execute various mergers and acquisitions.

The Finance and Investment Committee shall perform and discharge (under the supervision of the Board) the authority and responsibility so granted to it, in the manner it may deem fit and proper, in the best interest of the Trust, and in accordance with the policies adopted by the Investment Manager from time to time. The key terms of reference of the Finance and Investment Committee are set out below:

(i) to formulate strategic investment decisions and the expenditures to be involved;

(ii) to review every investment and divestment transaction, including the terms of such transaction, with respect to the underlying assets or projects of the Trust and the Project SPVs including any further investment or divestment;

(iii) to review any transactions that are proposed to be entered into by the Trust that have a potential for a conflict-of-interest in the assessment by the members of the Finance and Investment Committee or Board or Sponsor and refer to the relevant committee/ Board for a final resolution thereof;

(iv) to evaluate, review and recommend to the Board and/ or its relevant committees the various mergers and amalgamations or takeover or acquisitions opportunities.

(v) to review periodically the portfolio investments and monitor the assets of the Project SPVs;

(vi) to receive reports from the valuers with respect to valuation of any assets or projects of the Trust;

(vii) to identify insurance agencies and enter into contract to secure the underlying assets and projects from any financial losses; and

(viii) review overall Annual Operating Plan (AOP) and recommend to the board;

(ix) review changes to financial commitments and expenditures as compared to AOP and make appropriate recommendations to the relevant/ board;

(x) review changes in capital structure including equity, OCDs, ICDs, shareholder loans or by whatever name called;

(xi) review, approve, and apprise the board of the terms of borrowing at the InvIT including non-fund based facilities;

(xii) review and approve any changes to Borrowings (fund and non-fund-based, including creation of pledges, guarantees to be given etc.) including final terms and documentation;

(xiii) review and monitor performance under any board-approved Treasury and Funding Policy;

(xiv) approve related party transactions of amounts up to ₹ 20 lakhs in aggregate per annum (provided that the threshold does not exceed the thresholds prescribed under the InvIT Regulations) subject to compliance with provisions of applicable laws;

(xv) review declaration of distributions;

(xvi) review and approve emergency expenditures (either operating or capital) to secure operations and safeguard lives;

(xvii) review all routine & major maintenance contracts (including variations etc.) and approve variations of up to 5% in individual heads if overall opex & capex budgets as per AOP are not breached, else recommend to the Board;

(xviii) approval of workflow and payment tool in relation to signing of Invoices, bills, regulatory/ lender correspondences in ordinary course of business and in line with AOP;

(xix) review matters related to bank / demat Accounts – opening, closing, and managing of bank accounts, and banking authority. Monitor and recommend as appropriate (including any change in signing authority limits);

(xx) review and Approve all legal engagements and tax engagements;

(xxi) review and approve monthly financial and operating performance and intimate the Board (as appropriate) and approve any periodic submission to lenders (for eg. covenant certificates etc.);

(xxii) review of Periodic valuation, ratings, and make recommendations to the board;

(xxiii) review of any form of regulatory communications & sign-off as appropriate; and

(xxiv) to consider any other additional matters, as may be delegated by the Board.

Audit Committee

The Board has constituted the Audit Committee pursuant to a resolution dated December 27, 2023, for the purpose of assisting the Board in fulfilling its fiduciary responsibilities towards the Investment Manager in the best interest of all stakeholders of the Trust and the Project SPVs.

The Audit Committee shall perform and discharge (under the overall supervision of the Board) the authority and responsibility so granted to it, in the manner it may deem fit and proper, in the best interest of the Trust, and in accordance with the policies adopted by the Investment Manager from time to time The Audit Committee is in compliance with the InvIT Regulations and Regulations 18 and 21 of the SEBI Listing Regulations. The key terms of reference of the Audit Committee are set out below:

(i) overseeing the Trust's financial reporting process and disclosure of its financial information to ensure that its financial statements are correct, sufficient and credible;

(ii) giving recommendations to the IM Board regarding appointment, re-appointment and replacement, remuneration and terms of appointment of the statutory auditor of the Trust and the audit fee taking into consideration inputs from the Finance and Investment Committee, and subject to the approval of the unitholders;

(iii) reviewing and monitoring the independence and performance of the statutory auditor of the Trust, and effectiveness of audit process;

(iv) approving payments to statutory auditors of the Trust for any other services rendered by such statutory auditors;

(v) Reviewing, with the management, taking into consideration inputs from the Finance and Investment Committee, the annual financial statements and auditor's report thereon of the Trust, before submission to the IM Board for approval, with particular reference to:

a) matters required to be included in the director's responsibility statement to be included in the board's report in terms of clause C of sub-section (3) of Section 134 of the Companies Act, 2013, if applicable;

b) changes, if any, in accounting policies and practices and reasons for such change;

c) major accounting entries involving estimates based on the exercise of judgment by management;

d) significant adjustments made in the financial statements arising out of audit findings;

e) compliance with listing and other legal requirements relating to financial statements;

f) disclosure of any related party transactions; and

g) qualifications/modified opinions in the draft audit report;

(vi) recommending such related party transactions to the IM Board or the unitholders, as may be required under the SEBI InvIT Regulations;

(vii) reviewing, after taking into consideration the inputs from the Finance and Investment Committee, with the management, all periodic financial statements, including but not limited to quarterly, half-yearly and annual financial statements of the Trust whether standalone or consolidated or in any other form before submission to the IM Board for approval;

(viii) reviewing, with the management, the statement of uses/application of funds raised through an issue of units by the Trust (public issue, rights issue, preferential issue, private placement etc.) and any issue of debt securities and the statement of funds utilised for purposes other than those stated in the offer documents/ notice, and making appropriate recommendations to the IM Board for follow-up action;

(ix) approval or any subsequent modifications of transactions of the Trust with related parties;

(x) consider and comment on rationale, cost-benefits and impact of schemes involving merger, demerger, amalgamation etc., on the listed entity and its shareholders, taking into consideration the inputs from the Finance and Investment Committee;

(xi) scrutinising loans and investments that may be made or availed by the Trust;

(xii) reviewing valuation reports required to be prepared under applicable law, after taking into consideration the inputs from the Finance and Investment Committee, periodically, and as required, under applicable law;

(xiii) Evaluating internal financial controls and risk management systems of the Trust;

(xiv) reviewing, with the management, the performance of statutory auditors of the Trust, and adequacy of the internal control systems, as necessary;

(xv) discussion with internal auditors, along with members of the Finance and Investment Committee, of any significant findings relating to the Trust and follow up there on;

(xvi) reviewing the adequacy of internal audit function if any of the Trust, including the structure of the internal audit department, staffing and seniority of the official heading the department, reporting structure coverage and frequency of internal audit;

(xvii) reviewing the findings of any internal investigations in relation to the Trust, into matters where there is suspected fraud or irregularity or a failure of internal control systems of a material nature and reporting the matter to the IM Board;

(xviii) reviewing the procedures put in place by the Investment Manager for managing any conflict that may arise between the interests of the unitholders, the parties to the Trust and the interests of the Investment Manager, including related party transactions, the indemnification of expenses or liabilities incurred by the Investment Manager, and the setting of fees or charges payable out of the Trust's assets;

(xix) discussing with statutory auditors and valuers of the Trust prior to commencement of the audit or valuation, respectively, about the nature and scope, as well as post-audit/ valuation discussion;

(xx) Monitoring the end use of funds raised pursuant to an offer of the Units of the Trust in accordance with the SEBI InvIT Regulations;

(xxi) to look into the reasons for substantial defaults in the payment to the depositors, debenture holders and creditors;

(xxii) giving recommendations to the IM Board regarding appointment, re-appointment and replacement, remuneration and terms of appointment of the Valuer of the Trust;

(xxiii) evaluating any defaults or delay in payment of distributions to the unitholders or dividends by the SPVs to the Trust and payments to any creditors of the Trust or the SPVs, and recommending remedial measures, after taking into consideration inputs from the Finance and Investment Committee;

(xxiv) Reviewing management's discussion and analysis of financial condition and results of operations of the Trust along with the members of the Finance and Investment Committee;

(xxv) Reviewing the statement of significant related party transactions, submitted by the management;

(xxvi) valuation of undertakings or assets of the Trust, wherever it is necessary, taking into consideration the inputs from the Finance and Investment Committee;

(xxvii) Granting omnibus approval for related party transactions (which approvals shall be valid for a period not exceeding one year from the date of each such approval, and related party transactions undertaken after the expiry of such period shall require fresh approval of the Audit Committee);

(xxviii) Review, on a quarterly basis, of the details of related party transactions entered into by the Trust pursuant to the omnibus approval; (xxviii). Reviewing the management letters/internal audit reports and letters of internal control weaknesses issued by the statutory auditors or internal auditors; and

(xxix) Reviewing the functioning of the whistle blower mechanism; (xxx). Approval of appointment of chief financial officer/finance head after assessing the qualifications, experience and background, etc. of the candidate after taking into consideration inputs from the Finance and Investment Committee;

(xxx) Reviewing the utilization of loans and/ or advances from/investment by the Trust in the SPVs exceeding ₹10,000 lakhs or 10% of the asset size of the SPV, whichever is lower including existing loans / advances / investments after taking into consideration inputs from the Finance and Investment Committee;

(xxxi) Approving any management information systems or interim financial statements to be submitted by the Trust to any unitholder or regulatory or statutory authority;

(xxxii) (xxxiii). Approving any transaction involving a conflict of interest;

(xxxiii) The appointment, removal and terms of remuneration of the chief internal auditor shall be subject to review by the audit committee

(xxxiv) Reviewing the statement of deviations:

a. quarterly statement of deviation(s) including report of monitoring agency, if applicable, submitted to stock exchange(s) in terms of Regulation 32(1) of the SEBI Listing Regulations, if applicable; and

b. annual statement of funds utilized for purposes other than those stated in the offer document/prospectus/notice in terms of Regulation 32(7) of the SEBI Listing Regulations, if applicable.

(xxxv) Formulating any policy for the Investment Manager as necessary, in relation to its functions, as specified above.

(xxxvi) Performing such other activities as may be delegated by the IM Board and/ or are statutorily prescribed under any law to be attended to by the Audit Committee.

Risk Management Committee

The Board has constituted the Risk Management Committee pursuant to a resolution dated December 27, 2023, for the purpose of assisting the Board in fulfilling its fiduciary responsibilities towards the Investment Manager in the best interest of all unitholders of the Trust and the Project SPV. The Risk Management Committee is in compliance with the applicable provisions of the InvIT Regulations and the SEBI Listing Regulations.

Please see below the terms of reference of the Risk Management Committee to be constituted by Investment Manager:

(i) To formulate a detailed risk management policy which shall include:

a) A framework for identification of internal and external risks specifically faced by the Trust, in particular including financial, operational, sectoral, sustainability (particularly, environmental, social and governance related risks), information, cyber security risks or any other risk as may be determined by the Committee.

b) Measures for risk mitigation including systems and processes for internal control of identified risks.

c) Business continuity plan.

(ii) To ensure that appropriate methodology, processes and systems are in place to monitor and evaluate risks associated with the business of the Trust;

(iii) To monitor and oversee implementation of the risk management policy, including evaluating the adequacy of risk management systems;

(iv) To periodically review the risk management policy, at least once in two years, including by considering the changing industry dynamics evolving complexity;

(v) To keep the IM Board informed about the nature and content of its discussions, recommendations and actions to be taken;

(vi) The appointment, removal and terms of remuneration of the Chief Risk Officer (if any) shall be subject to review by the Risk Management Committee.

(vii) to Coordinate its activities with other committees, in instances where there is any overlap with activities of such committees, as per the framework laid down by the IM Board.

Policies Adopted by the IM Board in Relation to the Trust

The Board will adopt policies for corporate governance as may be required from time to time in accordance with applicable law and the InvIT Regulations. The Board has adopted the following policies under the corporate governance framework of the Trust.

Distribution Policy

The Board has adopted the distribution policy pursuant to a resolution of dated December 27, 2023, in relation to the Trust. For details of the Distribution Policy, see the section titled "*Distributions*" on page 234.

Code of Conduct (the "Code")

The Board has adopted the Code pursuant to a resolution dated December 27, 2023, in relation to the Trust and conduct of the Trust and the Parties to the Trust. Please see below a summary of the Code. Trust and the parties to the Trust shall comply with the Code at all times, in accordance with the InvIT Regulations.

The key principles of the Code are set out below:

(i) the Trust and the Parties to the Trust shall conduct all affairs of the Trust in the interest of all the Unitholders of the Trust;

(ii) the Trust and the Parties to the Trust shall make adequate, accurate, explicit and timely disclosure of relevant material information to all Unitholders, the stock exchanges and the SEBI in accordance with the InvIT Regulations and as may be specified by the stock exchanges from time to time.

(iii) the Trust and the Parties to the Trust shall try to avoid conflicts of interest, as far as possible, in managing the affairs of the Trust and keep the interest of all Unitholders paramount in all matters. In case such events cannot be avoided, it shall be ensured that appropriate disclosures are made to the Unitholders and they are fairly treated;

(iv) the Trust and the Parties to the Trust shall ensure that fees charged by them with respect to activities of the Trust shall be fair and reasonable;

(v) the Investment Manager shall carry out the business of the Trust and invest in accordance with the investment objectives (as disclosed in the offer document/ placement memorandum and take investment decisions solely in the interest of Unitholders;

(vi) the Trust, the Parties to the Trust and any third party appointed by the Investment Manager shall not use any unethical means to sell, market or induce any person to buy units of the Trust and where a third party appointed by the Investment Manager fails to comply with this condition, the Investment Manager shall be held liable for the same;

(vii) the Trust and the Parties to the Trust shall maintain high standards of integrity and fairness in all their dealings and in the conduct of their business;

(viii) the Trust and the Parties to the Trust shall render at all times high standards of service, exercise due diligence, ensure proper care and exercise independent professional judgment; and

(ix) the Trust and the Parties to the Trust shall not make any exaggerated statement, whether oral or written, either about their qualifications or capabilities or experience

Borrowing Policy

The Board has adopted the borrowing policy pursuant to a resolution of dated December 27, 2023, in relation to the Trust. The key terms of the Borrowing Policy include, amongst others:

The Investment Manager shall ensure that all funds borrowed in relation to the Trust are in compliance with the InvIT Regulations. Accordingly, the Investment Manager has formulated the Borrowing Policy to outline the process for borrowing monies in relation to the Trust. The key terms of the Borrowing Policy include, among other things, the following:

(i) The Investment Manager shall ensure that all funds borrowed in relation to the Trust are in compliance with the InvIT Regulations;

(ii) In the event the aggregate consolidated borrowings and deferred payments (net of cash and cash equivalents) of the Trust, holding companies and the SPVs, exceed any thresholds prescribed under the InvIT Regulations in this regard, any further borrowings by the Trust shall be availed in accordance with the requirements prescribed under the InvIT Regulations, including any approval from unitholders under the InvIT Regulations;

(iii) The Trust may raise debt and avail borrowings and deferred payments from time to time, including through (i) issuance of debt securities, in the manner specified by the SEBI, and in accordance with applicable law, and (ii) availing loans (fund and non-fund based both) from banks and financial institutions in accordance with applicable law (including the InvIT Regulations). The Trust shall be permitted to borrow monies through any permitted means, by any instrument, in Indian or foreign currency, as permitted by applicable law, including as prescribed by the Reserve Bank of India;

(iv) The Trust also has the power to create mortgage or secure any of its assets or provide guarantees in order to borrow funds. However, the Investment Manager shall not be allowed to create any obligation which would allow the liabilities to extend beyond the assets held by the Trust; and

(v) Except with prior approval of the Unitholders and obtaining any other approvals required under applicable law (including the InvIT Regulations), any such obligation will not allow the Investment Manager to make the liabilities of the Trust or its unitholders unlimited.

Policy for Determining Materiality of Information ("Materiality of Information Policy")

(i) Any information concerning the Trust is considered material to the business and affairs of a Trust if (i) it results in, or would reasonably be expected to result in a significant change in the market price or value of units of the Trust; or (ii) if there is a substantial likelihood that a reasonable unitholder would consider it important in determining whether to buy, sell or hold, or engage in other transactions concerning the Trust's units; or (iii) the investor would consider important in making an investment decision;

(ii) The Investment Manager and/or the Trustee shall provide to SEBI and to the stock exchanges, where applicable, such information as may be sought by SEBI or by the stock exchanges pertaining to the activity of the Trust;

(iii) The Trust shall also submit such information to the designated stock exchange(s) and Unitholders on a periodical basis as may be required under the listing agreements. Further, the Trust shall disclose all such information as may be specified by SEBI to the designated stock exchange(s), Unitholders and SEBI, in the manner as may be specified by SEBI; and

(iv) The Materiality of Information Policy also provides for the approval process for disclosure or dissemination of any material or unpublished price sensitive information on behalf of the Trust and authorises the compliance officer and other authorised persons to make the disclosures, as may be required.

Policy on Unpublished Price Sensitive Information and Dealing in Units by Parties to the Trust ("UPSI Policy")

The Investment Manager has adopted the UPSI Policy pursuant to a resolution of its board of directors on December 27, 2023. The purpose of the policy is, *inter alia*, to ensure that the Trust complies with applicable law, including the InvIT Regulations or such other 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:

(i) 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;

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

(iii) 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 Materiality of Information Policy;

(iv) The Compliance Officer shall also make an appropriate and fair response to the queries on news reports and requests for verification of market rumours by regulatory authorities, in accordance with the procedure specified in the Materiality of Information Policy. Further, no employee or representative of the Investment Manager who is in receipt of any inquiries relating to the Trust, including from any investors, shall respond to such inquiries. Such employee or representative of the Investment Manager shall refer the inquirer to the Compliance Officer or an any person authorised by the Board to deal with inquiries;

(v) While dealing with analysts or research persons or large investors like institutions, the Investment Manager shall provide only public information. Alternatively, the information given to analysts or research persons shall be simultaneously made public at the earliest; and

(vi) 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.

Other Policies

In addition to the above mentioned policies as required under the InvIT Regulations, the Board has also adopted, among others, code of conduct for board of directors and senior management personnel of the Investment Manager, nomination and remuneration policy, policy for evaluation of the performance of the board of directors of Investment Manager, policy on appointment of auditor and valuer of the Trust, policy for familiarisation programmes for independent directors of Investment Manager, policy to promote diversity on the board of directors of Investment Manager, risk management policy, policy on succession planning for the board and senior management of Investment Manager, whistle blower and vigil mechanism policy, policy on related party transactions of Trust, document archival policy of Trust, policy on qualification and criteria for appointment of unitholders nominee directors on the board Investment Manager and investor grievance redressal policy for Trust.

Representatives on the board of directors of each Project SPV

The Investment Manager, in consultation with the Trustee, shall appoint the majority of the members of the board of directors of each of the Project SPVs (except in case of WIPL, where the Investment Manager shall appoint representatives on the board of directors in accordance with the InvIT Regulations, read together with the terms and conditions under the WIPL concession agreement), in accordance with the requirements prescribed under the InvIT Regulations.

Appointment of Unitholders Nominee Directors

The Eligible Unitholder(s) is entitled to nominate such number of Unitholder Nominee Director, as may be prescribed by SEBI from time to time. However, if the right to nominate one or more directors on the Board of the Investment Manager is available to any entity (or to an associate of such entity) in the capacity of shareholder of the Investment Manager or lender to the Investment Manager or the Trust (or its holding companies or special purpose vehicles), then such entity in its capacity as Unitholder, shall not be entitled to nominate or participate in the nomination of a Unitholder Nominee Director.

If the unitholding of more than one Unitholder is aggregated for the purpose of qualifying as Eligible Unitholder(s) to exercise the right to nominate a Unitholder Nominee Director, then such Unitholders shall not be eligible to participate in any other group of Eligible Unitholder(s).

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

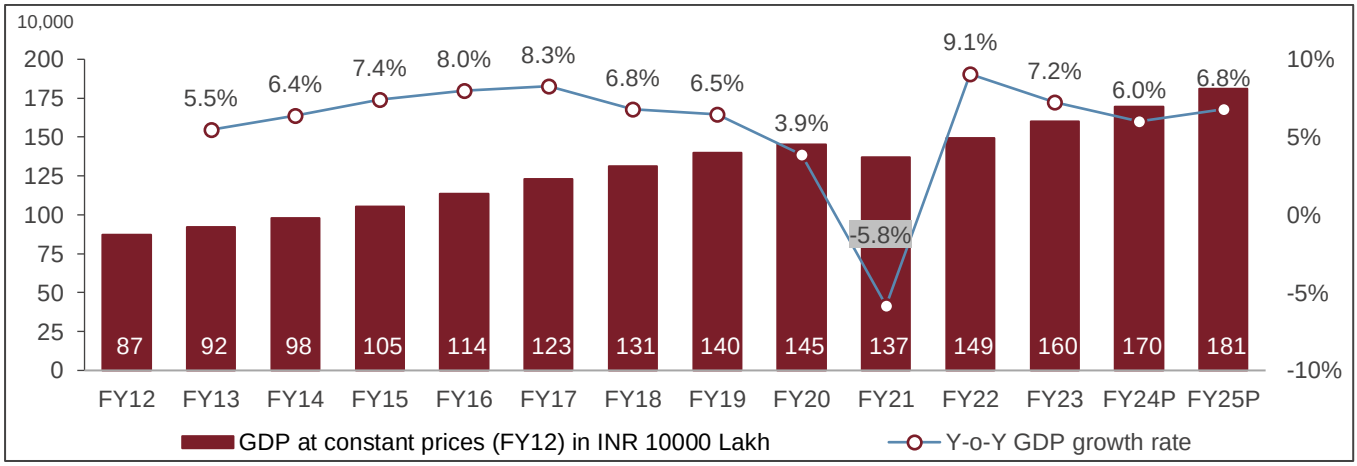
Macroeconomic overview of India

Review of India's GDP growth

GDP logged 5.7% CAGR between fiscals 2012 and 2023

In 2015, the Ministry of Statistics and Programme Implementation (MoSPI) changed the base year for calculating India's gross domestic product (GDP) to fiscal 2012 from fiscal 2005. Based on the change, India's GDP clocked a compound annual growth rate (CAGR) of 5.7% to Rs 1,60,00,00,000 lakh in fiscal 2023 from Rs 87,40,00,000 lakh in fiscal 2012. This was despite the stress inflicted by the pandemic that saw the GDP — which was already experiencing a slowdown and had grown 3.7% in fiscal 2020 — contract 5.7% in real terms in fiscal 2021 to Rs 1,37,00,00,000 lakh. The economy bounced back as the pandemic-related shocks subsided, resulting in growth of 9.1% on-year in real GDP to Rs 1,49,00,00,000 lakh in fiscal 2022.

Real GDP growth in India (new GDP series)



P: Projected
Source: NSO, Second advance estimates of national income 2020-21 and 2022-23, Central Statistics Office (CSO), MoSPI, CRISIL MI&A Consulting

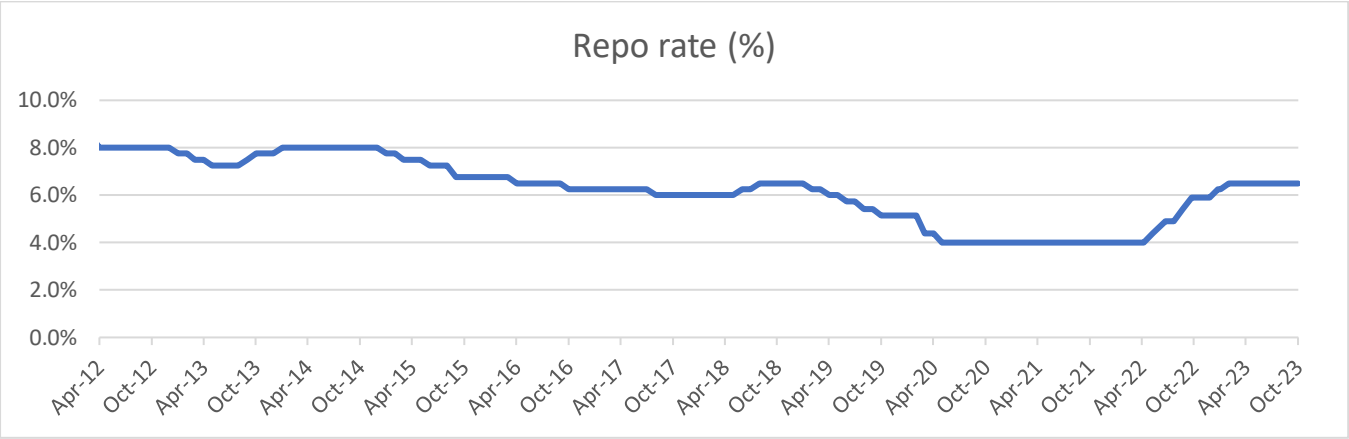
GDP grew 7.2% on-year in fiscal 2023

India's real gross domestic product (GDP) growth rose sharply to 6.1% on-year in the fourth quarter of fiscal 2023 compared with 4.5% in the third • The growth surpassed the number factored in the National Statistics Office's (NSO) second advance estimate of February. Annual growth for fiscal 2023 was revised up to 7.2% (provisional estimate) from 7.0% in the second advance estimate • Fourth-quarter growth was primarily driven by investment and net exports, with the latter less of a drag given rising exports and slowing imports. Fixed investment turned in the strongest growth on the demand side while private consumption growth was more subdued on-quarter.

Review and outlook of repo rate

The Reserve Bank of India's Monetary Policy Committee (MPC) kept the repo rate unchanged for the third consecutive time at its August 2023 meeting even as inflation remained on the higher side. The central bank has raised interest rates by 250 basis points (bps) since May 2022 as inflation surged in fiscal 2023. After cooling in the first few months of the fiscal 2024, Consumer Price Index (CPI) inflation once again rose above the RBI's tolerance band in July and August on the back of volatile food prices. However, the MPC decided to hold the repo rate, "with preparedness to undertake policy responses, should the situation so warrant.

Repo Rate (%)



Source: RBI

Review of roads infrastructure in India

Overview of infrastructure sector in India

Developing and modernising the infrastructure sector has been a priority area for the Government of India and has witnessed increasing public investments and budgetary support. Further, the government has undertaken several reforms and initiatives in the infrastructure sector, which has resulted in robust secular growth in most of the segments within the sector.

The roads sector registered a strong pace of constructions by NHAI, growing 6,003 km (16.4 km per day) in fiscal 2023 from 3,071 km (8.4 km per day) in fiscal 2018. Investments in the roads and highways sector rose from Rs 1,70,00,000 lakh in fiscal 2018 to ~Rs 2,90,00,000 lakh in fiscal 2022, registering ~1.7x growth. Civil aviation has witnessed strong growth as well. India's passenger traffic logged at a CAGR of ~8% from around 1,650 lakh in fiscal 2017 to around 2,090 lakh in fiscal 2020. In fiscal 2023, passenger traffic stood at 1,940 lakh passengers, however, international passenger traffic is still below pre-pandemic levels. In the ports and shipping sector, installed capacity of major ports in India increased to 24,560 lakh tonne in fiscal 2022 from 22,830 lakh tonne in fiscal 2018.

Contribution of roads sector to India's GVA

Share of the roads sector in India's GDP stood at 3.2% in fiscal 2022. The share hovered 3.3% from fiscals 2012 to 2022.

GVA share	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Road transport (at constant prices)	3.2%	3.3%	3.3%	3.3%	3.3%	3.2%	3.3%	3.3%	3.3%	2.5%	3.2%

Source: MoSPI, National Accounts Statistics 2023, CRISIL MI&A Consulting

Road network in India

India has the second-largest road network in the world, spanning 63.31 lakh km as of fiscal 2023. Road transportation, the most frequently used mode of transportation in India, accounted for ~86% of passenger traffic and close to ~64% of freight traffic as of fiscal 2022. Although national highways span nearly 1,44,955 km, constituting just 2% of road length, they accounted for about 40% of total road traffic in fiscal 2022. Secondary road system comprises state roads and major district roads, which accounted for the remaining 60% of traffic and 98% of road length.

Road network in India in FY23

Road network	Length ('000 km)	Percentage of total length	Percentage of total traffic	Connectivity to
National highways	145.0	~2%	40%	Union capital, state capitals, major ports, foreign highways
State highways	167.1	~3%	60%	Major centres within the states, national highways
Other roads	6,019.8	~95%		Major and other dis—rict roads, rural roads - production centres, markets, highways, railway stations

Source: MoRTH Annual Report 2021-22 & 2022-23, CRISIL MI&A Consulting

Total length and break-up of national, state and rural roads

Break-up of road length across different regions (in km)

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23
National highways	97,991	1,01,011	1,14,158	1,26,350	1,32,500	1,32,995	1,36,440	1,40,995	1,44,955
State highways	1,67,109	1,76,166	1,75,036	1,86,908	1,86,528	1,94,900	1,76,818	1,71,039	1,67,079
Other roads	52,07,044	53,26,116	56,08,477	59,02,539	60,67,269	61,65,660	59,02,539	60,59,813	60,19,757

Total	54,72,144	56,03,293	58,97,671	62,15,797	63,86,297	64,93,555	62,15,797	63,71,847	63,31,791

Source: MoRTH Annual Report 2021-22 & 2022-23, CRISIL MI&A Consulting

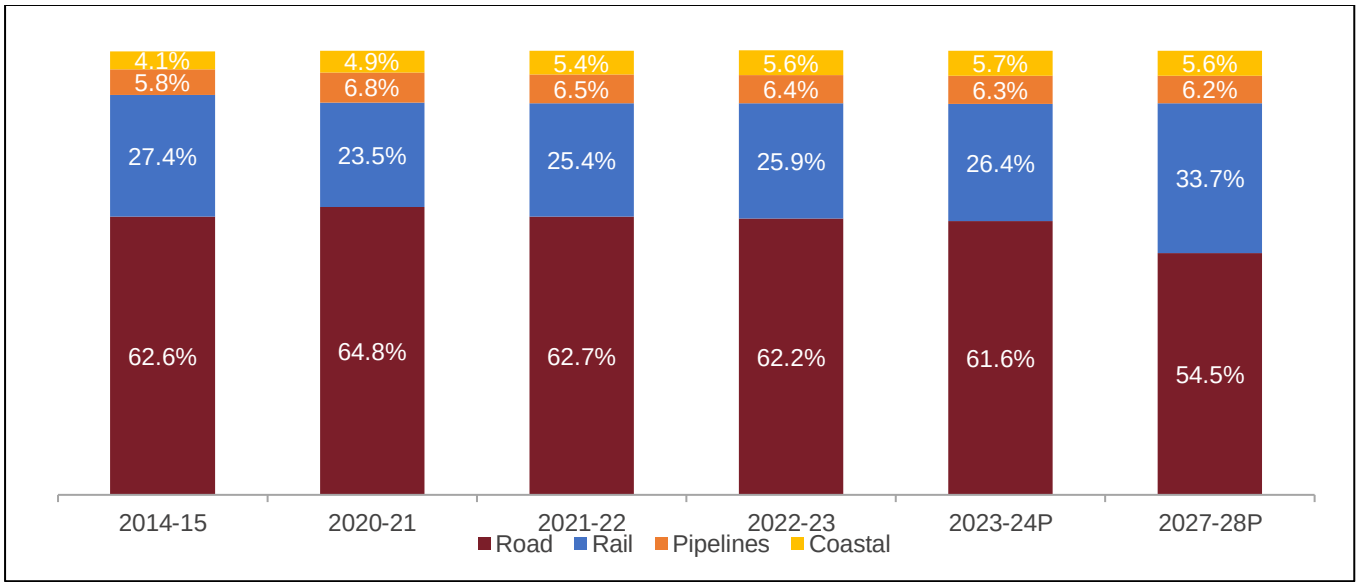
Indian freight traffic scenario

Roads to continue to hold a dominant share in overall freight movement

Road freight traffic is expected to increase at a compounded annual growth rate (CAGR) of 3-5% in BTKM terms between fiscals 2023 and 2028. In the same period, railways is expected to grow at a CAGR of 12-14%, growing faster than roads. Railways gained share in FY21 as rail freight traffic has been more resilient amid COVID-19 outbreak. Rail share further increased in FY22 due to increased rail capacity, partial commissioning of DFC, soaring diesel prices and higher road freight rates. Commissioning of the dedicated freight corridor to aid in increase in rail share. Impact is expected to be witnessed from fiscal 2024 onwards and would help rail to claw back share it had earlier lost owing to capacity constraints.

In fiscal year 2024, road freight movement is projected to experience a growth rate of 5-7%, slightly lower than that of rail freight movement. In fiscal year 2023, road BTKM is estimated to have grown by approximately 7%, mainly attributed to increased production across all sectors and government spending focused on investments. However, it is expected that road transport will lose market share to railways in the upcoming years due to the establishment of dedicated rail freight corridors and comparatively higher road freight rates relative to other modes of transportation.

Share of roads in total freight movement (in terms of BTKM)



E: Estimated; P: Projected (Source: CRISIL MI&A Consulting)

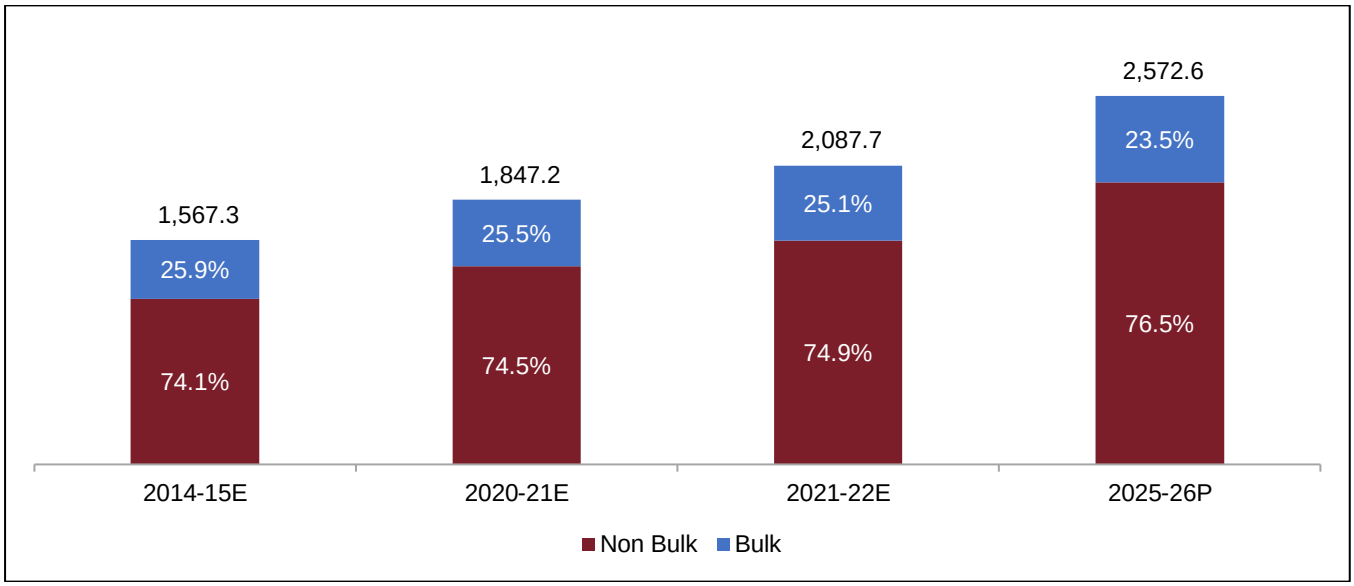
Roads remain the preferred mode for non-bulk transportation

Roads generally account for a significant share in non-bulk commodity transportation, as:

- Rail does not cater to piecemeal freight transportation. Entire rakes are provided for transportation, and not just single wagons (although Indian Railways is looking into multi-point loading, it would still not attract small-sized cargo).
- Road transport has better service quality and is more reliable.
- Road transporters operate on a much smaller scale. Also, given the large number of road transport operators, customers have better bargaining power. These transporters also add a personal touch to their service, which is important, as these commodities are typically expensive and fragile.
- Roads provide end-to-end connectivity and safer handling, which is an important factor while transporting low-volume, but high-value commodities.

Consequently, CRISIL expects the share of non-bulk commodities in the total road primary BTKM to increase to 76.5% by fiscal 2026 from 74.9% in fiscal 2022.

Roads predominantly transfer non-bulk freight (in terms of BTKM)



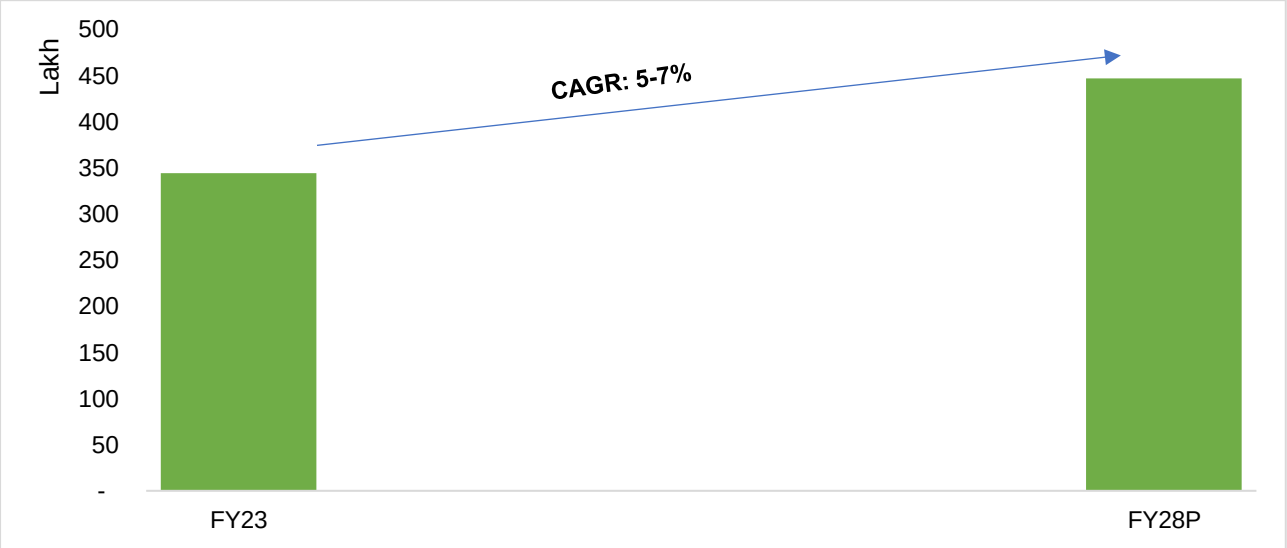
E: Estimated; P: Projected
Source: CRISIL MI&A Consulting

Vehicle population's historic growth

Market for PVs underpenetrated, offers sizeable potential in the long run

India's car market is extremely underpenetrated compared with most developed economies and some developing nations. As of fiscal 2021, India had ~24 passenger vehicles per 1,000 people. This number is expected to increase to 27 by fiscal 2026, which is significantly lower than that of developed nations and even Brazil, Russia, and China (all three, along with India, being part of the BRICS block) based on per capita GDP. Thus, India offers tremendous growth potential for automobile manufacturers. Even while comparing the penetration of cars and UVs across countries based on per capita GDP, India lags most others. We expect this gap to reduce gradually in the long run.

Outlook on passenger vehicles population



E: Estimated; P: Projected
Source: CRISIL MI&A Consulting

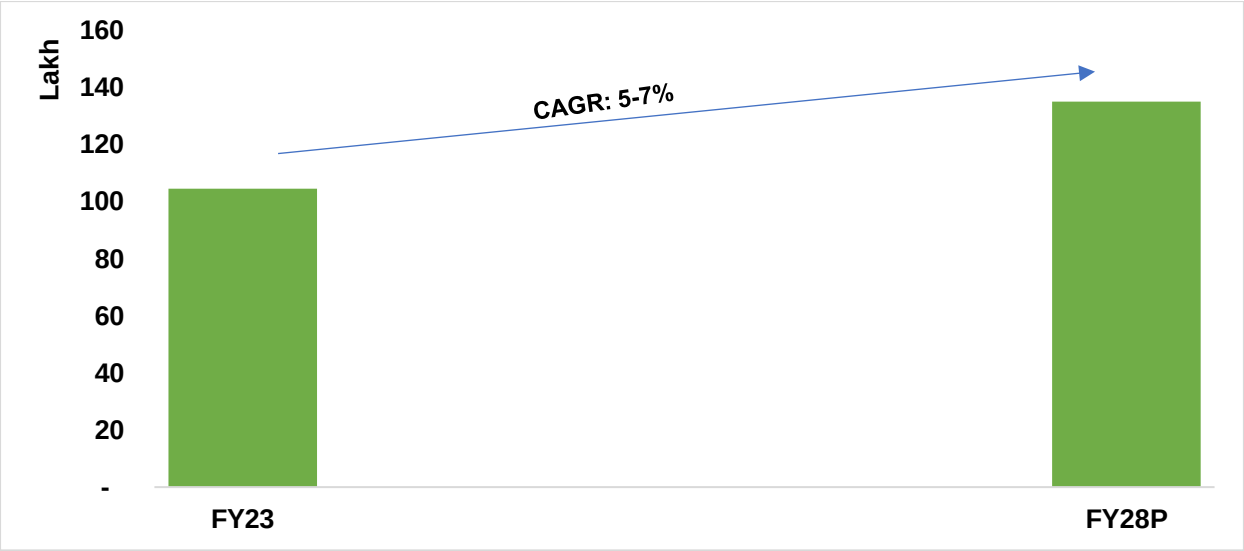
Efficiency gains, lower utilisation, and recovery in manufacturing to impact CV population growth in next five years

Manufacturing and construction sectors are the prime factors driving CV demand. Both sectors are expected to perform positively with revival in the overall macroeconomic scenario. The transportation industry enjoyed an increase in available capacity due to axle load norms published in 2018, but this acted as a negative for the CV industry as sales declined due to increased capacity and lower utilisation. Also, post implementation of GST, check posts across state borders have been removed, which has resulted in increase in efficiency of existing fleet on the road.

Improvement in road infrastructure is expected to increase the average speed of trucks, leading to efficiency gain of ~10%. Hence, fewer trucks will be required to move the same quantity of goods, lowering truck demand. On the other hand, increased running of trucks will help improve the competitiveness of the road transportation industry, helping attract more freight.

Considering the above-mentioned factors and their future impact CRISIL MI&A Consulting expects CV population to log 5-7% CAGR over the next five fiscals. The commercial traffic growth is expected to grow at a faster pace than the CV population due to a higher number of trip possible per vehicle owing to increased efficiency.

Outlook on freight vehicles population growth



E: Estimated; P: Projected (Source: CRISIL MI&A Consulting)

Key growth drivers and emerging trends for road sector

Policy push aimed at improving private participation in national highways

The following are the recent policy changes that the MoRTH and NHAI have undertaken to improve private participation in the sector and increase competition:

- Technical and financial bidder eligibility criteria reduced for HAM and EPC projects, which would promote the entry of smaller players.
- Changes in the hybrid-annuity model (HAM) concession agreement aimed at protecting developers' returns and easing their cash flows during the construction period.
- Changes in the Build-Operate-Toll (BOT) concession agreement to reinstate developer interest in the model.

Apart from this, the government has taken various steps under the Atmanirbhar package to mitigate the impact of Covid-19 on the sector:

- Extension of time (EOT) of up to 3-6 months for all projects and relaxation of milestone achievement.
- Monthly payment mechanism, instead of milestone-based payments.
- Reduction in performance security from 5% to 3%, release of retention money to the extent of work done.
- Additionally, Covid-19 emergency loan facilities and moratorium on loan repayment up to August 2020.
- Extension of concession period for BOT-toll operators, due to toll suspension and restriction in movement during lockdowns.

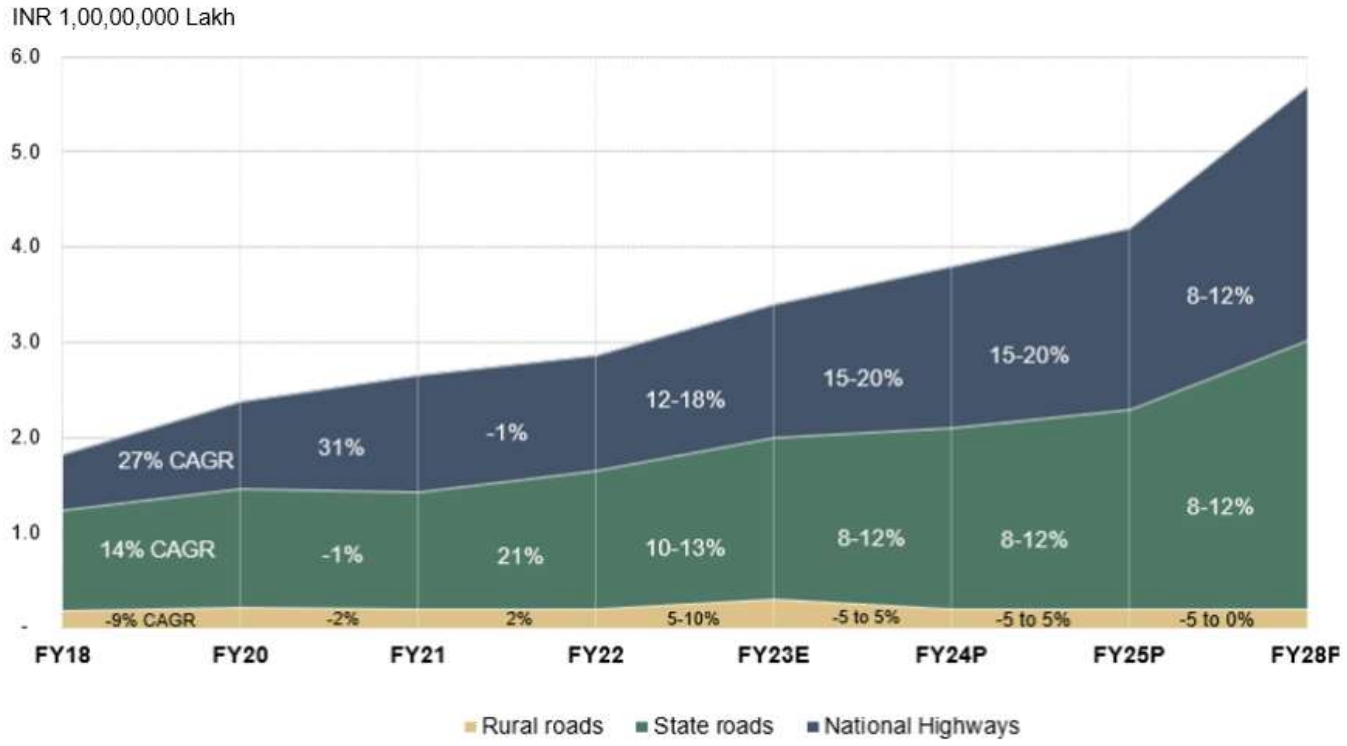
Strong government thrust likely to deliver steady growth in fiscal 2024

Overall road sector capex, comprising of National Highways, State Highways & rural roads is estimated to have grown at a CAGR of 14% between fiscals 2018 & 2023. This growth, driven by Bharatmala and increased state spends on roads has been achieved despite brief hiccups such as the pandemic and hampered construction due to elongated monsoons. The outlook of the sector also remains firm supported by higher awarding of previous fiscals, Bharatmala, NIP pipeline of DPR ready projects and steady state capex.

The NH segment contributes around 40-45% of the overall capex. While the execution remained flattish in fiscal 2023 vis-à-vis fiscal 2022, capex grew by 12-18% due to a rise in construction of high value projects and high commodity prices. In fiscal 2024, we expect the national highway capex to grow by 15-20% driven primarily by increased execution.

On the low base of fiscal 2021, the state spends grew by 21% in fiscal 2022 and are estimated to have grown further by 10-13% in fiscal 2023 largely in line with the growth in budgetary outlay. In fiscal 2024, state spends are expected to go up further by 8-12% as their percentage achievement of budgetary allocations are expected to be largely in line with historical average.

Momentum to continue, supported by Bharatmala and NIP pipeline



Note: Capex excludes the land-acquisition costs
Source: NHAI, MoRTH, State budget documents, PMGSY, CRISIL MI&A Research

Key challenges faced by roads sector in India

Issues and challenges for roads sector

Given the share of roads in the overall transport of goods and passenger traffic, it is critical to develop the roads sector. Although the government has been continuously making efforts to give a fillip to the sector, several issues and challenges hamper the pace of development.

NHAI trying to reduce risks associated with BOT projects through changes in MCA

In order to improve private participation via the BOT-toll mode, NHAI and the ministry introduced changes to the BOT MCA, aimed at addressing key issues such as land acquisition, revenue assessment in case of traffic shortfall and stuck projects. Key amendments to the MCA are as below:

Land acquisition

- Minimum 90% right of way before issue of appointed date as against 80% earlier, providing more comfort to lenders and developers.
- Balance 10% to be granted within 180 days of appointed date, else it would be removed from the scope of work. Automatic de-scoping clause would enable the developer to receive PCOD/COD on the completed stretch and start tolling.
- Termination clause if appointed date is not received within one year of concession signing date.

Traffic risk

- Revenue assessment of project to be done every five years instead of 10 years (or once in a life time of a project) earlier. In case of traffic either exceeding or seeing a shortfall from the target traffic, the concession period would be adjusted accordingly, providing more comfort to lenders and developers.

Stuck projects

- In case the project has not achieved COD one year post its scheduled completion date, the project will be mutually foreclosed, and the authority will pay the concessionaire an amount equal or lower of:

- 90% of the debt due less insurance cover and
- Value of work done

This will prevent dragging of projects that would lead to time and cost overruns, which was witnessed in the earlier BOT era.

Subdued private participation due to limited financial flexibility witnessing strong revival

Funding constraints and financial stress have thwarted the pace of development in the roads sector. The PPP model for road construction and development acted as a catalyst and provided an impetus to the sector's growth. During fiscals 2008-2012, of the total 10,600 km of national highways completed under the National Highways Development Programme, 50% was funded through the BOT-toll model and 10% through the BOT-annuity model. Rise of PPP in the roads sector has also had some adverse effects. Period of 2007 to 2011 was considered to be the golden age for PPP in the roads sector, wherein the road developers bid aggressively to bag more BOT-toll project.

In the subsequent years, developers faced viability issues with projects. Issues pertaining to subdued financing, lower traffic, high gearing ratio and delayed execution have stressed their balance sheets. Bidders for PPP toll projects have become limited on account of the said issues. This led to a rise in EPC contracts, but the quality of roads constructed has been usually poor as the EPC contractor has no stake in the roads once these are constructed and handed over to the government. Further, maintenance of roads has been poor after handover to the government, since there is no proper accountability on quality in case of state-owned roads. In case of PPP projects, the developer ensures that the roads are in a good condition for a longer period of time, i.e., the concession period. In the recent years, private participation has revived with the introduction of the HAM model in 2016 and the subsequent favourable changes to the concession agreements in 2020 for the HAM and BOT model.

Delays in project execution and resultant cost overruns

Delays in project execution have posed a major hurdle in the development of the roads sector. Delays lead to significant cost overruns, which lower returns for developers as well as adversely affect their debt-servicing ability. Reasons for delays are numerous and include:

- Issues in land acquisition
- Environmental clearances
- Forest clearances
- Railway clearances
- Shifting of utilities, religious structures and encroachments

It is observed that the duration of delay and cost escalation are on the higher side for projects involving interstate road construction owing to the involvement of different state agencies. NHAI is working towards fast-tracking the resolution of these issues and has established conciliation committees, which target at settling arbitration disputes within 18-20—months (Arbitration Act - amendment in 2019). As per the April 2022 press release, 251 cases have been referred to CCIE and claims worth Rs 38,74,000 lakh have been settled for an amount of Rs 13,06,000 lakh.

Hurdles in bank funding for road projects

Banks are reluctant to fund road sector projects as they are close to the sector exposure limits. Moreover, to ensure delays because of land acquisition do not hinder the progress of a project, they demand 80-100% of the land to be available with the developer at the time the project is awarded. Given the dependence of infrastructure projects on banks for funding, the projects are unable to take off owing to such funding constraints.

Moreover, the stretched working capital cycle in the core construction business of many entities has also strained their liquidity position and increased their dependence on borrowed funds. The operating margins of several road contractors came under pressure because of rising commodity prices (in case of fixed-price contracts) and idling of capacities since execution could not begin on many new projects.

Reluctance to pay toll

Indians have not yet completely accepted the importance of toll for road construction and improvement of service delivery. Also, appeasement of people through provision of subsidies has been a major tool for reaping political gains in the country. There have been several instances of people, backed by political groups, opposing toll plazas. Such instances have not only affected the sentiment of road developers, but also service delivery within the sector.

Policy framework for road sector

Recent policy reforms provide a significant push to the sector

Key policy measures to boost private participation

To encourage and facilitate private sector investment and participation in the roads sector, the central government, via its respective authorities, has undertaken certain policy measures and provided certain fiscal incentives within the sector. The most significant policy reforms in recent times are discussed below.

Amendments to the EPC model concession agreement (MCA)

The key changes are as follows:

- Right of way: Deadline reduced from 240 days to 180 days for approval/ clearances for areas under forest or sanctuary.
- If the appointed date is not received within 90 days of signing the agreement, the contract may be terminated, the authority will pay contractor damages = 1% of the contract price to the contractor for each day of delay.
- If the project is not completed within 90 days of the scheduled completion date, the contractor would be ineligible to bid for future projects till it is completed.
- Lower compensation and longer tenure for the contractor's maintenance obligations. Defect liability period increased from four years to 10 years.
- Higher interest on mobilisation advances paid to the authority; earlier recovery of mobilisation advance by the authority; release of retention money against bank guarantees discontinued.

Impact

- The authority's obligations increased to enable quicker land acquisition.
- Developer's working capital needs increased, also responsible for timely project completion

Introduction of the hybrid annuity model (HAM) in 2016

The broad outline of the new model of operation is as follows:

- Of the total project cost, 40% is to be funded by the government, and the remaining by the developer.
- The project cost will be linked to inflation.
- Construction support is to be disbursed in five equal instalments of 8% each, and the timing of each such payment will be linked to the percentage of project cost spent by the concessionaire.
- Traffic risk will be borne by the government, with developers receiving fixed annuities.
- Annuities will be linked to bank rate plus 3%.
- 80% of land to be provided prior to the appointed date.

Impact of the model

- With land being acquired and other clearances already in place before the appointed date, construction risk is expected to be lower.
- Lenders will be assured a steady stream of inflows as traffic risk will be borne entirely by the government.
- Low risk and lower capital requirements are expected to attract private players, as well as bankers, towards these projects and gradually help increase private participation in the sector.

Impact

The amendment to allow premium payment to begin only in the fourth year of completion will provide developers and lenders a great deal of comfort as interest payments are high in the first three years of operations. The deemed termination of projects will ensure that troubled projects are terminated without delay, thereby avoiding problems that previously existed with prolonged project delays. The amendments, with regard to toll fees and the maintenance of national highways, will provide better protection to highway users.

Exit policy

On August 26, 2015, the Cabinet Committee on Economic Affairs (CCEA) amended its earlier approval dated May 13, 2015, to allow 100% equity divestment after two years of completion for all BOT projects, irrespective of the year of award. The earlier policy allowed such divestments only for projects awarded prior to September 30, 2009. While the earlier policy allowed the funds obtained through such divestments to be used only for the completion of the concessionaire/promoter's other pending BOT road projects, the new policy allows the proceeds to be used to complete any highway project, any power sector project, or also to retire debt in any other infrastructure project. The exit policy has been changed to six months for HAM projects during construction period and remains as two years for BOT projects as per the latest MCA changes in 2020.

Impact

This move will help close stake sale transactions announced in the last one year and help free up developers' capital, which can be used to repay debt or invest in new projects.

NHAI fund infusion

On May 13, 2015, the CCEA permitted the NHAI to infuse funds in projects stuck in advanced stages of completion. Below are the broad contours of the policy announced:

- Government to look at one-time fund infusion for installed projects where 50% work has already been done.
- The NHAI to have the first charge on toll revenue.

Impact

This policy will improve developers' cash flows through toll collections and also their debt servicing ability. However, as the NHAI will have the first charge on receivables, lenders are hesitant to allow such a fund infusion. Hence, this policy may not have a significant impact in the near future.

Premium rescheduling

In March 2014, premium rescheduling was announced for projects with delays or lower-than-expected traffic. This helped players manage cash flow mismatches, especially at a time when loan tenures were significantly lower than the project life, resulting in cash flow issues. It also helped specifically in the case of aggressively bid projects where premium payments amounted to a very large portion of the total cost. Decision allowing rescheduling of premium payments, i.e. monthly payments due, to be made by developers to NHAI with an escalation of 5% per annum over the concession period.

Substitution

In January 2014, the CCEA approved the proposal to facilitate the substitution of concessioners in ongoing and completed national highway projects. As per the proposal, existing concessioners are permitted to divest their equity in totality in on-going or completed projects. However, subsequent to the substitution, the leading substituting entity will be required to maintain at least 51% equity holding in the project SPV. The decision to permit substitution will be taken by lenders in consent with the NHAI.

De-linking of forest and environmental clearances

In March 2013, the Supreme Court approved the de-linking of forest and environmental clearances. This de-linking is valid only for road widening projects. In a notification in 2011, the Ministry of Environment and Forests had asked for forest clearances before seeking environmental approval. This led to many road projects being stalled in the first stage itself. This judgement in 2013 allows companies to start road widening work with just environmental clearances, without having to wait for forest clearances. However, forest clearances will be necessary for stretches that fall in forested areas.

Relaxation on green nod norms for road widening projects up to 100 km

In June 2013, the environment ministry cleared a proposal allowing for the expansion of highways up to 100 km without environmental clearances. Earlier, approval from the environment ministry was not required for road expansion up to 30 km. The relaxation will also be applicable on existing highways, which require additional 40 m of land for widening. This limit was earlier 20 m.

Payment of 75% of arbitration claims

In August 2016, the ministry introduced a policy with regard to the payment of 75% of arbitration claims to the concessionaires. According to the policy, if an arbitration claim has been awarded in favour of a private concessionaire in a lower court/tribunal and the government agency has appealed against it in a higher court/tribunal, then the private player can receive 75% of the claimed amount. It will have to provide the authorities a bank guarantee of an equivalent amount to the government agency.

Impact

This policy will help private players facing financial problems and having substantial claims pending with the NHAI. It is expected to help kick-start stalled projects on account of fund infusion by developer and provide some relief to lenders because of loan repayment.

Overview of PPP framework and models in operations

PPP is an arrangement between a government/statutory entity/government-owned entity and a private sector entity for the provision of public assets and/or public services through investments made and/or management undertaken by the private sector entity for a specified period of time. In this arrangement, allocation of risk between the private sector and the public entity is defined well. The private entity receives performance-linked payments that conform with (or are benchmarked to) specified and pre-determined performance standards, measurable by the public entity or its representative.

For broad-based and sustainable growth, the government recognises the need to engage with the private sector through a PPP framework to achieve the following objectives:

- Harness private sector efficiencies in asset creation, maintenance and service delivery.
- Focus on a life-cycle approach for project development, involving asset creation and maintenance over its life cycle.
- Create opportunities to bring in innovation and technological improvements.
- Enable affordable and improved services to users in a responsible and sustainable manner.

While the preferred form of the PPP model is one in which ownership of the underlying asset remains with the private entity during the contract period, and the project is subsequently transferred back to the public entity on contract termination, the final decision on the form of PPP is taken using the value-for-money analysis.

The types of construction contracts based on price risk are as follows:

Fixed-price contracts: These contracts state the fixed fee or payment (per unit output or whole project) the contractor receives on completion of a contract. The contractor bears the risk of a rise in cost during the construction period. Certain pass-through of higher cost may be allowed in some projects.

Cost-plus contracts: These are contracts in which the contractor is entitled to receive a fixed surplus over the project cost borne. The surplus given to the contractor can be in the form of a fixed percentage over cost or a pre-decided fee over cost. Therefore, any increase in cost of the project, during the construction phase, is passed on to the client.

The types of contracts based on scope of execution are as follows:

Item rate contract

These are fixed-price contracts, where the concerned authority provides the detailed design and the estimated quantity of materials. A project is divided into several sub-activities, for which the item-wise quantity of input material to be used is specified in a document called bill of quantities. Bids are invited for the price of each construction activity based on the items specified. As the aggregate of bid amounts form the total project cost, the lowest bidder wins the project. The bill of quantity document may state the quantity of items such as cement, girders, electric boards, wires, etc, to be used, against which the bids are invited.

Lump-sum turnkey (LSTK) contract

LSTK is a fixed-price contract in which the contractor fixes a lump-sum fee based on the specific project requirements. The client states the project specifications with respect to designs, drawings, technical stipulations, quality of raw material, etc., based on which the contractor provides bids, stating a lump-sum fee for execution.

Design and build contract

In this type of a contract, the authority does a conceptual study of the project to be awarded and specifies the technical output details based on which the specifications of the project are decided. The developer has to undertake the detail designing and execution of these projects. EPC and BOT are design and build models.

A few operational models:

i. BOT-toll/-annuity/-hybrid annuity model (HAM)

ii. EPC

iii. Toll collection

iv. Operate, maintain and transfer (OMT)

v. Toll, operate and transfer (TOT)

Types of PPP models

Type of project	Description	Development risk	Financing risk	Traffic risk and accrual of toll fee collection	Net cash outflow for the government	Revenue for private party	Concession period	Award criteria
BOT-toll	Private party builds the road, undertakes O&M and collects toll	Concessionaire	Concessionaire	Concessionaire	Yes (in the form of grant/equity support)	Toll	20-30 years for the NHAI** and other authorities	Highest revenue sharing bid/highest premium/ lowest equity support
BOT-annuity	Private party builds the road, undertakes O&M* and collects annuity from the granting authority	Concessionaire	Concessionaire	Authority	Yes, net payment to be made is the difference between the toll collection and the annuity payable	Annuity payment	15-20 years for the NHAI and other authorities	Lowest annuity
BOT-HAM	Private party builds the road, undertakes O&M. Gets 40% of payment during construction and 60% as annuity along with interest	Concessionaire	Concessionaire	Authority	40% during construction and 60% as semi-annual annuity along with interest, net of toll collected	Construction grant plus annuity payments, interest on annuities, inflation-indexed O&M payments	Around 15 years of operations plus additional construction period	Lowest project cost plus O&M cost
EPC	Private party builds the road, based on the cost incurred by the government	Concessionaire	Authority	Authority	Yes	Contract amount	Not required	Lowest contract price requested
OMT	Private party collects toll, and undertakes O&M and major maintenance	No development risk except minimal risk in case of paved shoulders	Concessionaire	Concessionaire	No	Toll	Up to nine years for NHAI projects	Highest % of toll revenue share or highest premium per year
Tolling	Private party pays the estimated toll upfront to the authority and collects it during the concession period	No development by tolling contractor	Concessionaire	Concessionaire	No	Toll	One year for NHAI projects	Highest revenue-sharing bid

Type of project	Description	Development risk	Financing risk	Traffic risk and accrual of toll fee collection	Net cash outflow for the government	Revenue for private party	Concession period	Award criteria
TOT	Private party pays an upfront bid concession fee (summation of NPV of free cash flow based on concessionaire estimates) to the authority, undertakes O&M plus certain capex and collects the toll during concession period	Authority (in case upgradation of lanes is taken up during the concession period)	Concessionaire	Concessionaire	No	Toll	15, 20, 30 years#	Highest upfront payment

Note: Development risk refers to construction risk in developing a road project
* Operations and maintenance
** National Highways Authority of India
\# As per TOT bundles of NHAI in 2021-22
Source: CRISIL MI&A Consulting, NHAI

BOT

BOT contracts are typically PPP agreements wherein a government agency provides a private player the rights to build, operate and maintain a facility on public land for a fixed period, after which the assets are transferred back to the public authority.

Funding for the project is arranged by the concessionaire through a mix of equity and debt from banks and other financial institutions. Under the basic BOT mode, the concessionaire charges a fee to the users of the project/facility, and may either transfer the entire user fee collected to the authority or may retain the entire amount as revenue. BOT contracts are, therefore, classified into the following types:

- **Annuity-based contract:** Under this contract, the concessionaire is responsible for the construction and maintenance of the project during the concession period. Variability in user fee gives rise to revenue risk, which is borne by the authority. However, the concessionaire generates revenue through fixed annuity payments received from the authority over the concession period. Since this annuity payment is a cost to the authority, the contract is awarded to the lowest bidder. Tolls charged under these contracts are generally regulated by a policy or a public agency.

- **Toll-based:** Under this model, too, the concessionaire is responsible for the construction and maintenance of the project, after which the project's ownership is transferred to the public authority. However, the toll collected is retained by the concessionaire and not transferred to the authority. Therefore, the concessionaire bears the revenue risk during the concession period. As in BOT annuity-based projects, toll charged under these contracts is generally regulated by a policy or a public agency.

- **HAM:** This is a mix of EPC and BOT (annuity) models. In this model, the project cost is shared between the authority and the concessionaire in a 40:60 ratio. This model aims to lower the financial burden on the concessionaire during the project implementation phase. Compared with EPC projects, the shift to HAM will also ease cash flow pressure on the NHAI. It will lower project risk for developers because the NHAI will bear the risk of traffic volume and the developer earns through fixed annuity payments. It will also help developers participate in more projects given that equity contribution per project will now be lower. This model will also encourage banks to lend to road projects because of the NHAI's involvement. HAM was approved by the Cabinet Committee on Economic Affairs on January 27, 2016.

EPC

EPC contracts are fixed-price, wherein the client provides conceptual information about the project. Technical parameters, based on the desired output, are specified in the contract. The contractor undertakes the responsibility of designing the project either through an in-house design team or by appointing consultants. Unlike item rate and LSTK contracts, the contractor is allowed to innovate on the project design. Based on these designs, the contractor draws up cost estimates and accordingly bids for the project.

Toll collection

Toll collection, as a separate business model, evolved in 2009. Under this model, the authority invites bids from private players to collect toll on roads constructed under the EPC and BOT-annuity models. It is used for short-duration projects, typically lasting 12 months. The private player with the highest bid is awarded the project. The user fee is pre-determined by the

contracting authority. The right to collect user fees during the concession period lies with the private player. A contract of this category involves negligible to minimal road construction and maintenance.

Along with the NHAI, state authorities, municipal bodies and developers are also outsourcing toll collection to private players to recognise revenue upfront. Toll management companies recover their investments and make profits from toll receipts.

Technology used to help tolling industry

1. ***ETC***

   It is a system that enables road users to pay highway tolls electronically without stopping at the plazas. The applicable toll amount is deducted from a prepaid account that is linked to the FASTag. The dedicated ETC lanes are colour-coded for immediate recognition. This helps avoid fuel wastage, loss resulting from drivers who avoid payment, and booth attendants taking their cut. It also reduces time delays because of toll payment, thus reducing the resistance for toll payments. In November 2019, MoRTH directed the NHAI that all toll lanes on national highways must have ETC. In December, the ministry relaxed the rule temporarily to have 75% of the lanes to have ETC. However, in February 2021, the ministry mandated compulsory use of FASTag and announced penalty of double payment in case the toll was paid in cash.

2. ***Weigh-in-motion (WIM)***

   It is a system integrated with toll operations to ensure users are liable for overloaded vehicles and to provide accurate data for charging users by their vehicle weight and type. WIM's main purpose is to prevent road damage as these get easily damaged when overload vehicles pass over it. The Indian Road Congress has limits - prescribed to each axle - to which each vehicle can be loaded. Hence, WIM is an axle-weight calculator installed on the road near toll plazas, which weighs the vehicles in motion and hastens the weighing process.

3. ***Static weigh bridge (SWB)***

   This, too, is a weighing system integrated with toll operations to ensure users are liable for overloaded vehicles and to provide accurate data for charging users by their vehicle weight and type. It differs from WIM as it is used to weigh static vehicles.

4. ***Automatic vehicle counter-cum-classifier system (AVCC)***

   It is a system that consists of sensor devices installed in a lane to record the physical characteristics of vehicles to determine their configuration for the purpose of charging the user appropriately.

TOT

The TOT model is a new PPP model by the NHAI to spur private participation in the roads sector. In this model, globally, the concessionaire pays a one-time concession fee upfront (lump sum) in the operations and tolling phase. The TOT concessionaire will then be allowed to operate and toll the project stretch for the concession period. Any improvement in the road asset required may be taken up by the concessionaire as a part of the agreement in the TOT model. However, in the Indian context, these elements may be modified by the NHAI.

The key differences between the tolling and TOT models are:

- In the tolling model, the concession period is typically of a shorter duration (one year for NHAI projects) whereas in the TOT model, the concession period is longer (15-30 years). The NHAI has reduced the concession period to 15-20 years in the recent tenders pertaining to TOT bundle 5 onwards.

- In the TOT model, the concessionaire maintains the project stretch, which is not the case in the tolling model.

Over the past four years, the NHAI has been able to successfully monetise 14,000 km and raise Rs 17,00,000 lakh. However, with the implementation of FASTags, TOT becomes more attractive as its able to eliminate cash handling and plug leakages in the system.

As of June 2023, the NHAI offered 12 bundles under the TOT framework. NHAI has already invited bids for TOT 11 and TOT 12 and the progress in the same remains to be seen. The National Highways Authority of India (NHAI) has scrapped tenth bundle under the toll, operate and transfer (ToT) model after the highest bid of Rs 1,71,100 lakh placed by Sekura Roads Ltd. NHAI has awarded 72-km highway stretch on NH19 in Uttar Pradesh under TOT-9 to The National Investment and Infrastructure Fund (NIIF) on its quoted price of ₹3,14,400 lakh. CDPQ backed Maple Highways announced acquisition of Eastern Peripheral Expressway under TOT Bundle 7 for ₹ 6,26,700 lakh in November 2022. RFPs of TOT 6, 7 and 8 were released in August 2021, and bids were submitted in January 2022. However, TOT 6 and 8 were cancelled in April 2022. The NHAI has so far raised ₹ 27,00,000 lakh through the ToT mode of monetisation.

Key initiatives and overview on HAM

The MoRTH released the standard concession agreement and request for a proposal for the much-awaited HAM for private-public partnerships in the road construction sector in June 2016. HAM is a mix of EPC and BOT-annuity models.

The broad contours of the model of operation are as follows:

- 40% of the total project cost to be funded by the government, and the remaining by the developer.
- The project cost will be linked to inflation.
- Construction support is to be disbursed in five equal instalments of 8% each, and the timing of each such payment will be linked to the percentage of project cost spent by the concessionaire.
- Traffic risk will be borne by the government, with developers receiving fixed annuities.
- Annuities will be linked to bank rate plus 3%.
- 80% of land to be provided prior to the appointed date.

Key changes to HAM MCA, 2020

Key changes include the following:

- Back-ending of premium payment
- Redefinition of project milestones:
  - Interest on annuity payments linked to the average one-year MCLR of the top five scheduled commercial banks +1.25%.
  - 10 milestone payments each, equal to 4% of the bid project cost.
- Lenders receive the first charge on all receivables.
- Deemed termination of projects.
- Maintenance obligations.
- Toll fee notifications.

	Old Clause	Revised Clause	Impact
Annuity Payments	Interest on annuity payment linked to **RBI determined Bank Rate + 3%**	Interest on annuity payment linked to **average of one year MCLR of top 5 Scheduled Commercial Banks + 1.25%**	Differential between cost of borrowing and interest on annuity reduced, thus preventing erosion of developers' returns due to RBI repo rate changes
Milestone Payments	**5** instalments, each equal to **8%** of the Bid Project Cost	**10** instalments, each equal to **4%** of the Bid Project Cost	Quicker payments helping developers' liquidity
Change in ownership	Original sponsor/ concessionaire shall hold at least 26% of equity during construction period and **2 years thereafter**	Original sponsor/ concessionaire shall hold at least 26% of equity during construction period and **6 months thereafter**	Quicker stake sell-off would ease up developers' balance sheets to bid for new projects
Financial Closure	No clarity on amount on FC	FC to be undertaken for an amount no lower than either: 1. **Total Project Cost (60% of BPC); or** 2. **10% less than (Estimated Project Cost minus 40% of Bid Project Cost)**	Would likely prevent termination of projects due to inadequate financing

Impact

HAM will improve private participation, project awards

The elimination of traffic risk will provide stable cash flows to developers and ensure timely debt servicing for bankers.

The HAM shifts the traffic risk to the NHAI from the concessionaires, with developers being provided fixed annuities based on predetermined schedules. Debt servicing, which is generally challenging during the initial years of the concession period for BOT-toll projects, is set to become easier with the receipt of fixed annuity payments.

The elimination of traffic risk is also a positive, given the bitter experience of road developers, where actual base traffic and traffic growth are significantly lower than estimated. Typically, a two-percentage point decline in traffic growth leads to a 150 bps decline in project IRRs.

Linking construction and maintenance costs to inflation and ensuring the timely availability of land will mitigate cost overrun risks.

In the past, cost overruns severely impacted project returns. An analysis of projects completed between fiscals 2009 and 2014 shows a dramatic 45% cost overrun for a sample of 51 projects, aggregating to 3,350 km. The aggregate cost overrun works out to Rs 10,00,000 lakh for these projects.

Typically, a one-year reduction in the concession period owing to project completion delays can reduce project returns by 120-150 basis points (bps). Further, a 10% increase in cost can lower project returns by 100 bps.

Hence, to address the issue of cost overruns, the government has linked construction, and operation and maintenance costs to inflation. Issues related to delays in land acquisition, which have been the industry's Achilles' heel, have also been addressed, with projects being awarded only after 80% of the land required is in possession of the awarding agency.

In the past, there were significant discrepancies between project costs quoted by the NHAI and project loans taken by developers, due to the factoring in of cost overruns by developers into their own cost estimates. This posed a challenge to bankers in the case of project termination, as compensation was provided by the NHAI only on its approved cost. With project costs being dynamically linked to inflation, bankers' risk has been reduced significantly.

- ***Lower equity contribution requirement to increase private players' ability to bid for projects***

  With the government incurring 40% of the project cost, the HAM calls for lower equity contribution from developers (15%, compared with 25% for BOT-toll projects). This is extremely beneficial, given the current weak financial position of road developers. Further, with the NHAI's equity stake in the project, banker comfort in lending to the project increases significantly.

- ***Developers' interest rate risk to reduce significantly***

  The HAM provides for bi-annual interest rate payments to concessionaires on the reducing balance of project completion cost, at interest rate payments linked to the average one-year MCLR of the top five scheduled commercial banks +1.25%. This significantly lowers the risk for the developer, in terms of interest rate volatility.

- ***Low-risk model to provide moderate returns***

  We expect low risk and lower capital requirements to attract private players. Hence, we believe developers would target returns of 11-13%, given the lower risk and assuming moderate competition. Lower competition is mainly on account of the stretched financials of many developers.

- ***Boost private investments in national highways over the next five years***

  Because of delays in land acquisition and caution shown by lenders in the initial phases for lending to HAM projects, total awarding declined in fiscal 2019 to 2,222 km, compared with 7,397 km in fiscal 2018. Of the total awarding in fiscals 2018 and 2019, 2,884 and 977 km, respectively, were awarded through the HAM. The share of private investment has declined between fiscals 2018 and 2019 from 31% to 24%, respectively, mainly on account of EPC projects. Fiscal 2021 saw increased participation in awarding on account of changes to the HAM bid eligibility and MCA changes. A total of 6,306 km was awarded in fiscal 2022, of which, 3,468 km was under the HAM, compared with a total 4,818 km in fiscal 2021 (2,602 km under the HAM).

Key budgetary proposals for infrastructure sector

Among the sectors, infrastructure continues to be in focus, with a 30% hike in budgetary support. If there is an overarching picture, it is that this budget sets the tone for much-needed infrastructure growth for the next 3-4 years. That will help both sustain development and create jobs. But implementation, which is all-crucial, remains the elephant in the room.

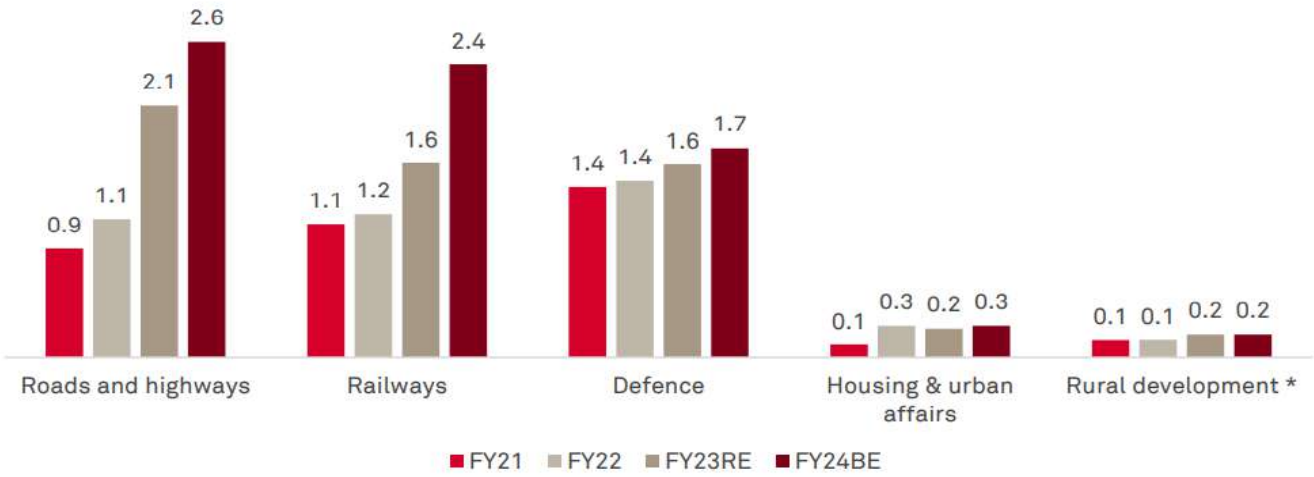
Roads and highways

- Capex for roads and highways next fiscal has been increased a sharp 25% over fiscal 2023RE. Similar to the previous fiscal, the entire Rs 2,59,00,000 lakh is via GBS since the IEBR limit has been completely eliminated to reduce dependence on the NHAI's borrowings. On the other hand, the asset monetisation target has been slashed by half to Rs 10,00,000 lakh (RE) from Rs 20,00,000 lakh (BE), in line with the limited success in awarding toll- operate-transfer (TOT) bundles. This assumes greater significance because roads account for close to 30% of the National Monetisation Pipeline (NMP) targets, and the slower-than-expected progress of monetisation in the sector indicates a delay in achieving the targets and continued dependency on budgetary support for the sector.

- Budgetary allocation of Rs 16,20,000 lakh to the NHAI next fiscal is up 15% over fiscal 2023RE. However, the contribution of cess towards NHAI funding for fiscal 2024BE is 1% of fiscal 2023RE. This is because the reduction in value-added tax (VAT) on crude oil and diesel adversely impacted receipts in the Central Road and Infrastructure Fund (CRIF). Fiscal 2024BE CRIF receipts are as much as 31% lower than fiscal 2023RE. Coupled with the elimination of IEBR, this implies that a significantly large portion of NHAI funding would be met through GBS. Nonetheless, the sources of NHAI funding remain a key monitorable.

- The budget introduced provisions for making unit redemption of infrastructure investment trusts (InvITs) taxable at the —ands of the unitholders - it was non-taxable earlier. The move is aimed at widening the tax base. While this would increase the tax outgo for investors, attractive risk-reward dynamics are expected to keep investor interest buoyant in InvITs in the roads sector.

Sector-wise funds allocation for infrastructure (INR 10,00,000 lakh)



Note: *Rural Development includes capex of the Department of Rural Development and expenditure under Pradhan Mantri Gram Sadak Yojana
Source: Budget documents, CEIC, CRISIL

As seen in previous years, the highest budgetary allocation under capex is directed towards major infrastructure- related sectors such as roads (Rs 2,60,00,000 lakh, 25.4% growth over fiscal 2023RE) and railways (Rs 2,40,00,000 lakh, growing 50.8%).

Capital outlay of the Ministry of Road, Transport and Highways

Capital outlay (INR 10,000 lakh)	FY16	FY17	FY18	FY19	FY20	FY21	FY22RE	FY23BE	FY23RE	FY24BE	Growth FY24BE vs FY23RE
Ministry of Road, Transport and Highways	275.33	411.93	507.52	676.46	683.74	892	1213	1877	2071	2,586	25%

Source: CRISIL MI&A Consulting

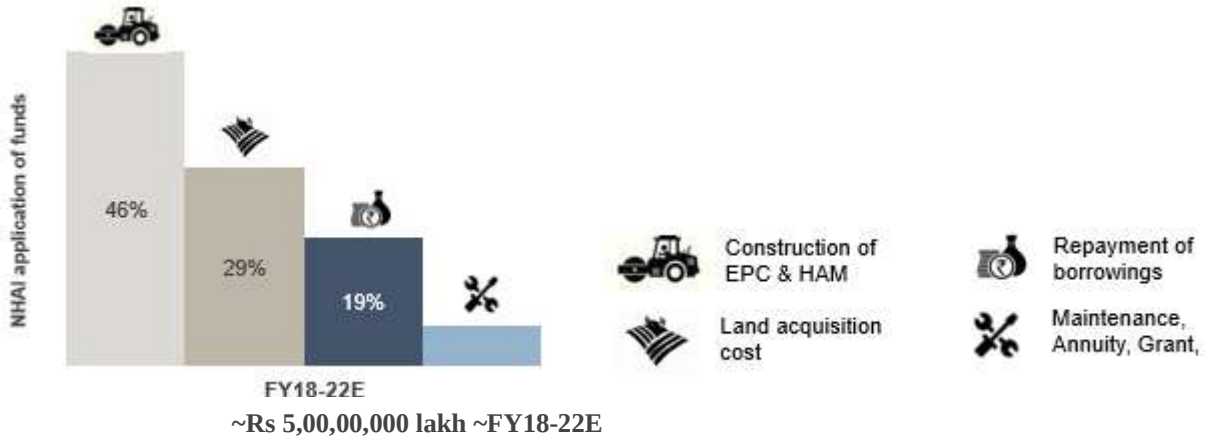
Review and outlook of NHAI funding

Asset monetisation critical

As per CRISIL MI&A estimates Rs 17,00,00,000-19,00,00,000 lakh will be invested in national highways between fiscals 2023 and 2027, with public funds dominating overall spending. In light of awarding more projects under the HAM and on a cash-contract basis, NHAI is now relying on external borrowings and asset monetisation. While asset monetisation via TOT and the InvIT route is challenging in itself, raising external funds is increasing the debt to equity ratio of the authority, with repayments forming a large part of NHAI's outflow. Timely asset monetisation is critical for NHAI to meet its ambitious Bharatmala targets. Due to higher awarding under EPC and HAM, NHAI's outflow toward milestone payments formed 46% of the total met through market borrowings. Of the Rs 5,00,00,000-6,00,00,000 lakh spent over the last five years (fiscals 2018-2022), 46%

was toward milestone payments for EPC and HAM (40% for HAM) projects, while 29% was toward land acquisition expenditures and 19% toward interest and repayment of borrowing.

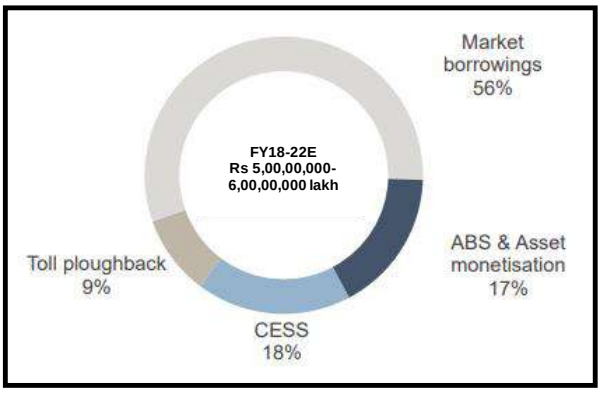
NHAI application of funds: 46% of NHAI outflow towards construction



E: Estimated
Source: NHAI, CRISIL MI&A Consulting

While toll plough-back and CESS (budgetary allocation) contributed 18% and 9%, respectively, to the sources, the maximum amount (56%) of NHAI's funding came from market borrowings. Additional budgetary support and asset monetisation were 17% of total amount. With NHAI's requirement expected to increase amid ambitious construction targets, additional support via monetisation are critical for future requirements.

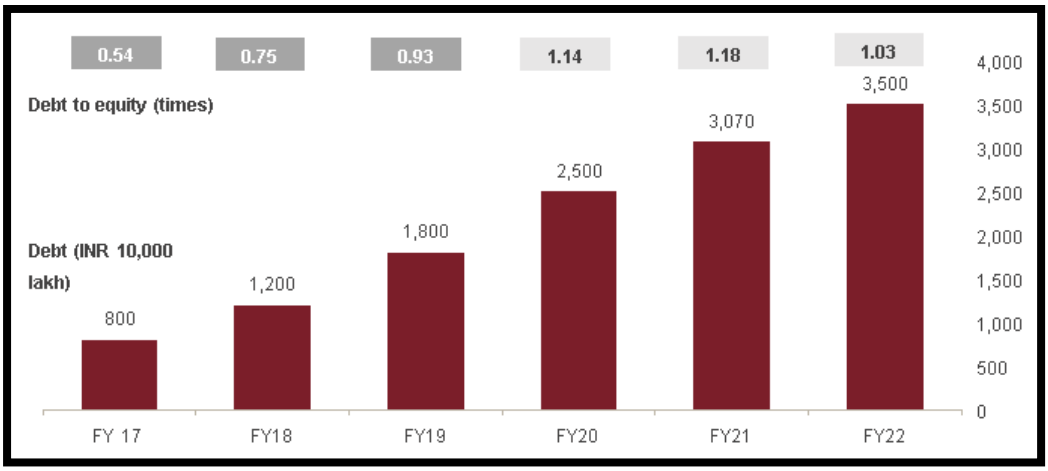
NHAI sources of funds: market borrowings accounted for 56%



Source: NHAI, CRISIL MI&A Consulting

On account of the high dependence on market borrowings to fund asset creation through E'C and HAM projects, NHAI's debt to equity ratio rose to 1.2 times in FY22. This can be attributed to NHAI's strategic importance to the Government of India and the road sector being a key area of reform in order to remove infrastructure bottlenecks and ensure a source of momentum for economic growth. Hence, the sector is witnessing the implementation of significant initiatives, such as the Bharatmala project.

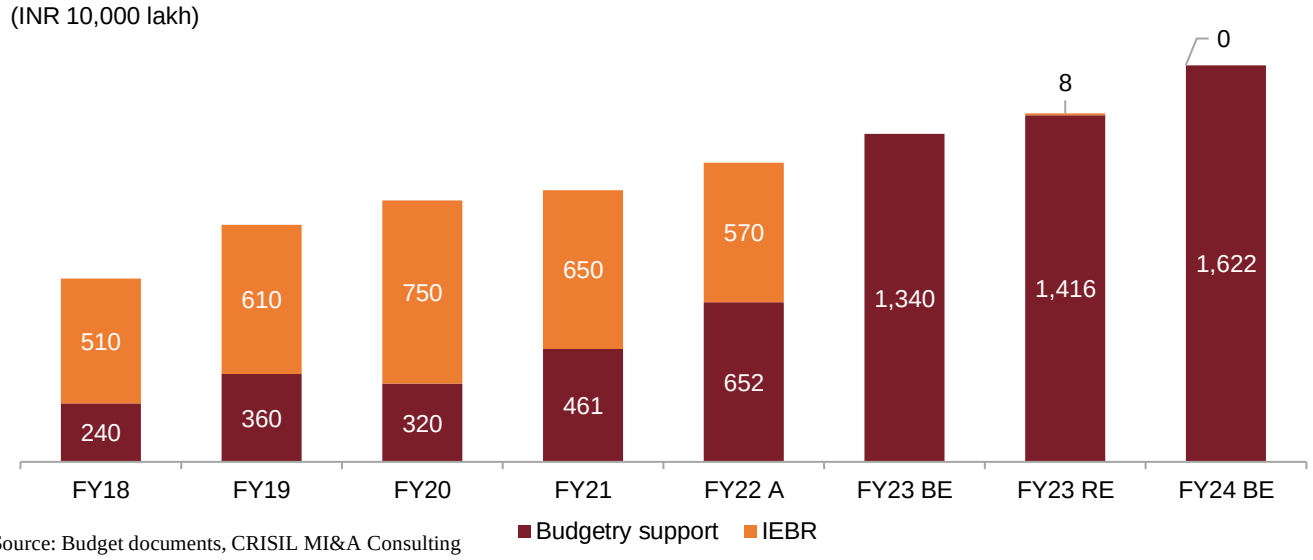
NHAI borrowings on the rise



Source: NHAI, CRISIL MI&A Consulting

To limit the rise in borrowings, NHAI's budgetary support in the form of CESS and toll plough-back was increased by 106% for fiscal 2023 (budgeted), with IEBR remaining nil.

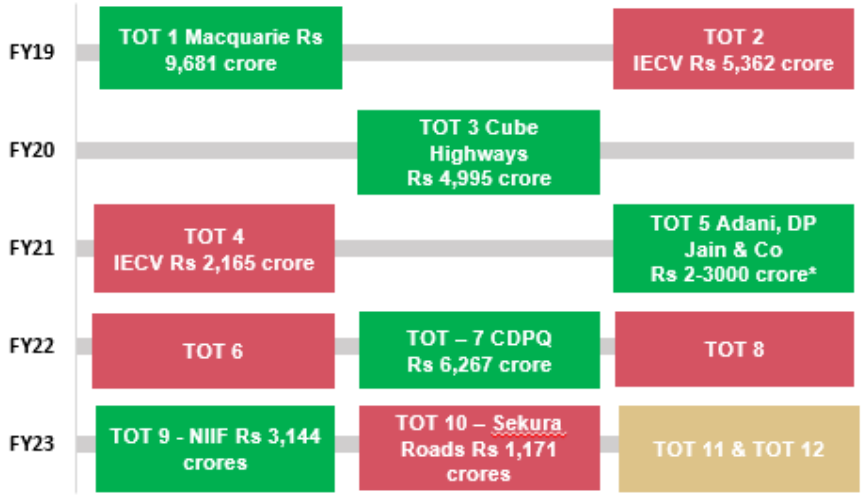
IEBR done away with in FY23 budget



Source: Budget documents, CRISIL MI&A Consulting

Other modes of funding such as TOT have seen only limited success. With the implementation of FasTags, TOT becomes more attractive as its able to eliminate cash handling and plug leakage in the system. However, of late, the awarding of TOT bundles have encountered impediments with certain TOT bundles like TOT-6, TOT-8 and TOT-10 getting cancelled due to low bids. NHAI has already invited bids for TOT 11 and TOT 12 and the progress in the same remains to be seen. 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.

Success of TOT critical to meet ambitious Bharatmala targets

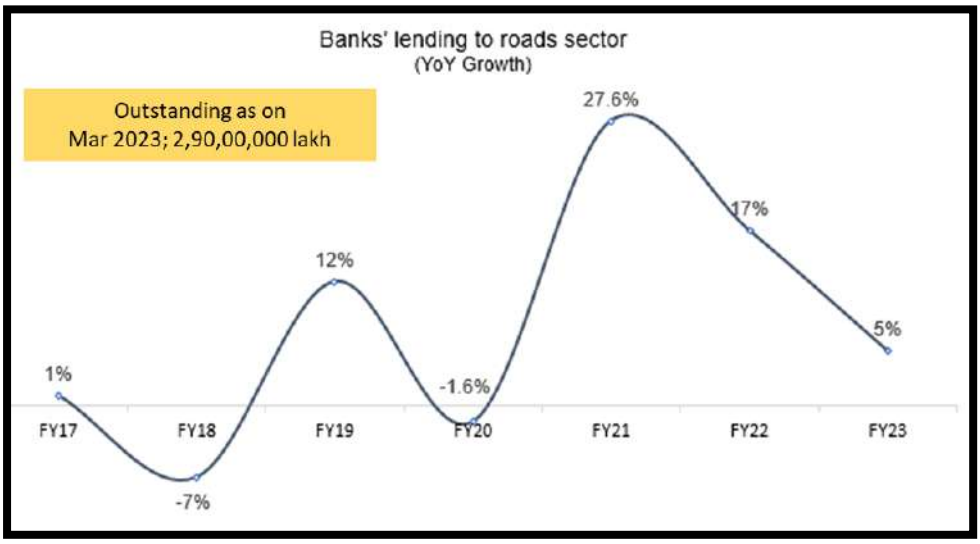


Source: NHAI, CRISIL MI&A Consulting

Improvement in bank credit growth led by higher HAM execution

After a dip in fiscal 2020, bank lending to the roads sector staged a healthy recovery and grew by 27% yoy owing to higher awarding and higher construction. The traction continued in fiscal 2022 as well with lending to the sector witnessing a robust growth of 17% yoy. In fiscal 2023, the growth momentum has moderated due to the high base with the on-year growth rate for the year standing at 5%. At the end of fiscal 2023, the outstanding bank credit to the roads & highways sector stood at Rs 2,90,00,000 lakh.

Bank credit growth to the roads sector moderated in fiscal 2023 due to the high base



Source: RBI, CRISIL MI&A Consulting

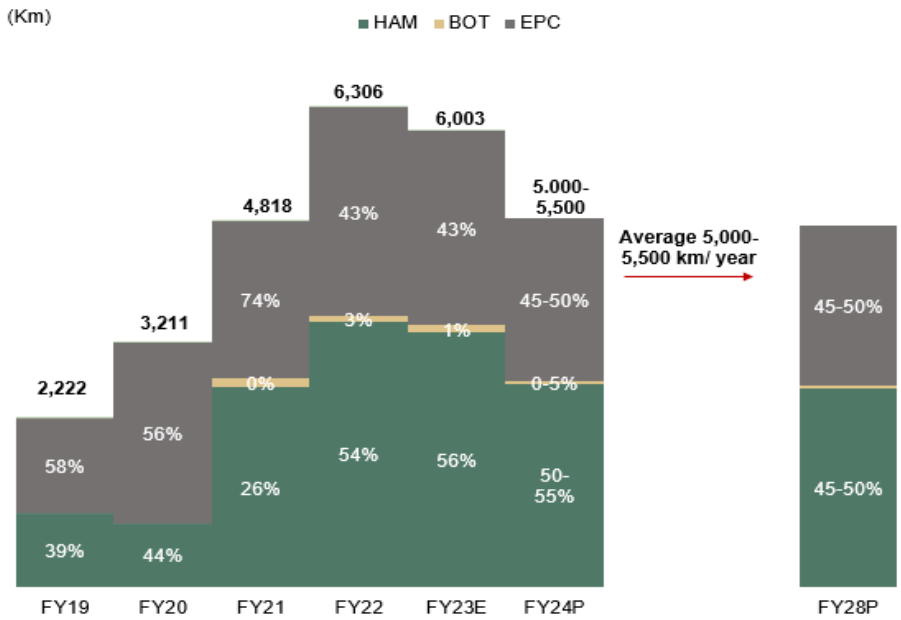
Investments in National Highways: Review and outlook

NHAI awarding to moderate in fiscal 2024, share of HAM likely to remain stable

National Highways Authority of India (NHAI) awarding has witnessed a rise from merely 2,222 km in fiscal 2019 to 6,003 km in fiscal 2023. Fiscal 2021 was a pivotal year since despite the COVID-induced disruptions, the NHAI awarded 4,818 kms in which was a three fiscal high back then. 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 stood at 54% and 43% respectively while projects under the BOT model accounted for only a partly 3%. In fiscal 2023, while the awarding momentum dipped slightly, the awarding volume was still above the 6,000 km mark as the NHAI awarded 6,003 km during the fiscal.

In fiscal 2024, as per CRISIL MI&A estimates, NHAI awarding is expected to slow down to 5,000-5,500 kms while the respective shares of HAM, EPC and BOT in the total awarding are expected to remain at similar levels vis-a-vis fiscal 2023. A limited rise in budgetary support coupled with the higher capex for 70% of high-value expressways currently under construction, could defer NHAI awards under Bharatmala Phase 1 beyond fiscal 2024 — the year construction was originally scheduled to be completed. Over the medium term, it is expected that the NHAI would continue to award 5,000-5,500 kms per year on an average between fiscals 2024 and 2027. Furthermore, the shares of HAM, EPC and BOT in the awarding are expected to remain largely stable without any significant deviations.

56% of projects awarded under HAM in FY23, share to remain similar



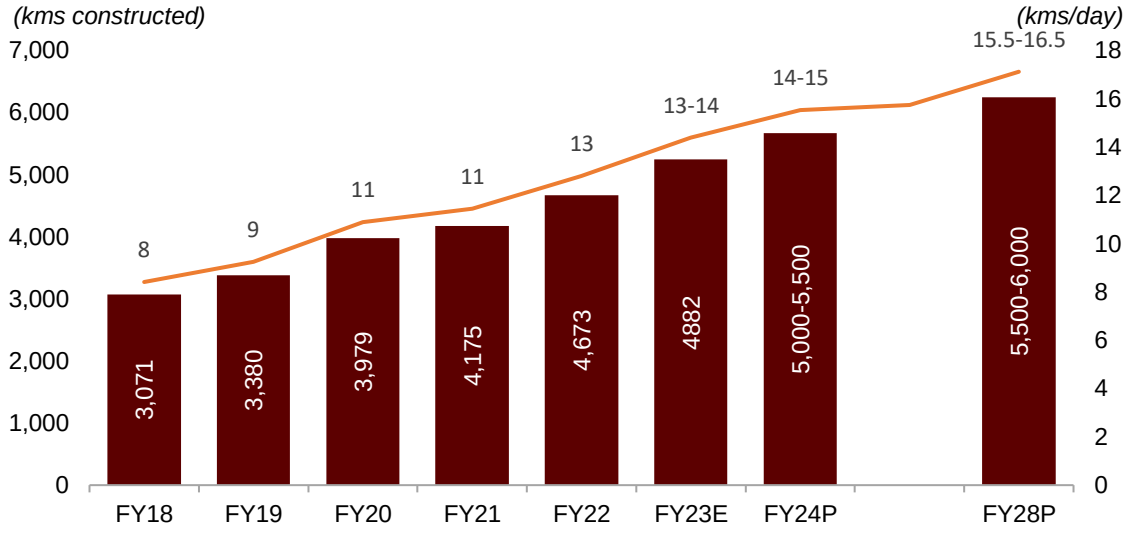
P: Projected
Sources: NHAI, CRISIL MI&A Consulting

NHAI execution is also rising steadily with focus on swifter execution

Even though overall national highways construction at the MoRTH level remained flattish in fiscals 2022 and 2023, NHAI execution witnessed strong momentum. NHAI execution sequentially rose from 4,175 km in fiscal 2021 to 4,882 km in fiscal 2023. Acceleration in project awards, sharper focus on resolving land acquisition issues, and the 'Atmanirbhar Bharat' initiatives to ease liquidity (monthly milestone payments, release of retention money, reduction in performance security & extension of 3-6 months in milestones & SCODs) for EPC road players augured well for the pace of construction during this period even though issues such as exorbitant commodity prices and elongated monsoons acted as headwinds.

CRISIL MI&A expects fiscal 2024 NHAI construction to be in the range of 5,000-5,500 kms on the back of higher awarding witnessed in the previous fiscals and many of those projects receiving appointed dates only towards the far end of fiscal 2023. Over the medium term, the pace of construction is expected to rise steadily to reach 16 km per day by fiscal 2028.

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



Source: NHAI, CRISIL MI&A Consulting

Policy push boosted HAM share in awarding

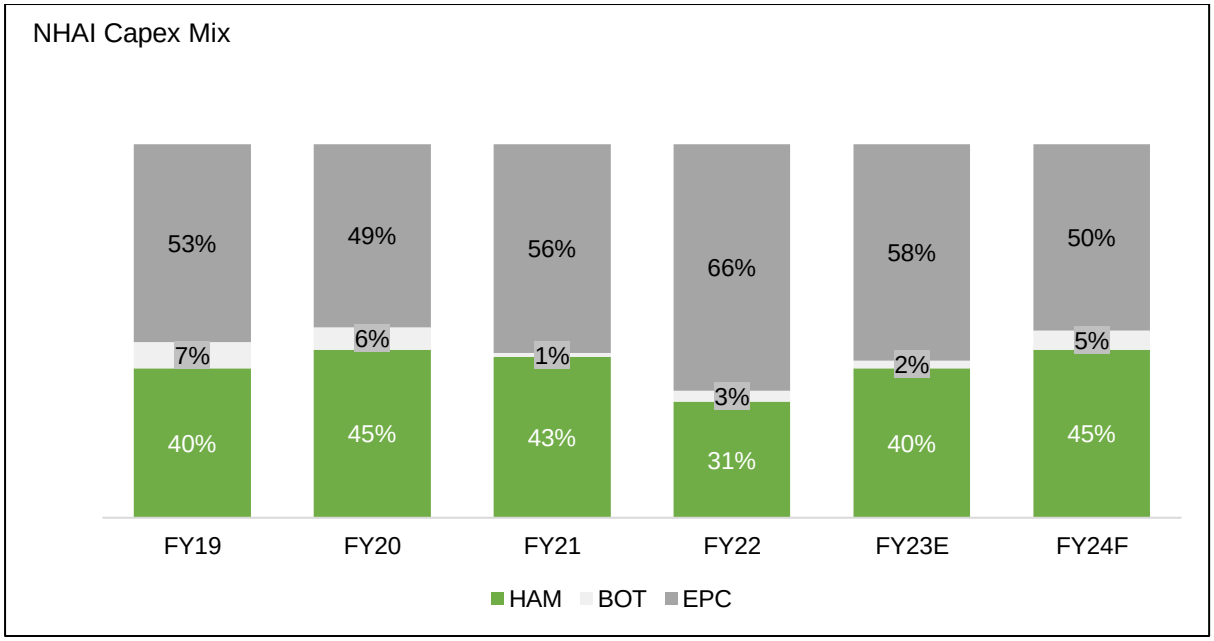
NHAI awards roads and highway projects under:

- EPC
- BOT
- HAM

Incorporating multiple suggestions from various stakeholders, the ministry and NHAI amended certain parameters (see below) in the HAM MCA in October 2020. These were largely aimed at protecting developers' returns and ease their liquidity.

Despite the higher HAM awarding, CRISIL MI&A Consulting's estimates of the NHAI capex mix indicates that as share of EPC remains high, the share of public funds would remain more than 70% over the next two fiscals. Thus, the NHAI's funding would remain critical to sustain the sector going forward.

As capex under EPC and HAM remains high, public funds are burdened

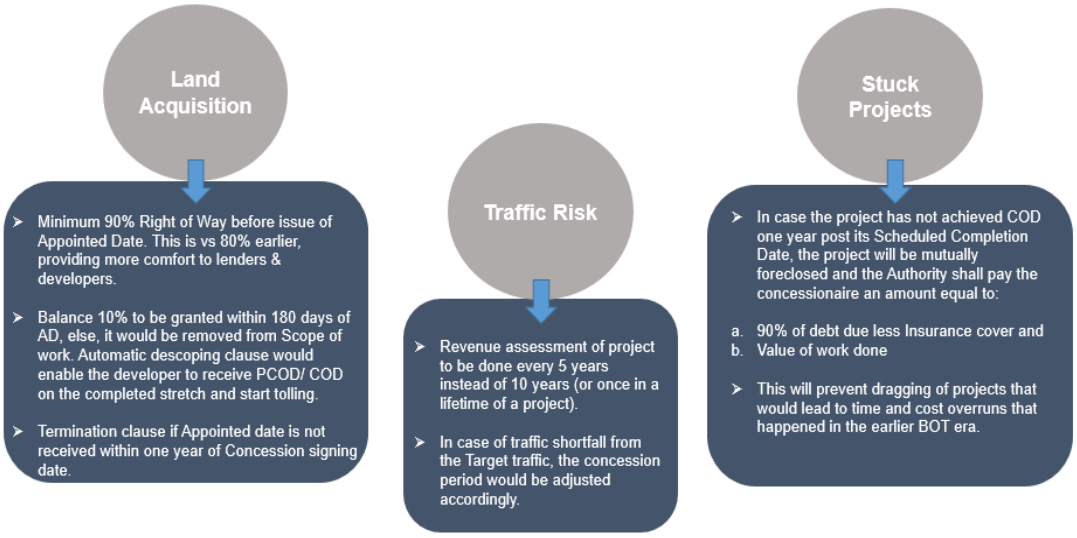


P: Projected
Source: NHAI, CRISIL MI&A Consulting.

Changes in BOT MCA introduced

In an effort to improve private participation via the BOT-toll mode, the NHAI and the ministry introduced changes to the BOT MCA, aimed at addressing key issues, such as land acquisition, revenue assessment in case of traffic shortfall and stuck projects.

BOT MCA revamped to revive interest in the model

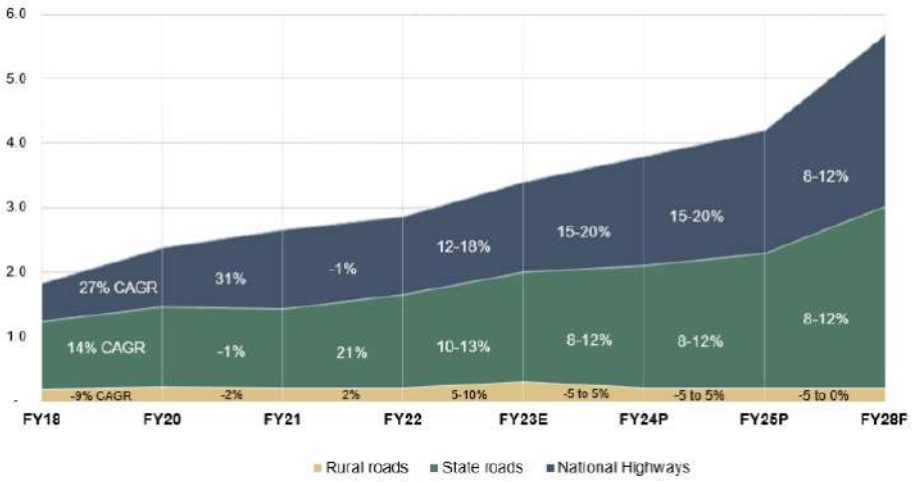


Source: MoRTH, NHAI, CRISIL MI&A Consulting

National highway capex to grow sharply in fiscal 2024

Despite challenges in the first half of fiscal 2021, where state spends were constrained following outbreak of Covid -19, and fiscal 2022, where an extended monsoon hampered national highway construction, the sector's medium-term growth remains intact. We derive comfort from Bharatmala and NIP of DPR ready projects, higher awarding in fiscal 2022, and revival in state capex.

Momentum to continue, supported by Bharatmala and NIP pipeline



E: Estimated, P: Projected
Note: Investment excludes land acquisition cost
Source: NHAI, MoRTH, state budget documents, Pradhan Mantri Gramsadak Yojana, CRISIL MI&A Consulting

Further, in fiscal 2022, even though construction in km terms declined by 22%, capex in rupee terms was steady, cushioned by higher share of greenfield six- and eight-lane expressways that cost 3x that of a four-lane highway. In fiscal 2023, capex is estimated to have risen 8-13% on the low base, with growth projected to rise a sharp 35-40% in fiscal 2024.

Outlook of toll collection and remittance on national highways

As per IHMCL data, the electronic toll collection on national highways is estimated to have reached ₹46,30,000 lakh in the Fiscal Year 2023. Further, toll collections are expected to grow at a CAGR of 9.5-10.0% between Fiscal Years 2023 and 2028 on a like-to-like basis and to grow at 18-19% considering new road additions and subsequent tolling on them over the same period. The growth will be driven by factors such as improvement in overall economic activity, efficiency gains due to removal of check posts post implementation of GST, increase in both passenger and commercial vehicles, strong execution pipeline of road and highway projects, better compliance and blocking of leakages due to electronic toll collection.

Key transactions in road sector

Recent key asset sales and private equity transactions

Date	Target	Buyer	Seller	Deal value (INR 100 lakhs)	% sought
Apr-2023	Kundapur-Surathkal section (90.1 km road project in Karnataka, comprising 74.8 km Kundapur-Surathkal section and 15.3 km Mangaluru-Kerala border section	KKR & Co	Navayuga Udupi Tollways	924.0	NA
Apr-2023	Baharampore-Farakka Highways Ltd	Cube Highways and Infrastructure Pte Ltd	HCC Group	1323.0	NA
Mar-2023	Aurang Tollway (section of NH 6 between Aurang in Chhattisgarh and Odisha border)	Macquarie Group	BSCPL	1600.0	NA
Feb-2023	5 completed HAM assets (Welspun Delhi Meerut Expressway Pvt Ltd, Welspun Road Infra Pvt Ltd, MBL (CGRG) Road Ltd, MBL (GSY) Road Ltd, Chikhali Tarsod Highways Pvt Ltd) and one operating BOT toll asset (Welspun Infrafacility Pvt Ltd)	Actis and Welspun Enterprises	5 completed HAM assets (Welspun Delhi Meerut Expressway Pvt Ltd, Welspun Road Infra Pvt Ltd, MBL (CGRG) Road Ltd, MBL (GSY) Road Ltd, Chikhali Tarsod Highways Pvt Ltd), and Welspun Infrafacility Pvt Ltd	NA	NA

Date	Target	Buyer	Seller	Deal value (INR 100 lakhs)	% sought
Nov-2022	Eastern Peripheral Expressway	CDPQ-backed Maple Highways	NHAI	6,267.0	NA
Oct-2022	InvIT (across 7 states: Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, Telangana)	C'PIB and Ontario Teachers' Pension Plan Board	National Highways Infra Trust	NA	NA
Sep-2022	Andhra Pradesh and Gujarat assets (Tada Nellore)	Adani Group	Macquarie Group	3,110.0	NA
Aug-2022	SP Jammu-Udhampur Highway Ltd	NIIF	Shapoorji Pallonji Group	2,280.0	100%
Jul-2022	Navayuga Quazigund Expressway Pvt. Ltd	NIIF	Navayuga Quazigund Expressway Pvt Ltd	3,035.0	NA
Jun-2022	Six operating highway toll projects	Actis' Long Life Infrastructure Fund	Welspun Enterprises Ltd	6,000.0	100%
Jun-2022	Five operational road projects	IndInfravit Trust, an InvIT led by Canada Pension Plan Investment Board	Brookfield	9,375.0	100%
April – 2022	KKR & Co's road platform in India	Ontario Teachers	Ontario Teachers' Pension Plan Board committed an investment to boost alternative investment company KKR & Co's road platform in India.	Committed Rs 1,33,330 lakh ($17.5crore)	-
Jul-2021	One highway concession	KKR Asian Fund III LP	Global Infrastructure Partners	-	39%
Jan-2021	Shree Jagannath Expressways Pvt. Ltd	Indian Highway Concessions Trust	Bharat Road Network	730.0	74%
Dec-2020	Jorabat Shillong Expressway Ltd	Sekura Roads Ltd	IL&FS Transportation Networks Ltd	930.0	100%
Dec-2020	Chenani Nashri Tunnelway Ltd.	Cube Highways and Transport Assets Advisors Private Limited	IL&FS Transportation Networks Ltd	3,900.0	100%
Jun-2021	Navayuga Road Projects Pvt. Ltd. – two road projects	Sekura Roads Ltd	Navayuga Road Projects Pvt Ltd	-	100%
Feb-2021	Sadbhav Infrastructure Projects Ltd	Allianz Global Investors joined by AMP Capital	-	To raise Rs 70,000 lskh ($960 lakh) through NCDs	-
Jan-2021	Chennai Elevated Tollway Ltd	JC Flowers Asset Reconstruction Company	-	Acquire over half of the debt of a stressed road developer at a di—ount of over 80%	-
Dec--2020	Chenani Nashri Tunnelway Ltd Asset, a road tunnel, from Infrastructure Leasing & Financial Services Ltd	Cube Highways and Infrastructure Pvt Ltd	-	Rs 3,90,000 lakh ($5,280 lakh)	-
Sep-2020	Farakka Raiganj Highways Ltd	Cube Highways and Infrastructure Pvt Ltd	Hindustan Construction Company	Rs 1,50,800 lakh (USD 20.5 crore)	-

Date	Target	Buyer	Seller	Deal value (INR 100 lakhs)	% sought
Jan-2020	KNR Walayar Tollways Pvt Ltd	Cube Highways and Transport Assets Advisors Private Limited	KNR Construction Ltd	620.0	100%
Aug-2019	Five under construction HAM projects – Dilip Buildcon Ltd	Cube Highways and Transport Assets Advisors Private Limited	Dilip Buildcon Ltd	730.0	100%
Aug-2019	KNR Shankarampet Projects Pvt Ltd	Cube Highways and Transport Assets Advisors Private Limited	KNR Construction Ltd	100.0	100%
Feb-2019	Two road projects – KNR Construction Ltd	Cube Highways and Transport Assets Advisors Private Limited	KNR Construction Ltd	200.0	100%

Source: Industry, CRISIL MI&A Consulting

Overview of investments in road platforms

Investments by private sector to grow 2x over the next five years

CRISIL expects private construction investments in national highways to increase 2x to Rs 2,70,00,000 lakh over fiscals 2023-2027 compared with the previous five years. This is expected to be mainly through the (HAM) mode, as the BOT toll mode may have only a few takers.

A policy push in the form of changes in model concession agreements (MCAs) for HAM and BOT projects and reduction in bid eligibility criteria across all national highway projects would bode well for private participation. However, the share of HAM in total awarding is constrained by the banks' cautious approach in lending to such projects.

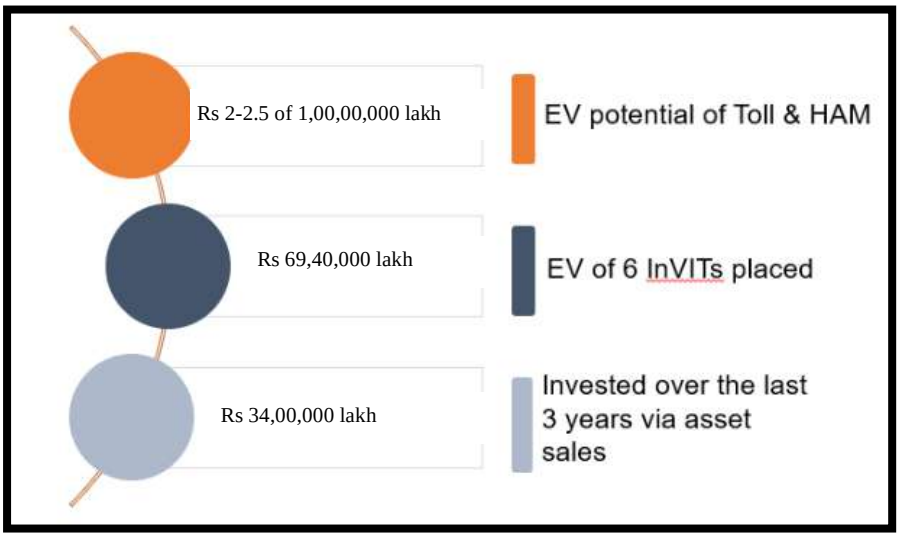
Asset monetisation, equity infusion key to support private investment in the long run

There are two broad drivers of asset sales in the roads sector — rationalisation of financial position to improve balance sheet strength and asset churning to be able to participate in the upcoming projects. The erstwhile major BOT players are selling off assets to reduce their debt burden and free up equity, which can be infused projects under execution.

HAM players are currently selling off their HAM assets to participate in the upcoming HAM projects. Some players intend to sell off under-construction projects to financial investors and continue the execution themselves. Thus, they convert HAM projects to EPC without facing the cut-throat competition prevalent in the EPC segment. The strategy will help them retain margins.

About Rs 70,00,000-80,00,000 lakh has already been invested through these models. CRISIL's analysis of BOT and HAM projects indicates a potential of Rs 2,00,00,000-2,50,00,000 lakh in terms of enterprise value.

Asset monetisation has a lot of potential to free up developers' balance sheets



Source: CRISIL MI&A Consulting

Overview of InvITs

InvITs to deleverage balance sheets and enable capital recycling

InvITs will help free up capital of players by divesting stake in operational assets and help recycle the capital to deleverage balance sheets for creating new assets.

Year wise developments in InvITs

InvIT	Year	Progress
Cube Highways Trust	Apr 2023	As per the SEBI's website, the InvIT filed the final placement memorandum in April 2023. Its portfolio assets include 18 toll assets and one annuity asset, totaling 1,636.5 km
Highway Infrastructure Trust (HIT)	Dec 2021	HIT is sponsored by Galaxy, in which KKR is an investor. It has acquired an initial portfolio of six operational projects with four toll and two annuity roads.
National Highways Infra Trust	Nov 2021	Eight road project assets (five in round-1 and three in round-2) have been transferred to the InvIT. It was listed in November 2021. Round-1 assets have received appointed date as December 2021. Round-2 assets were transferred in September 2022.
Shrem InvIT	Feb 2021	As of January 2023, the InvIT's portfolio had 28 projects (24 acquired from Dilip Buildcon Ltd in 2017 and 2018 and four newly acquired SPVs). Six additional SPVs were proposed to be acquired. The projects consist of annuity, state toll & annuity, NHAI HAM, MoRTH HAM and NHAI toll assets across five states. Floated by the sponsor, Shrem Infra Structure Pvt Ltd, Shrem InvIT got SEBI approval in February 2021.
IRB InvIT Fund	Feb 2020	In August 2019, the company had announced signing of definitive agreements with GIC affiliates, for up to Rs 4,40,000 lakh investment for 49% stake in a portfolio of nine of its assets through private InvIT structure (IRB Infrastructure Trust) with IRB retaining the controlling 51% stake in the trust. The portfolio has 5,900 km in Haryana, Uttar Pradesh, Rajasthan, Gujarat, Maharashtra, and Karnataka. In October 2020, IRB Infrastructure Trust successfully closed the second tranche of fund raising by way of rights Issue of units amounting to Rs 51,000 lakh. Being the sponsor and 51% stakeholder, the company contributed Rs 26,000 lakh and the GIC affiliates, the balance Rs 25,000 lakh. This is part of the total commitment of Rs 4,40,000 lakh by GIC affiliates for the 49% stake in private lnvlT housing nine BOT assets. Of Rs 4,40,000 lakh, the trust received Rs 375300 lakh in February 2020.
	May 2017	A fresh issue of units of about Rs 4,30,000 lakh and an offer for sale of about Rs 3,00,000 lakh. The proceeds from the offer from sale went to the sponsor, IRB, while the proceeds of the fresh issue (about Rs 4,20,000 lakh) were invested in the six road assets under the InvIT in the form of debt. The repayment of existing debt on the SPV to the lenders was completed.
IndInfravit Trust (L&T IDPL)	Jun 2019	Sadbhav Engineering transferred nine operational BOT assets (seven toll and two annuity) to this InvIT. The enterprise value of these assets is Rs 6,60,000 lakh, which will help deconsolidate Rs'4,00,000 lakh of Sadbhav's debt. This, in turn, will help unlock funds to bid for newer HAM projects.
	Apr 2018	L&T privately placed the InvIT units. It has transferred five operational assets to this InvIT.
Oriental Infra Trust	Jun 2019	It has five operational road assets of approximately 621 km.

Source: CRISIL MI&A Consulting

Infrastructure investment trusts (InvITs) will help free up capital of players by divesting stake in operational assets and help recycle this capital to deleverage balance sheets for creating new assets.

Details of InvITs currently registered in India:

Name	Sponsor	Date of registration	Assets
IRB InviT Fund	IRB	14-Mar	6 operating toll road assets
Indinfravit Trust	L&T IDPL	15-Mar	11 BOT-toll, 2 operational BOT annuity
Oriental Infratrust	Oriental Group	26-Mar	5 operational assets

Name	Sponsor	Date of registration	Assets
IRB Infrastructure Trust (IRB InVIT II)	IRB Infrastructure Trust (IRB InVIT II)	25-Nov	9 BOT-toll projects
Bharat Highways InvIT	G R Infraprojects Limited	3-Aug	7 operational HAM assets
Cube Highways Trust	Cube Highways Group	5-Apr	8 BOT Annuity Assets, 9 TOT Assets, and 1 BOT Toll
Highways Infrastructure Trust	Galaxy Investments II Pte. Ltd	23-Dec	4 BOT Annuity Assets, and 2 BOT Toll
Indian Highway Concessions Trust	Maple Highways Pte Ltd	24-Feb	3 BOT Toll assets
National Highways Infra Trust	National Highway Authority of India	28-Oct	5 BOT Annuity, 3 TOT Toll
Shrem InvIT	Shrem Infra Structure Private Limited	4-Feb	6 HAM assets, 2 BOT Toll assets, 10 State (Toll+Annuity) assets and 6 State Annuity Assets

Note: Details pertaining to Roadstar Infra Investment Trust is currently not available
Source: Credit Rating Rationale, DRHP, CRISIL MI&A

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 Union budget (FY21) announcement of scraping dividend distribution tax (DDT) and shifting the taxation of such payouts to investors would prove to be a negative for InvITs. Our interactions with market participants, however, indicate that given this could hurt asset monetisation plans especially in the roads sector, the government may create a carveout for InvITs to allow them to continue with the earlier regime.

Overview of National Highways Development Project (NHDP)

NHDP encompasses building, upgradation, rehabilitation, and broadening of national highways. The project is executed by NHAI, in coordination with the Public Works Departments of various states. NHAI also collaborates with the Border Roads Organisation to develop certain stretches. NHDP is being implemented in seven phases.

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

Bharatmala Pariyojana

Bharatmala Pariyojana, an umbrella project of the central government since 2015, aims to improve efficiency in the roads sector. It is expected to supersede the National Highways Development Project (NHDP) and envisages the construction of 65,000 km of highways under the national corridor (north-south, east-west, and golden quadrilateral), economic corridor, inter-corridor roads, and feeder roads categories. As per the ministry's announcements in 2017, Bharatmala, along with the other schemes being undertaken, was estimated to have required a total outlay of Rs 6,90,00,000 lakh.

Phase I of the scheme envisages development of 24,800 km of national highways/roads and residual 10,000 km of NHDP between fiscals 2018 and 2022 as per MoRTH Annual Report 2022-23. Awarding under Bharatmala has begun from fiscal 2018 and will likely stretch until fiscal 2025 for Phase 1, involving development of about 9,000 km of economic corridors, about 6,000 km of inter-corridor and feeder roads, about 5,000 km of national corridors efficiency improvements, about 2,000 km of border and international connectivity roads, about 2,000 km of coastal and port connectivity roads, and about 800 km of expressways. Of the total 34,800 km, around 20,800 km had been awarded as of August 2021.

Components of BMP Phase -I

Category	Description	Total length (Km)	Upgrade proposed in Phase I (Km)
National corridor efficiency improvement	Lane expansion and de-congestion of the national corridor	13,100	5,000
Economic corridor development	Connecting economically important production and consumption centres	26,200	9,000
Inter-corridor and feeder route development	Inter-connection between economic corridors; first and last mile connectivity	15,500	6,000
Border and international roads	Connectivity to border areas and boosting trades with neighboring 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

State Highways

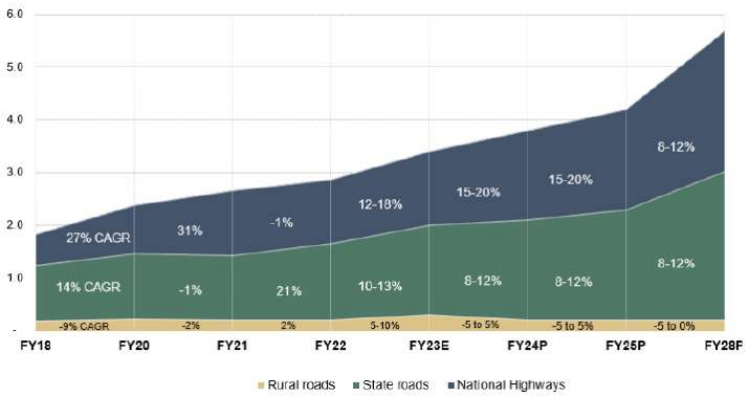
Review and Outlook of State Road

State road capex to continue its growth this fiscal, albeit at a slightly lower pace

CRISIL MI&A's analysis of state road budgets indicates that state road capex forms 45-50% of the sector. State capex on roads & highways sector remained flattish in fiscal 2021 due to constrained state funds. On this low base, it grew by 21% in fiscal 2022 and is estimated to have further grown by 10-13% in fiscal 2023 largely in line with the growth in budgetary outlay. Subsequently, growth is expected to moderate slightly to 8-12% over the next 2 years.

Our interactions with market participants indicate that state road projects funded by external agencies such as World Bank or ADB or have private/bank funding such as Expressways under UPEIDA have not had much impact due to COVID-19, as compared to state-funded projects

State road capex to witness slight moderation in growth on the high base of last fiscal

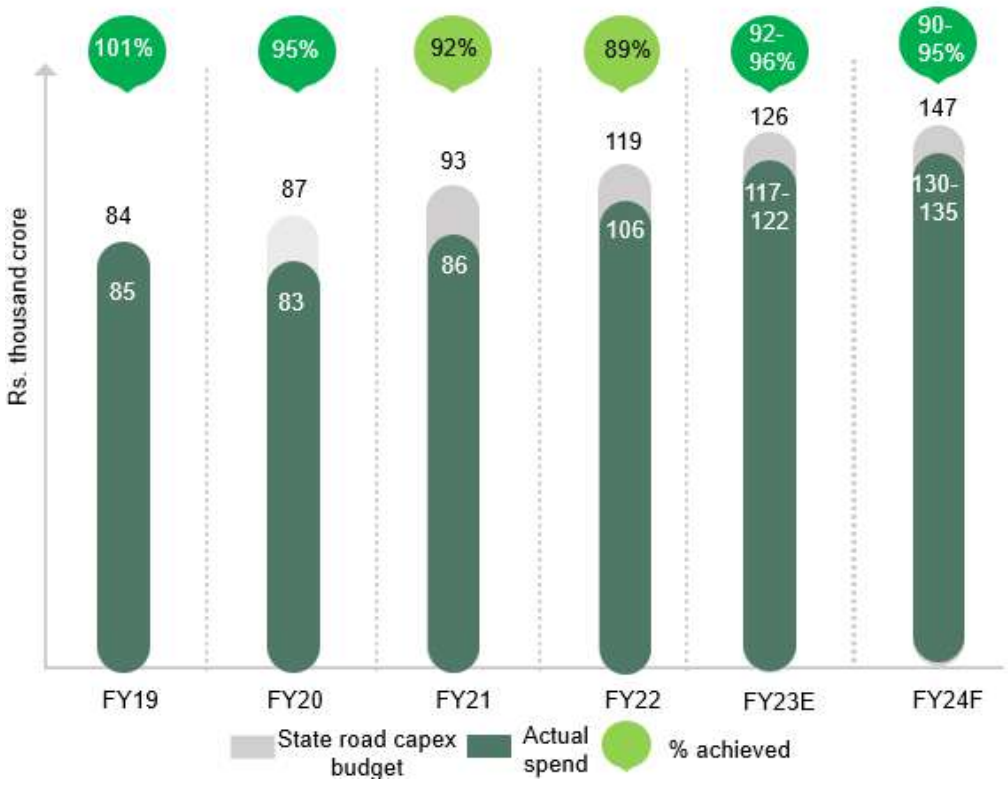


P: Projected (Source: State budget documents, CRISIL MI&A Consulting)

As per CRISIL MI&A's analysis of the budgets of top 15 states that account for 85% of state road capex, in fiscal 2024, the budgeted capital outlay on roads is higher by 9% vis-a-vis the revised estimated (RE) of fiscal 2023 while it is 17% higher than the fiscal 2023 budgeted estimates (BE).

The average achievement ratios, i.e., actual spends over the Budgeted Estimates, is in the range of 90-95%. Fiscal 2023 achievement ratio is likely to be largely in line with historical trend and hence, the actual spend is likely to be in the range of Rs 1,17,00,000-1,20,00,000 lakh. Due to the higher budgeted expenditures on roads in fiscal 2024, the actual expenditure is expected to go up to Rs 1,30,00,000-1,35,00,000 lakh. However, given the high fiscal deficits of some of the constituent states, there is a downside risk to this estimate.

FY23 budgets for top 15 states is 7% higher on-year, even on the high base of last year

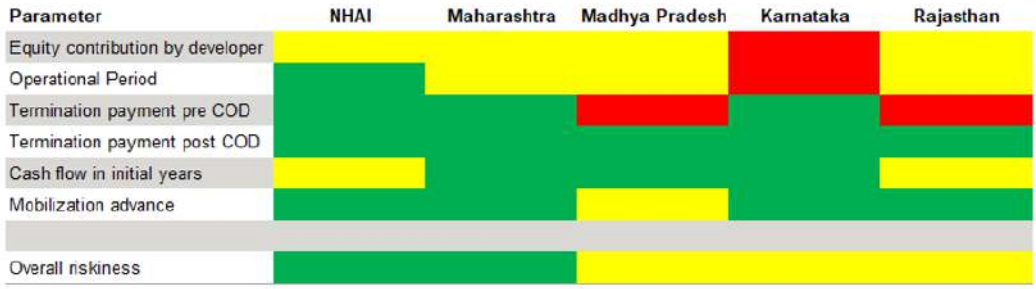


Note: E: Estimated, P: Projected; State budget data for 15 states that account for 85% of total state road capex outlay
Source: State budget documents, CRISIL MI&A Consulting

NHAI vs state HAM

Few states such a Maharashtra, Madhya, Karnataka and Rajasthan have implemented the HAM model in awarding of state highway projects. Maharashtra's model is similar to that of NHAI, while those of Madhya Pradesh, Karnataka & Rajasthan.

Maharashtra's HAM similar to NHAI's model



Source: State budget documents, CRISIL MI&A Consulting

State roads financed by state governments, private participation in state-level HAM projects, a monitorable

State roads are largely financed through budgetary allocations by respective state governments. These are supplemented by funds from the National Bank for Agriculture and Rural Development (Nabard), Housing and Urban Development Corporation Ltd, Rural Infrastructure Development Fund, and the state's portion of Central Road Fund (CRF).

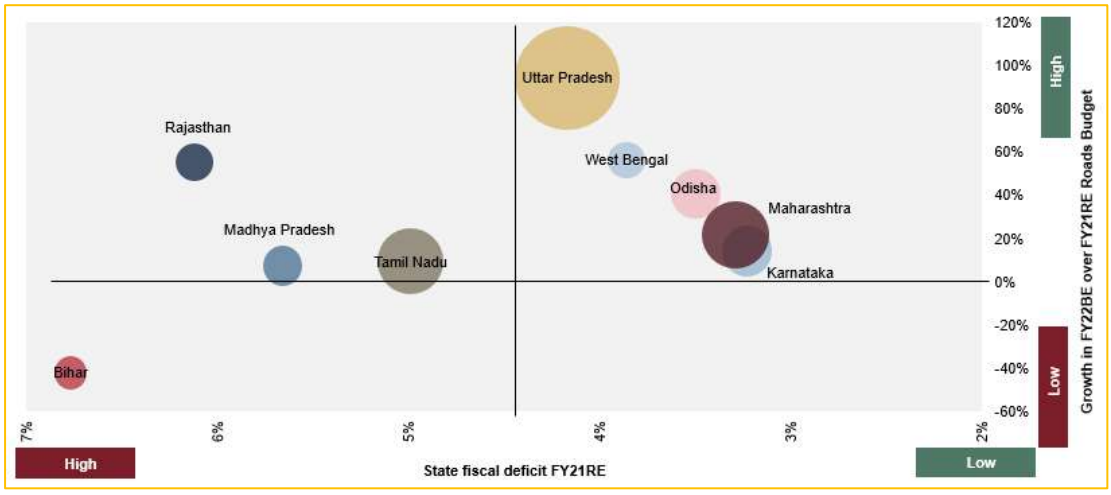
State governments will finance most state road projects (via budgetary allocation, external assistance, and CRF). Some states have a favourable policy framework to attract private participation. Going forward, the share of private participation in state roads is expected to be at 12-15% as the success of the HAM projects introduced across various states are monitorable.

Budgetary support and lender comfort — key success factors for states

	NHAI	Maharashtra	Madhya Pradesh	Karnataka	Rajasthan
Number of bidders	5-6 bidders	6-7 bidders	4-5 bidders	2-3 bidders	2-3 bidders
Bid Project Cost vs Authority Cost	10-15% above	Almost at par	Almost at par	15-20% above	8-10% above
Awarded projects (kms) till date	>7000	~10000	280	420	750
Average size of Project	~Rs 1,100 crore	~Rs 200 crore	~Rs 150 crore	~Rs 1,000 crore	~Rs 500 crore
Cost per km	Rs 20 crore per km	Rs 2.5-3 crore per km	Rs 3-3.5 crore per km	Rs 7 crore per km	Rs 2-2.5 crore per km
Key players	Dilip Buildcon, Ashoka Buildcon, PNC Infratech, Sadbhav, IRB	Rajpath Infra, SB Deshmukh, Harsh Construction, Welspun,	Ravi Infra, Shreeji, Path, RCL	Sadbhav, KNR	Dineshchandra R Agarwal, GR Infra, Gawar Construction
	Awarding began in FY16	Awarding began in FY18, future pipeline in line with Govt. budget allocation	Awarding began in FY20, future pipeline of ~1300 kms	Awarded in FY19, no future pipeline	Awarded in FY18, future awarding potential of 750 kms in FY21
Funding	Budgetary allocation + IEBR	Budgetary allocation of Rs 30-35 billion per year	$ 490 mn from ADB	$ 346 mn from ADB approved for KSHIP	$ 190 mn from ADB
Key findings		GoM deposits 50% of its grant in escrow account maintained by bank to ensure no delayed payments	Awarded in Jan 2020 after approval for ADB loan	Land acquisition & funding issues due to change in Govt. Projects awarded in June 2018 have only now achieved FC. Appointed date given with 65% land to KNR	750 kms awarded in FY18 under RSHIP-1 with ADB funding. RSHIP Tranche-2 now approved

Source: State budget documents, CRISIL MI&A Consulting

Most states have announced higher spending on roads in the FY22 budget



Note: Top nine states account for >70% of state road capex; Size of the bubble indicates each states' spend on road capex in FY22BE
Source: State budget documents, Ministry of Health and Family Welfare, CRISIL MI&A Consulting

BUSINESS

Some of the information in this section, including information with respect to our plans, strengths, and strategies, contain forward-looking statements that involve risks and uncertainties. You should read "Forward-Looking Statements" on page 16 for a discussion on the risks and uncertainties related to those statements and also "Risk Factors", "Summary Combined Financial Information of the Trust" and "Discussion and Analysis by the Directors of the Investment Manager of Financial Condition and Results of Operations and Cash Flows of the Project SPVs of the Trust" on pages 48, 26,and 237, respectively, and "Projections of Revenue From Operations and Cash Flow from Operating Activities" attached as Annexure I for a discussion of certain factors that may affect our business, financial condition or results of operations. Our actual results may differ materially from those expressed in or implied by these forward-looking statements. Our fiscal year ends on March 31 of each year, and references to a particular Fiscal are to the twelve months ended March 31 of that year. Unless otherwise stated or the context requires otherwise, the financial information included herein is based on our Special Purpose Combined Financial Statements included in this Draft Placement Memorandum. For further details, please see the section titled "Summary Combined Financial Information of the Trust" on page 26.

The Trust will own 49% equity interest in WIPL which holds the 8 laning of Mukarba Chowk – Panipat section of NH-1 (new NH-44) from km 15.500 to km 86.000 in the state of Haryana under NHDP-IV through PPP on toll basis pursuant to the WIPL Concession Agreement, and which is accounted for as an investee under the equity method of accounting. The interest of the Trust in WIPL is accounted for using the equity method in accordance with Ind AS 28, after initially being recognized at the net book value as at April 1, 2020. For details of accounting policies as required by Ind AS (read with Ind AS 28) relating to the accounting of WIPL as equity accounted investee, please refer to our sections titled "Presentation of Financial Data and Other Information" and "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results Of Operations and Cash Flows of the Project SPVs of the Trust" on pages 12 and 237 respectively.

In relation to WIPL, accounting in Special Purpose Combined Financial Statements is as per equity method, as per Ind AS 28 hence, only 49% share of profit/ loss is picked up considering joint control. All numbers with respect to WIPL, including in relation to projections are considered only to the extent of 49% in the document.

Unless otherwise stated or the context requires otherwise, references in this section to "we", "our" or "us" are to Nxt-Infra Trust along with the Project SPVs. However, for the purpose of the Special Purpose Combined Financial Statements, references to "we", "us", and "our" refers to the Project SPVs. We have included various operational and financial performance indicators in this section, some of which may not have been derived from our Special Purpose Combined Financial Statements. The manner in which such operational and financial indicators are calculated and presented, and the assumptions and estimates used in such calculations, may vary from that used by other entities in the business similar to ours. Investors are accordingly cautioned against placing undue reliance on such information in making an investment decision and must evaluate such information in the context of the Special Purpose Combined Financial Statements.

Unless stated otherwise or the context otherwise requires, industry and market data used in this section has been obtained or derived from the CRISIL Report dated September 2023 with respect to the assessment of the roads sector in India, which is a commissioned report, publicly available information as well as industry publications and sources, including from various government publications and websites. The data may have been re-classified by us for the purposes of presentation. 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 sources and publications are also prepared based on information as of specific dates and may no longer be current or reflect current trends. Industry sources and publications may also base their information on estimates, projections, forecasts and assumptions that may prove to be incorrect. Investors must rely on their independent examination of, and should not place undue reliance on, or base their investment decision solely on this information.

Overview

Nxt-Infra Trust is a registered Indian infrastructure investment trust which proposes to invest in road infrastructure assets in India. The Trust proposes to have an initial portfolio of six Project SPVs comprising of 14 road stretches spanning an aggregate length of over 2000 lane kilometres, located across Delhi, Haryana, Uttarakhand, Uttar Pradesh and Maharashtra in India. The portfolio is a mix of toll and annuity assets.

The Trust is sponsored by Actis Highway Infra Limited (the "**Sponsor**"), part of the Actis Group, which is a global investor in sustainable infrastructure.

Actis Group formed in 2004 when it spun out from CDC Group plc. It has a 75+ year heritage of investing in global growth markets. Actis Group focuses on sustainable infrastructure, investing globally in energy infrastructure, long life infrastructure, digital infrastructure & real estate. It focuses on ownership to better drive value creation and build sustainability leaders. Actis is a signatory to United Nations Principles for Responsible Investment.

Since its inception, Actis Group has invested over USD 24 billion as of March 31, 2023, and manages assets across a diverse range of sectors globally. The Sponsor presently holds and operates six road assets in India which were acquired from the Welspun group in 2022 and are proposed to be transferred to the Trust pursuant to the Issue.

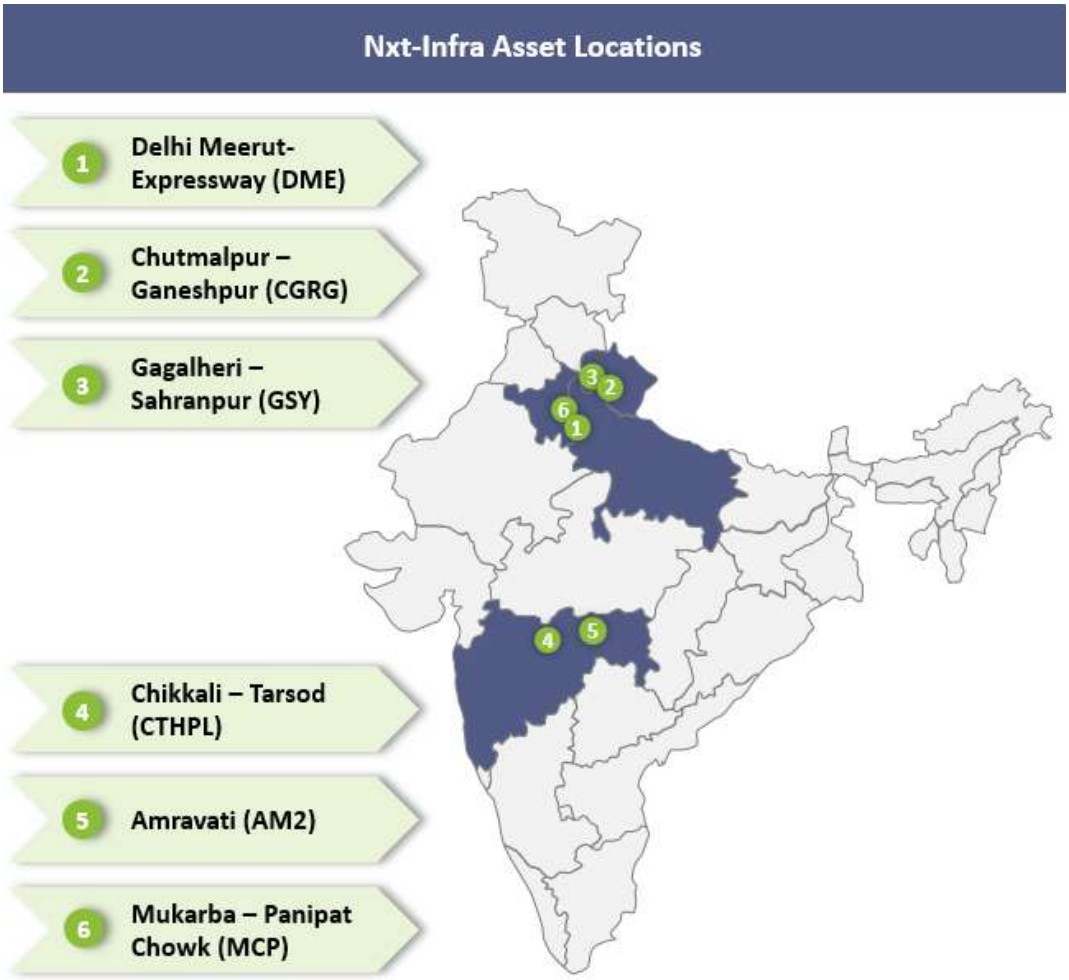
The Trustee, Catalyst Trusteeship Limited is a trusteeship company involved in varied facets of debenture and bond trusteeships, including, advisory functions and management functions. The Trustee also acts as a security trustee and is involved in providing services in relation to security creation, compliance and holding security on behalf of lenders.

Our Investment Manager, Walter Infra Manager Private Limited, will be responsible for managing the Initial Portfolio Assets as well as undertaking investment and management decisions in relation to our assets. Walter Infra Project Manager Private Limited, an associate of the Sponsor, has been appointed as the Project Manager in relation to the Initial Portfolio Assets.

Our Projects

Our Initial Portfolio Assets comprise both national highways and state highways, and are located in the states of Delhi, Haryana, Uttarakhand, Uttar Pradesh and Maharashtra.

The map below illustrates the locations of the Projects:



Some key details in relation to the Initial Portfolio Assets are provided below:

S. No.	Project SPV	Type of project model (Annuity or Toll)	Length (in km)	No. of lanes	State	Authority	COD	End of Concession Period	Residual Concession Period as of March 31, 2023 (in years)	Revenue for Fiscal 2023 (in ₹ lakhs)**
1.	Welspun Infrafacility Private Limited*	Toll	70.500	8	Haryana	NHAI	-	October 26, 2033	10	78,893.88
2.	Nxt-Infra CGRG Highways Limited	Annuity	53.300	4	Uttarakhand and Uttar Pradesh	NHAI	October 7, 2022	August 4, 2035	12	4,530.11
3.	Chikhali- Tarsod Highways Private Limited	Annuity	62.700	4	Maharashtra	NHAI	October 30, 2022	August 24, 2036	13	4,335.07
4.	M/s Welspun Delhi Meerut Expressway Private Limited	Annuity	8.716	14	Delhi and Uttar Pradesh	NHAI	September 26, 2018	June 27, 2033	10	613.39
5.	Nxt-Infra GSY Highways Limited	Annuity	51.455	4	Uttar Pradesh and Haryana	NHAI	February 10, 2022	October 30, 2035	12	2,678.52
6.	Welspun Road Infra Private Limited	Annuity	362.52	2	Maharashtra	PWD, Government of Maharashtra	July 29, 2022	November 10, 2031	8	15,566.67

Presently, 51% of the issued and paid-up equity share capital of WIPL is held by Welspun Enterprises Limited ("WEL**"). In terms of the securities subscription and purchase agreement dated June 9, 2022 ("**SSPA**") entered into between our Sponsor and WEL, our Sponsor is entitled to acquire 100% of the equity share capital of WIPL. In terms of the requirements prescribed by the NHAI, a change in ownership of WIPL may be undertaken only with the prior approval of the NHAI, and only after a period of two years from the COD of WIPL. Therefore, the proposed acquisition of the equity shares presently held by WEL may only be undertaken after the completion of the period prescribed by the concessioning authority. For further details in relation to the SSPA, please see section titled 'Summary of Key Agreements' on page 186. In accordance with the above, upon the completion of the Formation Transactions, the Project SPVs will only comprise 49% of the issued and paid-up equity share capital of WIPL. Further, the Sponsor, Trustee and the Investment Manager propose to enter into a Deed of Right of First Refusal pursuant to which the Trust will have the ability to acquire the remaining 51% of the issued and paid-up equity share capital of WIPL at a subsequent date.*

*** The data in the table above does not reflect the total annuity payment in relation to the annuity assets(including the interest on the balance annuity and O&M) from the NHAI as the financials are prepared under IND AS.*

Competitive Strengths

Sizeable and diversified portfolio of long-term, stable, revenue-generating assets with minimal construction risk

Upon the completion of the Issue, the Trust shall have a sizeable initial portfolio of completed and revenue-generating assets, comprising of six Projects with an aggregate length of over 2000 lane kilometres, located across five states in India, covering key geographies such as Delhi, Haryana, Uttarakhand, Uttar Pradesh and Maharashtra. Each Project SPV has entered into a long-term concession agreement with one of the concessioning authorities, having residual concession periods ranging between 8 and 14 years, with each such concession period commencing from the appointed date of the relevant Project. Project SPVs are comprising of 14 road stretches. On a collective basis, the Projects had a weighted average residual concession period of approximately 10.8 years, as of September 30, 2023. With a balanced combination of HAM and toll assets, the Projects are well positioned to provide long-term cash flows to the Trust. The government launched the National Infrastructure Pipeline ("**NIP**") for fiscals 2020 to 2025, to boost infrastructure, with a projected investment of ₹ 1,11,00,00,000 lakh during the period. (*Source: Crisil Report*).

Stable income through annuity assets and toll income generating assets with high traffic volume

We believe that the diversified revenue streams from our Projects provide us with steady cash flow during the year. Approximately 42.39% of our combined revenue in the financial year ended March 31, 2023 came from HAM projects awarded by the relevant concessioning authorities while approximately 57.61% of our combined total revenue in the financial year ended March 31, 2023 was generated from toll collections.

Our toll-based Project is located in strategic areas and directly connecting Delhi and Panipat, and is dominated by traffic from the passenger segment. (*Source: Traffic Report*). This allows our toll linked Project SPV to exhibit a stable growth in toll collections. Road transportation is the most frequently used mode of transportation in India, accounted for 86% of passenger traffic and close to 64% of freight traffic as of fiscal 2022. Although national highways constitute just 2% of road length, they accounted for about 40% of total road traffic in fiscal 2022. Road freight traffic is expected to increase at a CAGR of 3%-5% in BTKM terms between fiscals 2023 and 2028. MNCs and domestic companies setting up manufacturing plants in India will facilitate increase in passenger as well as freight traffic on roads (*Source: Crisil Report*). For further details, please see the section titled "*Discussion and analysis by the Directors of the Investment Manager of the financial condition, results of operations and cash flows of the Project SPVs of the Trust*" on page 237 and the Traffic Report attached as Annexure V.

Our annuity-based Project SPVs have received semi-annual annuities until September 30, 2023. As per the concession agreements, the relevant concessioning authorities are required to make payments on the dates set out in the concession agreements. Our annuity-based Project SPVs have predictable cash flows and bring stable income to the Trust. Annuity based projects will lower project risk for developers because the NHAI will bear the risk of traffic volume and the developer earns through fixed annuity payments. The elimination of traffic risk will provide stable cash flows to developers and ensure timely debt servicing for bankers. (*Source: Crisil Report*).

Diversified portfolio in terms of business models and geographies

The Projects comprise five hybrid annuity projects and one toll project across five states of India. We believe that the diversified revenue streams from our Projects place us in an advantageous position in the Indian roads sector providing us with steady cash flow during the course of the year.

Revenue streams: A significant portion of our revenue is derived from and is expected to continue in the future from annuities payable by the relevant concessioning authorities from our HAM Projects, which will ensure steady income for the Trust. Further, the toll revenue from our toll project comprising approximately 57.61% as per fiscal 2023 of our combined revenue from operations provides necessary growth to the revenue. Toll projects give an opportunity to have a growing in income in line with traffic growth. The electronic toll collection on national highways is estimated to have reached ₹ 46,30,000 lakh in the Fiscal Year 2023. Further, toll collections are expected to grow at a CAGR of 9.5%-10.0% between Fiscal Years 2023 and 2028 on a like-to-like basis and to grow at 18%-19% considering new road additions and subsequent tolling on them over the same period. A growth of 49% is expected in AADT between Fiscal 24 and Fiscal 30. The growth will be driven by factors such as improvement in overall economic activity, efficiency gains due to removal of check posts post implementation of GST, increase in both passenger and commercial vehicles, strong execution pipeline of road and highway projects, better compliance and blocking of leakages due to electronic toll collection. (*Source: Crisil Report*)

Annuity Track Record: The Project SPVs have received an aggregate of 23 regular semi-annual annuities till March 31, 2023. We have been receiving regular semi-annual annuities from NHAI since December 2018 and PWD Maharashtra since May 2022. The residual terms of the concession agreements range between 8 years and 14 years as of September 30, 2023. We believe that our temporally and geographically diverse project portfolio and our expertise leveraged from existing projects provides us with an advantage in capitalizing on new opportunities available in the Indian roads and highways sector. We believe that this diversification strengthens our business by reducing our reliance on any specific project and reducing the potential impact on our business of any economic slowdown or Project-specific *force majeure* event or with respect to any particular project.

Strong support from the Sponsor, Project Manager and Investment Manager

We intend to leverage the experience and expertise of our Sponsor and its affiliates, to gain a competitive advantage within the road infrastructure industry. Our Sponsor is engaged in investment activities primarily with an objective of generating stable returns and earning long term capital appreciation. Our Sponsor is affiliated with funds, vehicles and/or entities managed and/or advised by the Actis Group.

Our Sponsor is part of the Actis Group, which is a global investor in sustainable infrastructure. Since its inception, Actis Group has invested over USD 24 billion as of March 31, 2023, and manages assets across a diverse range of sectors globally. The Sponsor presently holds and operates six road assets in India which were acquired from the Welspun group in 2022 and are proposed to be transferred to the Trust pursuant to the Issue.

Drawing upon this depth of experience, our Sponsor, Investment Manager, Project Manager and their management teams have established a strong track record of operating and managing largescale projects, which will benefit us across all stages of project operations and acquisitions within India's complex regulatory framework (including, for example, strategic acquisition, O&M, and receivables management). Our Sponsor also provides us the ability to leverage its parentage and long-term industry relationships with stakeholders to gain cost efficient access to financing from institutions and capital markets. Further, our Investment Manager and Project Manager are also affiliates of the Sponsor. We believe our affiliation to Actis will allow us to pursue marque and high-quality road infrastructure assets and engage effectively with regulators and concessioning authorities.

Hedge against adverse interest rate movements

The HAM Projects have a natural hedge against the risk of adverse interest rate movement. In addition to the annuity payments due under such concession agreements during the operations period, the relevant concession agreements for HAM Projects require the relevant concessioning authority to pay interest on the reducing balance of the completion cost (equivalent to 60% of the BPC) throughout the operation period at the rate of three per cent above the prevailing RBI Bank Rate. Accordingly, any increase in operating and financing costs is likely to be offset by the increased revenues earned by us on such HAM Projects. Similarly, our toll project has a natural hedge against any indirect reduction in traffic volumes on account of high WPI-based inflation, as a high WPI mandatorily requires the toll rates to be revised on an annual basis, depending on the variation in WPI. Further, we also benefit from the mix of HAM and toll projects and are able to adopt a yield focused strategy which has a combination of hedged fixed income from our HAM Projects, and growth income from our toll project.

Attractive industry sector with favourable government policies

Further development of the infrastructure sector, in particular road infrastructure, is a priority for the GoI and many state governments and has been the subject of enhanced investment from the public sector through traditional means of public investment and new channels such as PPPs. Roads have been the key focus area for budget allocations over the years. Under Union Budget 2022-23, the Government has allocated ₹ 1,99,107.71 crore under the Ministry of Road Transport and Highways. Between FY2016-17 and FY2022-23, budget allocation for road transport and highways increased at a robust CAGR of 24.90%. CRISIL expects private construction investments in national highways to increase 2x to ₹ 2,70,00,000 lakh over fiscals 2023-2027 compared with the previous five years. This is expected to be mainly through the (HAM) mode, as the BOT toll mode may have only a few takers. About ₹ 70,00,000-80,00,000 lakh has already been invested through these models. CRISIL's analysis of BOT and HAM projects indicates a potential of ₹ 2,00,00,000-2,50,00,000 lakh in terms of enterprise value. (*Source: Crisil Report*). Overall road sector capex, comprising of National Highways, State Highways & rural roads is estimated to have grown at a CAGR of 14% between Fiscal 2018 and Fiscal 2023 (*Source: Crisil Report*).

The roads sector registered a strong pace of constructions by NHAI, growing 6,003 km (16.4 km per day) in fiscal 2023 from 3,071 km (8.4 km per day) in fiscal 2018. Investments in the roads and highways sector rose from ₹ 1,70,00,000 lakh in fiscal 2018 to ₹ 2,90,00,000 lakh in fiscal 2022, registering 1.7x growth. Bharatmala Pariyojana is an umbrella project introduced by the central government in 2015 to improve the efficiency in the roads sector. It is expected to supersede the NHDP and envisages the construction of 65,000 km of highways under the following categories: national corridor roads (north-south, east-west and Golden Quadrilateral), economic corridor roads, inter-corridor roads and feeder roads. Phase I of the scheme envisages development of 24,800 km of national highways/roads as well as 10,000 km of residual roads between fiscals 2018 and 2022 under NHDP. Awarding under Bharatmala Pariyojana began in fiscal 2018, with Phase 1 expected to stretch till fiscal 2025 (*Source: Crisil Report*). Among the sectors, infrastructure continues to be in focus, with a 30% hike in budgetary support. Through the PPP model, among others, we believe that the Nxt-Infra Trust has acquired, and will continue to capture through further acquisitions, a healthy share in the PPP format of the road infrastructure sector. For further details in relation to the industry sector, please see the section titled "*Industry Overview*" on page 134.

Skilled and experienced management team with industry experience

We have an experienced management team with several years of experience in the infrastructure sector providing us an ability to pursue our growth strategies in a seamless manner. We draw on the knowledge of our Board of Directors and key personnel, who bring us expertise in the areas of business strategy and operational and financial capabilities, amongst others. We believe this will be key to the execution of our growth strategies. Our Board comprises six directors as on the date of this Draft Placement Memorandum, with extensive experience in management, finance and infrastructure.

We believe that the experience of our management team (Investment Manager and Project Manager) in the infrastructure sector will ensure that the Project SPVs and the Trust are operated and managed in an efficient manner. With the aim of enshrining principles of good corporate governance, effective management and operations of the Nxt-Infra Trust, the Investment Manager has constituted various committees and adopted corporate governance policies to manage the activities of the Nxt-Infra Trust. The Investment Manager has further created separate audit committee and risk management committee for managing the decision-making process for the Nxt-Infra Trust. For details in relation to the corporate governance framework of the Investment Manager, please see the section titled "*Corporate Governance*" on page 123.

We believe that our governance process will ensure adherence and enforcement of principles of sound corporate governance with the objectives of fairness, transparency, professionalism, trusteeship and accountability, while facilitating effective management of the businesses and efficiency in operations.

Business Strategies

Future acquisition of completed steady revenue- generating annuity road infrastructure assets

The Investment Manager may in the future expand our initial portfolio by identifying and acquiring additional operational revenue generating projects such as toll projects and hybrid annuity or annuity projects which meet our Investment Objectives in accordance with the provisions of the Trust Deed. For further details of the Investment Objectives, please see the section titled "*Overview of the Trust*" on page 19.

In addition, the Investment Manager believes that due to trends in the industry, a number of acquisition opportunities may be available. These trends include the potential divestment of assets by government entities, reputed Infrastructure developers, and by financial and private equity investors seeking to exit their investments. The Investment Manager hopes to take advantage of these opportunities by actively sourcing and acquiring quality assets from such third parties on a case-by-case basis which is value accretive to existing unitholders. The acquisitions shall be done only after a detailed technical and financial due diligence from independent third parties and will consider factors such as access to important locations in the vicinity, connecting roads, industrial and manufacturing hubs, connectivity with raw materials, ports, availability of the relevant approvals, ease of complying with laws and also evaluating competing modes of transportation.

Institute and maintain prudent capital management policies

We focus on achieving an optimal capital structure for our projects and will continue to draw upon the experience, relationship and expertise of our Sponsor and its affiliates in sourcing funds from multiple sources, both from domestic and international markets. The Nxt-Infra Trust's total external outstanding consolidated net debt after full utilization of the Issue Proceeds, will be within the regulatory requirement of 49% of the value of the InvIT Assets upon completion of the Issue (net of cash and cash equivalents) as specified under the InvIT Regulations and shall not, in accordance with the InvIT Regulations, exceed 70% of the value of the InvIT Assets (or such other limit as may be prescribed form time to time) on an ongoing basis.

We also intend to optimize our leverage to retain enough flexibility to provide sustainable and predictable cash flows while also evaluating potential acquisition opportunities in the future. We will aim to optimize our debt and maintain a healthy credit rating at all times. We will plan to add debt after the issue to maintain an optimal capital structure. After the completion of the Issue, we believe that we will institute robust acquisition policies to support acquisition of additional assets while maintaining an optimum capital structure. Fixed / benchmark linked floating rate debt to partially/fully hedge HAM Projects and Toll Projects cashflows. We will seek to employ appropriate financing policies and also diversify our funding sources with an objective of minimizing our overall cost of capital. We will seek to optimizing our debt and equity mix in such a manner that the aggregate consolidated borrowings and deferred payments of the Nxt-Infra Trust, net of cash and cash equivalents does not exceed such value of the Nxt-Infra Trust Assets, at any time subject to the approval of the unitholders, as provided in accordance with the SEBI InvIT Regulations.

Further, any additional debt beyond 49% of the value of the Nxt-Infra Trust Assets will be raised only upon compliance with the conditions set out in the SEBI InvIT Regulations. In accordance with the Trust Deed, and subject to the Applicable Law permitting such additional debt, any additional debt will be raised only with the consent of such number of Unitholders of the Nxt-Infra Trust, as prescribed under the SEBI InvIT Regulations. If it is in the interests of the Unitholders, the Investment Manager may also pursue growth opportunities that require raising additional capital through the issuance of new Units.

Continue to ensure efficient and active asset management

We intend to continue to manage our road assets through the services of the Project Manager and the O&M Contractor with guidance from the Investment Manager. The Project Manager and the O&M Contractor will be responsible for providing routine O&M services pursuant to the provisions of the Project Implementation and Management Agreements and O&M Agreements. For further details in respect of our O&M arrangements, please see the section titled "*Business – Key O&M Agreements*" on page 184.

Structure of the Nxt-Infra Trust

The Sponsor has set up the Nxt-Infra Trust on October 26, 2023, as an irrevocable trust, under the provisions of the Trusts Act, 1882. The Nxt-Infra Trust is registered as an infrastructure investment trust under the InvIT Regulations on October 26, 2023, having registration number IN/INVIT/23-24/00028. The Nxt-Infra Trust's principal investment objectives to carry on the activity of an infrastructure investment trust as permissible in terms of the InvIT Regulations. Investment by the Nxt-Infra Trust shall be in accordance with the InvIT Regulations, either directly or through special purpose vehicles or holding companies or securities of Indian companies related to the infrastructure sector or government securities or money market instruments, liquid mutual funds or cash equivalents, as permitted under the InvIT Regulations and the acquisition policy.

The Nxt-Infra Trust will acquire the initial portfolio asset which comprises the Project SPVs consisting of the Projects. The Nxt-Infra Trust will, subject to receiving the requisite approvals, acquire the Projects through the acquisition of the issued and paid-up equity share capital of the Project SPVs from the Sponsor. Please see the section titled "*Formation Transactions in Relation to the Trust*" on page 22, for a graphical representation of the structure of the Nxt-Infra Trust.

Brief description of the Projects

The initial portfolio of the Nxt-Infra Trust comprises six Projects that are operated and maintained through the Project SPVs. The Project SPVs, other than WIPL have undertaken or are undertaking their respective Projects on a HAM basis, pursuant to which they design, build, finance, operate and maintain the Projects pursuant to concession agreements with the relevant concessioning authorities. WIPL operates the project on a toll basis pursuant to which it designs, build, finance, operate and maintain and toll the project pursuant to concession agreement with the relevant concessioning authority.

Salient Features of the Projects		
Particulars	**HAM**	**Toll**
Bid Criteria	Bid project cost ("**BPC**") and first year O&M payable during operation (Both BPC and O&M are indexed with inflation from bid date at every payment invoice)	One time grant receivable from the relevant concessioning authority or annual premium payable to the relevant concessioning authority
Bid Parameter	Lowest lifecycle cost considering net present value of BPC & O&M bids	Lowest grant or highest premium, as the case maybe
Payments during Construction	40% of the BPC, linked to physical progress in five equal instalments	Grant if payable else Nil
Payments during Operation/Revenue	**60% of the BPC is paid in bi-annual annuities over 15 years** after COD along with interest at 3 per cent above the RBI Bank Rate and O&M payment as per bid norms	**Actual Toll Collection.** Toll rates are revised and notified annually by the relevant concessioning authority with a fixed formula which consists of one fixed component (3% annual) and second inflation linked (40% of WPI)
Concession Period	Construction period and 15 years of operations	As per the respective concession agreements
Revenue Risk	There is no revenue risk as it is not dependent on actual traffic plying on project stretch and the bi-annual annuity, interest and O&M payments are made by the relevant concessioning authority irrespective of the traffic.	The revenue is directly linked with the actual traffic plying on the project stretch. This risk is partially mitigated by annual revision in toll rates with fixed increase of 3% and 40% of variation in WPI.

The Projects

The concessioning authority for the state projects is the Public Works Department, Government of Maharashtra ("**PWD, Maharashtra**"), and for the national highway projects are the National Highways Authority of India ("**NHAI**") (collectively, the "**Concessioning Authorities**"). Each of the concessioning authorities is a government entity.

Apart from WIPL, all the other five Projects are operated and managed on a HAM model. HAM was introduced in January 2016 by the Government of India with an intent to share the financial risk with the developers, given that infrastructure projects are capital intensive in nature. In a HAM project, the concessioning authority shares a portion of the total project cost during the construction phase. As a mix of EPC and annuity models, HAM reduces the financial burden of a concessionaire during the project construction phase and provides an assured revenue in form of annuities, interest on reducing balance of completion cost (BCC) and O&M payments linked to inflation in the operational phase. Annuity payments eliminate the risk of income fluctuations resulting from changes in traffic volumes.

In a toll-based project, concessionaires are allowed to collect tolls from vehicles that use their project carriageways during the concession period at rates notified by the relevant concessioning authority, as updated from time to time. Income collected on

a toll basis thus fluctuates as traffic volume changes, which is a risk inherent in the operation of our toll roads. This risk is partially mitigated by annual revision in toll rates with fixed increase of 3% and 40% of variation in WPI.

Nxt-Infra CGRG Highways Limited

Start Point at km. 0.000 (NH-73) End Point at km. 35.400 (NH-73)

Start Point at km. 0.000 (NH-72A) End Point at km. 17.900 (NH-72A)
(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Concession agreement

CGRG entered into the concession agreement dated May 27, 2016 (the "**CGRG Concession Agreement**"), pursuant to which CGRG was engaged on a design, build, operate and transfer basis for the development, maintenance and management of NH 72A and 73 including the section from km 0.000 to km 16.000 of NH 72A and from km 0.000 to km 33.000 of NH 73 (approx. 53.300 km).

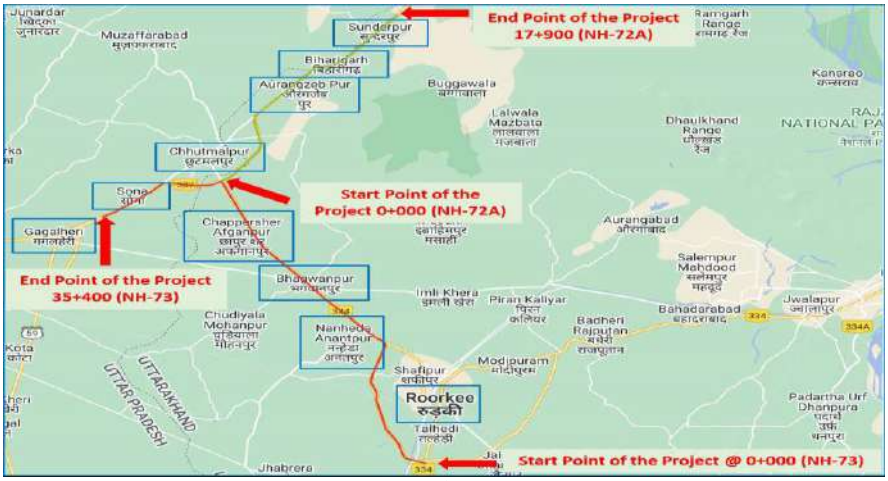
The CGRG Concession Agreement was granted for construction period of 730 days and operation period of 15 years from the COD. As consideration, upon achieving commercial operation date for the project highway and CGRG accepting the concession and undertaking to perform and discharge its obligations in accordance with the terms, conditions and covenants set forth in the CGRG Concession Agreement. Pursuant to this arrangement, as of September 30, 2023, total revenue in CGRG were ₹ 3,665.10 lakhs. CGRG pays ₹ 1 per year, as concession fee. For further details on the CGRG Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

Corridor description:

CGRG corridor has four-lane divided carriageway consisting of two section of national highways, NH-72A and NH-73. It has rigid pavement in the entire length with 7.0m & 10.5m wide carriageway plus 1.5m paved shoulder and 0.5m shyness on each side. The total lane-kms of CGRG is 213 and type of pavement is rigid.

The corridor generally runs in plain terrain. CGRG - NH-73 passes through villages like Roorkee, Bhagwanpur, Chutmalpur, Sona and Gagalehri and CGRG - NH-72A passes through Chutmalpur, Aurangzebpur, Biharigarh and Sundarpur etc.

The map below illustrates the location of the Project and the corridor it covers:



(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Salient Features

Salient features of the CGRG Project include:

S. No.	Description	Unit	As per CGRG Concession Agreement
1	Start Chainage (Km)-NH-73	km.	0.000
2	End chainage (Km)-NH-73	km.	35.400
1	Start Chainage (Km)-NH-72A	km.	0.000
2	End chainage (Km)-NH-72A	km.	17.900
3	Length of the Project Corridor	km	53.300
4	Service Road / Slip Road	km	39.47
5	Toll Plaza	Nos.	2
6	No. of Lanes	Nos.	As per Manual (IRC: SP 84)
7	ROBs	Nos.	1
8	Flyovers	Nos.	1
9	VUPs	Nos.	4
10	LVUP's	Nos.	9
11	PUP's	Nos.	04
12	Major Bridges	Nos.	03
13	Minor Bridges	Nos.	08
14	Culverts (Pipe)	Nos.	42
15	Culvert (Slab/Box)	Nos.	16
16	Major Junctions	Nos.	2
17	Minor junctions	Nos.	20
18	W-Beam Safety Barriers	km	37.00
19	Rigid Concrete Barrier	km	8.6
20	Kilometer / Hectometer / Boundary Stones	Nos.	104/432/106
21	Gantry Sign Boards	Nos.	03
22	Cantilever Sign Boards	Nos.	11
23	No of Truck Lay bye	Nil	04
24	No of Bus Bays with Shelter	Nos.	38
25	Rest Areas	No's	4

(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Operation and Maintenance

For details of the O&M obligations of CGRG under the CGRG Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

Project cost and financing

The cost of the CGRG Project net of grant / construction support received from NHAI during the construction period (wherever applicable) is ₹ 65,269.79 lakhs. This cost does not include non-EPC expenditure. As of September 30, 2023, equity invested (including Optionally Convertible Debentures) was ₹ 16,350.9 lakhs and debt outstanding to lenders was ₹ 47,061.51lakhs.

Chikhali- Tarsod Highways Private Limited ("CTHPL")

(Start Point at km.360.000) (End point at km. 422.700)
(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Concession agreement

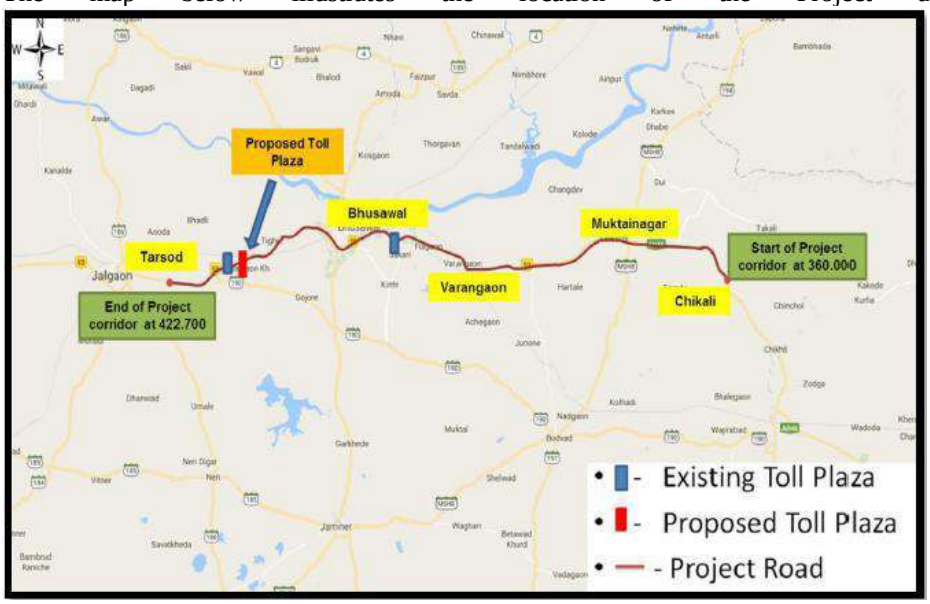
CTHPL entered into the concession agreement dated April 3, 2017 (the "**CTHPL Concession Agreement**"), pursuant to which CTHPL was engaged on a design, build, operate and transfer basis for the development, maintenance and management of NH 6 including the section from km 360.000 to km 422.700 of NH 6 and from km 359.310 to km 423.680 of NH 6 (approx. 62.700 km).

The CTHPL Concession Agreement was granted for construction period of 910 days and operation period of 15 years from the COD. As consideration, upon achieving commercial operation date for the project highway and CTHPL accepting the concession and undertaking to perform and discharge its obligations in accordance with the terms, conditions and covenants set forth in the CTHPL Concession Agreement. Pursuant to this arrangement, as of September 30, 2023, total revenue in CTHPL were ₹ 5,296.53 lakhs. CTHPL pays ₹ 1 per year, as concession fee. For further details on the CTHPL Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

Corridor description

CTHPL is a four-lane divided corridor passing through Pimprikaraut, Muktainagar, Varungaon, Bhusawal and Jalgaon khurd villages. Most length of CTHPL road runs through plain terrain and with intermittent locations in rolling terrain. The existing NH-16 numbering has been changed with new NH-53. The total lane-kms of CTHPL is 251 and type of pavement is flexible.

The map below illustrates the location of the Project and the corridor it covers:



(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Salient Features

Salient features of the CTHPL Project include:

S. No	Description	Unit	As per CTHPL Concession Agreement
1	Start Chainage (km)	km.	360.000
2	End chainage (km)	km.	422.700
3	Length of the Project Corridor	km	62.700
4	Service Road / Slip Road	km	62.796
5	Toll Plaza	Nos.	2 No. (1 New +1 Existing) (Existing Fekri Toll Plaza to dismantled)
6	No. of Lanes	Nos.	As per IRC SP 84-2014
7	ROBs	Nos.	4
8	ROBs-Reconstruction	Nos.	-
9	ROBs-Rehabilitation	Nos.	2
10	ROBs-Widening	Nos.	-
11	ROBs-New	Nos.	2
12	VUPs	Nos.	09
13	LVUP's	Nos.	01
14	PUP's	Nos.	16
15	Major Bridges	Nos.	03
20	Minor Bridges	Nos.	22+ under COS: 3 N0s.
Culverts (Pipe)			
27	Culverts-Reconstruction	Nos.	21
28	Culverts-Rehabilitation	Nos.	-
29	Culverts-Widening	Nos.	39
30	Culverts-New	Nos.	5
Culvert (Slab/Box)			
32	Culverts-Reconstruction	Nos.	25
33	Culverts-Rehabilitation	Nos.	-
34	Culverts-Widening	Nos.	17
35	Culverts-New	Nos.	Box-04
36	Streetlights	Kms	As per Manual (IRC-SP84-2014)
37	High Mast Lights	Nos.	As per Manual (IRC-SP84-2014)
38	Solar Blinkers	Nos.	As per Manual (IRC-SP84-2014)
39	Covered Drain cum Foot path	km	-
40	Median Opening	Nos.	-
41	Major Junctions	Nos.	06
42	Minor junctions	Nos.	67
43	W-Beam Safety Barriers	km	As per manual (IRC SP: 84-2014)
44	Rigid Concrete Barrier	km	As per manual (IRC SP: 84-2014)
45	Guard Posts	Nos	-
46	Pedestrian Guard Rails	km	As per manual (IRC SP: 84-2014)
47	Road Markings	km	As per Sch-C to be provided in Consultation with IE
48	Gantry Sign Boards	Nos.	As per Sch-C to be provided in Consultation with IE
49	Cantilever Sign Boards	Nos.	As per Sch-C to be provided in Consultation with IE
50	No of Truck Layby	Nos.	01
51	No of Bus Bays with Shelter	Nos.	13 -Both
52	Double Arm Lightings	No's	As per manual (IRC SP: 84-2014)
53	Three Arm Lightings	No's	As per manual (IRC SP: 84-2014)
54	Single Arm Lightings	No's	As per manual (IRC SP: 84-2014)

(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Operation and Maintenance

For details of the O&M obligations of CTHPL under the CTHPL Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

Project cost and financing

The cost of the CTHPL Project net of grant / construction support received from NHAI during the construction period (wherever applicable) is ₹ 76,385.53 lakhs. This cost does not include non-EPC expenditure. As of September 30, 2023, equity invested (including Optionally Convertible Debentures) was ₹ 46,121.8 lakhs and debt outstanding to lenders was ₹ 49,736.78 lakhs.

M/s Welspun Delhi Meerut Expressway Private Limited ("DME")

(*Start point of DME*) (*End point of DME*)

(Corridor with 0.75m CCB, at Km 1.750) (Corridor with 0.75m CCB width, at Km 5.200)

(Corridor - 0.5m CCB (Median) at Km 7.000) (Corridor with CCB BHS & Overhead gantry, at Km 7.900)
(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Concession agreement

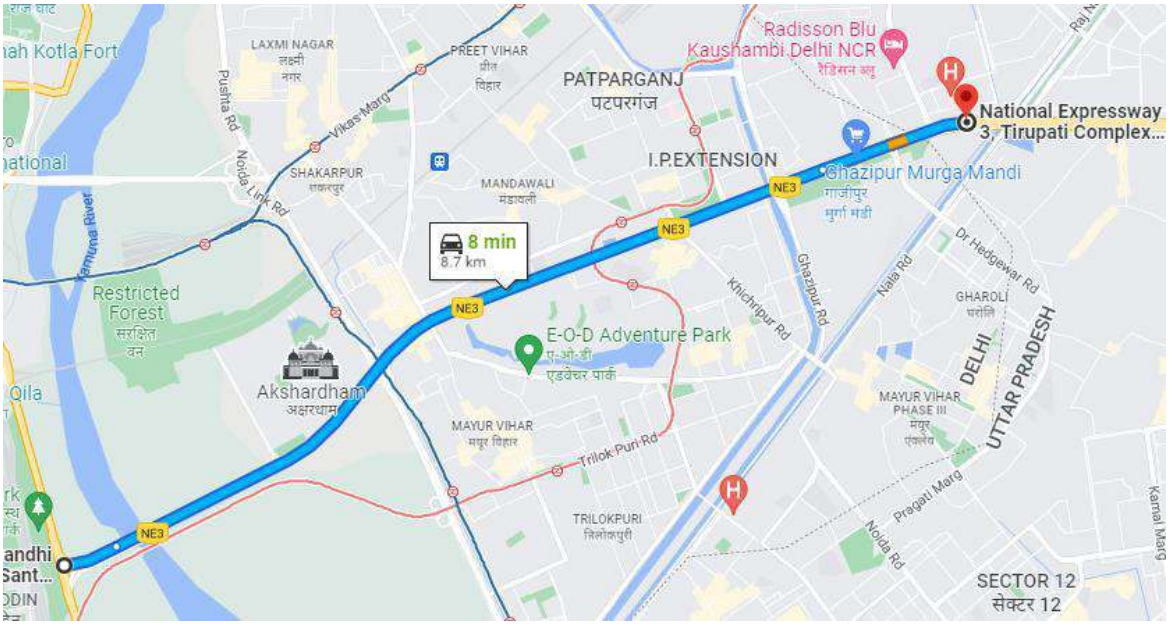
DME entered into the concession agreement dated March 4, 2016 (the "**DME Concession Agreement**"), pursuant to which DME was engaged on a design, build, operate and transfer basis, for the development, maintenance and management of NH 24 including the section from km 000.000 to km 8.360 (174approx. 8.716 km).

The DME Concession Agreement was granted for construction period of 910 days and operation period of 15 years from the COD. As consideration, upon achieving commercial operation date for the project highway and DME accepting the concession and undertaking to perform and discharge its obligations in accordance with the terms, conditions and covenants set forth in the DME Concession Agreement. Pursuant to this arrangement, as of September 30, 2023, total revenue DME was ₹ 2,494.00 lakhs. DME pays ₹ 1 per year, as concession fee. For further details on the DME Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

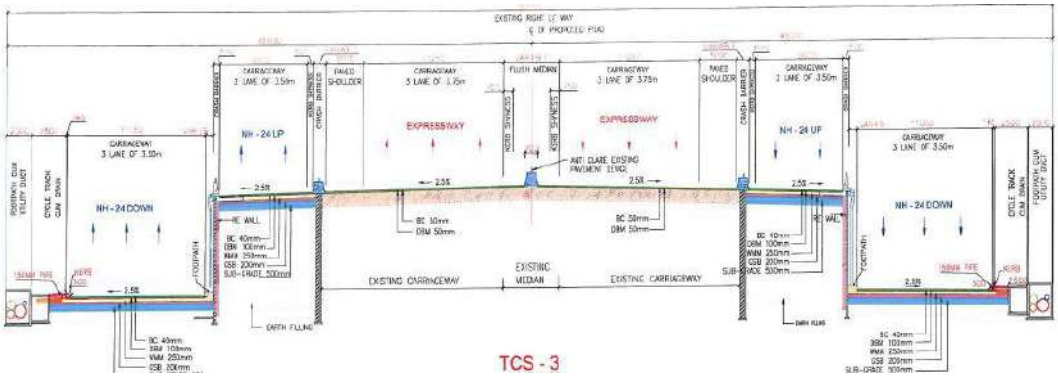
Corridor description

DME road consists of elevated six-lane expressway corridor and is attached with NH24-UP(3-lane) and NH-24-DN(2-lane) on either side of expressway. DME Corridor starts nearby Indraprastha park at km 0+000 of (NE-3 and NH-9) ends at UP border at km 8.716 of (NE-3& NH-9). The total lane-kms of DME is 122 and type of pavement is flexible

The map below illustrates the location of the Project and the corridor it covers:



(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)



(Typical Cross section of expressway attached to NH-24 UP & DN on either direction)
(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Salient Features

Salient features of the DME Project include:

S.No.	Particulars	Length/ Nos.	As per DME Concession Agreement
1	Start Chainage (Km)	Km	0
2	End chainage (Km)	Km	8.716
3	Length of the Project Corridor	Kms	8.716
4	Cycle Track Length	Kms	17.432
5	Flyovers	Nos.	5
6	VUPs	Nos.	4
7	FOBs	Nos.	4
8	Major Bridges	Nos.	1
9	Minor Bridges	Nos.	2
10	Major Junctions	Nos.	23
11	Full Height RE Wall	Kms	8.064
12	W-Beam Safety Barriers	Kms	3.156
13	Rigid Concrete Barriers	Kms	26.826

(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Operation and Maintenance

For details of the O&M obligations of DME under the DME Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

Project cost and financing

The cost of the DME Project net of grant / construction support received from NHAI during the construction period (wherever applicable) is ₹ 54,111.42 lakhs. This cost does not include non-EPC expenditure. As of September 30, 2023, equity invested (including Optionally Convertible Debentures) was ₹ 4,622.7 lakhs and debt outstanding to lenders was ₹ 29,917.18 lakhs.

(Start point at km. 35.400) (End point at km. 86.855)
(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Concession agreement

GSY entered into the concession agreement dated May 27, 2016 (the "**GSY Concession Agreement**"), pursuant to which GSY was engaged on a design, build, operate and transfer basis, for the development, maintenance and management of NH 73 including the section from km 33.000 to km 71.640 (approx. 51.455 km).

The GSY Concession Agreement was granted for construction period of 730 days and operation period of 15 years from the COD. As consideration, upon achieving commercial operation date for the project highway and GSY accepting the concession and undertaking to perform and discharge its obligations in accordance with the terms, conditions and covenants set forth in the GSY Concession Agreement. Pursuant to this arrangement, as of September 30, 2023, total revenue in GSY were ₹ 4,105.11 lakhs. GSY pays ₹ 1 per year, as concession fee. For further details on the GSY Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

Corridor description

GSY corridor has rigid pavement in the entire length with 7.0m wide carriageway with additional 1.5-meter paved shoulder on each side. In approach locations 10.5-meter-wide carriageway with additional 1.5-meter paved shoulder on each side. GSY corridor generally runs in pain terrain. It passes through villages like Gagalheri, kailashpur, Mahipura, Saharanpur, Ismailpur, Sarsawa, etc. The total lane-kms of GSY is 206 and type of pavement is flexible

The map below illustrates the location of the Project and the corridor it covers:

(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Salient Features

Salient features of the GSY Project include:

S. No	Description	Unit	As per GSY Concession Agreement
1	Start Chainage (km)	Km.	35.400
2	End chainage (km)	Km.	86.855
3	Length of the Project Corridor	Km.	51.455
4	Service Road / Slip Road	Km.	14.834
5	Toll Plaza	Nos.	1
6	No. of Lanes	Nos.	As per IRC SP 84-2014
7	ROBs	Nos.	3
8	ROBs-Reconstruction	Nos.	-
9	ROBs-Rehabilitation	Nos.	-
10	ROBs-Widening	Nos.	-
11	ROBs-New	Nos.	-
12	RUB's	Nos.	-
13	Interchange /GS	Nos.	-
14	Flyovers	Nos.	1
15	VUPs	Nos.	10
16	LVUP's	Nos.	10
17	PUP's	Nos.	6
CUP's			
19	FOBs	Nos.	-
20	Major Bridges	Nos.	3
21	Major Bridges-Reconstruction	Nos.	-
22	Major Bridges-Rehabilitation	Nos.	1
23	Major Bridges-Widening	Nos.	-
24	Major Bridges-New	Nos.	-
25	Minor Bridges	Nos.	9
26	Minor Bridges-Reconstruction	Nos.	1
27	Minor Bridges-Rehabilitation	Nos.	-
28	Minor Bridges-Widening	Nos.	-
29	Minor Bridges- Retained	Nos.	-
Minor Bridges-New			
Culverts (Pipe)			
32	Culverts-Reconstruction	Nos.	3
33	Culverts-Rehabilitation	Nos.	1
34	Culverts-Widening	Nos.	1
35	Culverts-New	Nos.	-
36	Culvert (Slab/Box)	Nos.	13
37	Culverts-Reconstruction	Nos.	-
38	Culverts-Rehabilitation	Nos.	-
39	Culverts-Widening	Nos.	-
40	Culverts-New	Nos.	-
41	Street Lights	Kms	As per Schedule-D (IRC: SP:84-2014)
42	High Mast Lights	Nos.	As per Schedule-D (IRC: SP:84-2014)
43	Solar Blinkers	Nos.	-
44	Covered Drain cum Foot path	km	-
45	Median Opening	Nos.	-
46	Major Junctions	Nos.	2
47	Minor junctions	Nos.	4
48	W-Beam Safety Barriers	km	37.000
49	Rigid Concrete Barrier	km	8.600
50	Guard Posts	Nos	-
51	Pedestrian Guard Rails	km	-
52	Road Markings	km	As per IRC:35
53	Traffic Delineators	Nos.	-
54	Kilometer / Hectometer / Boundary Stones	Nos.	100/411
55	Gantry Sign Boards	Nos.	3
56	Cantilever Sign Boards	Nos.	4
57	No of Truck Lay bye	Nil	2
58	No of Bus Bays with Shelter	Nos.	12
59	Double Arm Lightnings	No's	As per Schedule-D (IRC: SP:84)
60	Three Arm Lightnings	No's	As per Schedule-D (IRC: SP:84)

(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Operation and Maintenance

For details of the O&M obligations of GSY under the GSY Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

Project cost and financing

The cost of the GSY Project net of grant / construction support received from NHAI during the construction period (wherever applicable) is ₹ 83,473.86 lakhs. This cost does not include non-EPC expenditure. As of September 30, 2023, equity invested (including Optionally Convertible Debentures) was ₹ 19,438.0 lakhs and debt outstanding to lenders was ₹ 60,280.76 lakhs.

Welspun Infrafacility Private Limited ("WIPL")

Typical cross-section of the highway

(Source: Steer Site Visit)

Bhagan Toll Plaza / OD survey

(Source: Steer Site Visit)

Key Asset Connections

(Source: Steer Site Visit)

Concession agreement

WIPL entered into the concession agreement dated August 28, 2015 (the "**WIPL Concession Agreement**"), pursuant to which WIPL was engaged on a design, build, operate and transfer basis, for the development, maintenance and management of NH 1 (New NH 44) including the section from km 15.500 to km 86.000 (approx. 69.849 km).

The WIPL Concession Agreement was granted for construction period of 910 days from the COD. As consideration, upon achieving commercial operation date for the project highway and WIPL accepting the concession and undertaking to perform and discharge its obligations in accordance with the terms, conditions and covenants set forth in the WIPL Concession Agreement. Pursuant to this arrangement, as of September 30, 2023, total revenue in WIPL were ₹ 15,141.09 lakhs*. WIPL pays ₹ 1 per year, as concession fee. For further details on the WIPL Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

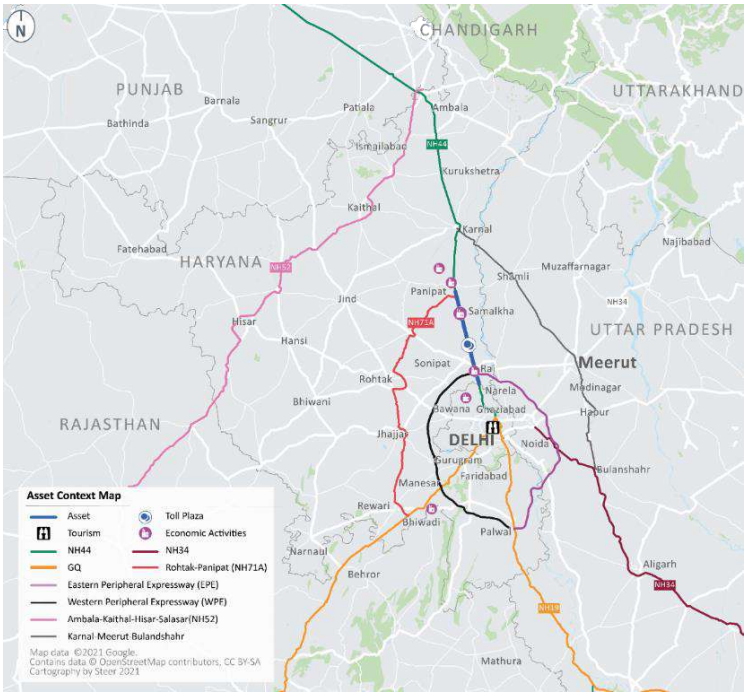
**Note: In relation to WIPL, accounting in Special Purpose Combined Financial Statements is as per equity method as per Ind AS 28, hence, only 49% share of profit/ loss is picked up considering joint control. All numbers with respect to WIPL, including in relation to projections, are considered only to the extent of 49% in the document.*

Corridor description

WIPL forms part of NH 44 which is a north south corridor connecting Srinagar in Jammu and Kashmir to Kanyakumari in Kerela, runs from km 15.500 to km 86.000. It connects the states of Delhi and Haryana and is a direct feeder into the National Capital, Delhi. It passes through the urban settlements of Delhi, Sonipat and Panipat. The total lane-kms of WIPL is 564 and type of pavement is flexible. Four flyovers, one major bridge, three minor bridges, one pedestrian under pass and one vehicle under pass between section Km 29 to Km 37 have been hampered due to farmers' agitation, amongst others, and are under cosntruction in this section. For further details please see the *'Technical Report'* attached at Annexure IV.

The maps below illustrate the location of the Project and the corridor it covers:

(Source: Steer cartography based on OpenStreetMap data)



(Source: Steer cartography based on OpenStreetMap data)

According to the Traffic Report, the factors that contribute to traffic growth on the Project include, among other things:

Car and Bus – It attracts high volume of passenger traffic on daily basis due to its function as a key road connection between a large urban centre in Delhi to several industrial towns in the North such as (e.g., Kundli, Panipat, Sonepat, Chandigarh). This is alongside catering for strong tourism demand to attractors in states such as Himachal Pradesh, and the establishment of well-known commercial, entertainment, and educational attractors located along the Asset. Passenger traffic from the region dominates, driven by some of India's highest rates of car ownership in Delhi (28%) and Haryana (22%).

LCV and 2A - Light and medium sized commercial vehicles cater to consumer demand of the urban centres and carry industrial goods. Panipat is well known for its production of textiles, while Delhi has several industrial hubs like Narela, which exist along the WIPL. There are also significant movements of Compressed Natural Gas (CNG) trucks supplying demand for these commodities in Delhi and nearby industrial centres.

3A and MAV – Heavy commercial vehicles demand is driven by the movement of commodities from strong producer states in the northern regions of the country, such as agriculture distribution from states such as Punjab and Haryana. WIPL enables medium to long distance trips to industrial centres in and around Delhi and also further south of the country through access to the Western Peripheral Expressway (WPE) (also called as KMP Expressway) and Eastern Peripheral Expressway (EPE).

Traffic volume

Historical traffic - Traffic volumes observed:

	FY23	April 23	May 23	June 23	July-23	Aug-23
CJV	51,493	53,537	53,328	59,090	46,042	49,996
LCV	3,459	3,164	3,173	3,302	3,133	3,078
Bus	1,866	1,950	2,081	2,119	1,897	1,824
2A	4,285	4,038	4,007	4,078	4,279	4,217
3A	1,808	1,621	1,602	1,568	1,616	1,557
MAV	4,625	4,007	3,957	3,958	4,211	4,200
Total (Nos.)	**67,545**	**68,321**	**68,152**	**74,117**	**61,183**	**64,875**
Total (PCU)	**101,415**	**99,162**	**98,985**	**105,162**	**93,089**	**96,324**
LCV+Bus+2A	9,610	9,151	9,261	9,498	9,309	9,119
3A+MAV	6,433	5,628	5,559	5,526	5,827	5,757

(*Source: Steer Report*)

Historical traffic

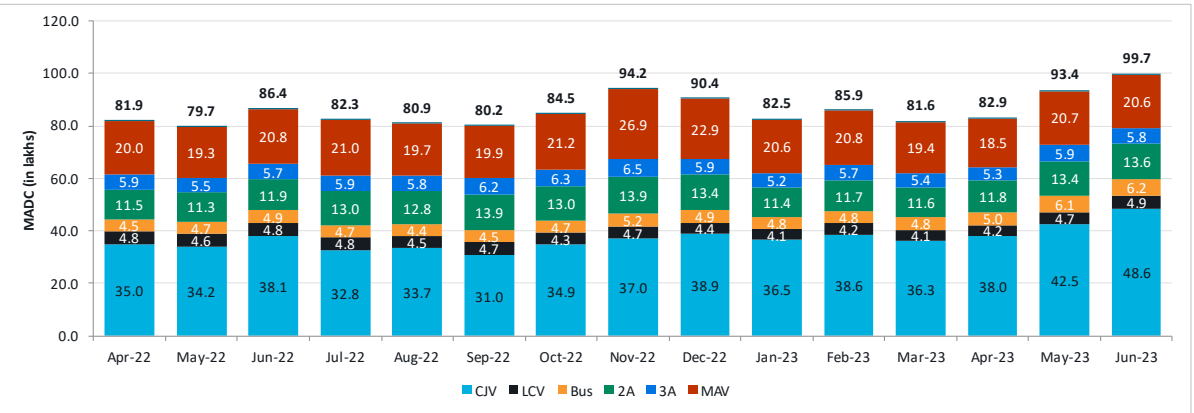
AADC Evolution (lakhs):

AADC	FY23	Apr-23	May-23	June-23
CJV	34.7	38.0	42.5	48.6
LCV	4.4	4.2	4.7	4.9

AADC	FY23	Apr-23	May-23	June-23
Bus	4.6	5.0	6.1	6.2
2A	12.2	11.8	13.4	13.6
3A	5.7	5.3	5.9	5.8
MAV	20.5	18.5	20.7	20.6
Total (Lakhs)	**82.1**	**82.9**	**93.4**	**99.7**
Total Collection (Crores)	**299.8**	**24.9**	**28.9**	**29.9**

(*Source: Steer Report*)

Monthly Revenue Profile: Average Daily Collection (INR Lakhs) (Revised toll length applicable):



(*Source: Steer Report*)

Salient features of the WIPL Project include:

S. No.	Description	Unit	As per WIPL Concession Agreement
1	Start Chainage (km)	km.	14.972
2	End chainage (km)	km.	86.361
3	Length of the Project Corridor	km	71.389
4	Service Road / Slip Road	km	138.300
5	Toll Plaza	Nos.	1
6	Flyovers	Nos.	10
7	VUPs	Nos.	5
8	PUP's	Nos.	6
9	CUP's	Nos.	2
10	FOBs	Nos.	11
Major Bridges			
12	Major Bridges-Reconstruction	Nos.	Nil
13	Major Bridges-Rehabilitation	Nos.	Nil
14	Major Bridges-Widening	Nos.	Nil
15	Major Bridges-New	Nos.	Nil
Minor Bridges			
17	Minor Bridges-Reconstruction	Nos.	13 MCW BHS
18	Minor Bridges-Rehabilitation	Nos.	5 MCW BHS / 2 SR BHS and 1 SR RHS
19	Minor Bridges-Widening	Nos.	1 SR RHS
20	Minor Bridges-New	Nos.	16 SR LHS and 14 SR RHS
Culverts (Pipe)			
22	Culverts-Reconstruction	Nos.	Not specified
23	Culverts-Rehabilitation	Nos.	Not specified
24	Culverts-Widening	Nos.	29 (SR BHS)
25	Culverts-New (Including HPC)	Nos.	Not specified
Culvert (Slab/Box)			
27	Culverts-Reconstruction	Nos.	14 Box (MCW BHS)
28	Culverts-Rehabilitation	Nos.	Not specified
29	Culverts-Widening	Nos.	02 Slab / 36 Box (SR BHS)
30	Culverts-New	Nos.	Not specified
31	Street Lights	Kms	As per Manual IRC: SP:87-2013
32	High Mast Lights	Nos.	As per Manual IRC: SP:87-2013
33	Solar Blinkers	Nos.	As per IRC Manual
34	Major Junctions	Nos.	15
35	Minor junctions	Nos.	23
36	W-Beam Safety Barriers	km	96.950 (BHS)
37	Kilometer / Hectometer / Boundary Stones	Nos.	142/710/2840
38	Gantry Sign Boards	Nos.	23
39	Cantilever Sign Boards	Nos.	46
40	Only Bus bays	Nos.	78 (BHS)

S. No.	Description	Unit	As per WIPL Concession Agreement
41	Double Arm Lightnings-Length	km	66.200 (BHS)
42	RE Wall	km	17.449 (BHS)
43	Road Signs	No's	As per Sch-D & IE
44	RCC Cover Drain	km	211.856 (BHS)
45	Steel Railing	Kms	71.946 (BHS)

(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Note: For details, see Traffic Report attached as Annexure V.

Welspun Road Infra Private Limited ("WRIPL")

(A view of WRIPL road with 7.0m wide at Km: 4.000_SH-312, Package-1) (A view of WRIPL road Km: 1.000 -Package 2)

(A view of WRIPL road Km: 27.885, Package-3) (A view of WRIPL road Km: 181.100, Package 4)

(A view of WRIPL road Km: Km: 69.145, Package 6) (A view of WRIPL road Km: 29.600 -SH-296-Package)
(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Concession agreement

WRIPL entered into the concession agreement dated January 10, 2019 (the "**WRIPL Concession Agreement**"), pursuant to which WRIPL was engaged on a design, build, operate and transfer basis, for (i) improvement to roads joining district place in Akola District (Akola Mhaisang Daryapur) (SH 280 SH 312 Length 41.59Km); (ii) improvement to Roads joining Taluka place in Akola and Amravati District (Anjangaon Daryapur) (SH 282 Length 26.80 Km); (iii) improvement to Roads joining Taluka place in Akola and Amravati District (Daryapur Murtizapur) (SH 282 Length 22.42 Km); (iv) improvement to Roads joining District place in Amravati district (Daryapur Walgaon) (SH 47 length 44.15km); (v) improvement to Amravati Mardi Kurha Kaundynapur up to district boarder road in Amravati district joining Kaundynaour Holy place to Amravati district HQ (SH 280, SH 300 & SH 294; (vi) improvement to Amravati-Bhatkuly-Asara road joining Bhatkul Taluka HQ to Amravati District HQ of (SH-280); (vii) improvement to Amravati Candur Railway Dhamangaon road in Amravati district joining Chandur railway and Dhamangaon Taluka HQ to Amravati district HQ (SH 297 & 296); (viii) improvement to roads for Chikhaldara hill station in Amravati district (Paratwada Chikhaldara Ghatang road); and (ix) improvement to roads joining district place in Amravati district (Warun Gavankund Bahada Jarud Mangruli Kachrna Haturna and Morshi Pala Salbardi Dongaryavali Dapori) project in the state of Maharashtra by two lane with paved shoulder thereof.

The WRIPL Concession Agreement was granted for construction period of 730 days and operation period of 10 years from the COD. As consideration, upon achieving commercial operation date for the project highway and WRIPL accepting the concession and undertaking to perform and discharge its obligations in accordance with the terms, conditions and covenants set forth in the WRIPL Concession Agreement. Pursuant to this arrangement, as of September 30, 2023, total revenue in WRIPL were ₹ 5,564.61 lakhs. WRIPL pays ₹ 1 per year, as concession fee. For further details on the WRIPL Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

Corridor description

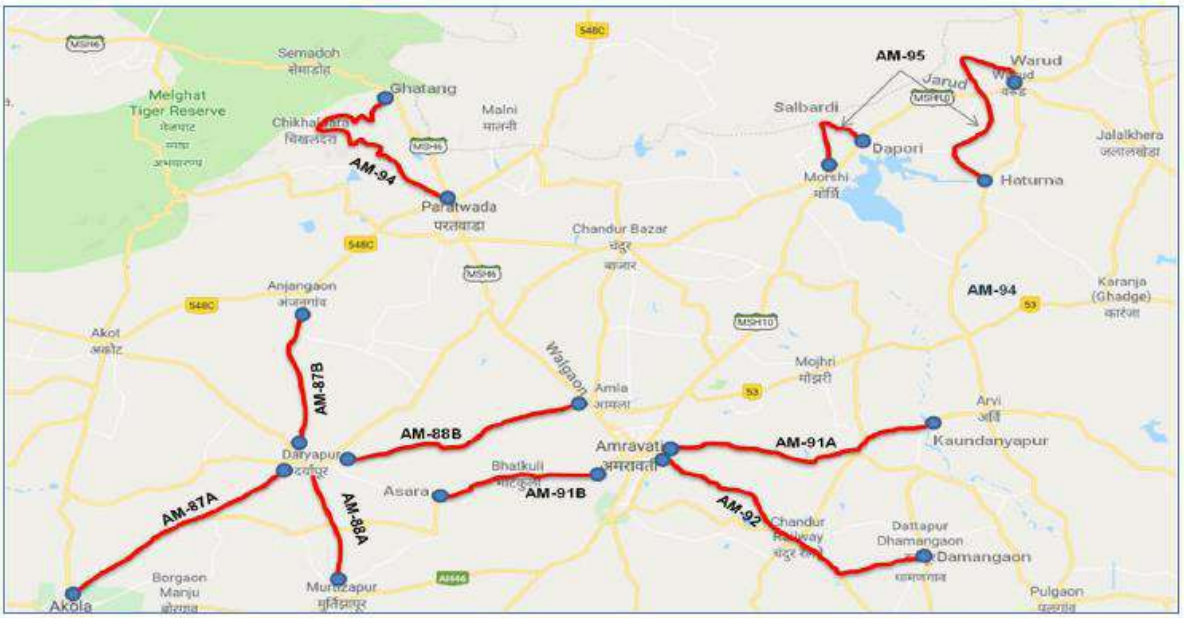
WRIPL consists of nine package and covers seventeen 17 (seventeen) road sections in Amaravati district and Akola district. These roads are part of few state highways (SH) and major district roads (MDR). Most length of packages runs through plain and rolling terrain, except Package-8, Chikhaldara which is on hilly station passes through forest lands. Intermittent lengths of package-5,6 &7 also consists of forest lands. The total lane-kms of WRIPL is 724 and type of pavement is flexible.

List of WRIPL Corridor details

Pkg	Description	Length (Km)
Pkg-1	AM- 87A: Improvement to Roads joining District place in Akola District (Akola Mhaisang Daryapur) (SH 280 SH-312 Length 41.59 Km)	41.59
Pkg-2	AM- 87B: Improvement to Roads joining Taluka place in Akola and Amravati District (Anjangaon Daryapur) (SH 282 Length 26.80 Km)	26.8
Pkg-3	AM- 88A: Improvement to Roads joining Taluka place in Akola and Amravati District (Daryapur Murtizapur) (SH 282 Length 22.42 Km)	22.42
Pkg-4	AM- 88A: Improvement to Roads joining District place in Amravati District (Daryapur Walgaon) (SH47 Length 44.15 Km)	44.15
Pkg-5	AM- 91A: Improvement to Amravati Mardi Kurha Kaundynapur up to District Border Road in Amravati District Joining Kaundynapur Holy place to Amravati Dist. HQ (SH 280, SH 300 & SH 294). Length- 39.70 Km.	39.7
Pkg-6	AM- 91B: Improvement to Amravati-Bhatkuli-Asara Road joining Bhatkuli Taluka HQ to Amravati District HQ of (SH-280). Length- 28.92 Km.	28.92
Pkg-7	AM- 92: Improvement to Amravati Chandur Railway Dhamangaon Road in Amravati Dist. Joining Chandur Railway & Dhamangaon Taluka HQ to Amravati Dist. HQ (SH 297& 296). Length - 49.7 Km.	49.7
Pkg-8	AM- 94: Improvement to Roads for Chikhaldara Hill Station in Amravati District. (Paratwada -Chikhaldara - Ghatang Road) (SH-305, MDR-8). Length - 52.574 Km.	52.574
Pkg-9	AM- 95: Improvement to Roads joining District place in Amravati District. (Warud - Gavankund -Bahada - Jarud - Mangruli - Kachurna - Haturna and Morshi - Pala - Salbardi - Dongaryavali - Dapori) (MDR-66, MDR-45). Length - 46.305 Km.	46.305
TOTAL (Km)		**352.15**

(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

The map below illustrates the location of the Project and the corridor it covers:



(Source: Technical Diligence Report issued by Samarth Infraengg Technocrats Private Limited)

Salient Features

Please refer to Technical Diligence Report attached as Annexure IV

Operation and Maintenance

For details of the O&M obligations of WRIPL under the WRIPL Concession Agreement, please see the section titled "*Summary of Key Agreements*" on page 186.

Project cost and financing

The cost of the WRIPL Project net of grant / construction support received from NHAI during the construction period (wherever applicable) is ₹ 69,665.36 lakhs. This cost does not include non-EPC expenditure. As of September 30, 2023, equity invested (including Optionally Convertible Debentures) was ₹ 20,995.0 lakhs and debt outstanding to lenders was ₹ 31,829.28 lakhs.

Operation and maintenance

For details, please see the sections titled "*Summary of the Concession Agreements*" and "*Business – Key O&M Agreements*" on pages 186 and 184.

Financing

As of September 30, 2023, equity and securities premium was ₹ 15,505.6 lakhs and debt outstanding to lenders, was ₹ 31,829.28 lakhs. For details in relation to the debt outstanding, please see the section titled "*Financial Indebtedness*" on page 226.

Key O&M Agreements

The operation and maintenance of the Project SPVs is the responsibility of the Project Manager and the various O&M Contractors, pursuant to their obligations under the Project Implementation and Management Agreement and the O&M Agreements, respectively.

The Project SPVs, have entered into O&M agreements with the O&M Contractors including, (i) undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, markings, lighting, signage and other control devices; (ii) procuring and ensuring safe, smooth and uninterrupted use of the project, including prevention of loss or damage thereto, during normal operating conditions; (iii) minimizing disruption in the event of accidents or other incidents affecting the safety and use of the Project by providing a rapid and effective response and maintaining liaison with emergency services of the state; (iv) preventing, with the assistance of concerned law enforcement agencies, any unauthorized use or encroachments on, or unauthorized entry of the project; (v) protection of the environment and provision of equipment and materials thereof; operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the project and for providing safe, smooth and uninterrupted use of the project; (vi) maintaining public relations unit to interface with and attend to suggestions from the users, government agencies, media and other agencies; (vii) complying with safety requirements as per the respective concession agreements; and (viii) obligation to obtain all approvals that may be required to undertake the operations and maintenance of the project.

For further details in relation the Project Implementation and Management Agreement, please refer to the section titled "*Parties to the Trust - Key terms of the Project Implementation and Management Agreement"* on page 114.

Environment, health and safety

The Project SPVs are required to meet certain health, safety and environmental specifications and standards in the operation and maintenance of the Projects and are subject to a number of laws and regulations relating to health, safety and environmental protection. The Project SPVs are also required to adhere to various labour and workplace related laws and regulations in India.

We are committed to ensuring that our business activities are conducted safely, the health of our employees, contractors and the public are protected and the environmental impact resulting from our operations and maintenance are minimized, energy resources are utilized in a responsible and efficient manner to reduce emissions and statutory and regulatory requirements concerning health, safety and environment are complied with. We also seek to improve our environmental practices and performance.

Competition

The Nxt-Infra Trust faces competition from other road operators, financial investors, private equity funds and from other InvITs, in acquiring concessions for existing and future projects. While service quality, technological capacity and performance, health and safety records and personnel, as well as reputation and experience, are important considerations in client decisions, price is a major factor for such acquisitions.

Insurance

The Project SPVs maintain project-specific insurance coverage with various insurers in India. Some of the major risks covered in their all-risk policies for their assets, include, the risk of fire and natural calamities, such as earthquakes, landslides and floods. Further, some of the project-specific insurance policies also cover the Project SPVs against burglary, loss or damage to equipment or machinery, loss due war, riots, gradually developing flaws, pecuniary loss in respect of monies arising from fraud, forgery, theft or dishonesty, loss of money in transit by theft robbery etc.

Properties

Under the terms of the concession agreements, title to the roads and related infrastructure such as toll plazas and monitoring posts remains with the concessioning authority for the duration of the concession period. During the concession period, the Project SPVs are licensed to use the roads and the related infrastructure which constitute the concession assets and the Project SPVs are entitled to an income from the collection of tolls. Upon the expiration of a concession period, each Project SPV is required to transfer possession of its concession assets to the relevant concessioning authority.

Employees

As on March 31, 2023, the Project SPVs had 104 permanent employees and two contractual employees. Further, various employees of the Investment Manager and Project Manager will be engaged in managing the Trust and Initial Portfolio Assets. For further details, please see section titled "*Parties to the Trust*" on page 85.

SUMMARY OF KEY AGREEMENTS

Set out below are summaries of the key agreements, including concession agreements entered into by the Project SPVs in relation to their respective projects and the Trust. The descriptions and summaries of the agreements below are indicative and are not and nor do they purport to be complete descriptions or summaries of all terms of such agreements. Certain terms used in this section have the meaning as assigned to such terms in the respective agreements. Copies of these key agreements will be made available for inspection at the office of the Trust at Mumbai. For further details, please see the section titled "*Material Contracts and Documents for Inspection"* on page 314.

I. *CGRG Concession Agreement*

The concession agreement executed between CGRG and NHAI ("**Concessioning Authority/Authority**") dated May 27, 2016 (the "**CGRG Concession Agreement**") is to operate four laning of Chutmalpur, Ganeshpur section of NH-72A (from 0.00 km to 16.00 km) and Roorkee-Chutmalpur – Gagalheri section of NH-73 (from 0.00 km to 33 km) in the state of Uttarakhand and Uttar Pradesh. CGRG is operating on a HAM basis.

A summary of the key terms of the CGRG Concession Agreement has been set out below:

1. Grant of Concession

The Authority grants to the concessionaire the exclusive right, license and authority to construct, operate and maintain the project during the concession period. Further, as per the CGRG Concession Agreement, the concession shall oblige or entitle (as the case may be) the concessionaire to (among others):

a) Right of way, access and license to the site for the purpose of and to the extent conferred by the provisions of the concession agreement.

b) Manage, operate, maintain, finance and construct the project; and

c) Perform and fulfill all of the concessionaire's obligations under and in accordance with the concession agreement.

2. Construction and Operation Period

The construction period is of 730 (seven hundred thirty) days and the operation period is of 15 (fifteen) years from the Commercial Operations Date (as defined in the CGRG Concession Agreement).

3. Performance Security

CGRG is required to provide to the concessioning authority an irrevocable and unconditional guarantee from a bank for a sum equivalent to ₹ 47.10 crore (Rupees Forty-Seven Crore and Ten Lakhs only) in no later than 30 (thirty) days from the date of the CGRG Concession Agreement.

4. Operations and Maintenance

CGRG is required to, operate and maintain the project, either by itself or through a contractor, including by modifying, repairing or otherwise making improvements to the project to comply with the requirements set out in the CGRG Concession Agreement, the minimum maintenance requirements set out in schedules to the CGRG Concession Agreement, and conforms to specifications, standards, good industry practices, applicable laws and permits. The CGRG's operations and maintenance obligations include:

a) procuring and ensuring safe, smooth and uninterrupted use of the project during normal operating conditions;

b) operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the project;

c) minimizing disruption in the event of accidents or other incidents affecting the safety and use of the project by providing rapid and effective responses and maintaining liaison with emergency services of the state;

d) undertaking routine maintenance, including prompt repairs of potholes, cracks, joints, drains, embankments, structures, markings, lighting, signage and other control devices;

e) undertaking major maintenance such as resurfacing, repairs to structures and repairs and refurbishment of system and equipment;

f) carrying out periodic preventive maintenance to the project;

g) preventing, with the assistance of concerned law enforcement agencies, any unauthorized use of the project;

h) preventing, with the assistance of the concerned law enforcement agencies, encroachments on or unauthorized use of the project;

i) protection of the environment and provision of equipment and materials thereof;

j) maintaining a public relations unit to interface with and attend to suggestions from users of the project, the media, government agencies and other agencies; and

k) complying with the safety requirements as set out in the CGRG Concession Agreement.

5. *Bid Project Cost*

The cost of construction of the project as on the bid date, which is due and payable by the concessioning authority to CGRG is ₹ 942.00 Crore (Rupees Nine Hundred and Forty-Two Crore only). Upon receipt of report from the independent engineer certifying the achievement of the payment milestones described under the concession agreements, the authority is required to release payment during the construction period as follow: (a) first payment milestone – on achievement of each 20% physical progress; (b) second payment milestone - on achievement of each 40% physical progress; (c) third payment milestone - on achievement of each 60% physical progress; (d) fourth payment milestone - on achievement of each 75% physical progress; and (e) fifth payment milestone - on achievement of each 90% physical progress.

6. *Change in Scope*

The concessioning authority is entitled to issue a change in scope order and require the CGRG to perform additional work and services, which are not included in the CGRG Concession Agreement. Any such change of scope shall be in accordance with the prescribed procedure and the additional cost incurred by the CGRG will be reimbursed by the concessioning authority, as per the CGRG Concession Agreement. Further, if CGRG determines that change of scope is necessary for providing safer and improved services to the user then the same will be notified to the concessioning authority. Accordingly, the concessioning authority either accept or decline the proposal (with reasons for not accepting).

7. *Insurance*

CGRG is required to maintain at no cost to the concessioning authority, during the construction and operation period under the CGRG Concession Agreement, insurance of such types and such amounts as may be considered necessary in accordance with good industry practice and as required under the financing documents and applicable law. Such insurance must include a waiver of any right of subrogation of the insurers against, among others, the concessioning authority. The failure by CGRG to maintain such insurance will entitle the concessioning authority to recover the cost of such insurance from such CGRG.

8. *Escrow Account*

The funds constituting the financial package, revenue from or in respect of the project (including rental, deposits, capital receipts or insurance claims), all payment by the concessioning authority, subject to any deductions and appropriation, will be deposited into the escrow account. The bank/escrow agent is required make payments from the escrow account in the order of priority set out thereunder each month, or proportionately if not due in that particular month, during the concession period. Such order cannot be modified without the prior written consent of the concessioning authority.

9. *Indemnities*

CGRG is required to indemnify the concessioning authority, its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises (the "**Indemnified Persons**") against any and all loss and damages arising out of or with respect to: (i) CGRG's failure to comply with applicable laws and permits; (ii) make payment of taxes relating to its contractors, suppliers and representatives, income or other taxes required to be paid by the CGRG without reimbursement under the CGRG Concession Agreement; or (iii) make payment of amounts due resulting from materials or services provided to the CGRG or its contractors which are payable by any such party. In addition, the CGRG is required to indemnify the Indemnified Persons from and against any and all damages they may suffer as a result of demands, claims, suits or proceedings arising out of claims of infringement of any patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any material, information, design or process used by the CGRG or its contractors in performing the CGRG's obligations or in any way incorporated in or related to the project.

10. *Suspension of Rights*

Upon occurrence of the CGRG Default (as defined in the CGRG Concession Agreement), the concessioning authority is entitled to (i) suspend all rights of the CGRG under the CGRG Concession Agreement and (ii) exercise such rights

itself and perform the obligations or authorise any person to exercise or perform the same on its behalf during such suspension.

11. *Effect of force majeure:*

Upon the occurrence of any force majeure event, as defined in the CGRG Concession Agreement prior to appointed date, as provided for in the concession agreement, the period for achieving the appointed date would be extended by a period equal in length to the duration of the force majeure event.

If any force majeure event occurs after the appointed date: (i) before the commercial operation date, the concession period would be extended by a period, equal in length to the period during which force majeure event subsists; and (ii) after the commercial operation date, CGRG will be entitled to receive annuity payment along with interest (subject to deduction of outstanding dues by the NHAI) as per the CGRG Concession Agreement.

Allocation of costs arising out of Force Majeure

Upon occurrence of any force majeure event prior to the appointed date, the parties to the CGRG Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof. Upon occurrence of a force majeure event after the appointed date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

a) upon occurrence of a Non-Political Event, as defined in the CGRG Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

b) upon occurrence of an Indirect Political Event, as defined in the CGRG Concession Agreement, all Force Majeure Costs attributable to such Indirect Political Event, and not exceeding the insurance cover for such Indirect Political Event, shall be borne by CGRG, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by NHAI to CGRG; and

c) upon occurrence of a Political Event, as defined in the CGRG Concession Agreement, all Force Majeure Costs attributable to such Political Event shall be reimbursed by NHAI to CGRG.

Force Majeure Costs may include interest payments on debt, operation and maintenance expenses, any increase in the cost of construction works on account of inflation and all other costs directly attributable to the force majeure event, but shall not include any costs which are expressly covered under any provision of the concession agreement or debt repayment obligations, and for determining such costs, information contained in the Financial Package, as defined in the CGRG Concession Agreement, may be relied upon to the extent that such information is relevant.

Termination

If force majeure event subsists for a period of 180 days or more within a continuous period of 365 days, either party to the respective concession agreement would be entitled to terminate the concession agreement.

12. *Compensation for breach of concession agreement:*

The party in material breach or default of the concession agreement is required to compensate the non-defaulting party for all direct costs suffered or incurred by the non-defaulting party, as a result of such material breach or default. No compensation would be payable for material breach or default in respect of items for which damages are expressly provided for in the concession agreement (or for any consequential losses incurred by NHAI in case of the default by CGRG). The affected party to the concession agreement shall make all reasonable efforts to mitigate or limit the costs and damage arising out of or as a result of breach of the concession agreement by the other party.

13. *Termination:*

If any of the defaults specified under the concession agreement occur (the "**CGRG Defaults**"), and CGRG fail to cure the same within the cure period set thereunder, or where no cure period is specified within a cure period of 60 days ("**Universal Cure Period**"), CGRG would be deemed to be in default of the concession agreement. Some of the key CGRG Defaults are specified below:

a) the performance security, as specified in the relevant concession agreement, is encashed/appropriated and CGRG fails to replenish or provide fresh performance security within a prescribed cure period under the concession agreement;

b) subsequent to the replenishment or furnishing of fresh performance security in accordance with concession agreement, CGRG fails to meet any condition precedent or cure, within a prescribed cure period under the concession agreement, the concessionaire default for which whole or part of the performance security was appropriated;

c) CGRG does not achieve the latest outstanding project milestones as per the concession agreement and continues to be in default for duration prescribed under the concession agreement;

d) CGRG abandons or manifests intention to abandon the construction or operation of the project without the prior written consent of NHAI;

e) commercial operation date does not occur within the period specified in the concession agreement;

f) punch list items have not been completed within the period set forth in the concession agreement;

g) CGRG is in breach of the maintenance requirements or the safety requirements, as specified in the concession agreement;

h) CGRG fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with concession agreement, at least three months prior to expiry of subsisting bank guarantee;

i) CGRG has failed to make any payment to NHAI within the period specified in the concession agreement;

j) an escrow default has occurred and CGRG fails to cure the default within a cure period specified in the concession agreement;

k) upon occurrence of a financial default, the lenders' representatives has required the NHAI to undertake the suspension or termination as per the substitution agreement and CGRG fails to cure the default within the Universal Cure Period;

l) a breach of any of the project agreements by the SPVs has caused a material adverse effect;

m) CGRG creates any encumbrance in breach of the concession agreement;

n) CGRG repudiate the concession agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the concession agreement;

o) a change in ownership has occurred in breach of the provisions of the concession agreement;

p) there is a transfer, pursuant to law either of (i) the rights and/or obligations of CGRG under any of the project agreements, or of (ii) all or part of the assets or undertaking of CGRG, and such transfer causes a material adverse effect as specified in the concession agreement;

q) an execution levied on any of the assets of CGRG has caused a material adverse effect;

r) CGRG is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for CGRG or for the whole or material part of its assets that has a material bearing on the project;

s) CGRG 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;

t) any representation or warranty of the CGRG which is, as of the date of the concession agreement, found to be materially false, incorrect or misleading or CGRG is at any time found to be in breach thereof;

u) a resolution or any petition for the winding up of CGRG is passed or 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 CGRG is ordered to be wound up by a court, except if there is an amalgamation or reconstruction, and the entire property, assets and undertaking of CGRG are transferred to the amalgamated or reconstructed entity and such entity has unconditionally assumed the obligations of CGRG under the concession agreement and provided that: (i) such entity has the capability and operating experience necessary for the performance of its obligations under the concession agreement the project agreements; (ii) such entity has the financial standing to perform its obligations under the concession agreement and the project agreements and has a credit worthiness at least as good as that of CGRG; and (iii) each of the project agreements remains in full force and effect.

v) CGRG 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;

w) CGRG has failed to fulfil any obligation, for which failure termination has been specified in the concession agreement;

x) CGRG issues a termination notice in violation of this concession agreement;

y) CGRG commits a default in complying with any other provision of this concession agreement if such default causes a material adverse effect on NHAI;

Upon occurrence of the CGRG Default and expiry of the relevant cure period or Universal Cure Period, NHAI is entitled to terminate the concession agreement.

NHAI's Default

In the event any of the defaults specified below occur (the "**NHAI Defaults**"), and NHAI fails to cure such default within a cure period of 90 days ("**Universal Cure Period**") or such longer period as has been expressly provided in the concession agreement, NHAI would be deemed to be in default.

Some of the key NHAI Defaults are as follows:

a) NHAI commits a material default in complying with any of the provisions of the concession agreement and such default has a material adverse effect on CGRG (as defined in the relevant concession agreement);

b) NHAI repudiates the concession agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the concession agreement; or

c) NHAI has failed to make any payment to CGRG within the period specified in the concession agreement;

d) the state government commits a material default in complying with the provisions of the respective state support agreement if such default has a material adverse effect on the CGRG and the breach continues for a period of 90 days from the date of notice given in this behalf by the CGRG to NHAI.

Upon occurrence of NHAI Default and expiry of the Universal Cure Period or such longer period as prescribed under the concession agreement, CGRG shall be entitled to terminate the respective concession agreement.

14. *Termination Payment:*

Upon termination on account of a CGRG's default during the operation period, NHAI is required to pay CGRG an amount equal to 65% (sixty-five per cent) of the sum of annuity payments remaining unpaid for and in respect of the concession period including interest up to the transfer date.

Upon termination on account of the NHAI's Default, NHAI is required to pay CGRG an amount equal to:

(i) In case the termination occurs prior to commercial operations date (a) debt due payment less insurance cover, provided that if any insurance claims forming part of the insurance cover are not admitted and paid, then 80% (eighty per cent) of such unpaid claims shall be included in the computation of debt due; and (b) 150% (one hundred and fifty per cent) of the adjusted equity;

(ii) In case the termination occurs on or after the commercial operations date - NHAI is required to pay CGRG an amount equal to sum of annuity payments remaining unpaid for and in respect of the concession period, including interest up to the transfer date.

Termination payment shall become due and payable to the CGRG within 15 (fifteen) days of a demand being made by the CGRG to NHAI with the necessary particulars, and in the event of any delay, NHAI shall pay interest at a rate equal to 3% (three per cent) above the daily average bank rate on the amount of termination payment remaining unpaid provided that such delay shall not exceed 90 (ninety) days.

15. *Annuity Payments:*

The completion cost remaining to be paid is required to be paid in biannual installments over a period of 15 (fifteen) years commencing from commercial operations date. The completion cost will be paid as per adjustment for the applicable price index multiple on the reference index date preceding the date of the report in accordance with concession agreements that (a) first 20% of the bid project cost upon confirming 20% physical progress; (b) second 20% of the bid project cost upon confirming 40% physical progress; (c) third 20% of the bid project cost upon confirming 60% physical progress; (d) fourth 15% of the bid project cost upon confirming 75% physical progress; (e) fifth 15% of the bid project cost upon confirming 90% physical progress; and (e) final 10% of the bid project cost preceding the date of completion of the project.

16. *Withdrawals during Concession Period:*

CGRG, at the time of opening the escrow account, is required to give irrevocable instructions, in the escrow agreement, to the escrow bank instructing, that deposits in the escrow account are to be appropriated in the following order every month, or at shorter intervals as necessary, and if not due in a month then retained in the escrow account and appropriated proportionately and paid out therefrom in the months when due:

a) all taxes due and payable by CGRG for and in respect of the projects;

b) any amount due on account of appropriation of the deemed performance security;

c) all payments relating to construction of the project, subject to and in accordance with the conditions, if any set forth in the financing agreements;

d) operation and maintenance expenses, subject to the ceiling set forth in the financing agreements;

e) operation and maintenance expenses and other costs and expenses incurred by the authority in accordance with the provisions of the concession agreement , and certified by the authority as due and payable to it;

f) any amounts due and payable to the authority;

g) monthly proportionate provision of debt service due in an accounting year;

h) all payments and damages certified by the Authority as due and payable to it by CGRG;

i) monthly proportionate provision of debt service payments due in an accounting year in respect of subordinated debt;

j) any reserve requirements set forth in the financing agreements; and

k) balance, if any. in accordance with the instructions of CGRG

17. *Withdrawals upon Termination:*

All amounts standing to the credit of the escrow account, upon termination, are required to be appropriated in the following order:

a) all taxes due and payable by CGRG for and in respect of the project;

b) any amount due on account of appropriation of the deemed performance security;

c) percentage of debt due excluding subordinated debt, if required;

d) outstanding payments due to the authority;

e) all payments and damages certified by the Authority as due and payable to it by CGRG;

f) retention and payments relating to the liability for defects and deficiencies;

g) outstanding debt service including the balance of debt due;

h) outstanding subordinated debt;

i) incurred or accrued operation and maintenance expenses;

j) any other payments required to be made under the concession agreement; and

k) balance, if any. in accordance with the instructions of CGRG

II. CTHPL Concession Agreement

The concession agreement executed between CTHPL and NHAI ("**concessioning authority/authority**") dated April 3, 2017 (the "**CTHPL Concession Agreement**") to construct, operate and maintain NH 6 including the section from km 360.000 to km 422.700 of NH 6 and from km 359.310 to km 423.680 of NH 6 (approx. 62.700 km) on a HAM basis.

A summary of the key terms of the CTHPL Concession Agreement has been set out below:

1. Grant of Concession

The Authority grants to the concessionaire the exclusive right, license and authority to construct, operate and maintain the project during the concession period. Further, as per the CTHPL Concession Agreement, the concession shall oblige or entitle (as the case may be) the concessionaire to (among others):

a) Right of way, access and license to the site for the purpose of and to the extent conferred by the provisions of the concession agreement.

b) Manage, operate, maintain, finance and construct the project; and

c) Perform and fulfill all of the concessionaire's obligations under and in accordance with the concession agreement.

2. *Construction and Operation Period*

The construction period is of 910 (nine hundred ten) days and the operation period is of 15 (fifteen) years from the Commercial Operations Date (as defined in the CTHPL Concession Agreement).

3. *Performance Security*

CTHPL is required to provide to the concessioning authority an irrevocable and unconditional guarantee from a bank for a sum equivalent to ₹ 52.41 crore (Rupees Fifty-Two crore Forty One Lakhs only) in no later than 30 (thirty) days from the date of the CTHPL Concession Agreement.

4. *Operations and Maintenance*

CTHPL is required to, operate and maintain the project, either by itself or through a contractor, including by modifying, repairing or otherwise making improvements to the project to comply with the requirements set out in the CTHPL Concession Agreement, the minimum maintenance requirements set out in Schedules to the CTHPL Concession Agreement, specifications, standards, good industry practices, applicable laws and permits. The CTHPL's operations and maintenance obligations include:

a) procuring and ensuring safe, smooth and uninterrupted use of the project during normal operating conditions;

b) operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the project;

c) minimizing disruption in the event of accidents or other incidents affecting the safety and use of the project by providing rapid and effective responses and maintaining liaison with emergency services of the state;

d) undertaking routine maintenance, including prompt repairs of potholes, cracks, joints, drains, embankments, structures, markings, lighting, signage and other control devices;

e) undertaking major maintenance such as resurfacing, repairs to structures and repairs and refurbishment of system and equipment;

f) carrying out periodic preventive maintenance to the project;

g) preventing, with the assistance of concerned law enforcement agencies, any unauthorized use of the project;

h) preventing, with the assistance of the concerned law enforcement agencies, encroachments on or unauthorized use of the project;

i) protection of the environment and provision of equipment and materials thereof;

j) maintaining a public relations unit to interface with and attend to suggestions from users of the project, the media, government agencies and other agencies; and

k) complying with the safety requirements as set out in the CTHPL Concession Agreement.

5. *Bid Project Cost*

The cost of construction of the project as on the bid date, which is due and payable by the concessioning authority to CTHPL is ₹ 1048.10 Crore (Rupees One Thousand Forty-Eight Crore Ten Lakhs only). Upon receipt of report from the independent engineer certifying the achievement of the payment milestones described under the concession agreements, the authority is required to release payment during the construction period as follow: (a) first payment milestone – on achievement of each 20% physical progress; (b) second payment milestone - on achievement of each 40% physical progress; (c) third payment milestone - on achievement of each 60% physical progress; (d) fourth payment milestone - on achievement of each 75% physical progress; and (e) fifth payment milestone - on achievement of each 90% physical progress.

6. *Change in Scope*

The concessioning authority is entitled to issue a change in scope order and requires CTHPL to perform additional work and services, which are not included in the CTHPL Concession Agreement. Any such change of scope shall be in accordance with the prescribed procedure and the additional cost incurred by the CTHPL will be reimbursed by the concessioning authority, as per the CTHPL Concession Agreement. Further, if CTHPL determines that change of scope is necessary for providing safer and improved services to the user then the same will be notified to the

concessioning authority. Accordingly, the concessioning authority either accept or decline the proposal (with reasons for not accepting).

7. *Insurance*

CTHPL is required to maintain at no cost to the concessioning authority, during the construction and operation period under the CTHPL Concession Agreement, insurance of such types and such amounts as may be considered necessary in accordance with good industry practice and as required under the financing documents and applicable law. Such insurance must include a waiver of any right of subrogation of the insurers against, among others, the concessioning authority. The failure by CTHPL to maintain such insurance will entitle the concessioning authority to recover the cost of such insurance from such CTHPL.

8. *Escrow Account*

The funds constituting the financial package, revenue from or in respect of the project (including rental, deposits, capital receipts or insurance claims), all payment by the concessioning authority, subject to any deductions and appropriation, will be deposited into the escrow account. The bank/escrow agent is required make payments from the escrow account in the order of priority set out thereunder each month, or proportionately if not due in that particular month, during the concession period. Such order cannot be modified without the prior written consent of the concessioning authority.

9. *Indemnities*

CTHPL is required to indemnify the concessioning authority, its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises (the "**Indemnified Persons**") against any and all loss and damages arising out of or with respect to: (i) CTHPL's failure to comply with applicable laws and permits; (ii) make payment of taxes relating to its contractors, suppliers and representatives, income or other taxes required to be paid by the CTHPL without reimbursement under the CTHPL Concession Agreement; or (iii) make payment of amounts due resulting from materials or services provided to the CTHPL or its contractors which are payable by any such party. In addition, the CTHPL is required to indemnify the Indemnified Persons from and against any and all damages they may suffer as a result of demands, claims, suits or proceedings arising out of claims of infringement of any patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any material, information, design or process used by the CTHPL or its contractors in performing the CTHPL's obligations or in any way incorporated in or related to the project.

10. *Suspension of Rights*

Upon occurrence of the CTHPL Default (as defined in the CTHPL Concession Agreement), the concessioning authority is entitled to (i) suspend all rights of the CTHPL under the CTHPL Concession Agreement and (ii) exercise such rights itself and perform the obligations or authorise any person to exercise or perform the same on its behalf during such suspension.

11. *Effect of force majeure:*

Upon the occurrence of any force majeure event, as defined in the CTHPL Concession Agreement prior to appointed date, as provided for in the concession agreement, the period for achieving the appointed date would be extended by a period equal in length to the duration of the force majeure event.

If any force majeure event occurs after the appointed date: (i) before the commercial operation date, the concession period would be extended by a period, equal in length to the period during which force majeure event subsists; and (ii) after the commercial operation date, CTHPL will be entitled to receive annuity payment along with interest (subject to deduction of outstanding dues by the NHAI) as per the CTHPL Concession Agreement.

Allocation of costs arising out of Force Majeure

Upon occurrence of any force majeure event prior to the appointed date, the parties to the CTHPL Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof. Upon occurrence of a force majeure event after the appointed date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

a) upon occurrence of a Non-Political Event, as defined in the CTHPL Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

b) upon occurrence of an Indirect Political Event, as defined in the CTHPL Concession Agreement, all Force Majeure Costs attributable to such Indirect Political Event, and not exceeding the insurance cover for such Indirect Political Event, shall be borne by CTHPL, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by NHAI to CTHPL; and

c) upon occurrence of a Political Event, as defined in the CTHPL Concession Agreement, all Force Majeure Costs attributable to such Political Event shall be reimbursed by NHAI to CTHPL.

Force Majeure Costs may include interest payments on debt, O&M expenses, any increase in the cost of construction works on account of inflation and all other costs directly attributable to the force majeure event, but shall not include any costs which are expressly covered under any provision of the concession agreement or debt repayment obligations, and for determining such costs, information contained in the Financial Package, as defined in the CTHPL Concession Agreement, may be relied upon to the extent that such information is relevant.

Termination

If force majeure event subsists for a period of 180 days or more within a continuous period of 365 days, either party to the respective concession agreement would be entitled to terminate the concession agreement.

12. *Compensation for breach of concession agreement:*

The party in material breach or default of the concession agreement is required to compensate the non-defaulting party for all direct costs suffered or incurred by the non-defaulting party, as a result of such material breach or default. No compensation would be payable for material breach or default in respect of items for which damages are expressly provided for in the concession agreement (or for any consequential losses incurred by NHAI in case of the default by CTHPL). The affected party to the concession agreement shall make all reasonable efforts to mitigate or limit the costs and damage arising out of or as a result of breach of the concession agreement by the other party.

13. *Termination:*

If any of the defaults specified under the concession agreement occur (the "**CTHPL Defaults**"), and CTHPL fail to cure the same within the cure period set thereunder, or where no cure period is specified within a cure period of 60 days ("**Universal Cure Period**"), CTHPL would be deemed to be in default of the concession agreement. Some of the key CTHPL Defaults are specified below:

a) the performance security, as specified in the relevant concession agreement, is encashed/appropriated and CTHPL fails to replenish or provide fresh performance security within a prescribed cure period under the concession agreement;

b) subsequent to the replenishment or furnishing of fresh performance security in accordance with concession agreement, CTHPL fails to meet any condition precedent or cure, within a prescribed cure period under the concession agreement, the concessionaire default for which whole or part of the performance security was appropriated;

c) CTHPL does not achieve the latest outstanding project milestones as per the concession agreement and continues to be in default for duration prescribed under the concession agreement;

d) CTHPL abandons or manifests intention to abandon the construction or operation of the project without the prior written consent of NHAI;

e) commercial operation date does not occur within the period specified in the concession agreement;

f) punch list items have not been completed within the period set forth in the concession agreement;

g) CTHPL is in breach of the maintenance requirements or the safety requirements, as specified in the concession agreement;

h) CTHPL fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with concession agreement, at least three months prior to expiry of subsisting bank guarantee;

i) CTHPL has failed to make any payment to NHAI within the period specified in the concession agreement;

j) an escrow default has occurred and CTHPL fails to cure the default within a cure period specified in the concession agreement;

k) upon occurrence of a financial default, the lenders' representatives has required the NHAI to undertake the suspension or termination as per the substitution agreement and CTHPL fails to cure the default within the Universal Cure Period;

l) a breach of any of the project agreements by the SPVs has caused a material adverse effect;

m) CTHPL creates any encumbrance in breach of the concession agreement;

n) CTHPL repudiate the concession agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the concession agreement;

o) a change in ownership has occurred in breach of the provisions of the concession agreement;

p) there is a transfer, pursuant to law either of (i) the rights and/or obligations of CTHPL under any of the project agreements, or of (ii) all or part of the assets or undertaking of CTHPL, and such transfer causes a material adverse effect as specified in the concession agreement;

q) an execution levied on any of the assets of CTHPL has caused a material adverse effect;

r) CTHPL is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for CTHPL or for the whole or material part of its assets that has a material bearing on the project;

s) CTHPL 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;

t) any representation or warranty of the CTHPL which is, as of the date of the concession agreement, found to be materially false, incorrect or misleading or CTHPL is at any time found to be in breach thereof;

u) a resolution or any petition for the winding up of CTHPL is passed or 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 CTHPL is ordered to be wound up by a court, except if there is an amalgamation or reconstruction, and the entire property, assets and undertaking of CTHPL are transferred to the amalgamated or reconstructed entity and such entity has unconditionally assumed the obligations of CTHPL under the concession agreement and provided that: (i) such entity has the capability and operating experience necessary for the performance of its obligations under the concession agreement the project agreements; (ii) such entity has the financial standing to perform its obligations under the concession agreement and the project agreements and has a credit worthiness at least as good as that of CTHPL; and (iii) each of the project agreements remains in full force and effect.

v) CTHPL 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;

w) CTHPL has failed to fulfil any obligation, for which failure termination has been specified in the concession agreement;

x) CTHPL issues a termination notice in violation of this concession agreement;

y) CTHPL commits a default in complying with any other provision of this concession agreement if such default causes a material adverse effect on NHAI;

Upon occurrence of the CTHPL SPV Default and expiry of the relevant cure period or Universal Cure Period, NHAI is entitled to terminate the concession agreement.

NHAI's Default

In the event any of the defaults specified below occur (the "**NHAI Defaults**"), and NHAI fails to cure such default within a cure period of 90 days ("**Universal Cure Period**") or such longer period as has been expressly provided in the concession agreement, NHAI would be deemed to be in default.

Some of the key NHAI Defaults are as follows:

a) NHAI commits a material default in complying with any of the provisions of the concession agreement and such default has a material adverse effect on CTHPL (as defined in the relevant concession agreement);

b) NHAI repudiates the concession agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the concession agreement; or

c) NHAI has failed to make any payment to CTHPL within the period specified in the concession agreement;

d) the state government commits a material default in complying with the provisions of the respective state support agreement if such default has a material adverse effect on the CTHPL and the breach continues for a period of 90 days from the date of notice given in this behalf by the CTHPL to NHAI.

Upon occurrence of NHAI Default and expiry of the Universal Cure Period or such longer period as prescribed under the concession agreement, CTHPL shall be entitled to terminate the respective concession agreement.

14. *Termination Payment:*

Upon termination on account of a CTHPL's default during the operation period, NHAI is required to pay CTHPL an amount equal to 65% (sixty-five per cent) of the sum of annuity payments remaining unpaid for including interest up to the transfer date.

Upon termination on account of the NHAI's Default, NHAI is required to pay CTHPL an amount equal to:

(i) In case the termination occurs prior to commercial operations date: (a) debt due payment less insurance cover, provided that if any insurance claims forming part of the insurance cover are not admitted and paid, then 80% (eighty per cent) of such unpaid claims shall be included in the computation of debt due, and (b) 150% (one hundred and fifty per cent) of the adjusted equity;

(ii) In case the termination occurs on or after the commercial operations date - NHAI is required to pay CTHPL, by way of termination payment, an amount equal to sum of annuity payments remaining unpaid for and in respect of the concession period, including interest up to the transfer date. Termination payment shall become due and payable to CTHPL within 15 (fifteen) days of a demand being made by CTHPL to the authority.

Termination payment shall become due and payable to CTHPL within 15 (fifteen) days of a demand being made by the CTHPL to NHAI with the necessary particulars, and in the event of any delay, NHAI shall pay interest at a rate equal to 3% (three per cent) above the daily average bank rate on the amount of termination payment remaining unpaid provided that such delay shall not exceed 90 (ninety) days.

15. *Annuity Payments:*

The completion cost remaining to be paid is required to be paid in biannual installments over a period of 15 (fifteen) years commencing from commercial operations date. The completion cost will be paid as per adjustment for the applicable price index multiple on the reference index date preceding the date of the report in accordance with concession agreements that (a) first 20% of the bid project cost upon confirming 20% physical progress; (b) second 20% of the bid project cost upon confirming 40% physical progress; (c) third 20% of the bid project cost upon confirming 60% physical progress; (d) fourth 15% of the bid project cost upon confirming 75% physical progress; (e) fifth 15% of the bid project cost upon confirming 90% physical progress; and (e) final 10% of the bid project cost preceding the date of completion of the project.

16. *Withdrawals during Concession Period:*

CTHPL, at the time of opening the escrow account, is required to give irrevocable instructions, in the escrow agreement, to the escrow bank instructing, that deposits in the escrow account are to be appropriated in the following order every month, or at shorter intervals as necessary, and if not due in a month then retained in the escrow account and appropriated proportionately and paid out therefrom in the months when due:

a) all taxes due and payable by CTHPL for and in respect of the projects;

b) any amount due on account of appropriation of the deemed performance security;

c) all payments relating to construction of the project, subject to and in accordance with the conditions, if any set forth in the financing agreements;

d) operation and maintenance expenses, subject to the ceiling set forth in the financing agreements;

e) operation and maintenance expenses and other costs and expenses incurred by the authority in accordance with the provisions of the concession agreement, and certified by the authority as due and payable to it;

f) any amounts due and payable to the authority;

g) monthly proportionate provision of debt service due in an accounting year;

h) all payments and damages certified by the Authority as due and payable to it by CTHPL;

i) monthly proportionate provision of debt service payments due in an accounting year in respect of subordinated debt;

j) any reserve requirements set forth in the financing agreements; and

k) balance, if any. in accordance with the instructions of CTHPL.

17. *Withdrawals upon Termination:*

All amounts standing to the credit of the escrow account, upon termination, are required to be appropriated in the following order:

a) all taxes due and payable by CTHPL for and in respect of the project;

b) any amount due on account of appropriation of the deemed performance security;

c) percentage of debt due excluding subordinated debt, if required;

d) outstanding payments due to the authority;

e) all payments and damages certified by the Authority as due and payable to it by CTHPL;

f) retention and payments relating to the liability for defects and deficiencies;

g) outstanding debt service including the balance of debt due;

h) outstanding subordinated debt;

i) incurred or accrued operation and maintenance expenses;

j) any other payments required to be made under the concession agreement; and

k) balance, if any. in accordance with the instructions of CTHPL.

III. DME Concession Agreement

The concession agreement executed between DME and NHAI ("**concessioning authority/authority**") dated March 4, 2016 (the "**DME Concession Agreement**") to operate NH 24 including the section from km 000.000 to km 8.360 (approx. 8.716 km) on a HAM basis.

A summary of the key terms of the DME Concession Agreement has been set out below:

1. Grant of Concession

The Authority grants to the concessionaire the exclusive right, license and authority to construct, operate and maintain the project during the concession period. Further, as per the DME Concession Agreement, the concession shall oblige or entitle (as the case may be) the concessionaire to (among others):

a) Right of way, access and license to the site for the purpose of and to the extent conferred by the provisions of the concession agreement.

b) Manage, operate, maintain, finance and construct the project; and

c) Perform and fulfill all of the concessionaire's obligations under and in accordance with the concession agreement.

2. Construction and Operation Period

The construction period is of 910 (nine hundred and ten) days and the operation period is of 15 (fifteen) years from the Commercial Operations Date (as defined in the DME Concession Agreement).

3. Performance Security

DME is required to provide to the concessioning authority an irrevocable and unconditional guarantee from a bank for a sum equivalent to ₹ 42.08 crore (Rupees Forty-Two crores and Eight Lakhs Rupees only) in no later than 30 (thirty) days from the date of the DME Concession Agreement.

4. Operations and Maintenance

DME is required to, operate and maintain the project, either by itself or through a contractor, including by modifying, repairing or otherwise making improvements to the project to comply with the requirements set out in the DME Concession Agreement, the minimum maintenance requirements set out in Schedules to the DME Concession Agreement, specifications, standards, good industry practices, applicable laws and permits. The DME's operations and maintenance obligations include:

a) procuring and ensuring safe, smooth and uninterrupted use of the project during normal operating conditions;

b) operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the project;

c) minimizing disruption in the event of accidents or other incidents affecting the safety and use of the project by providing rapid and effective responses and maintaining liaison with emergency services of the state;

d) undertaking routine maintenance, including prompt repairs of potholes, cracks, joints, drains, embankments, structures, markings, lighting, signage and other control devices;

e) undertaking major maintenance such as resurfacing, repairs to structures and repairs and refurbishment of system and equipment;

f) carrying out periodic preventive maintenance to the project;

g) preventing, with the assistance of concerned law enforcement agencies, any unauthorized use of the project;

h) preventing, with the assistance of the concerned law enforcement agencies, encroachments on or unauthorized use of the project;

i) protection of the environment and provision of equipment and materials thereof;

j) maintaining a public relations unit to interface with and attend to suggestions from users of the project, the media, government agencies and other agencies; and

k) complying with the safety requirements as set out in the DME Concession Agreement.

5. *Bid Project Cost*

The cost of construction of the project as on the bid date, which is due and payable by the concessioning authority to DME is ₹ 841.50 Crore (Rupees Eight Hundred and Forty One crores and Fifty Lakhs rupees only). Upon receipt of report from the independent engineer certifying the achievement of the payment milestones described under the concession agreements, the authority is required to release payment during the construction period as follow: (a) first payment milestone – on achievement of each 20% physical progress; (b) second payment milestone - on achievement of each 40% physical progress; (c) third payment milestone - on achievement of each 60% physical progress; (d) fourth payment milestone - on achievement of each 75% physical progress; and (e) fifth payment milestone - on achievement of each 90% physical progress.

6. *Change in Scope*

The concessioning authority is entitled to issue a change in scope order and require the DME to perform additional work and services, which are not included in the DME Concession Agreement. Any such change of scope shall be in accordance with the prescribed procedure and the additional cost incurred by the DME will be reimbursed by the concessioning authority, as per the DME Concession Agreement. Further, if DME determines that change of scope is necessary for providing safer and improved services to the user then the same will be notified to the concessioning authority. Accordingly, the concessioning authority either accept or decline the proposal (with reasons for not accepting).

7. *Insurance*

DME is required to maintain at no cost to the concessioning authority, during the construction and operation period under the DME Concession Agreement, insurance of such types and such amounts as may be considered necessary in accordance with good industry practice and as required under the financing documents and applicable law. Such insurance must include a waiver of any right of subrogation of the insurers against, among others, the concessioning authority. The failure by DME to maintain such insurance will entitle the concessioning authority to recover the cost of such insurance from such DME.

8. *Escrow Account*

The funds constituting the financial package, revenue from or in respect of the project (including rental, deposits, capital receipts or insurance claims), all payment by the concessioning authority, subject to any deductions and appropriation, will be deposited into the escrow account. The bank/escrow agent is required make payments from the escrow account in the order of priority set out thereunder each month, or proportionately if not due in that particular month, during the concession period. Such order cannot be modified without the prior written consent of the concessioning authority.

9. *Indemnities*

DME is required to indemnify the concessioning authority, its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises (the "**Indemnified Persons**") against any and all loss and damages arising out of or with respect to: (i) DME's failure to comply with applicable laws and permits; (ii) make payment of taxes relating to its contractors, suppliers and representatives, income or other taxes required to be paid by the DME without reimbursement under the DME Concession Agreement; or (iii) make payment of amounts due resulting from materials or services provided to the DME or its contractors which are payable by any such party. In addition, the DME is required to indemnify the Indemnified Persons from and against any and all damages they may suffer as a result of demands, claims, suits or proceedings arising out of claims of infringement of any patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any material, information, design or process used by the DME or its contractors in performing the DME's obligations or in any way incorporated in or related to the project.

10. *Suspension of Rights*

Upon occurrence of the DME Default (as defined in the DME Concession Agreement), the concessioning authority is entitled to (i) suspend all rights of the DME under the DME Concession Agreement and (ii) exercise such rights itself and perform the obligations or authorise any person to exercise or perform the same on its behalf during such suspension.

11. *Effect of force majeure:*

Upon the occurrence of any force majeure event, as defined in the DME Concession Agreement prior to appointed date, as provided for in the concession agreement, the period for achieving the appointed date would be extended by a period equal in length to the duration of the force majeure event.

If any force majeure event occurs after the appointed date: (i) before the commercial operation date, the concession period would be extended by a period, equal in length to the period during which force majeure event subsists; and (ii) after the commercial operation date, DME will be entitled to receive annuity payment along with interest (subject to deduction of outstanding dues by the NHAI) as per the DME Concession Agreement.

Allocation of costs arising out of Force Majeure

Upon occurrence of any force majeure event prior to the appointed date, the parties to the DME Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof. Upon occurrence of a force majeure event after the appointed date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

a) upon occurrence of a Non-Political Event, as defined in the DME Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

b) upon occurrence of an Indirect Political Event, as defined in the DME Concession Agreement, all Force Majeure Costs attributable to such Indirect Political Event, and not exceeding the insurance cover for such Indirect Political Event, shall be borne by DME, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by NHAI to DME; and

c) upon occurrence of a Political Event, as defined in the DME Concession Agreement, all Force Majeure Costs attributable to such Political Event shall be reimbursed by NHAI to DME.

Force Majeure Costs may include interest payments on debt, O&M expenses, any increase in the cost of construction works on account of inflation and all other costs directly attributable to the force majeure event, but shall not include any costs which are expressly covered under any provision of the concession agreement or debt repayment obligations, and for determining such costs, information contained in the Financial Package, as defined in the DME Concession Agreement, may be relied upon to the extent that such information is relevant.

Termination

If force majeure event subsists for a period of 180 days or more within a continuous period of 365 days, either party to the respective concession agreement would be entitled to terminate the concession agreement.

12. *Compensation for breach of concession agreement:*

The party in material breach or default of the concession agreement is required to compensate the non-defaulting party for all direct costs suffered or incurred by the non-defaulting party, as a result of such material breach or default. No compensation would be payable for material breach or default in respect of items for which damages are expressly provided for in the concession agreement (or for any consequential losses incurred by NHAI in case of the default by

DME). The affected party to the concession agreement shall make all reasonable efforts to mitigate or limit the costs and damage arising out of or as a result of breach of the concession agreement by the other party.

13. *Termination:*

If any of the defaults specified under the concession agreement occur (the "**DME Defaults**"), and DME fail to cure the same within the cure period set thereunder, or where no cure period is specified within a cure period of 60 days ("**Universal Cure Period**"), DME would be deemed to be in default of the concession agreement. Some of the key DME Defaults are specified below:

a) the performance security, as specified in the relevant concession agreement, is encashed/appropriated and DME fails to replenish or provide fresh performance security within a prescribed cure period under the concession agreement;

b) subsequent to the replenishment or furnishing of fresh performance security in accordance with concession agreement, DME fails to meet any condition precedent or cure, within a prescribed cure period under the concession agreement, the concessionaire default for which whole or part of the performance security was appropriated;

c) DME does not achieve the latest outstanding project milestones as per the concession agreement and continues to be in default for duration prescribed under the concession agreement;

d) DME abandons or manifests intention to abandon the construction or operation of the project without the prior written consent of NHAI;

e) commercial operation date does not occur within the period specified in the concession agreement;

f) punch list items have not been completed within the period set forth in the concession agreement;

g) DME is in breach of the maintenance requirements or the safety requirements, as specified in the concession agreement;

h) DME fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with concession agreement, at least three months prior to expiry of subsisting bank guarantee;

i) DME has failed to make any payment to NHAI within the period specified in the concession agreement;

j) an escrow default has occurred and DME fails to cure the default within a cure period specified in the concession agreement;

k) upon occurrence of a financial default, the lenders' representatives has required the NHAI to undertake the suspension or termination as per the substitution agreement and DME fails to cure the default within the Universal Cure Period;

l) a breach of any of the project agreements by the SPVs has caused a material adverse effect;

m) DME creates any encumbrance in breach of the concession agreement;

n) DME repudiate the concession agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the concession agreement;

o) a change in ownership has occurred in breach of the provisions of the concession agreement;

p) there is a transfer, pursuant to law either of (i) the rights and/or obligations of DME under any of the project agreements, or of (ii) all or part of the assets or undertaking of DME, and such transfer causes a material adverse effect as specified in the concession agreement;

q) an execution levied on any of the assets of DME has caused a material adverse effect;

r) DME is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for DME or for the whole or material part of its assets that has a material bearing on the project;

s) DME 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;

t) any representation or warranty of the DME which is, as of the date of the concession agreement, found to be materially false, incorrect or misleading or DME is at any time found to be in breach thereof;

u) a resolution or any petition for the winding up of DME is passed or 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 DME is ordered to be wound up by a court, except if there is an amalgamation or reconstruction, and the entire property, assets and undertaking of DME are transferred to the amalgamated or reconstructed entity and such entity has unconditionally assumed the obligations of DME under the concession agreement and provided that: (i) such entity has the capability and operating experience necessary for the performance of its obligations under the concession agreement the project agreements; (ii) such entity has the financial standing to perform its obligations under the concession agreement and the project agreements and has a credit worthiness at least as good as that of DME; and (iii) each of the project agreements remains in full force and effect.

v) DME 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;

w) DME has failed to fulfil any obligation, for which failure termination has been specified in the concession agreement;

x) DME issues a termination notice in violation of this concession agreement;

y) DME commits a default in complying with any other provision of this concession agreement if such default causes a material adverse effect on NHAI;

Upon occurrence of the DME SPV Default and expiry of the relevant cure period or Universal Cure Period, NHAI is entitled to terminate the concession agreement.

NHAI's Default

In the event any of the defaults specified below occur (the "**NHAI Defaults**"), and NHAI fails to cure such default within a cure period of 90 days ("**Universal Cure Period**") or such longer period as has been expressly provided in the concession agreement, NHAI would be deemed to be in default.

Some of the key NHAI Defaults are as follows:

a) NHAI commits a material default in complying with any of the provisions of the concession agreement and such default has a material adverse effect on DME (as defined in the relevant concession agreement);

b) NHAI repudiates the concession agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the concession agreement; or

c) NHAI has failed to make any payment to DME within the period specified in the concession agreement;

d) the state government commits a material default in complying with the provisions of the respective state support agreement if such default has a material adverse effect on the DME and the breach continues for a period of 90 days from the date of notice given in this behalf by the DME to NHAI.

Upon occurrence of NHAI Default and expiry of the Universal Cure Period or such longer period as prescribed under the concession agreement, DME shall be entitled to terminate the respective concession agreement.

14. *Termination Payment:*

Upon termination on account of a DME's default during the operation period, NHAI is required to pay DME an amount equal to 65% (sixty-five per cent) of the sum of annuity payments remaining unpaid for and in respect of the concession period including interest up to the transfer date.

Upon termination on account of the NHAI's Default, NHAI is required to pay DME an amount equal to:

(i) In case the termination occurs prior to commercial operations date (a) debt due payment less insurance cover, provided that if any insurance claims forming part of the insurance cover are not admitted and paid, then 80% (eighty per cent) of such unpaid claims shall be included in the computation of debt due; and (b) 150% (one hundred and fifty per cent) of the adjusted equity;

(ii) In case the termination occurs on or after the commercial operations date - NHAI is required to pay DME an amount equal to sum of annuity payments remaining unpaid for and in respect of the concession period, including interest up to the transfer date.

Termination payment shall become due and payable to DME within 15 (fifteen) days of a demand being made by DME to the NHAI with the necessary particulars, and in the event of any delay, NHAI is required to pay interest at a rate equal to 3% (three per cent) above the daily average bank rate on the amount of termination payment remaining unpaid; provided that such delay shall not exceed 90 (ninety) days.

15. *Annuity Payments:*

The completion cost remaining to be paid is required to be paid in biannual installments over a period of 15 (fifteen) years commencing from commercial operations date. The completion cost will be paid as per adjustment for the applicable price index multiple on the reference index date preceding the date of the report in accordance with concession agreements that (a) first 20% of the bid project cost upon confirming 20% physical progress; (b) second 20% of the bid project cost upon confirming 40% physical progress; (c) third 20% of the bid project cost upon confirming 60% physical progress; (d) fourth 15% of the bid project cost upon confirming 75% physical progress; (e) fifth 15% of the bid project cost upon confirming 90% physical progress; and (e) final 10% of the bid project cost preceding the date of completion of the project.

16. *Withdrawals during Concession Period:*

At the beginning of every month, or at such shorter intervals as the lenders' representative and DME may by written instructions determine, the escrow bank shall withdraw amounts from the escrow account and appropriate them in the following order by depositing such amounts in the , relevant sub-accounts for making due payments, and if such payments are not due in any month, then retain such monies in such sub-accounts and pay out therefrom on the payment date(s):

a) all taxes due and payable by DME for and in respect of the projects;

b) any amount due on account of appropriation of the deemed performance security;

c) all payments relating to construction of the project, subject to and in accordance with the conditions, if any set forth in the financing agreements;

d) operation and maintenance expenses, subject to the ceiling set forth in the financing agreements;

e) operation and maintenance expenses and other costs and expenses incurred by the authority in accordance with the provisions of the concession agreement , and certified by the authority as due and payable to it;

f) any amounts due and payable to the authority;

g) monthly proportionate provision of debt service due in an accounting year;

h) all payments and damages certified by the Authority as due and payable to it by DME;

i) monthly proportionate provision of debt service payments due in an accounting year in respect of subordinated debt;

j) any reserve requirements set forth in the financing agreements; and

k) balance, if any. in accordance with the instructions of DME

No later than 60 (sixty) days prior to the commencement of each accounting year, DME is required to provide to the escrow bank, with prior written approval of the lenders' representative, details of the amounts likely to be required for each of the payment obligations provided that such amounts may be subsequently modified, with prior written approval of the lenders' representative.

18. *Withdrawals upon Termination:*

All amounts standing to the credit of the escrow account, upon termination, are required to be appropriated in the following order:

a) all taxes due and payable by DME for and in respect of the project;

b) any amount due on account of appropriation of the deemed performance security;

c) 90% (ninety per cent) of debt due excluding subordinated debt, if required;

d) outstanding payments due to the authority;

e) all payments and damages certified by the Authority as due and payable to it by DME;

f) retention and payments relating to the liability for defects and deficiencies;

g) outstanding debt service including the balance of debt due;

h) outstanding subordinated debt;

i) incurred or accrued O&M expenses;

j) any other payments required to be made under the concession agreement; and

k) balance, if any. in accordance with the instructions of DME

IV. GSY Concession Agreement

The concession agreement executed between GSY and NHAI ("**concessioning authority/authority**") dated May 27, 2016 (the "**GSY Concession Agreement**") to operate NH 73 including the section from km 33.000 to km 71.640 (approx. 51.455 km) on a HAM basis.

A summary of the key terms of the GSY Concession Agreement has been set out below:

1. Grant of Concession

The Authority grants to the concessionaire the exclusive right, license and authority to construct, operate and maintain the project during the concession period. Further, as per the GSY Concession Agreement, the concession shall oblige or entitle (as the case may be) the concessionaire to (among others):

a) Right of way, access and license to the site for the purpose of and to the extent conferred by the provisions of the concession agreement.

b) Manage, operate, maintain, finance and construct the project; and

c) Perform and fulfill all of the concessionaire's obligations under and in accordance with the concession agreement.

2. Construction and Operation Period

The construction period is of 730 (seven hundred thirty) days and the operation period is of 15 (fifteen) years from the Commercial Operations Date (as defined in the GSY Concession Agreement).

3. Performance Security

GSY is required to provide to the concessioning authority an irrevocable and unconditional guarantee from a bank for a sum equivalent to ₹ 59.20 crore (Rupees fifty-nine crore twenty lakhs only) in no later than 30 (thirty) days from the date of the GSY Concession Agreement.

4. Operations and Maintenance

GSY is required to, operate and maintain the project, either by itself or through a contractor, including by modifying, repairing or otherwise making improvements to the project to comply with the requirements set out in the GSY Concession Agreement, the minimum maintenance requirements set out in Schedules to the GSY Concession Agreement, specifications, standards, good industry practices, applicable laws and permits. The GSY's operations and maintenance obligations include:

a) procuring and ensuring safe, smooth and uninterrupted use of the project during normal operating conditions;

b) operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the project;

c) minimizing disruption in the event of accidents or other incidents affecting the safety and use of the project by providing rapid and effective responses and maintaining liaison with emergency services of the state;

d) undertaking routine maintenance, including prompt repairs of potholes, cracks, joints, drains, embankments, structures, markings, lighting, signage and other control devices;

e) undertaking major maintenance such as resurfacing, repairs to structures and repairs and refurbishment of system and equipment;

f) carrying out periodic preventive maintenance to the project;

g) preventing, with the assistance of concerned law enforcement agencies, any unauthorized use of the project;

h) preventing, with the assistance of the concerned law enforcement agencies, encroachments on or unauthorized use of the project;

i) protection of the environment and provision of equipment and materials thereof;

j) maintaining a public relations unit to interface with and attend to suggestions from users of the project, the media, government agencies and other agencies; and

k) complying with the safety requirements as set out in the GSY Concession Agreement.

5. *Bid Project Cost*

The cost of construction of the project as on the bid date, which is due and payable by the concessioning authority to GSY is ₹ 1184 crores (Rupees one thousand one hundred eighty-four crore only). Upon receipt of report from the independent engineer certifying the achievement of the payment milestones described under the concession agreements, the authority is required to release payment during the construction period as follow: (a) first payment milestone – on achievement of each 20% physical progress; (b) second payment milestone - on achievement of each 40% physical progress; (c) third payment milestone - on achievement of each 60% physical progress; (d) fourth payment milestone - on achievement of each 75% physical progress; and (e) fifth payment milestone - on achievement of each 90% physical progress.

6. *Change in Scope*

The concessioning authority is entitled to issue a change in scope order and require the GSY to perform additional work and services, which are not included in the GSY Concession Agreement. Any such change of scope shall be in accordance with the prescribed procedure and the additional cost incurred by the GSY will be reimbursed by the concessioning authority, as per the GSY Concession Agreement. Further, if GSY determines that change of scope is necessary for providing safer and improved services to the user then the same will be notified to the concessioning authority. Accordingly, the concessioning authority either accept or decline the proposal (with reasons for not accepting).

7. *Insurance*

GSY is required to maintain at no cost to the concessioning authority, during the construction and operation period under the GSY Concession Agreement, insurance of such types and such amounts as may be considered necessary in accordance with good industry practice and as required under the financing documents and applicable law. Such insurance must include a waiver of any right of subrogation of the insurers against, among others, the concessioning authority. The failure by GSY to maintain such insurance will entitle the concessioning authority to recover the cost of such insurance from such GSY.

8. *Escrow Account*

The funds constituting the financial package, revenue from or in respect of the project (including rental, deposits, capital receipts or insurance claims), all payment by the concessioning authority, subject to any deductions and appropriation, will be deposited into the escrow account. The bank/escrow agent is required make payments from the escrow account in the order of priority set out thereunder each month, or proportionately if not due in that particular month, during the concession period. Such order cannot be modified without the prior written consent of the concessioning authority.

9. *Indemnities*

GSY is required to indemnify the concessioning authority, its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises (the "**Indemnified Persons**") against any and all loss and damages arising out of or with respect to: (i) GSY's failure to comply with applicable laws and permits; (ii) make payment of taxes relating to its contractors, suppliers and representatives, income or other taxes required to be paid by the GSY without reimbursement under the GSY Concession Agreement; or (iii) make payment of amounts due resulting from materials or services provided to the GSY or its contractors which are payable by any such party. In addition, the GSY is required to indemnify the Indemnified Persons from and against any and all damages they may suffer as a result of demands, claims, suits or proceedings arising out of claims of infringement of any patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any material, information, design or process used by the GSY or its contractors in performing the GSY's obligations or in any way incorporated in or related to the project.

10. *Suspension of Rights*

Upon occurrence of the GSY Default (as defined in the GSY Concession Agreement), the concessioning authority is entitled to (i) suspend all rights of the GSY under the GSY Concession Agreement and (ii) exercise such rights itself and perform the obligations or authorise any person to exercise or perform the same on its behalf during such suspension.

11. *Effect of force majeure:*

Upon the occurrence of any force majeure event, as defined in the GSY Concession Agreement prior to appointed date, as provided for in the concession agreement, the period for achieving the appointed date would be extended by a period equal in length to the duration of the force majeure event.

If any force majeure event occurs after the appointed date: (i) before the commercial operation date, the concession period would be extended by a period, equal in length to the period during which force majeure event subsists; and (ii) after the commercial operation date, GSY will be entitled to receive annuity payment along with interest (subject to deduction of outstanding dues by the NHAI) as per the GSY Concession Agreement.

Allocation of costs arising out of Force Majeure

Upon occurrence of any force majeure event prior to the appointed date, the parties to the GSY Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof. Upon occurrence of a force majeure event after the appointed date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

a) upon occurrence of a Non-Political Event, as defined in the GSY Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

b) upon occurrence of an Indirect Political Event, as defined in the GSY Concession Agreement, all Force Majeure Costs attributable to such Indirect Political Event, and not exceeding the insurance cover for such Indirect Political Event, shall be borne by GSY, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by NHAI to GSY; and

c) upon occurrence of a Political Event, as defined in the GSY Concession Agreement, all Force Majeure Costs attributable to such Political Event shall be reimbursed by NHAI to GSY.

Force Majeure Costs may include interest payments on debt, O&M expenses, any increase in the cost of construction works on account of inflation and all other costs directly attributable to the force majeure event, but shall not include any costs which are expressly covered under any provision of the concession agreement or debt repayment obligations, and for determining such costs, information contained in the Financial Package, as defined in the GSY Concession Agreement, may be relied upon to the extent that such information is relevant.

Termination

If force majeure event subsists for a period of 180 days or more within a continuous period of 365 days, either party to the respective concession agreement would be entitled to terminate the concession agreement.

12. *Compensation for breach of concession agreement:*

The party in material breach or default of the concession agreement is required to compensate the non-defaulting party for all direct costs suffered or incurred by the non-defaulting party, as a result of such material breach or default. No compensation would be payable for material breach or default in respect of items for which damages are expressly provided for in the concession agreement (or for any consequential losses incurred by NHAI in case of the default by GSY). The affected party to the concession agreement shall make all reasonable efforts to mitigate or limit the costs and damage arising out of or as a result of breach of the concession agreement by the other party.

13. *Termination:*

If any of the defaults specified under the concession agreement occur (the "GSY **Defaults**"), and GSY fail to cure the same within the cure period set thereunder, or where no cure period is specified within a cure period of 60 days ("**Universal Cure Period**"), GSY would be deemed to be in default of the concession agreement. Some of the key GSY Defaults are specified below:

a) the performance security, as specified in the relevant concession agreement, is encashed/appropriated and GSY fails to replenish or provide fresh performance security within a prescribed cure period under the concession agreement;

b) subsequent to the replenishment or furnishing of fresh performance security in accordance with concession agreement, GSY fails to meet any condition precedent or cure, within a prescribed cure period under the concession agreement, the concessionaire default for which whole or part of the performance security was appropriated;

c) GSY does not achieve the latest outstanding project milestones as per the concession agreement and continues to be in default for duration prescribed under the concession agreement;

d) GSY abandons or manifests intention to abandon the construction or operation of the project without the prior written consent of NHAI;

e) commercial operation date does not occur within the period specified in the concession agreement;

f) punch list items have not been completed within the period set forth in the concession agreement;

g) GSY is in breach of the maintenance requirements or the safety requirements, as specified in the concession agreement;

h) GSY fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with concession agreement, at least three months prior to expiry of subsisting bank guarantee;

i) GSY has failed to make any payment to NHAI within the period specified in the concession agreement;

j) an escrow default has occurred and GSY fails to cure the default within a cure period specified in the concession agreement;

k) upon occurrence of a financial default, the lenders' representatives have required the NHAI to undertake the suspension or termination as per the substitution agreement and GSY fails to cure the default within the Universal Cure Period;

l) a breach of any of the project agreements by the SPVs has caused a material adverse effect;

m) GSY creates any encumbrance in breach of the concession agreement;

n) GSY repudiate the concession agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the concession agreement;

o) a change in ownership has occurred in breach of the provisions of the concession agreement;

p) there is a transfer, pursuant to law either of (i) the rights and/or obligations of GSY under any of the project agreements, or of (ii) all or part of the assets or undertaking of GSY, and such transfer causes a material adverse effect as specified in the concession agreement;

q) an execution levied on any of the assets of GSY has caused a material adverse effect;

r) GSY is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for GSY or for the whole or material part of its assets that has a material bearing on the project;

s) GSY 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;

t) any representation or warranty of the GSY which is, as of the date of the concession agreement, found to be materially false, incorrect or misleading or GSY is at any time found to be in breach thereof;

u) a resolution or any petition for the winding up of GSY is passed or 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 GSY is ordered to be wound up by a court, except if there is an amalgamation or reconstruction, and the entire property, assets and undertaking of GSY are transferred to the amalgamated or reconstructed entity and such entity has unconditionally assumed the obligations of GSY under the concession agreement and provided that: (i) such entity has the capability and operating experience necessary for the performance of its obligations under the concession agreement the project agreements; (ii) such entity has the financial standing to perform its obligations under the concession agreement and the project agreements and has a credit worthiness at least as good as that of GSY; and (iii) each of the project agreements remains in full force and effect.

v) GSY 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;

w) GSY has failed to fulfil any obligation, for which failure termination has been specified in the concession agreement;

x) GSY issues a termination notice in violation of this concession agreement;

y) GSY commits a default in complying with any other provision of this concession agreement if such default causes a material adverse effect on NHAI;

Upon occurrence of the GSY SPV Default and expiry of the relevant cure period or Universal Cure Period, NHAI is entitled to terminate the concession agreement.

NHAI's Default

In the event any of the defaults specified below occur (the "**NHAI Defaults**"), and NHAI fails to cure such default within a cure period of 90 days ("**Universal Cure Period**") or such longer period as has been expressly provided in the concession agreement, NHAI would be deemed to be in default.

Some of the key NHAI Defaults are as follows:

a) NHAI commits a material default in complying with any of the provisions of the concession agreement and such default has a material adverse effect on GSY (as defined in the relevant concession agreement);

b) NHAI repudiates the concession agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the concession agreement; or

c) NHAI has failed to make any payment to GSY within the period specified in the concession agreement;

d) the state government commits a material default in complying with the provisions of the respective state support agreement if such default has a material adverse effect on the GSY and the breach continues for a period of 90 days from the date of notice given in this behalf by the GSY to NHAI.

Upon occurrence of NHAI Default and expiry of the Universal Cure Period or such longer period as prescribed under the concession agreement, GSY shall be entitled to terminate the respective concession agreement.

14. *Termination Payment:*

Upon termination on account of a GSY's default during the operation period, NHAI is required to pay GSY an amount equal to 65% (sixty-five per cent) of the sum of annuity payments remaining unpaid for and in respect of the concession period including interest up to the transfer date.

Upon termination on account of the NHAI's Default, NHAI is required to pay GSY an amount equal to:

(i) In case the termination occurs prior to commercial operations date (a) debt due payment less insurance cover, provided that if any insurance claims forming part of the insurance cover are not admitted and paid, then 80% (eighty per cent) of such unpaid claims shall be included in the computation of debt due; and (b) 150% (one hundred and fifty per cent) of the adjusted equity;

(ii) In case the termination occurs on or after the commercial operations date - NHAI is required to pay GSY an amount equal to sum of annuity payments remaining unpaid for and in respect of the concession period, including interest up to the transfer date.

Termination payment shall become due and payable to GSY within 15 (fifteen) days of a demand being made by GSY to the NHAI with the necessary particulars, and in the event of any delay, NHAI is required to pay interest at a rate equal to 3% (three per cent) above the daily average bank rate on the amount of termination payment remaining unpaid; provided that such delay shall not exceed 90 (ninety) days.

15. *Annuity Payments:*

The completion cost remaining to be paid is required to be paid in biannual installments over a period of 15 (fifteen) years commencing from commercial operations date. The completion cost will be paid as per adjustment for the applicable price index multiple on the reference index date preceding the date of the report in accordance with concession agreements that (a) first 20% of the bid project cost upon confirming 20% physical progress; (b) second 20% of the bid project cost upon confirming 40% physical progress; (c) third 20% of the bid project cost upon confirming 60% physical progress; (d) fourth 15% of the bid project cost upon confirming 75% physical progress; (e) fifth 15% of the bid project cost upon confirming 90% physical progress; and (e) final 10% of the bid project cost preceding the date of completion of the project.

16. *Withdrawals during Concession Period:*

GSY, at the time of opening the escrow account, is required to give irrevocable instructions, in the escrow agreement, to the escrow bank instructing, that deposits in the escrow account are to be appropriated in the following order every month, or at shorter intervals as necessary, and if not due in a month then retained in the escrow account and appropriated proportionately and paid out therefrom in the months when due:

a) all taxes due and payable by GSY for and in respect of the projects;

b) any amount due on account of appropriation of the deemed performance security;

c) all payments relating to construction of the project, subject to and in accordance with the conditions, if any set forth in the financing agreements;

d) operation and maintenance expenses, subject to the ceiling set forth in the financing agreements;

e) operation and maintenance expenses and other costs and expenses incurred by the authority in accordance with the provisions of the concession agreement , and certified by the authority as due and payable to it;

f) any amounts due and payable to the authority;

g) monthly proportionate provision of debt service due in an accounting year;

h) all payments and damages certified by the Authority as due and payable to it by GSY;

i) monthly proportionate provision of debt service payments due in an accounting year in respect of subordinated debt;

j) any reserve requirements set forth in the financing agreements; and

k) balance, if any. in accordance with the instructions of GSY.

17. *Withdrawals upon Termination:*

All amounts standing to the credit of the escrow account, upon termination, are required to be appropriated in the following order:

a) all taxes due and payable by GSY for and in respect of the project;

b) any amount due on account of appropriation of the deemed performance security;

c) percentage of debt due excluding subordinated debt, if required;

d) outstanding payments due to the authority;

e) all payments and damages certified by the Authority as due and payable to it by GSY;

f) retention and payments relating to the liability for defects and deficiencies;

g) outstanding debt service including the balance of debt due;

h) outstanding subordinated debt;

i) incurred or accrued operation and maintenance expenses;

j) any other payments required to be made under the concession agreement; and

k) balance, if any. in accordance with the instructions of GSY

V. WIPL Concession Agreement

The concession agreement executed between WIPL and NHAI ("**concessioning authority/authority**") dated August 28, 2015 (the "**WIPL Concession Agreement**") to operate NH 1 (New NH 44) including the section from km 15.500 to km 86.000 (approx. 70.50 km) on a toll basis.

A summary of the key terms of the WIPL Concession Agreement has been set out below:

1. Grant of Concession

The Authority grants to the concessionaire the exclusive right, license and authority to construct, operate and maintain the project during the concession period. Further, as per the WIPL Concession Agreement, the concession shall oblige or entitle (as the case may be) the concessionaire to (among others):

a) Right of way, access and license to the site for the purpose of and to the extent conferred by the provisions of the concession agreement.

b) Manage, operate, maintain, finance and construct the project; and

c) Perform and fulfill all of the concessionaire's obligations under and in accordance with the concession agreement.

2. Construction Period

The construction period is of 17 (seventeen) years the Commercial Operations Date (as defined in the WIPL Concession Agreement).

3. *Performance Security*

WIPL is required to provide to the concessioning authority an irrevocable and unconditional guarantee from a bank for a sum equivalent to ₹ 106.44 crore (Rupees one hundred six crores and forty four lakhs only) in no later than 180 (one hundred and eighty) days from the date of the WIPL Concession Agreement.

4. *Operations and Maintenance*

WIPL is required to, operate and maintain the project, either by itself or through a contractor, including by modifying, repairing or otherwise making improvements to the project to comply with the requirements set out in the WIPL Concession Agreement, the minimum maintenance requirements set out in Schedules to the WIPL Concession Agreement, specifications, standards, good industry practices, applicable laws and permits. The WIPL's operations and maintenance obligations include:

a) permitting safe, smooth and uninterrupted flow of traffic during normal operating conditions;

b) collecting and appropriating the fee;

c) minimizing disruption to traffic in the event of accidents or other incidents affecting the safety and use of the project highway by providing rapid and effective response and maintaining liaison with emergency services of the state;

d) minimizing disruption in the event of accidents or other incidents affecting the safety and use of the project by providing rapid and effective responses and maintaining liaison with emergency services of the state;

e) undertaking periodic preventive and routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and traffic control devices;

f) undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;

g) preventing with the assistance of concerned law enforcement agencies, unauthorised entry to and exit from the project highway;

h) protection of the environment and provision of equipment and materials therefore;

i) operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the project highway;

j) maintaining a public relations unit to interface with and attend to suggestions from the users, government agencies, media and other agencies; and

k) complying with the safety requirements as set out in the MCPTRAL Concession Agreement.

5. *Change in Scope*

The concessioning authority is entitled to issue a change in scope order and require the WIPL to perform additional work and services, which are not included in the WIPL Concession Agreement. Any such change of scope shall be in accordance with the prescribed procedure and the additional cost incurred by the WIPL will be reimbursed by the concessioning authority, as per the WIPL Concession Agreement. Further, if WIPL determines that change of scope is necessary for providing safer and improved services to the user then the same will be notified to the concessioning authority. Accordingly, the concessioning authority either accept or decline the proposal (with reasons for not accepting).

6. *Insurance*

WIPL is required to maintain at no cost to the concessioning authority, during the construction and operation period under the WIPL Concession Agreement, insurance of such types and such amounts as may be considered necessary in accordance with good industry practice and as required under the financing documents and applicable law. Such insurance must include a waiver of any right of subrogation of the insurers against, among others, the concessioning authority. The failure by WIPL to maintain such insurance will entitle the concessioning authority to recover the cost of such insurance from such WIPL.

7. *Escrow Account*

The funds constituting the financial package, revenue from or in respect of the project (including rental, deposits, capital receipts or insurance claims), all payment by the concessioning authority, subject to any deductions and appropriation, will be deposited into the escrow account. The bank/escrow agent is required make payments from the escrow account in the order of priority set out thereunder each month, or proportionately if not due in that particular month, during the concession period. Such order cannot be modified without the prior written consent of the concessioning authority.

8. *Indemnities*

WIPL is required to indemnify the concessioning authority, its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises (the "**Indemnified Persons**") against any and all loss and damages arising out of or with respect to: (i) WIPL's failure to comply with applicable laws and permits; (ii) make payment of taxes relating to its contractors, suppliers and representatives, income or other taxes required to be paid by the WIPL without reimbursement under the WIPL Concession Agreement; or (iii) make payment of amounts due resulting from materials or services provided to the WIPL or its contractors which are payable by any such party. In addition, the WIPL is required to indemnify the Indemnified Persons from and against any and all damages they may suffer as a result of demands, claims, suits or proceedings arising out of claims of infringement of any patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any material, information, design or process used by the WIPL or its contractors in performing the WIPL's obligations or in any way incorporated in or related to the project.

9. Suspension *of Rights*

Upon occurrence of the WIPL Default (as defined in the WIPL Concession Agreement), the concessioning authority is entitled to (i) suspend all rights of the WIPL under the WIPL Concession Agreement and (ii) exercise such rights itself and perform the obligations or authorise any person to exercise or perform the same on its behalf during such suspension.

10. *User Fee*

WIPL shall have the sole and exclusive right to demand, collect and appropriate fee from the users in accordance with WIPL Concession Agreement and applicable laws and rules prescribed thereunder ("**Fees Rules**"). WIPL may determine and collect fee at such lower rates as it may, by public notice to the users, specify in respect of all or any category of users or vehicles. Fees shall be revised annually on April 1 of the respective year in accordance with the Fees Rules. However, no revision will be effected within a period of six months from the date of the preceding revision of fee.

11. *Effect of force majeure:*

Upon the occurrence of any force majeure event, as defined in the WIPL Concession Agreement prior to appointed date, as provided for in the concession agreement, the period for achieving the appointed date would be extended by a period equal in length to the duration of the force majeure event.

If any force majeure event occurs after the appointed date: (i) before the commercial operation date, the concession period would be extended by a period, equal in length to the period during which force majeure event subsists; and (ii) after the commercial operation date, If WIPL are unable to collect fee despite making best efforts or it is directed by NHAI to suspend the collection thereof during the subsistence of such force majeure event, the concession period would be extended by a period, equal in length to the period during which WIPL was prevented from collection of fee on account thereof; provided that in the event of partial collection of fee where the daily collection is less than 90% of the average daily fee, as defined in the WIPL Concession Agreement, NHAI would extend the concession period in proportion to the loss of fee on a daily basis (loss of 25% in collection of fee as compared to the average daily fee for four days shall entitle the WIPL to extension of one day in the concession period).

Allocation of costs arising out of Force Majeure

Upon occurrence of any force majeure event prior to the appointed date, the parties to the WIPL Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof. Upon occurrence of a force majeure event after the appointed date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

a) upon occurrence of a Non-Political Event, as defined in the WIPL Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

b) upon occurrence of an Indirect Political Event, as defined in the WIPL Concession Agreement, all Force Majeure Costs attributable to such Indirect Political Event, and not exceeding the insurance cover for such

Indirect Political Event, shall be borne by WIPL, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by NHAI to WIPL; and

c) upon occurrence of a Political Event, as defined in the WIPL Concession Agreement, all Force Majeure Costs attributable to such Political Event shall be reimbursed by NHAI to WIPL.

Force Majeure Costs may include interest payments on debt, O&M expenses, any increase in the cost of construction works on account of inflation and all other costs directly attributable to the force majeure event, but shall not include any costs which are expressly covered under any provision of the concession agreement or debt repayment obligations, and for determining such costs, information contained in the Financial Package, as defined in the WIPL Concession Agreement, may be relied upon to the extent that such information is relevant.

Termination

If force majeure event subsists for a period of 180 days or more within a continuous period of 365 days, either party to the respective concession agreement would be entitled to terminate the concession agreement.

12. *Compensation for breach of concession agreement:*

The party in material breach or default of the concession agreement is required to compensate the non-defaulting party for all direct costs suffered or incurred by the non-defaulting party, as a result of such material breach or default. No compensation would be payable for material breach or default in respect of items for which damages are expressly provided for in the concession agreement (or for any consequential losses incurred by NHAI in case of the default by WIPL). The affected party to the concession agreement shall make all reasonable efforts to mitigate or limit the costs and damage arising out of or as a result of breach of the concession agreement by the other party.

13. *Termination:*

If any of the defaults specified under the concession agreement occur (the "**WIPL Defaults**"), and WIPL fail to cure the same within the cure period set thereunder, or where no cure period is specified within a cure period of 60 days ("**Universal Cure Period**"), WIPL would be deemed to be in default of the concession agreement. Some of the key WIPL Defaults are specified below:

a) the performance security, as specified in the relevant concession agreement, is encashed/appropriated and WIPL fails to replenish or provide fresh performance security within a prescribed cure period under the concession agreement;

b) subsequent to the replenishment or furnishing of fresh performance security in accordance with concession agreement, WIPL fails to meet any condition precedent or cure, within a prescribed cure period under the concession agreement, the concessionaire default for which whole or part of the performance security was appropriated;

c) WIPL does not achieve the latest outstanding project milestones as per the concession agreement and continues to be in default for duration prescribed under the concession agreement;

d) WIPL abandons or manifests intention to abandon the construction or operation of the project without the prior written consent of NHAI;

e) commercial operation date does not occur within the period specified in the concession agreement;

f) punch list items have not been completed within the period set forth in the concession agreement;

g) WIPL is in breach of the maintenance requirements or the safety requirements, as specified in the concession agreement;

h) WIPL fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with concession agreement, at least three months prior to expiry of subsisting bank guarantee;

i) WIPL has failed to make any payment to NHAI within the period specified in the concession agreement;

j) an escrow default has occurred and WIPL fails to cure the default within a cure period specified in the concession agreement;

k) upon occurrence of a financial default, the lenders' representatives has required the NHAI to undertake the suspension or termination as per the substitution agreement and WIPL fails to cure the default within the Universal Cure Period;

l) a breach of any of the project agreements by the SPVs has caused a material adverse effect;

m) WIPL creates any encumbrance in breach of the concession agreement;

n) WIPL repudiate the concession agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the concession agreement;

o) a change in ownership has occurred in breach of the provisions of the concession agreement;

p) there is a transfer, pursuant to law either of (i) the rights and/or obligations of WIPL under any of the project agreements, or of (ii) all or part of the assets or undertaking of WIPL, and such transfer causes a material adverse effect as specified in the concession agreement;

q) an execution levied on any of the assets of WIPL has caused a material adverse effect;

r) WIPL is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for WIPL or for the whole or material part of its assets that has a material bearing on the project;

s) WIPL 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;

t) any representation or warranty of the WIPL which is, as of the date of the concession agreement, found to be materially false, incorrect or misleading or WIPL is at any time found to be in breach thereof;

u) a resolution or any petition for the winding up of WIPL is passed or 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 WIPL is ordered to be wound up by a court, except if there is an amalgamation or reconstruction, and the entire property, assets and undertaking of WIPL are transferred to the amalgamated or reconstructed entity and such entity has unconditionally assumed the obligations of WIPL under the concession agreement and provided that: (i) such entity has the capability and operating experience necessary for the performance of its obligations under the concession agreement the project agreements; (ii) such entity has the financial standing to perform its obligations under the concession agreement and the project agreements and has a credit worthiness at least as good as that of WIPL; and (iii) each of the project agreements remains in full force and effect.

v) WIPL 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;

w) WIPL has failed to fulfil any obligation, for which failure termination has been specified in the concession agreement;

x) WIPL issues a termination notice in violation of this concession agreement;

y) WIPL commits a default in complying with any other provision of this concession agreement if such default causes a material adverse effect on NHAI;

Upon occurrence of the WIPL SPV Default and expiry of the relevant cure period or Universal Cure Period, NHAI is entitled to terminate the concession agreement.

NHAI's Default

In the event any of the defaults specified below occur (the "**NHAI Defaults**"), and NHAI fails to cure such default within a cure period of 90 days ("**Universal Cure Period**") or such longer period as has been expressly provided in the concession agreement, NHAI would be deemed to be in default.

Some of the key NHAI Defaults are as follows:

a) NHAI commits a material default in complying with any of the provisions of the concession agreement and such default has a material adverse effect on WIPL (as defined in the relevant concession agreement);

b) NHAI repudiates the concession agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the concession agreement;

c) NHAI has failed to make any payment to WIPL within the period specified in the concession agreement; or

d) the state government commits a material default in complying with the provisions of the respective state support agreement if such default has a material adverse effect on the WIPL and the breach continues for a period of 90 days from the date of notice given in this behalf by the WIPL to NHAI.

14. Upon occurrence of NHAI Default and expiry of the Universal Cure Period or such longer period as prescribed under the concession agreement, WIPL shall be entitled to terminate the respective concession agreement. *Termination Payment:*

Upon termination on account of a WIPL's default during the operation period, NHAI is required to pay WIPL an amount equal to 90% (ninety per cent) of the debt due less insurance cover; provided that if any insurance claims forming part of the insurance cover are not admitted and paid, then 80% (eighty per cent) of such unpaid claims shall be included in the computation of debt due. For the avoidance of doubt, WIPL hereby acknowledges that no termination payment shall be due or payable on account of a WIPL Default occurring prior to the commercial operations date.

Upon termination on account of the NHAI's Default, NHAI is required to pay WIPL, by way of termination payment, an amount equal to:

(i) debt due; and

(ii) 150% (one hundred and fifty per cent) of the adjusted equity.

Termination payment shall become due and payable to WIPL within 15 (fifteen) days of a demand being made by WIPL to the authority with the necessary particulars, and in the event of any delay, the authority shall pay interest at a rate equal to 3% (three per cent) above the bank rate on the amount of termination payment remaining unpaid; provided that such delay shall not exceed 90 (ninety) days.

15. *Withdrawals during Concession Period:*

WIPL, at the time of opening the escrow account, is required to give irrevocable instructions, in the escrow agreement, to the escrow bank instructing, that deposits in the escrow account are to be appropriated in the following order every month, or at shorter intervals as necessary, and if not due in a month then retained in the escrow account and appropriated proportionately and paid out therefrom in the months when due:

a) all taxes due and payable by WIPL for and in respect of the project highway;

b) all payments relating to construction of the project highway, subject to and in accordance with the conditions, if any set forth in the financing agreements;

c) operation and management expenses, subject to the ceiling set forth in the financing agreements;

d) operation and management expenses and other costs and expenses incurred by the authority in accordance with the provisions of the concession agreement , and certified by the authority as due and payable to it;

e) concession fee due and payable to the authority;

f) monthly proportionate provision of debt service due in an accounting year;

g) all payments and damages certified by the Authority as due and payable to it by WIPL;

h) monthly proportionate provision of debt service payments due in an accounting year in respect of subordinated debt;

i) any reserve requirements set forth in the financing agreements; and

j) balance, if any. in accordance with the instructions of WIPL

16. *Withdrawals upon Termination:*

All amounts standing to the credit of the escrow account, upon termination, are required to be appropriated in the following order:

a) all taxes due and payable by WIPL for and in respect of the project highway;

b) 90% (ninety per cent) of debt due excluding subordinated debt, if required;

c) outstanding concession fee;

d) all payments and damages certified by the Authority as due and payable to it by WIPL;

e) retention and payments relating to the liability for defects and deficiencies;

f) outstanding debt service including the balance of debt due;

g) outstanding subordinated debt;

h) incurred or accrued operation and management expenses;

i) any other payments required to be made under the concession agreement; and

j) balance, if any. in accordance with the instructions of WIPL

VI. WRIPL Concession Agreement

The concession agreement is executed between WRIPL and Principal Secretary, PWD – Government of Maharashtra ("**PWD**") dated January 10, 2019 (the "**WRIPL Concession Agreement**") for) improvement to roads joining (i) district place in Akola district (41.59 km) and Akola and Amravati district (26.80 km); (ii) talika place in Akola and Amravati district (22.42 km) and district place in Amravati (44.15 km); (iii) district place in Amravati district (Amravati Chandur Railway Dhamangaon) ; (iv) Chikhaldara hill station in Amravati district; and (v) Warud Gavankund Bahada Jarud Mangruli Kachurna Hatuma and Morshi Pala Salbardi Dongaryavali Dapori. WRIPL was engaged to undertake construction, operation and maintenance of the project on design, build, operate and transfer on annuity basis pursuant to the WRIPL Concession Agreement.

A summary of the key terms of the WRIPL Concession Agreement has been set out below:

1. Grant of Concession

The Authority grants to the concessionaire the exclusive right, license and authority to construct, operate and maintain the project during the concession period. Further, as per the WRIPL Concession Agreement, the concession shall oblige or entitle (as the case may be) the concessionaire to (among others):

a) Right of way, access and license to the site for the purpose of and to the extent conferred by the provisions of the concession agreement.

b) Manage, operate, maintain, finance and construct the project; and

c) Perform and fulfill all of the concessionaire's obligations under and in accordance with the concession agreement.

2. Construction and Operation Period

The construction period is of 730 (seven hundred thirty) days and the operation period is of 10 (ten) years from the Commercial Operations Date (as defined in the WRIPL Concession Agreement).

3. Performance Security

WRIPL is required to provide to the concessioning authority an irrevocable and unconditional guarantee from a bank for a sum equivalent to ₹ 73.00 crore (Rupees Seventy-Three Crores Only) in no later than 30 (thirty) days from the date of the WRIPL Concession Agreement.

4. Operations and Maintenance

WRIPL is required to, operate and maintain the project, either by itself or through a contractor, including by modifying, repairing or otherwise making improvements to the project to comply with the requirements set out in the WRIPL Concession Agreement, the minimum maintenance requirements set out in Schedules to the WRIPL Concession Agreement, specifications, standards, good industry practices, applicable laws and permits. The WRIPL's operations and maintenance obligations include:

a) procuring and ensuring safe, smooth and uninterrupted use of the project during normal operating conditions;

b) operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the project;

c) minimizing disruption in the event of accidents or other incidents affecting the safety and use of the project by providing rapid and effective responses and maintaining liaison with emergency services of the state;

d) undertaking routine maintenance, including prompt repairs of potholes, cracks, joints, drains, embankments, structures, markings, lighting, signage and other control devices;

e) undertaking major maintenance such as resurfacing, repairs to structures and repairs and refurbishment of system and equipment;

f) carrying out periodic preventive maintenance to the project;

g) preventing, with the assistance of concerned law enforcement agencies, any unauthorized use of the project;

h) preventing, with the assistance of the concerned law enforcement agencies, encroachments on or unauthorized use of the project;

i) protection of the environment and provision of equipment and materials thereof;

j) maintaining a public relations unit to interface with and attend to suggestions from users of the project, the media, government agencies and other agencies; and

k) complying with the safety requirements as set out in the WRIPL Concession Agreement.

5. *Bid Project Cost*

The cost of construction of the project as on the bid date, which is due and payable by the concessioning authority to WRIPL is ₹ 1460.00 Crores (Rupees One Thousand Four Hundred Sixty Crores Only). Upon receipt of report from the independent engineer certifying the achievement of the payment milestones described under the concession agreements, the authority is required to release payment during the construction period as follow: (a) first payment milestone – on achievement of 20% physical progress; (b) second payment milestone - on achievement of 40% physical progress; (c) third payment milestone - on achievement of 60% physical progress; (d) fourth payment milestone - on achievement of 75% physical progress; and (e) fifth payment milestone - on achievement of 90% physical progress.

6. *Change in Scope*

The concessioning authority is entitled to issue a change in scope order and require the WRIPL to perform additional work and services, which are not included in the WRIPL Concession Agreement. Any such change of scope shall be in accordance with the prescribed procedure and the additional cost incurred by the WRIPL will be reimbursed by the concessioning authority, as per the WRIPL Concession Agreement. Further, if WRIPL determines that change of scope is necessary for providing safer and improved services to the user then the same will be notified to the concessioning authority. Accordingly, the concessioning authority either accept or decline the proposal (with reasons for not accepting).

7. *Insurance*

WRIPL is required to maintain at no cost to the concessioning authority, during the construction and operation period under the WRIPL Concession Agreement, insurance of such types and such amounts as may be considered necessary in accordance with good industry practice and as required under the financing documents and applicable law. Such insurance must include a waiver of any right of subrogation of the insurers against, among others, the concessioning authority. The failure by WRIPL to maintain such insurance will entitle the concessioning authority to recover the cost of such insurance from such WRIPL.

8. *Escrow Account*

The funds constituting the financial package, revenue from or in respect of the project (including rental, deposits, capital receipts or insurance claims), all payment by the concessioning authority, subject to any deductions and appropriation, will be deposited into the escrow account. The bank/escrow agent is required make payments from the escrow account in the order of priority set out thereunder each month, or proportionately if not due in that particular month, during the concession period. Such order cannot be modified without the prior written consent of the concessioning authority.

9. *Indemnities*

WRIPL is required to indemnify the concessioning authority, its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises (the "**Indemnified Persons**") against any and all loss and damages arising out of or with respect to: (i) WRIPL's failure to comply with applicable laws and permits; (ii) make payment of taxes relating to its contractors, suppliers and representatives, income or other taxes required to be paid by the WRIPL without reimbursement under the WRIPL Concession Agreement; or (iii) make payment of amounts due resulting from materials or services provided to the WRIPL or its contractors which are payable by any such party. In addition, the WRIPL is required to indemnify the Indemnified Persons from and against any and all damages they may suffer as a result of demands, claims, suits or proceedings arising out of claims of infringement of any patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any material, information, design or process used by the WRIPL or its contractors in performing the WRIPL's obligations or in any way incorporated in or related to the project.

10. *Suspension of Rights*

Upon occurrence of the WRIPL Default (as defined in the WRIPL Concession Agreement), the concessioning authority is entitled to (i) suspend all rights of the WRIPL under the WRIPL Concession Agreement and (ii) exercise

such rights itself and perform the obligations or authorise any person to exercise or perform the same on its behalf during such suspension.

11. *Effect of force majeure:*

Upon the occurrence of any force majeure event, as defined in the WRIPL Concession Agreement prior to appointed date, as provided for in the concession agreement, the period for achieving the appointed date would be extended by a period equal in length to the duration of the force majeure event.

If any force majeure event occurs after the appointed date: (i) before the commercial operation date, the concession period would be extended by a period, equal in length to the period during which force majeure event subsists; and (ii) after the commercial operation date, WRIPL will be entitled to receive annuity payment along with interest (subject to deduction of outstanding dues by the NHAI) as per the WRIPL Concession Agreement.

Allocation of costs arising out of Force Majeure

Upon occurrence of any force majeure event prior to the appointed date, the parties to the WRIPL Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof. Upon occurrence of a force majeure event after the appointed date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

a) upon occurrence of a Non-Political Event, as defined in the WRIPL Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

b) upon occurrence of an Indirect Political Event, as defined in the WRIPL Concession Agreement, all Force Majeure Costs attributable to such Indirect Political Event, and not exceeding the insurance cover for such Indirect Political Event, shall be borne by WRIPL, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by PWD to WRIPL; and

c) upon occurrence of a Political Event, as defined in the WRIPL Concession Agreement, all Force Majeure Costs attributable to such Political Event shall be reimbursed by PWD to WRIPL.

Force Majeure Costs may include interest payments on debt, O&M expenses, any increase in the cost of construction works on account of inflation and all other costs directly attributable to the force majeure event, but shall not include any costs which are expressly covered under any provision of the concession agreement or debt repayment obligations, and for determining such costs, information contained in the Financial Package, as defined in the WRIPL Concession Agreement, may be relied upon to the extent that such information is relevant.

Termination

If force majeure event subsists for a period of 180 days or more within a continuous period of 365 days, either party to the respective concession agreement would be entitled to terminate the concession agreement.

12. *Compensation for breach of concession agreement:*

The party in material breach or default of the concession agreement is required to compensate the non-defaulting party for all direct costs suffered or incurred by the non-defaulting party, as a result of such material breach or default. No compensation would be payable for material breach or default in respect of items for which damages are expressly provided for in the concession agreement (or for any consequential losses incurred by PWD in case of the default by WRIPL). The affected party to the concession agreement shall make all reasonable efforts to mitigate or limit the costs and damage arising out of or as a result of breach of the concession agreement by the other party.

13. *Termination:*

If any of the defaults specified under the concession agreement occur (the "**WRIPL Defaults**"), and WRIPL fail to cure the same within the cure period set thereunder, or where no cure period is specified within a cure period of 60 days ("**Universal Cure Period**"), WRIPL would be deemed to be in default of the concession agreement. Some of the key WRIPL Defaults are specified below:

a) the performance security, as specified in the relevant concession agreement, is encashed/appropriated and WRIPL fails to replenish or provide fresh performance security within a prescribed cure period under the concession agreement;

b) subsequent to the replenishment or furnishing of fresh performance security in accordance with concession agreement, WRIPL fails to meet any condition precedent or cure, within a prescribed cure period under the concession agreement, the concessionaire default for which whole or part of the performance security was appropriated;

c) WRIPL does not achieve the latest outstanding project milestones as per the concession agreement and continues to be in default for duration prescribed under the concession agreement;

d) WRIPL abandons or manifests intention to abandon the construction or operation of the project without the prior written consent of PWD;

e) commercial operation date does not occur within the period specified in the concession agreement;

f) punch list items have not been completed within the period set forth in the concession agreement;

g) WRIPL is in breach of the maintenance requirements or the safety requirements, as specified in the concession agreement;

h) WRIPL fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with concession agreement, at least three months prior to expiry of subsisting bank guarantee;

i) WRIPL has failed to make any payment to PWD within the period specified in the concession agreement;

j) an escrow default has occurred and WRIPL fails to cure the default within a cure period specified in the concession agreement;

k) upon occurrence of a financial default, the lenders' representatives has required the PWD to undertake the suspension or termination as per the substitution agreement and WRIPL fails to cure the default within the Universal Cure Period;

l) a breach of any of the project agreements by the SPVs has caused a material adverse effect;

m) WRIPL creates any encumbrance in breach of the concession agreement;

n) WRIPL repudiate the concession agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the concession agreement;

o) a change in ownership has occurred in breach of the provisions of the concession agreement;

p) there is a transfer, pursuant to law either of (i) the rights and/or obligations of WRIPL under any of the project agreements, or of (ii) all or part of the assets or undertaking of WRIPL, and such transfer causes a material adverse effect as specified in the concession agreement;

q) an execution levied on any of the assets of WRIPL has caused a material adverse effect;

r) WRIPL is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for WRIPL or for the whole or material part of its assets that has a material bearing on the project;

s) WRIPL 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 PWD, a material adverse effect;

t) any representation or warranty of the WRIPL which is, as of the date of the concession agreement, found to be materially false, incorrect or misleading or WRIPL is at any time found to be in breach thereof;

u) a resolution or any petition for the winding up of WRIPL is passed or 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 WRIPL is ordered to be wound up by a court, except if there is an amalgamation or reconstruction, and the entire property, assets and undertaking of WRIPL are transferred to the amalgamated or reconstructed entity and such entity has unconditionally assumed the obligations of WRIPL under the concession agreement and provided that: (i) such entity has the capability and operating experience necessary for the performance of its obligations under the concession agreement the project agreements; (ii) such entity has the financial standing to perform its obligations under the concession agreement and the project agreements and has a credit worthiness at least as good as that of WRIPL; and (iii) each of the project agreements remains in full force and effect.

v) WRIPL submits to PWD any statement, notice or other document, in written or electronic form, which has a material effect on PWD's rights, obligations or interests and which is false in material particulars;

w) WRIPL has failed to fulfil any obligation, for which failure termination has been specified in the concession agreement;

x) WRIPL issues a termination notice in violation of this concession agreement;

y) WRIPL commits a default in complying with any other provision of this concession agreement if such default causes a material adverse effect on PWD;

Upon occurrence of the WRIPL Default and expiry of the relevant cure period or Universal Cure Period, PWD is entitled to terminate the concession agreement.

PWD's Default

In the event any of the defaults specified below occur (the "**PWD Defaults**"), and PWD fails to cure such default within a cure period of 90 days ("**Universal Cure Period**") or such longer period as has been expressly provided in the concession agreement, PWD would be deemed to be in default.

Some of the key PWD Defaults are as follows:

a) PWD commits a material default in complying with any of the provisions of the concession agreement and such default has a material adverse effect on WRIPL (as defined in the relevant concession agreement);

b) PWD repudiates the concession agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the concession agreement; or

c) PWD has failed to make any payment to WRIPL within the period specified in the concession agreement;

d) PWD fails to provide statutory clearances required for construction of the project, within a period specified under the concession agreement

e) the state government commits a material default in complying with the provisions of the respective state support agreement if such default has a material adverse effect on the WRIPL and the breach continues for a period of 90 days from the date of notice given in this behalf by the WRIPL to PWD.

Upon occurrence of PWD Default and expiry of the Universal Cure Period or such longer period as prescribed under the concession agreement, WRIPL shall be entitled to terminate the respective concession agreement.

14. *Termination Payment:*

Upon termination on account of a WRIPL's default during the operation period, PWD is required to pay WRIPL an amount equal to 65% (sixty-five per cent) of the sum of annuity payments remaining unpaid for and in respect of the concession period including interest at the rate of bank rate up to the transfer date.

Upon termination on account of the PWD's Default, PWD is required to pay WRIPL an amount equal to:

(i) In case the termination occurs prior to commercial operations date (a) debt due payment less insurance cover, provided that if any insurance claims forming part of the insurance cover are not admitted and paid, then 80% (eighty per cent) of such unpaid claims shall be included in the computation of debt due; and (b) 150% (one hundred and fifty per cent) of the adjusted equity;

(ii) In case the termination occurs on or after the commercial operations date - PWD is required to pay WRIPL an amount equal to sum of annuity payments remaining unpaid for and in respect of the concession period, including interest up to the transfer date.

Termination payment shall become due and payable to the WRIPL within 15 (fifteen) days of a demand being made by the WRIPL to PWD with the necessary particulars, and in the event of any delay, PWD shall pay interest at a rate equal to 3% (three per cent) above the daily average bank rate on the amount of termination payment remaining unpaid provided that such delay shall not exceed 90 (ninety) days.

15. *Annuity Payments:*

The completion cost remaining to be paid is required to be paid in biannual installments over a period of 10 (ten) years commencing from commercial operations date. The completion cost will be paid as per adjustment for the applicable price index multiple on the reference index date preceding the date of the report in accordance with concession agreements that (a) first 20% of the bid project cost upon confirming 20% physical progress; (b) second 20% of the bid project cost upon confirming 40% physical progress; (c) third 20% of the bid project cost upon confirming 60% physical progress; (d) fourth 15% of the bid project cost upon confirming 75% physical progress; (e) fifth 15% of the bid project cost upon confirming 90% physical progress; and (e) final 10% of the bid project cost preceding the date of completion of the project.

16. *Withdrawals during Concession Period:*

WRIPL, at the time of opening the escrow account, is required to give irrevocable instructions, in the escrow agreement, to the escrow bank instructing, that deposits in the escrow account are to be appropriated in the following

order every month, or at shorter intervals as necessary, and if not due in a month then retained in the escrow account and appropriated proportionately and paid out therefrom in the months when due:

a) all taxes due and payable by WRIPL for and in respect of the projects;

b) any amount due on account of appropriation of the deemed performance security;

c) all payments relating to construction of the project, subject to and in accordance with the conditions, if any set forth in the financing agreements;

d) operation and maintenance expenses, subject to the ceiling set forth in the financing agreements;

e) operation and maintenance expenses and other costs and expenses incurred by the authority in accordance with the provisions of the concession agreement , and certified by the authority as due and payable to it;

f) any amounts due and payable to the authority;

g) monthly proportionate provision of debt service due in an accounting year;

h) all payments and damages certified by the Authority as due and payable to it by WRIPL;

i) monthly proportionate provision of debt service payments due in an accounting year in respect of subordinated debt;

j) any reserve requirements set forth in the financing agreements; and

k) balance, if any. in accordance with the instructions of WRIPL

17. *Withdrawals upon Termination:*

All amounts standing to the credit of the escrow account, upon termination, are required to be appropriated in the following order:

a) all taxes due and payable by WRIPL for and in respect of the project;

b) any amount due on account of appropriation of the deemed performance security;

c) percentage of debt due excluding subordinated debt, if required;

d) outstanding payments due to the authority;

e) all payments and damages certified by the Authority as due and payable to it by WRIPL;

f) retention and payments relating to the liability for defects and deficiencies;

g) outstanding debt service including the balance of debt due;

h) outstanding subordinated debt;

i) incurred or accrued operation and maintenance expenses;

j) any other payments required to be made under the concession agreement; and

k) balance, if any. in accordance with the instructions of WRIPL

VII. Securities Subscription and Purchase Agreement (hereinafter referred to as the "**Welspun SSPA**")

This Welspun SSPA is executed between Welspun Enterprises Limited ("**Seller**"), Actis Highway Infra Limited ("**Purchaser**"), Welspun Delhi Meerut Expressway Private Limited, Welspun Road Infra Private Limited, Welspun Infrafacility Private Limited, MBL (CGRG) Road Limited, MBL (GSY) Road Limited, Chikhali Tarsod Highways Private Limited (together "**Companies**') (together the "**Parties**") on June 9, 2022 ("**Welspun SSPA**"). Welspun SSPA records the understanding of the Parties in relation to sale by the Seller, of the Company's securities the Purchaser in terms of the Welspun SSPA and letter agreement dated December 13, 2022. In furtherance of the Welspun SSPA, the Seller and the Sponsor also entered into agreements in relation engineering, procurement and construction ("**EPC**") services, and operation and management services to be provided to WIPL by the Seller. For the purposes of the EPC services, the Seller and Sponsor have, along with CTHPL, entered into an advance and pledge agreement dated January 24, 2023 ("**AP Agreement**") pursuant to which an advance of Rs. 16,923 lakhs has been granted by CTHPL to the Seller for the fulfilment of its EPC obligations. Further, pursuant to the AP Agreement, CTHPL has also created a term deposit of Rs. 10,000 lakhs, with respect to any cost overruns in relation to the balance portions of the WIPL

project. In light of the Issue, and in furtherance of the current status of the WIPL project, the Sponsor and CTHPL propose to liquidate or withdraw the term deposit, in accordance with the terms of the AP Agreement, prior to the filing of the Placement Memorandum.

VIII. Shareholders' Agreement (hereinafter referred to as the "**SHA**")

This SHA is executed between Welspun Enterprises Limited ("**Seller**"), Actis Highway Infra Limited ("**Purchaser**") and Welspun Infra Facility Private Limited ("**WIPL**" or the "**Company**") (together the "**Parties**") on December 22, 2022, pursuant to the securities subscription and purchase agreement executed between the Parties dated June 9, 2022 ("**SSPA**"). SHA records the understanding of the Parties in relation to the operation and management of the Company between the Agreement Date and the Second Closing Date. The Parties propose to enter into an amendment to the SHA, prior to the filing of the Placement Memorandum, in relation to the compliance of WIPL and the Parties in relation to the compliance with Regulation 18(3)(a) of the InvIT Regulations.

Unitholding of the Trust:

Particulars	Number of Units
Units issued and outstanding prior to this Issue	[●]*
Units issued and outstanding after this Issue*	Up to [●]*

** To be updated in the Final Placement Memorandum to be filed with SEBI and NSE.*

Unitholders holding more than 5% of the Units

Sr. No.	Name of the Unit Holders*	Pre-Issue		Post Issue*	
		Number of Units	Percentage of holding (%)	Number of Units	Percentage of holding (%)
1.	[●]	Up to [●]	[●]	Up to [●]	[●]

**To be updated in the Final Placement Memorandum to be filed with SEBI and NSE.*

Unitholding of the Sponsor, Sponsor Group, Investment Manager, Project Manager and Trustee

The Sponsor shall be allotted Units of the Trust pursuant to the Securities Purchase Agreements, prior to Allotment of Units in the Issue. Further, the Sponsor is also proposing to subscribe to the Units of the Trust proposed to be Allotted in the Issue.

The Sponsor Group, Trustee, Investment Manager and Project Manager do not hold any Units and shall not acquire any Units in this Issue.

Unitholding of the directors of the Investment Manager

As on the date of this Draft Placement Memorandum, none of the directors of the Investment Manager hold any Units or propose to hold any Units in the Trust.

Sponsor and Sponsor Group lock-in

In accordance with Regulation 12(3)(c), read with Regulation 12(3A) of the InvIT Regulations, the Sponsor and Sponsor Group, collectively, shall hold not less than 15% of Units on a post-Issue basis, aggregating up to [●] Units, which shall be locked-in period of three years from the date of listing pursuant to the Issue and the balance of its unitholding in the Trust is required to be locked in for a period of one year from the date of listing of the Units. Further, in accordance with the InvIT Regulations, the unitholding of the Sponsor and Sponsor Group, collectively, shall be locked-in as follows:

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

** Provided that the maximum value of the Units to be held by the Sponsor and Sponsor Group for compliance with the above shall not exceed ₹ 500 crores or such other value as may be decided by SEBI from time to time wherein such valuation shall be based on the latest available net asset value of the Trust.*

USE OF PROCEEDS

The Issue Proceeds will be up to ₹ 1,90,000 lakhs. The Issue Proceeds will be utilised towards the following objects:

(i) To provide loans to Project SPVs for redemption of optionally convertible debentures, including any accrued interest, in whole or part, issued by them to the Sponsor Group;

(ii) General purposes; and

(iii) Issue expenses.

Requirements of Funds

The Issue Proceeds are proposed to be utilised in accordance with the details provided in the following table:

(In ₹ lakhs)

S. No.	Particulars	Amount
(i)	Providing loans to Project SPVs for redemption of optionally convertible debentures, including any accrued interest, in whole or part, issued by them to the Sponsor Group.	Up to 1,73,688.19
(ii)	General purposes*	[●]
(iii)	Issue expenses*	[●]
	TOTAL	[●]

* *To be updated in the Final Placement Memorandum prior to filing with SEBI and NSE.*

The Investment Manager believes that providing a loan to Project SPVs for redemption of optionally convertible debentures including any accrued interest, in whole or part, issued by them, will help reduce outstanding indebtedness of the Trust on a consolidated basis and assist the Trust in maintaining a favourable debt-equity ratio, which will enable the Trust to raise further resources in the future to fund potential business development opportunities and plans to grow and expand its business in the future thereby enabling the Trust to meet its commitment towards distributions 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, competitive environment, interest rate and exchange rate fluctuations. Consequently, the fund requirements are subject to revisions, in the future, at the discretion of the Investment Manager.

Details of Utilisation of the Issue Proceeds

The details of utilisation of the Issue Proceeds are set forth herein below:

(i) ***Providing loans to Project SPVs for redemption of optionally convertible debentures, including any accrued interest, in whole or part, issued by them.***

As of December 31, 2023, the amount outstanding in relation to the optionally convertible debentures issued by the Project SPVs is ₹ 1,83,688.19 lakhs, comprising of an aggregate principal amount of ₹ 1,67,349.94 lakhs and interest (likely to accrue as of March 31, 2024) aggregating to ₹ 16,338.25 lakhs.

The Trust proposes to utilise an estimated aggregate amount of up to ₹ 1,73,688.19 lakhs from the Issue Proceeds to provide loans to Project SPVs for redemption of the optionally convertible debentures. Further, one of the Project SPVs, being, CTHPL, proposes to utilize its cash and cash equivalents aggregating up to ₹ 10,000 lakhs towards part redemption of the optionally convertible debentures issued by it, prior to the filing of the Placement Memorandum.

Sr. No.	Nature of the borrowing	Amount Outstanding as on December 31, 2023 (in ₹ lakhs)
CGRG		
1.	Optionally convertible debentures	19,185.20
CTHPL*		
2.	Optionally convertible debentures	46,021.81
DME		
3.	Optionally convertible debentures	4,617.70
GSY		
4.	Optionally convertible debentures	21,884.53
WIPL		
5.	Optionally convertible debentures	70,151.30
WRIPL		
6.	Optionally convertible debentures	5,489.40
TOTAL		**1,67,349.94**

** OCDs aggregating to an amount of up to ₹10,000 lakhs are proposed to be redeemed through the cash and cash equivalent of CTHPL prior to the filing of the Placement Memorandum*

For further details on all outstanding borrowings availed by the Project SPVs, please see the section titled *"Financial Indebtedness"* on page 226.

Upon the listing of the Units, Trust shall utilize the Issue Proceeds, as set out above, to provide loans to the Project SPVs ("**Trust Loan**") for redemption of optionally convertible debentures, including any accrued interest, in whole or part, issued by them to the Sponsor Group, pursuant to a facility agreement to be entered into between the Trustee (on behalf of the Nxt-Infra Trust), the Investment Manager, and the Project SPVs (the "**Trust Loan Agreement**"). The indicative key terms of the proposed Trust Loan Agreement are set out below, however, grant of such loans and the terms thereof, are subject to the approval from NHAI and/or relevant State authorities as well as comments/requirements of any lenders to Nxt-Infra Trust, and hence such terms may be changed to incorporate the comments or requirements from such stakeholders.

<table>
<tr><th>Sr. No.</th><th>Parameter</th><th>Description</th></tr>
<tr><td>1.</td><td>Borrowers</td><td>a) Nxt-Infra CGRG Highways Limited
b) Nxt-Infra GSY Highways Limited
c) Welspun Road Infra Private Limited
d) Welspun Delhi Meerut Expressway Private Limited
e) Chikhali Tarsod Highways Private Limited
f) Welspun Infrafacility Private Limited</td></tr>
<tr><td>2.</td><td>Lender</td><td>Nxt-Infra Trust</td></tr>
<tr><td>3.</td><td>Purpose of Facility</td><td>This facility is proposed to be utilized by the Project SPVs for redemption of optionally convertible debentures, including any accrued interest, in whole or part, issued by them (including principal amounts, interest thereon and any other fees or charges payable in connection thereto) as may be permitted under the SEBI InvIT Regulations and any other purpose as may be agreed between the relevant Project SPV and the InvIT as specified in the relevant disbursement request submitted by the relevant Project SPV.</td></tr>
<tr><td>4.</td><td>Facility Amount</td><td>This facility amount, being, an unsecured rupee term loan facility of up to ₹ 1,73,688.19 lakhs.</td></tr>
<tr><td>5.</td><td>Prepayment Penalty</td><td>No prepayment penalty shall be imposed for prepayment by the Project SPVs and prepayment may be carried out at any time.</td></tr>
<tr><td>6.</td><td>Repayment schedule and Tenor</td><td>As may be mutually agreed with the Project SPVs under the Trust Loan Agreement.
If the repayment is not possible as per the agreed repayment schedule due to any reason, this shall not be a default, and the unpaid amount shall be paid no later than the date of expiry of the final maturity date (as defined in the Trust Loan Agreement).

Tenor of the trust loan shall be as follows for each Project SPV:
<table>
<tr><th>Name of the Project SPV</th><th>Tenor</th></tr>
<tr><td>CTHPL</td><td>27 half yearly installments</td></tr>
<tr><td>DME</td><td>20 half yearly installments</td></tr>
<tr><td>GSY</td><td>25 half yearly installments</td></tr>
<tr><td>CGRG</td><td>24 half yearly installments</td></tr>
<tr><td>WIPL</td><td>16 half yearly installments</td></tr>
<tr><td>WRIPL</td><td>40 half quarterly installments</td></tr>
</table>
Please note that the detailed terms of the trust loan will contain an indicative schedule, setting out the amount of the principal payable under the Trust Loan Agreement on a periodic basis.</td></tr>
<tr><td>7.</td><td>Interest Rate</td><td>Fixed rate of 13 % per annum.
The rate of interest may be reset at the discretion of the Trustee or the Investment Manager.
<u>Interest Payment Date</u> - The interest shall be payable on a monthly basis or, on any such other period as may be communicated by the Investment Manager to the Borrower with a prior written reasonable notice. Interest shall accrue but shall be payable only when adequate funds are available with the Borrower.</td></tr>
<tr><td>8.</td><td>Security</td><td>Unsecured, unless otherwise required by the Lender and the lenders to the financial indebtedness to be availed the Lender ("InvIT Lenders").</td></tr>
<tr><td>9.</td><td>Representations and Warranties</td><td>The Project SPVs shall represent to the Trust that, amongst other things:
a) they are a company, duly incorporated and validly existing under the laws of India and has all corporate powers and all material governmental licenses, authorizations, consents and approvals required to carry on its business.</td></tr>
</table>

Sr. No.	Parameter	Description
		b) they have complied with all Applicable Laws in relation to the conduct of its business and is not subject to any present, potential or threatened liability by reason of non-compliance with such Applicable Law, which will have a material impact on the Project SPVs, its business or its obligations under the agreement. c) each certified copy of a document provided to the Trustee or Investment Manager pursuant to the terms of the Transaction Documents is a true, complete and accurate copy of the original document and the original document was in full force and effect, in each case as at the date any such document is provided.
10.	**Negative Covenants**	The Project SPVs shall not, without the prior approval of the Trustee or the Investment Manager: a) raise or incur any further indebtedness; b) amend any of the Transaction Documents, as defined in the Trust Loan Agreement; and c) create any Lien over or sell, transfer or dispose of, all or part of its assets. Provided that the Project SPVs shall be permitted to create such encumbrance over its assets as may be required by the InvIT Lenders, and if required by the Lender.
11.	**Events of Defaults**	The proposed Trust Loan Agreement shall contain events of default affecting the Project SPVs as may be required by the Lender, including but not limited to: a) failure to pay any sum under the Trust Loan Agreement (i.e. failure to pay when they have sufficient cash available); b) breach of covenants and undertakings set out in the Trust Loan Agreements; and c) any change in ownership or management control, shareholding of the Project SPVs, at sole discretion, without the prior written approval of Trustee (in its capacity as the trustee to the Trust) or the Investment Manager. Upon occurrence of an event of default, the Trustee may (subject to applicable law and without prejudice to any other rights it may have under applicable law) accelerate the repayment of Term Loan and all other amounts outstanding in relation thereto. The Events of Default structure shall be subject to change as may be decided by the Lender with the InvIT Lenders.
12.	**Governing Laws and Jurisdiction**	Laws of India
13.	**Others**	There may be additional conditions under the financing proposed to be availed by the InvIT which may require corresponding conditions to be included in the Trust Loan Agreement to be executed amongst the InvIT and the Project SPV. For instance, in the event that the InvIT financing documents prescribe any conditions in relation to mandatory prepayments by the InvIT, corresponding provisions for mandatory prepayment shall also be included in the Trust Loan Agreement.

The redemption of optionally convertible debentures issued by the Project SPVs, including any accrued interest, as set out above, shall be based on various factors, including: (i) any conditions attached to the optionally convertible debentures ("**OCDs**") restricting the Project SPV's ability to redeem the OCD and time taken to fulfil such requirements; (ii) provisions of any laws, rules, regulations and contracts governing such borrowings; (iii) repayment of any other existing borrowings of the Project SPVs; and (iv) other commercial considerations, including the coupon rates, outstanding amounts and term of the OCDs.

(ii) ***General purposes***

In terms of the InvIT Regulations, the Investment Manager shall, at its discretion, deploy the balance Issue Proceeds (excluding the Issue Expenses) aggregating up to ₹ [●] lakhs towards general expenses for the operation of the Trust, subject to such utilization not exceeding 10% of the Issue Proceeds, in compliance with the InvIT Regulations. The general purposes for which the Trust proposes to utilise Issue Proceeds include meeting exigencies and expenses incurred in the ordinary course of business. In addition, the Trust may utilise the Issue 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 Issue 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, 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.

(iii) **Issue Expenses**

The total expenses of this Issue are estimated to be up to ₹ [●] lakhs ("**Issue Expenses**"). The Issue Expenses consist of fee and commissions payable to the Lead Managers, fee payable to legal counsels, fee payable to Escrow Collection Bank, Registrar and other advisors or arrangers and all other incidental and miscellaneous expenses for undertaking the formation transactions and for listing the Units on NSE. The Issue Expenses shall be borne by the Trust.

For ease of operations, if required, the Issue Expenses as stated above, may be borne by the Investment Manager. Such expenses may be reimbursed by the Trust to the Investment Manager in the future, as agreed between the Investment Manager and the Trust in terms of the Investment Management Agreement.

FINANCIAL INDEBTEDNESS

The details of indebtedness of the Project SPVs as at September 30, 2023, together with a brief description of certain material covenants of the relevant financing agreements, are provided below:

(in ₹ lakhs)

Category of borrowing	Principal Amount Outstanding as on September 30, 2023	Interest outstanding as on September 30, 2023
Project SPVs		
WRIPL		
Secured	31,089.28	-
Unsecured (OCDs)	5,489.40	330.27
Total Borrowings	**36,578.68**	**330.27**
CGRG		
Secured	47,061.51	-
Unsecured (OCDs)	16,345.87	1,447.75
Total Borrowings	**63,407.38**	**1,447.75**
CTHPL		
Secured	49,736.78	-
Unsecured (OCDs)	46,021.81	4,103.38
Total Borrowings	**95,758.59**	**4,103.38**
DME		
Secured	29,917.18	-
Unsecured (OCDs)	4,617.70	413.09
Total Borrowings	**34,534.88**	**413.09**
GSY		
Secured	60,280.76	-
Unsecured (OCDs)	19,432.96	1,721.17
Total Borrowings	**79,713.72**	**1,721.17**
WIPL		
Secured	1,17,339.27	-
Unsecured (OCDs)	70,151.30	6,214.44
Total Borrowings	**1,87,490.57**	**6,214.44**
Total	**4,97,483.82**	**14,230.10**

Principal terms of the borrowings availed by the Project SPVs:

1. *Security:* The borrowings availed by the Project SPVs, are secured by, amongst others, a first ranking *pari passu* charge over:

   (i) identified immovable assets of the Project SPVs (not including the project assets);

   (ii) tangible and moveable assets of the Project SPVs (present and future) except the project assets;

   (iii) the intangible assets of certain Project SPVs;

   (iv) pledge of a certain specified percentage of the equity shares of certain Project SPVs;

   (v) accounts of certain Project SPVs, including escrow accounts and sub-accounts maintained in accordance with the financing arrangements, accounts created for maintaining reserves such as debt service reserve account and any other bank accounts of the Project SPV and all its receivables; and

   (vi) the assignment of all rights and interests of certain Project SPVs: (A) under the project agreements, (B) in the clearances obtained by the Project SPVs, (C) in any letter of credit,

liquidation damages or performance bonds provided by any party to the project agreement, and (D) under the insurance contracts.

2. *Pre-payment:* Most of the loans availed by the SPVs may be prepaid in full or in part without the payment of any prepayment penalty, subject to certain conditions such as (i) the prepayment being affected at the instance of the lenders; (ii) the prepayment being on account of of reset in the 'Spread' on the facility by a lender which increase is not acceptable to the Project SPV, (iii) the prepayment being made within a specified time-period post any spread reset date, after giving a prior written notice to the lenders; and (iv) the prepayment being made from the internal accruals, after giving a prior written notice to the lenders. The Project SPVs may also be required to mandatorily prepay the loans availed by them in full or in part, immediately upon, amongst others, (i) receipt of certain amounts by the Project SPV, as set out in the financing arrangements such as amounts in the nature of termination payments under the project agreements and any insurance proceeds received, and (ii) the Projects SPV accepting offers for capacity augmentation in accordance with the project agreements.

3. *Restrictive Covenants:* The borrowing arrangements entered into by the Project SPVs contain standard restrictive covenants affecting the Project SPVs, which prevent them from undertaking certain actions, including:

   (i) incurring any indebtedness without prior approval of certain lenders, other than as permitted in accordance with the financing documents;

   (ii) effecting changes in its management control or shareholding structure or capital structure without prior approval of certain lenders;

   (iii) making any 'Restricted Payments' which include amongst other things, payment of dividends, distributions, returns on equity, repayment or redemption for value and payment of interests;

   (iv) amending its constitutional documents which is in contravention of the financing documents or adversely affects the rights of the secured parties without the prior consent of certain lenders;

   (v) changing the general nature of its business or its corporate identity, without the prior consent of certain lenders;

   (vi) making any investment in share capital of any entity or set up any subsidiaries , without the prior consent of certain lenders;

   (vii) settling any dispute, litigation or arbitration which may have a material adverse effect, without prior consent of certain lenders; and

   (viii) taking any action towards amalgamation, reconstruction, merger, consolidation or re-organisation without the prior consent of certain lenders.

4. *Events of Default:* Borrowing arrangements entered into by the Project SPVs contain standard events of default affecting the Project SPVs, including, amongst others:

   (i) failure to pay any sum under the financing agreement;

   (ii) non-compliance with the provisions of the financing agreements or any misrepresentations thereunder;

   (iii) a default by the Project SPVs under any of their other financing documents;

   (iv) the security interest provided to the lenders being in jeopardy, in the opinion of the lenders;

   (v) initiation of insolvency or other analogous proceedings against the Project SPVs;

   (vi) failure to maintain (or cause to be maintained) insurances in accordance with the terms of the transaction documents or as required by the lenders' insurance advisor;

   (vii) defaults in the payment, or interest or any other money due or payable on any of its financial indebtedness under any loan agreements, facility agreements or similar agreements;

(viii) failure to maintain (or cause to be maintained) insurance in accordance with the terms of the financing agreements or as advised by the lenders' insurance advisor;

(ix) court order and government actions, as described under financing agreements, executed against the Project SPVs;

(x) failure to obtain, renew, maintain or comply in any respect with any clearance for the execution, delivery, performance or enforcement of the financing documents; and

(xi) Project SPV has abandoned its business or threatens in writing to abandon its business.

5. *Consequences of default*: In terms of the borrowing arrangements entered into by the Project SPVs, the following, amongst others, are the consequences of default:

(i) cancellation or suspension the available commitments;

(ii) acceleration of repayment obligations and declaration of amounts outstanding to be forthwith due and payable;

(iii) enforcement of security interests;

(iv) conversion of the loans in part or full to equity of the Project SPV; and

(v) exercise of other remedies as permitted or available under the borrowing arrangements.

This is an indicative list of the terms of the borrowings availed by the Project SPVs and there may be additional terms, conditions and requirements under the various borrowing arrangements entered into by the Project SPVs. Where applicable and in relation to any debentures issued by the Project SPVs, the term 'lenders' may include the relevant debenture trustee and/or the debenture holders.

Given the nature of these borrowings and the terms of prepayment, the aggregate outstanding borrowing amounts may vary from time to time. In addition to the above, the Project SPVs may, from time to time, enter into re-financing arrangements and draw down funds thereunder, prior to the filing of the Placement Memorandum.

Principal terms of the borrowing to be availed by the Trust

The Investment Manager has, pursuant to a resolution passed by its board of directors dated December 27, 2023, is proposing to avail credit facilities aggregating to ₹ 3,50,000 lakhs by the Trust, subject to receipt of any requisite third-party approvals and the finalisation of the terms of the relevant financing documentation. The Nxt-Infra Trust's total outstanding consolidated net debt after availing of such borrowings and other borrowings as may be approved by the board of directors and in accordance with Borrowing Policy, will be within the regulatory requirement specified under Regulation 20(2) of the InvIT Regulations and the Nxt-Infra Trust will obtain the necessary credit ratings as required in accordance with the InvIT Regulations. The indicative terms of such proposed borrowings may be:

Sr. No.	Parameter	Description
1.	Purpose of Facility	a) The fund-based facilities are proposed to be utilised towards refinancing of existing bank loans of the Project SPVs and creation of reserve and some miscellaneous purposes. b) The non-fund-based facilities are purposed to be utilised towards (i) deposit for government/other authorities towards performance security and other operational purpose as per the respective concession agreements of the Project SPVs; and (ii) bank guarantee towards security for bidding / purchase in Road Projects that are part of permitted acquisition.
2.	Facility Details	The Nxt-Infra Trust is proposing to avail rupee term loan as a senior debt facility.
3.	Tenor	10 Years
4.	Security	Secured
5.	Interest Rate	The rate of interest for each drawl of the facility will be stipulated by the lender at the time of disbursement of each drawl, which shall be sum of the repo rate (benchmark) and spread rate per annum, plus applicable statutory levy, if any.

Sr. No.	Parameter	Description
6.	Repayment schedule	Repayment of the facility amount may be in equated quarterly instalments payable at the end of quarter, as per the specified repayment schedule in the financing documents to be executed by the Nxt-Infra Trust and relevant lenders.
7.	Prepayment	The Nxt-Infra Trust will have the right to prepay the outstanding amount under the credit facility, in part or in full. Further, the Trust will be liable to pay specified prepayment premium/penalty as per the terms of the financing documents to be executed between the Trust and lenders.
8.	Event of Default	Financing arrangements to be entered into by the Trust and relevant lenders may contain standard events of default affecting the Trust, including, amongst others: a) any payment default including default in principal, interest or any other amounts remaining unpaid beyond due date to any lender; b) breach or default in performance or observation of the financial covenants, and the same is not rectified to the satisfaction of the lender; and c) failure to comply with any condition, covenant, or undertaking provided under the transaction documents.

Borrowings by the Project SPVs from the Trust

*Optionally convertible debentures issued by the Project SPVs ("**Project SPV OCDs**")*

The Nxt-Infra Trust proposes to utilize the Issue Proceeds to provide debt to the Project SPVs, for redemption of optionally convertible debentures, including any accrued interest, in whole or part, issued by the Project SPVs. For further details, see the section titled "*Use of Proceeds*" on page 222.

As of the date of this Draft Placement Memorandum, each of the Project SPVs have issued unsecured, redeemable, optionally convertible debentures to the Sponsor Group, i.e. Actis PCC.

The Project SPV OCDs are proposed to be redeemed in their entirety, from the Issue proceeds. For further details, see the section titled "*Use of Proceeds*" on page 222. The Project SPV OCDs are proposed to be redeemed simultaneously with, but immediately following the, utilization of the InvIT Loan by each of the Project SPVs for the purpose set out above.

The principal terms of the Project SPV OCDs are as follows:

Instrument	Unsecured, redeemable optionally convertible debentures (OCDs)
Number of Debentures	• CTHPL – 4,60,21,808 • NXT-INFRA CGRG HIGHWAYS LIMITED – 1,63,45,873 • WRIPL – 54,89,398 • WIPL – 7,01,51,301 • NXT-INFRA GSY HIGHWAYS LIMITED – 1,94,32,964 • DME – 46,17,697
Face Value	The face value of each of the OCDs is ₹100 (Indian Rupees One Hundred only).
Summary of Project SPV OCD amounts (in ₹)	• CTHPL – 4,60,21,80,800 • NXT-INFRA CGRG HIGHWAYS LIMITED – 1,63,45,87,300 • WRIPL – 54,89,39,800 • WIPL - 7,01,51,30,100 • NXT-INFRA GSY HIGHWAYS LIMITED – 1,94,32,96,400 • DME – 46,17,69,700
Summary of tenor and repayment of the Project SPV OCDs	• Each OCDs, if not already redeemed or converted, shall convert into equity shares on the date occurring on the earlier of 15 years from the date of issuance of the OCDs or expiry of the respective concession agreements ("**Term**").
Summary of Status of OCDs	• The OCDs shall constitute unconditional obligation of the Project SPVs • The OCDs shall be non-marketable i.e., they are not capable of being sold on a recognized stock exchange in or outside India.

	• The Project SPVs do not intend to and will not list, the OCDs on any recognized stock exchange in or outside India.
Purpose	To refinance the existing financial debt of the relevant Project SPVs.
Acknowledgement of Liability	The Project SPVs hereby acknowledge their liability to the OCDs holder in respect of the OCDs and covenants with OCDs holder that, the OCDs when due are to be converted in accordance with the provisions of the respective contractual arrangement executed by respective Project SPVs.
Security	The OCDs will be unsecured.
Coupon Rate	• Until conversion, the OCDs will have a fixed coupon of 12% (Twelve percent) per annum or such other interest rate as may be prescribed by the financing documents. • The accrued interest on the OCDs shall be payable to the holder on payable when able basis. • The coupon on the OCDs shall accrue from the date of issuance and shall become payable, subject to the Project SPVs having sufficient Distributable Cash Flows. • Distributable Cash Flows to be defined as surplus cash available with the Project SPVs to be determined by the board of directors of the respective Project SPVs after discharging and providing for all liabilities and before payment of any dividend to the shareholders, such that the effect of payment of interest does not make the Project SPV insolvent.
Conversion	• The holder of the OCDs will have the right to convert the OCDs into equity shares any time after the issue date by issuing a notice to the Project SPVs No. of equity shares issued upon conversion = Total face value of OCDs ---------- Conversion Price • Conversion Price is defined as higher of: (1) FMV ("Fair Market Value") of equity shares on the date of conversion; and (2) Face value of equity shares. The above shall be subject to applicable laws.
No Impairment	• The Project SPVs will not, by amendment hereof or through any reorganization, transfer of assets, consolidation, merger, amalgamation, dissolution, issue or sale of securities or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms to be observed or performed hereunder by the Project SPVs and will at all times in good faith taking of all such action as may be necessary or appropriate in order to protect the conversion rights of OCDs holder in relation to the OCDs against impairment. • The Project SPVs will take all such action as may be necessary or appropriate in order that the Project SPVs may validly and legally issue fully paid equity shares on the conversion of the OCDs.
Redemption Right	• Subject to applicable laws, the Project SPVs can redeem the OCDs any time after the issue date, with the prior written consent of the OCD holder and they shall be redeemable at face value.
Taxes	• Each holder of OCDs shall be responsible for its own taxes (present or future) on any coupon (if any) paid or accrued. • The Project SPVs shall deduct withholding taxes, as per applicable law, on coupon (if any) paid to the holders of OCDs.
Voting Rights	• The OCDs shall not carry any voting rights until converted into the equity shares.
Status of Converted OCDs	• The Project SPVs covenant that (i) all equity shares issuable upon the conversion of any OCDs will, upon issuance and delivery, be duly and validly issued, fully paid and free from all liens and charges with respect to the issuances thereof and that all pre-emptive rights of shareholders with respect to the issuances thereof, if any, will have been duly waived. (ii) it will take all such actions necessary to provide for the issuance of the equity shares upon conversion of any OCDs in accordance with the terms and provisions of the Agreement and the restated articles of association.

	•	No fractional equity shares shall be issued upon the conversion of any OCDs and the number of equity shares to be issued shall be rounded to the next highest whole share.
Events of Default and consequences of Event of Default	•	All customary events of default and consequences thereof to these types of transactions are detailed in definitive documents executed in relation to the Project SPV OCDs.
Compliance with Governing Laws	•	The Project SPVs will ensure that the issue, allotment, redemption, and conversion of the OCDs will be done in accordance with applicable law.
	•	The Project SPVs will obtain and/or file all relevant authorizations that may be required for conversion of the OCDs into equity shares.

Borrowings by the Project SPVs from the Trust out of proceeds from credit facilities to be availed by the Trust

Further, the Nxt-Infra Trust proposes to utilise the proceeds from credit facilities to be availed by the Trust to provide debt to the Project SPVs, to partially or fully prepay/ repay the borrowings availed by the Project SPVs from its external lenders (including principal amounts, interest thereon and any other fees or charges payable in connection thereto.

The indicative key terms of the proposed loan to be provided by the InvIT to the SPVs are set out below. However, grant of such loans and the terms thereof, are subject to the approval from NHAI, and/or relevant State authorities as well as comments/requirements of any lenders to Nxt-Infra Trust, and hence such terms may be changed to incorporate the comments or requirements from such stakeholders.

S. No.	Parameter	Description
1.	**Borrowers**	a) Nxt-Infra CGRG Highways Limited b) Nxt-Infra GSY Highways Limited c) Welspun Road Infra Private Limited d) Welspun Delhi Meerut Expressway Private Limited e) Chikhali Tarsod Highways Private Limited f) Welspun Infrafacility Private Limited
2.	**Lender**	Nxt-Infra Trust ("**InvIT**")
3.	**Purpose of Facility**	This facility is proposed to be utilized for the pre-payment or repayment, in whole or part, of the existing outstanding secured or unsecured loans of the Project SPVs (including principal amounts, interest thereon and any other fees or charges payable in connection thereto) as may be permitted under the SEBI InvIT Regulations and any other purpose as may be agreed between the relevant Project SPV and the InvIT as specified in the relevant disbursement request submitted by the relevant Project SPV.
4.	**Facility Amount**	This facility amount, being, an unsecured rupee term loan facility of up to ₹ [●] lakhs.
5.	**Prepayment Penalty**	No prepayment penalty will be imposed for prepayment to the InvIT by the Project SPVs and prepayment may be carried out at any time.
6.	**Repayment schedule and Tenor**	As may be mutually agreed with the Project SPVs under the Trust Loan Agreement. If the repayment is not possible as per the agreed repayment schedule due to any reason, this shall not be a default, and the unpaid amount shall be paid no later than the date of expiry of the final maturity date (as defined in the Trust Loan Agreement). Tenor of the trust loan agreement shall be as follows for each Project SPV: ***Name of the Project SPV*** — ***Tenor*** CTHPL — 27 half yearly installments DME — 20 half yearly installments GSY — 25 half yearly installments CGRG — 24 half yearly installments WIPL — 16 half yearly installments WRIPL — 40 half quarterly installments Please note that the detailed terms of the trust loan will contain an indicative schedule, setting out the amount of the principal payable under the Trust Loan Agreement on a periodic basis.
7.	**Interest Rate**	Fixed rate of 13 % per annum.

S. No.	Parameter	Description
		The rate of interest may be reset at the discretion of the Trustee or the Investment Manager. *Interest Payment Date* - The interest shall be payable on a monthly basis or, on any such other period as may be communicated by the Investment Manager to the Borrower with a prior written reasonable notice. Interest shall accrue but shall be payable only when adequate funds are available with the Borrower.
8.	**Security**	Unsecured, unless otherwise required by the Lender and the lenders to the financial indebtedness to be availed the Lender ("**InvIT Lenders**").
9.	**Representations and Warranties**	The Project SPVs shall represent to the Trust that, amongst other things: a) they are a company, duly incorporated and validly existing under the laws of India and has all corporate powers and all material governmental licenses, authorizations, consents and approvals required to carry on its business. b) they have complied with all Applicable Laws in relation to the conduct of its business and is not subject to any present, potential or threatened liability by reason of non-compliance with such Applicable Law, which will have a material impact on the Project SPVs, its business or its obligations under the agreement. c) each certified copy of a document provided to the Trustee or Investment Manager pursuant to the terms of the Transaction Documents is a true, complete and accurate copy of the original document and the original document was in full force and effect, in each case as at the date any such document is provided.
10.	**Negative Covenants**	The Project SPVs shall not, without the prior approval of the Trustee or the Investment Manager: a) raise or incur any further indebtedness; b) amend any of the Transaction Documents, as defined in the Trust Loan Agreement; and c) create any Lien over or sell, transfer or dispose of, all or part of its assets. Provided that the Project SPVs shall be permitted to create such encumbrance over its assets as may be required by the InvIT Lenders, and if required by the Lender.
11.	**Events of Defaults**	The proposed Trust Loan Agreement shall contain events of default affecting the Project SPVs as may be required by the Lender, including but not limited to: a) failure to pay any sum under the Trust Loan Agreement (i.e. failure to pay when they have sufficient cash available); b) breach of covenants and undertakings set out in the Trust Loan Agreements; and c) any change in ownership or management control, shareholding of the Project SPVs, at sole discretion, without the prior written approval of Trustee (in its capacity as the trustee to the Trust) or the Investment Manager. Upon occurrence of an event of default, the Trustee may (subject to applicable law and without prejudice to any other rights it may have under applicable law) accelerate the repayment of Term Loan and all other amounts outstanding in relation thereto. The Events of Default structure shall be subject to change as may be decided by the Lender with the InvIT Lenders.
12.	**Governing Laws and Jurisdiction**	Laws of India
13.	**Others**	There may be additional conditions under the financing proposed to be availed by the InvIT which may require corresponding conditions to be included in the Trust Loan Agreement to be executed amongst the InvIT and the Project SPV. For instance, in the event that the InvIT financing documents prescribe any conditions in relation to mandatory prepayments by the InvIT, corresponding provisions for mandatory prepayment shall also be included in the Trust Loan Agreement.

Leverage

In accordance with and subject to the InvIT Regulations, the provisions of the Trust Deed, and the borrowing policy adopted by the Investment Manager, the aggregate consolidated borrowings and deferred payments of the Trust may be up to 70% of the aggregate of the Trust Assets.

Status of lender consents

The Project SPVs have availed debt from certain third-party lenders and acknowledgement from the respective lenders are required in connection with the Issue. The facility documentation entered into with these third-party lenders permit the proposed formation of the trust. As on the date of this Draft Placement Memorandum, the Project SPVs have obtained clarification certificates from certain lenders for the purposes of Issue and transfer of the Project SPVs to the Nxt-Infra Trust. However, acknowledgment/clarification certificates from certain lenders are yet to be received as of the date of filing of this Draft Placement Memorandum with SEBI. For further details, please see the section titled *"Risk Factors"* on page 48.

Borrowing Policy

The Investment Manager shall ensure that all funds borrowed in relation to the Trust are in compliance with the InvIT Regulations. Accordingly, the Investment Manager has formulated a borrowing policy to outline the process for borrowing monies in relation to the Trust. For further details, please see the section titled "*Corporate Governance – Investment Manager – Policies adopted in relation to the Trust – Borrowing Policy*" on page 131.

DISTRIBUTIONS

Statements contained in this section that are not historical facts are forward-looking statements. Such statements are subject to certain risks and uncertainties that could cause actual results to differ materially from those that may be projected. Under no circumstances should the inclusion of such information herein be regarded as a representation, warranty or prediction with respect to the accuracy of the underlying assumptions by the Trust, the Trustee, the Sponsor, the Investment Manager, the Lead Manager or any other person. Bidders are cautioned not to place undue reliance on these forward-looking statements that are stated only as at the date of this Draft Placement Memorandum. For details in relation to such forward-looking statements, please see the section titled "Forward-Looking Statements" on page 16.

The net distributable cash flows of the Trust (the "**Distributable Income**") are based on the cash flows generated from the underlying operations undertaken by the Project SPVs. For details of the business and operations presently undertaken by the SPVs, please see the section titled *"Business*" on page 163. Currently, cash flows receivable by the Trust may be in the form of dividend, capital reduction, interest income or principal repayment received from the SPVs in relation to any debt sanctioned by the Trust, or a combination of both.

In terms of the InvIT Regulations, not less than 90% of the net distributable cash flows of the Project SPVs, shall be distributed to the Trust, subject to applicable provisions in the Companies Act, 2013, as amended and not less than 90% of the net distributable cash flows of the Trust shall be distributed to the Unitholders.

The Trust shall declare and distribute at least 90% of the Distributable Income to the Unitholders. Such distribution shall be declared and made such that the time period between any two declarations of distribution shall not exceed one year. However, if any infrastructure asset is sold by the Trust or the SPVs, or if the equity shares or interest in the SPVs are sold by the Trust and if the Trust proposes to re-invest the sale proceeds into another infrastructure asset within one year, it shall not be required to distribute any sales proceeds to the Trust or to the Unitholders. Further, if the Trust proposes not to invest the sale proceeds into any other infrastructure asset within one year, it shall be required to distribute the same in the manner specified above. In accordance with the InvIT Regulations, distributions by the Trust shall be made no later than 15 days from the date of such declarations. The distribution, when made, shall be made in Indian Rupees. For details on the risks relating to distribution, please see the section titled "*Risk Factors*" on page 48.

Distribution Policy

Method of calculation of Distributable Income

The Distributable Income of the Trust shall be calculated in accordance with the InvIT Regulations. The Trust proposes to calculate Distributable Income in the manner provided below:

(a) Calculation of the Net Distributable Cash Flows at Project SPV level:

Description
Profit after tax as per Statement of profit and loss/ income and expenditure (standalone) (A)
Add: Depreciation and amortisation as per sstatement of profit and loss/ income and expenditure.
Add/ Less: Loss / gain on sale of Infrastructure Assets net of any costs incurred
Add: Any amount received from tolls or annuities or any other income, not recognised as income for the purposes of working out the profit after tax
Add/(Less): Decrease/(increase) in working capital
Add: Amounts invested by Trust in the Project SPV for service of debt or interest or other expense, through internal accruals to the extent allowed under SEBI InvIT regulations, which is now available for repayment to the Trust
Less: Any amount to be kept aside for maintenance of reserves required under the financing agreements of the Trust/SPV
Add: Any excess reserves released in lieu providing a separate line of credit or a bank guarantee or demonstration of cash flows or lesser expense for amounts equivalent to the reserve requirement if allowed to be distributed as per the financing agreements
Add/Less: Any amounts received from the authority towards change of scope works or utility shifting or any other amounts (net of payments to relevant third parties or other costs)
Less: Payment towards • any maintenance/capital expense in excess of amounts set aside inclusive of all costs and claims • payment of existing claims/settlement of any project SPV basis any existing arrangements of the SPV

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
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.
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, including but not limited to • any decrease/increase in carrying amount of an asset or a liability recognised in the statement of profit and loss/ income and expenditure on measurement of the asset or the liability at fair value; • interest cost as per the effective interest rate method; • deferred taxes;
Less: Repayment of external debt/ debt raised from related party at the SPV (net of any new debt raised or refinancing of external debt)
Add/(Less): (Any provision or reserve set aside)/ excess provision or reserve released by the IM for expenses which may be due in the next quarter/period
Add/Less: Any other adjustment to be undertaken as recommended by the IM to avoid double counting in the above calculation and provide adequate effect to adjustments ex. Taxes etc.
Add/Less: Any other adjustment to be undertaken by the IM as it may deem necessary
Less: Any claims/deferred consideration/other amounts payable under the transaction documents with the Sellers of the SPVs
Total Adjustments (B)
Net Distributable Cash Flows (C) = (A+B)

(b) Calculation of the Distributable Income at the Trust level:

Description
Add: Proceeds from sale of the Project SPV not distributed pursuant to an earlier plan to re-invest, or if such proceeds are not intended to be invested within one year from the date of such sale.
Less: Costs/retention associated with sale of the Project SPV (a) related debts settled or due to be settled from sale proceeds of SPV; (b) transaction costs paid on sale of the Project SPV; and (c) capital gains taxes on sale of the Project SPV, or other investments of the Trust.
Add: Any other income accruing at the Trust level and not captured above, including but not limited to interest/return on surplus cash, if any, invested by the Trust.
Less: Any claims/deferred consideration/other amounts payable under the transaction documents with the Seller(s) of the SPVs
Less: Any fees, interest and expense incurred at the Trust level, including but not limited to the fees of the Investment Manager and the Trustee
Less: Any expenditure reimbursed to Investment Manager or Sponsor which the Investment Manager incurred on behalf of Trust
Less: Proceeds reinvested or planned to be reinvested in accordance with SEBI InvIT Regulations and other policies of the Trust
Less: Repayment of external debt at the Trust level (net of any new debt raised or refinancing of external debt)
Add/ Less: Any amount to be kept aside/ release with regards to DSRA, MMRA or any other reserve requirements by the financing documents/lenders;
Less: Income tax (if applicable) at the standalone Trust level and payment of other statutory dues
Less: Amount invested in or lent to any of the Project SPVs funded through internal accruals of the Trust, to the extent allowed under the SEBI InvIT Regulations. Such amount shall be decided by the IM Board.
Less: Payment of all amounts to the Sponsor pursuant to, and in accordance with, the Preliminary Placement Memorandum or Placement Memorandum
Add/(Less): (Any provision or reserve set aside)/ excess provision or reserve released by the IM for expenses which may be due in the next quarter/period
Less: Any other reserve deemed necessary by the IM Board for infusing funds into the SPVs meet their obligations
Less: Any costs incurred towards expenses towards due diligence or other expenses for the purpose of acquisition of assets as approved by the IM Board
Less: Any other adjustment to be undertaken by the IM Board to ensure that there is no double counting of the same item for the above calculations
Add: Any undistributed cash retained for a specific purpose now available for distribution
Add/ Less: Any other adjustment to be undertaken by the IM Board as it may deem necessary
Distributable Income

In terms of the InvIT Regulations, if the distribution is not made within 15 (fifteen) days from the date of declaration of the Distributable Income, the Investment Manager shall be liable to pay interest to the Unitholders at the rate of 15% (fifteen per cent) per annum till the distribution is made. Such interest shall not be recovered in the Management Fees of the Investment Manager or in the form of fee or any other form payable to the Investment Manager by the Trust.

Pursuant to a circular dated December 6, 2023 ("**NDCF Circular**"), SEBI has notified the 'Revised framework for computation of Net Distributable Cash Flow (NDCF) by Infrastructure Investment Trusts (InvITs) to standardize the framework for calculation of available net distributable cash flows. In the event that the Trust is listed on NSE, or declares Distributable Income post April 1, 2024, the revised net distributable cash flows framework shall be in accordance with the NDCF Circular.

Amendment

Any amendment or variation to the distribution policy shall be subject to receipt of 60% approval from the Unitholders (present and voting) of the Trust, unless otherwise required by any governmental, statutory or regulatory authority.

Notwithstanding the above, the distribution policy will stand amended to the extent of any change in applicable law, including any amendment to the InvIT Regulations or pursuant to the effectiveness of the NDCF Circular, without any action from the Investment Manager or approval of the Unitholders of the Trust.

DISCUSSION AND ANALYSIS BY THE DIRECTORS OF THE INVESTMENT MANAGER OF THE FINANCIAL CONDITION, RESULTS OF OPERATIONS AND CASH FLOWS OF THE PROJECT SPVS OF THE TRUST

*The following discussion and analysis of our financial condition and results of operations should be read in conjunction with the sections titled "Summary Combined Financial Information of the Trust" on page 26 and "Special Purpose Combined Financial Statements" attached as Annexure II. This discussion contains forward-looking statements and involves numerous risks and uncertainties, including, but not limited to, those described in the section titled "Risk Factors" on page 48. Actual results could differ materially from those contained in any forward-looking statements and for further details regarding forward-looking statements, kindly refer to the section titled "Forward-Looking Statements" on page 16. The Special Purpose Combined Financial Statements are prepared in accordance with Guidance Note on Reports in Company Prospectuses (Revised 2019), and the Guidance Note on Combined and Carve Out Financial Statements issued by the Institute of Chartered Accountants of India (the "**Guidance Notes**") using the recognition and measurement principles of Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 read with Section 133 of the Companies Act, 2013 ("**Ind AS**") , except Ind AS 33 earnings per share and other generally accepted accounting principles and other provisions relating to disclosures required as per of the InvIT Regulations and the SEBI Circular on Financial Disclosures. Our fiscal year ends on March 31 of each year, and references to a particular fiscal are to the twelve months ended March 31 of that year. For the sole purposes of the Special Purpose Combined Financial Statements, references to "we", "us" and "our" is to the Project SPVs on a combined basis. Unless stated otherwise or the context otherwise requires, industry and market data used in this section has been obtained or derived from the CRISIL Report dated September 2023 with respect to the assessment of the roads sector in India, publicly available information as well as industry publications and sources, including from various government publications and websites.*

The Trust will own 49% equity interest in WIPL which holds the 8 laning of Mukarba Chowk – Panipat section of NH-1 (new NH-44) from km 15.500 to km 86.000 in the state of Haryana under NHDP-IV through PPP on toll basis pursuant to the WIPL Concession Agreement, and which is accounted for as an investee under the equity method of accounting. The interest of the Trust in WIPL is accounted for using the equity method in accordance with Ind AS 28, after initially being recognized at the net book value as at April 1, 2020. For details of accounting policies as required by Ind AS (read with Ind AS 28) relating to the accounting of WIPL as equity accounted investee, please refer to sections titled "Presentation of Financial Data and Other Information" and "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results Of Operations and Cash Flows of the Project SPVs of the Trust" on pages 12 and 237, respectively.

In relation to WIPL, accounting in Special Purpose Combined Financial Statements is as per equity method, as per Ind AS 2, hence, only 49% share of profit/ loss is picked up considering joint control. All numbers with respect to WIPL, including in relation to projections, are considered only to the extent of 49% in the document.

Overview

Nxt-Infra Trust is a registered Indian infrastructure investment trust which proposes to invest in road infrastructure assets in India. The Trust proposes to have an initial portfolio of six Project SPVs comprising of 14 road stretches spanning an aggregate length of over 2000 lane kilometres, located across Delhi, Haryana, Uttarakhand, Uttar Pradesh and Maharashtra in India. The portfolio is a mix of toll and annuity assets.

The Trust is sponsored by Actis Highway Infra Limited (the "**Sponsor**"), part of the Actis Group, which is a global investor in sustainable infrastructure.

Actis Group formed in 2004 when it spun out from CDC Group plc. It has a 75+ year heritage of investing in global growth markets. Actis Group focuses on sustainable infrastructure, investing globally in energy infrastructure, long life infrastructure, digital infrastructure & real estate. It focuses on ownership to better drive value creation and build sustainability leaders. Actis is a signatory to United Nations Principles for Responsible Investment.

Since its inception, Actis Group has invested over USD 24 billion as of March 31, 2023, and manages assets across a diverse range of sectors globally. The Sponsor presently holds and operates six road assets in India which were acquired from the Welspun group in 2022 and are proposed to be transferred to the Trust pursuant to the Issue.

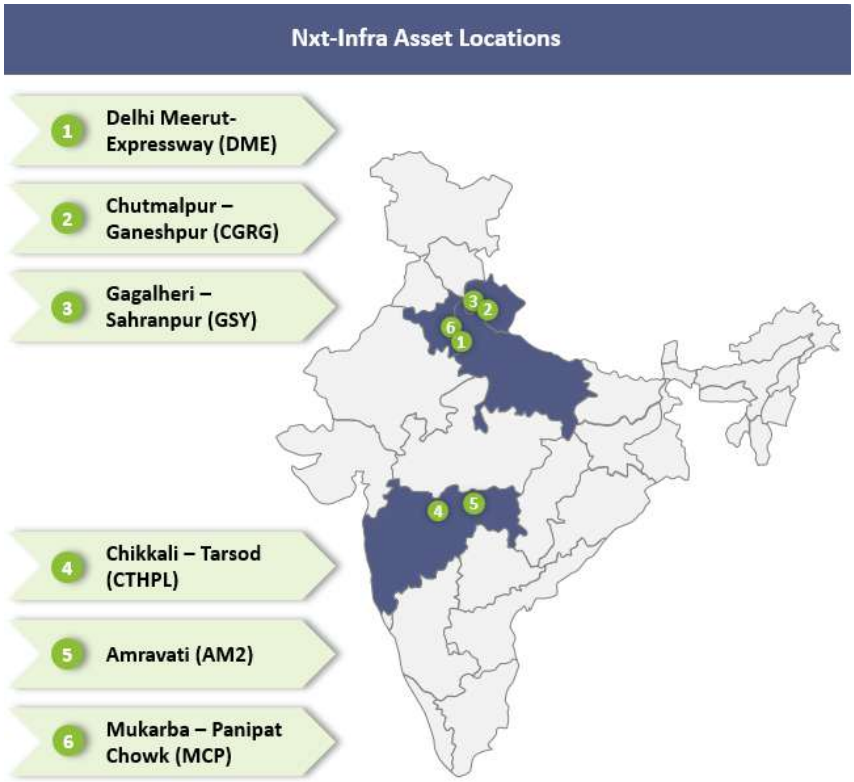
The Trustee, Catalyst Trusteeship Limited is a trusteeship company involved in varied facets of debenture and bond trusteeships, including, advisory functions and management functions. The Trustee also acts as a security trustee and is involved in providing services in relation to security creation, compliance and holding security on behalf of lenders.

Our Investment Manager, Walter Infra Manager Private Limited, will be responsible for managing the Initial Portfolio Assets as well as undertaking investment and management decisions in relation to our assets. Walter Infra Project Manager Private Limited, an associate of the Sponsor, has been appointed as the Project Manager in relation to the Initial Portfolio Assets.

Our Projects

Our Initial Portfolio Assets comprise both national highways and state highways, and are located in the states of Delhi, Haryana, Uttarakhand, Uttar Pradesh and Maharashtra.

The map below illustrates the locations of the Projects:



Factors Affecting Our Results of Operations

Failure and inability to identify and acquire new infrastructure assets that generate comparable revenue, profits or cash flows

The InvIT Assets will comprise six road assets, of which five are operating on a hybrid annuity model and one is operating in the toll model, that the Project SPVs operate and maintain pursuant to concessions granted by the NHAI. The Concession Agreements of the Project SPVs stipulate a limited concession period at the end of which the operation of the relevant project will be transferred to NHAI/concessioning authorities. As at March 31, 2023, the residual periods for the concessions of the InvIT Assets ranged from approximately 8 to 14 years. For further details on the residual concession period of each of the InvIT Assets, please see the section titled "*Business*" on page 163.

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

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

We cannot assure you that we will be able to acquire new infrastructure assets upon the expiry of the term of the Project SPVs' existing Concession Agreements or at any time thereafter. Accordingly, the number of assets forming part of our portfolio and the revenue generated by them may vary. Further, even if new infrastructure assets are added to our portfolio, we cannot assure you that such infrastructure assets will be able to generate comparable cash flows, revenues and profits. If we are unable to acquire new road assets that generate comparable cash flows, revenue or profits, our business, financial condition, cash flows and results of operations and our ability to make distributions to Unitholders may be adversely affected. For further details on the terms of each of the Concession Agreements, see "*Summary of Key Agreements*" on page 186.

The Project SPVs' financing agreements entail interest at variable rates and Project SPVs are subject to restrictive covenants under their financing agreements

The Trust proposes to avail a loan aggregating to ₹ 3,50,000 lakhs, after the Closing Date (the "**InvIT Loan**" for the purpose of prepayment or repayment of the Project SPV Loans. For the indicative terms in relation to the InvIT Loan, please see the section titled "*Financial Indebtedness*" on page 226. Further, the financing agreements entered into by the Project SPVs with certain banks and financial institutions contain certain restrictive covenants and cross default provisions. The financing agreements restrict the Project SPVs from, amongst other things, (i) make any amendments or alter the constitutional documents; (ii) make any changes in the management or control of the board without prior consent of the lenders; and (iii) effecting changes in its ownership without prior approval of the lenders. In addition, these restrictive covenants may also affect some of the Nxt-Infra Trust's rights as the shareholder of the relevant Project SPV and the Project SPV's ability to pay dividends if it is in breach of its obligations under the applicable financing agreement. These may restrict our ability to conduct business and any breach thereof may adversely affect our results of operations and financial condition. In the event of any breach of any covenant contained in these financing agreements, apart from other consequences, the security trustee may enforce the security under the financing agreements which may adversely affect our business, financial condition and results of operations. We may also be required to immediately repay our borrowings either in whole or in part, together with any related costs.

In addition, our ability to meet the debt service obligations and repay the outstanding borrowings of the Project SPVs will depend primarily on the cash generated by our business. We cannot assure you that we will generate sufficient cash to service existing or proposed borrowings or fund other liquidity needs, which could have an adverse effect on our business, cash flows and results of operations. We may be required to refinance our outstanding borrowings in the future. There is no assurance that we will be able to obtain such financing, on favorable terms, or at all, which may have a material adverse effect on our business, financial condition and results of operations.

Revenues of our Toll Project are subject to significant fluctuations

WIPL is exclusively toll based and the remaining five Projects are hybrid annuity projects. Toll revenues depend on toll receipts and are affected by changes in traffic volumes and the mix of traffic. Our total revenue from DBFOT (Toll) SPV for six-month period ended September 30, 2023, and the Financial Years 2023 were ₹ 16,919.35 lakhs and ₹ 25,410.17 lakhs, respectively. Traffic volumes are directly or indirectly affected by a number of factors, many of which are outside the control of DBFOT (Toll) SPV, including toll rates, fuel prices, the affordability of automobiles, the quality, convenience and travel time on alternate routes, industrial growth and development and the availability of alternate means of transportation, including rail networks and air transport. Moreover, the cash flows of DBFOT (Toll) SPV are affected by seasonal factors, which may adversely affect traffic volumes. India experiences monsoon rains each year, which can affect the volume of traffic on such projects. During such periods of curtailed activity, DBFOT (Toll) SPV may continue to incur operating expenses but receive reduced toll revenues. Such fluctuations may adversely affect the business, financial condition or results of operations of DBFOT (Toll) SPV.

The toll revenues of the DBFOT (Toll) SPV may also be affected by various regulatory and statutory conditions and restrictions. On May 26, 2021, the NHAI issued guidelines to ensure service time of not more than 10 seconds

per vehicle even at peak hours at the toll plazas on the National Highways. In accordance with these guidelines, queues of vehicles at toll plazas must not exceed 100 meters, and in the event of queues longer than 100 meters the vehicles will be allowed to pass without paying toll till the queue comes within 100 meters from the toll booth. Such conditions on the payment of toll may adversely affect the business, financial condition or results of operations of DBFOT (Toll) SPV.

Traffic volumes are also influenced by the convenience and extent of a toll road's connections with other parts of the state and national highway and toll road network, as well as the cost, convenience and availability of other means of transportation and alternative routes. There can be no assurance that future changes affecting the road network in India, through road additions and closures or through other traffic diversions or redirections, or the development of other means of transportation, such as air or rail transport, will not adversely affect traffic volume on toll roads.

The Special Purpose Combined Financial Statements and Projections of Revenue from Operations and Cash Flow from Operating Activities presented in this Draft Placement Memorandum

The Special Purpose Combined Financial Statements of the Project SPVs constitute a different presentation of information and may not necessarily reflect the consolidated financial position, results of operations or cash flows of the Nxt-Infra Trust, and nor will they necessarily give an indication of the financial position, results of operations or cash flows of the Nxt-Infra Trust or the Project SPVs in the future. Furthermore, the future consolidated financial statements of the Nxt-Infra Trust will be prepared on the basis of Ind AS including (Ind AS 103 "Business Combinations"), which is different from the accounting treatment used for the preparation of the Special Purpose Combined Financial Statements.

After the Listing, there may be certain changes to the Nxt-Infra Trust's cost structure, levels of indebtedness and operations, and these could differ materially from the historical combined cost structure and levels of indebtedness presented in the Special Purpose Combined Financial Statements. For example, there are certain costs, such as the Investment Manager's fee, the Project Manager's fee and other costs relating to the Nxt-Infra Trust, that will be incurred by the Nxt-Infra Trust going forward, some of which were not incurred by the Project SPVs historically. For details of recurring expenses, please see the section titled *"Overview of the Trust"* on page 19.

The financial projections contained in this Draft Placement Memorandum are based on historical financial information and certain estimates and assumptions. There can be no assurance that the Project SPVs will be able to generate sufficient cash from the operations of the Projects for the Nxt-Infra Trust to make distributions to Unitholders or that such distributions will be in line with those set out in the section titled *"Projections of Revenue from Operations and Cash Flow from Operating Activities"* attached as Annexure I. The future financial performance of the Nxt-Infra Trust could vary materially from the financial projections and some of the underlying assumptions of such projections, may change or not materialise as expected. Further, unfavourable events or circumstances not presently anticipated may also arise, which may have an impact on the future financial performance of Nxt-Infra Trust

Leakage of the tolls collected on the toll-linked Projects

One of the Projects is exclusively toll based and five of the Projects are hybrid annuity projects. Toll receipts are primarily dependent on the integrity of toll collection systems. The Project SPVs that have a toll component generate revenues from the Projects through the collection of tolls. On Indian toll roads, each motorist generally pays a one-time entry tariff to the toll operator at the point of entry to the toll road based on the average trip distance calculated for all users of the toll road. Such Project SPVs employ toll management software to monitor their operations.

The level of revenues derived from the collection of tolls may be affected by reduction in toll rates as determined by the concessioning authorities. Toll revenues may also be affected by leakage through toll evasion, theft, fraud or technical faults in the toll systems or forced violations by users of toll roads. At times, there may be a need to allow users of tolls roads to pass through without paying applicable tolls due to heavy traffic build up, or there may be an inability to collect tolls due to political protests or agitations relating to tolling. Although DBFOT (Toll) SPV has systems in place to minimise leakage through fraud and pilfering, any significant failure to control leakage in toll collection systems could have an adverse effect on our business, prospects, financial condition and results of operations

Systems failures, cyber security breaches and attacks and resulting interruptions in our toll-linked project

The proper functioning of our technology infrastructure is essential to the conduct of our business. As the Project SPV is reliant on an electronic toll collection system, our transaction-processing systems and our network infrastructure are critical to our success.

To the extent of our Toll Project, our electronic toll collection systems may experience service interruptions or degradation or other performance problems because of, amongst other, hardware and software defects or malfunctions, unexpected high volume of transactions, cyberattacks and cyber-security breaches, infrastructure changes, human error, natural disasters, power losses, disruptions in telecommunications services, unauthorized access, fraud, military or political conflicts, terrorist attacks, legal or regulatory takedowns, computer viruses, ransomware, malware, or other events. In some instances, we may not be able to identify the cause or causes of these performance problems within an acceptable period of time. Further, as techniques used to obtain unauthorized access to or sabotage systems change frequently and may not be known until launched against us, we may be unable to anticipate, or implement adequate measures to protect against, these attacks.

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

Strikes, work stoppages or increased wage demands by the employees of the Project SPVs, O&M Contractors or other sub-contractors

In the event of any strikes or work stoppages by employees of the Project SPV itself, the O&M Contractors or other sub-contractors due to increased wage demands or the inability of the Project SPV, O&M Contractors or other sub-contractors to either retain or recruit employees and sub-contractors with suitable credentials, the ability of the Project SPVs to collect tolls and maintain and operate the Projects will be adversely affected. In addition, any disruption to the services provided by the employees of the Project SPV, the O&M Contractors or other sub-contractors will have an adverse effect on the operations of the Project SPVs. There can be no assurance that future disruptions will not be experienced due to disputes or other problems with the work force, which may adversely affect the business and results of operations of the Project SPVs.

No identified acquisition opportunities from the Sponsor or third parties in the future

The Nxt-Infra Trust aims to achieve portfolio growth through our acquisition growth strategy. Accordingly, in respect of future acquisitions, the Nxt-Infra Trust may depend on third parties as a source of attractive acquisition opportunities. Further, the Nxt-Infra Trust may also wish to acquire certain assets from the Sponsor in the future.

Eligible acquisition opportunities from third parties may also not materialise or the Nxt-Infra Trust may face increased competition from other InvITs and third parties, which may cause the price at which the Nxt-Infra Trust is able to acquire a given asset to not be financially desirable.

An inability to grow through prudent acquisitions may adversely affect the Nxt-Infra Trust's business, financial condition and results of operations.

Further, we cannot assure you 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 adversely affect our profits, financial condition and distributions. The concession agreements for future road projects may also contain terms and conditions that are more restrictive than those under the existing Concession Agreements for the InvIT Assets. These restrictions may restrict our flexibility in managing our business or projects and could in turn adversely affect our business prospects, financial condition and results of operation. Further, if the operating periods of InvIT Assets are shortened or disrupted or the Project SPVs right to operate the InvIT Assets is terminated before the expiration of the concessions, the business, financial condition, cash flows and results of operations of the InvIT may be adversely affected.

Changing laws, rules and regulations, including changes in legislation or the rules relating to tax regimes, legal uncertainties and the political situation in India

Our business, financial condition, cash flows, and results of operations could be 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. We cannot assure you that the Government or the state governments will not implement new regulations and policies which will require the Nxt-Infra Trust and Project SPVs to obtain additional approvals and licenses from governmental and other regulatory bodies or impose onerous requirements and conditions on our operations. Regulatory changes in India, particularly in respect of the InvIT Regulations and other taxation legislations, could expose us to greater tax liability than what our financial projections assume. The application of various Indian sales, value-added and other tax laws, rules and regulations to our services, currently or in the future, may be subject to differing or stricter interpretation by applicable authorities, which could result in an increase in our tax payments (prospectively or retrospectively) and/or subject us to penalties, which could affect our business operations and affect our ability to make distributions to our Unitholders. For further details, please see section titled "*Risk Factors - Changes in legislation or the rules relating to tax regimes could materially and adversely affect our business, prospects and results of operations*" and "*Regulations and Policies*" on pages 76 and 269, respectively.

Routine and periodic major maintenance obligations contained in the concession agreements

The Project SPVs are required to operate and maintain the Projects in accordance with the respective concession agreements. Accordingly, the Project SPVs prepare a maintenance manual and a maintenance program in consultation with an independent engineer appointed by the NHAI or other concessioning authority for each Project and are required to abide by the same. The Project SPVs' maintenance obligations are primarily to operate and maintain the Projects in order to permit the safe, smooth and uninterrupted flow of traffic and the related work and maintenance that they are required to undertake in order to fulfil such obligations. Such maintenance obligations include the repair of wear and tear of roads including overlaying the surface of the roads, among other things. Please see the section titled "*Summary of the Key Agreements*" on page 186 for details on the Project SPVs' O&M obligations.

Routine and periodic major maintenance costs mainly comprise costs of raw materials and other items including fuel, equipment costs and labour expenses, besides maintenance and replacement of hardware, software, tolling expenses and equipment. The prices and supply of raw materials depend upon factors that are beyond our control, including, but not limited to, general economic conditions, transportation costs, global and domestic market prices, competition, production levels and import duties, which could be cyclical in nature. Unanticipated increases in the price of materials, fuel costs, labour or other inputs will affect the results of operations of the Project SPVs, especially if the wear and tear on the relevant Project requires major work. The ability of the Project SPVs to absorb increases in the purchase price of materials, fuel and other inputs is limited.

Further, our operational costs may also increase substantially, if the any O&M Contractors engaged by the Project SPV or the Project Manager fail to perform their duties as per the O&M Agreements.

Inflation/deflation and interest rate risks

Inflation rates in India have been volatile in recent years, and such volatility may continue. Increasing inflation in India could cause a rise in the price of transportation, wages, raw materials and other expenses. There can be no assurance that increased toll charges will sufficiently offset our increased costs due to inflation which could have a material adverse effect on our business, prospects, financial condition, results of operations and cash flows. Inflation may also have an impact on interest rates, which can affect our profitability.

There are no specific provisions in our concession agreements protecting us against increases in interest rates or cost of raw materials. Our lenders may have the right to periodically adjust our interest rates and our applicable interest rates may increase based on their review of our credit profile and perceived risks in our operations. Many factors causing such adverse changes are beyond our control and we are usually not able to demand matching increases in our annuities.

The HAM Projects have a natural hedge against the risk of adverse interest rate movement. In addition to the annuity payments due under such concession agreements during the operations period, the relevant concession agreements for HAM Projects require the relevant concessioning authority to pay interest on the reducing balance of the completion cost (equivalent to 60% of the BPC) throughout the operation period at the rate of three per cent above the prevailing RBI Bank Rate. Accordingly, any increase in operating and financing costs is likely to be offset by the increased revenues earned by us on such HAM Projects. Similarly, our toll project has a natural hedge against any indirect reduction in traffic volumes on account of high WPI-based inflation, as a high WPI mandatorily requires the toll rates to be revised on an annual basis, depending on the variation in WPI. If the relevant concessioning authority shall not revise the interest rate or toll rates, financial condition and results of

operations of the Nxt-Infra Trust may be adversely affected.

Purpose and Basis of Accounting and Preparation of Special Purpose Combined Financial Statement

The Special Purpose Combined Financial Statements of the Group comprise the Special Purpose Combined Balance Sheets as at September 30, 2023, March 31, 2023, March 31, 2022 and March 31, 2021, the Special Purpose Combined Statements of Profit and Loss (including Other Comprehensive Income), the Special Purpose Combined Statement of Changes in Equity, the Special Purpose Combined Cash Flow Statements for the six months period ended September 30, 2023 and for the years ended March 31, 2023, March 31, 2022 and March 31, 2021, the Combined Statement of Net Assets at Fair Value as at September 30, 2023, the Combined Statement of Total Returns at Fair Value for the six months period ended September 30, 2023 and year ended March 31, 2023 and notes to the special purpose combined financial statements including a summary of significant accounting policies and other explanatory information (collectively, the "**Special Purpose Combined Financial Statements**").

The Special Purpose Combined Financial Statements have been prepared in accordance with Indian Accounting Standards prescribed under Section 133 of the Companies Act, 2013 read with the Companies (Indian Accounting Standards) Rules, 2015 ("**Ind AS**") except for Ind AS 33: Earning per share. Further, the Special Purpose Combined Financial Statements are in compliance with the SEBI (Infrastructure Investment Trusts) Regulations, 2014 as amended from time to time including circulars, notifications, clarifications and guidelines issued thereunder ("**InvIT Regulations**") and the Guidance Note on Combined and Carve-Out Financial Statements issued by the Institute of Chartered Accountants of India ("**Guidance Note**").

The details of various entities included in the Special Purpose Combined Financial Statements is as given below:

Name of SPV	Principal Activities	Proposed Shareholding by Trust	Nature of Proposed Investment	Project Type	Country of incorporation
CTHPL	Construction of Road	100%	Subsidiary	HAM	India
CGRG	Construction of Road	100%	Subsidiary	HAM	India
GSY	Construction of Road	100%	Subsidiary	HAM	India
DME	Construction of Road	100%.	Subsidiary	HAM	India
WRIPL	Construction of Road	100%	Subsidiary	HAM	India
WIPL	Construction of Road	49%*	Joint Venture*	BOT	India

***Presently, 51% of the issued and paid-up equity share capital of WIPL is held by Welspun Enterprises Limited ("WEL"). In terms of the securities subscription and purchase agreement dated June 9, 2022 ("SSPA") entered into between our Actis Highway Infra Limited (Sponsor) and WEL, the Sponsor, is entitled to acquire 100% of the equity share capital of WIPL. In terms of the requirements prescribed by the NHAI, a change in ownership of WIPL may be undertaken only with the prior approval of the NHAI, and only after a period of two years from the commercial operations date of WIPL. Therefore, the proposed acquisition of the equity shares presently held by WEL may only be undertaken after the completion of the period prescribed by the concessioning authority.*

The Special Purpose Combined Financial Statements have been prepared by Investment Manager, acting on behalf of the Trust ('**Trust Management**') to meet the requirements of InvIT Regulations and for inclusion in the Draft Placement Memorandum, Placement Memorandum and Final Placement Memorandum prepared by the Investment Manager in connection with the proposed initial private placement of units of Trust. As a result, the Special Purpose Combined Financial Statements may not be suitable for another purpose. Further, Special Purpose Combined Financial Statements do not comply with all the presentation and disclosure requirements of Division II of Schedule III notified under the Companies Act, 2013 (as amended) nor the Special Purpose Combined Financial Statements comply with all the presentation and disclosure requirements of Ind AS. Specific attention is drawn to the following aspects:

- In preparing the Special Purpose Combined Financial Statements, "Equity Share Capital" represent shareholder's investment in the SPVs.

- The number of units that NXT – Infra Trust will issue to the investors is not presently ascertainable. Hence, the Earnings per unit could not be computed.

In accordance with requirements of the InvIT Regulations, since the Trust was registered as an InvIT on October 26, 2023. It has been in existence for a period lesser than three completed financial years before the filing of offer documents. Accordingly, Financial information of the Trust has not been included in the Special Purpose Combined Financial Statements from that date. The special purpose interim financial statements of the SPVs as at and for the six months period ended September 30, 2023 and general purpose financial statements of the SPVs as at and for the years ended March 31, 2023, March 31, 2022 and March 31, 2021 were audited by firms of Chartered Accountants other than S R B C & CO LLP.

Further, as required by the InvIT regulations, the Special Purpose Combined Financial Statements are prepared, based on an assumption that 100% stake in all SPV entities is held by Trust for such period when the Trust was not in existence. However, in case of WIPL the share of net profit/ (loss) is accounted for using equity method as the Sponsor has purchased 49% stake in and the balance 51% stake would be acquired at an agreed consideration upon completion of 2 years following Provisional Commercial Operation Date ("PCOD") date (i.e. March 31, 2024 and approval from National Highway Authority of India (NHAI) (the Grantor) is obtained.

Further, in accordance with section 3.3.4 of SEBI Master Circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2023/115 dated 06 July 2023 the Special Purpose Combined Financial Statements have been presented after making necessary adjustments and accordingly, these may be different from the general purpose audited financial statements of the SPV's.

The Special Purpose Combined Financial Statements are presented in INR, which is the functional currency of the Trust. The Trust does not have any foreign operation and has assessed the functional currency to be INR. All values are rounded to the nearest Lakh rupees, unless otherwise indicated. Certain amounts that are required to be disclosed and do not appear due to rounding-off are expressed as 0.00.

The Special Purpose Combined Financial Statements correspond to classification provisions contained in Ind AS 1 'Presentation of Financial Statements'. The Special Purpose Combined Financial Statements have been prepared on a historical cost convention and on an accrual basis except for certain financial assets.

a) Basis of Combination

The Special Purpose Combined Financial Statements have been prepared using uniform accounting policies for like transactions and other events in similar circumstances. The financial statements / information of all the SPV's and the Investment Entity are transferred and used for the purpose of combination and are drawn up to the same reporting date i.e. for the six months period ended September 30, 2023, for the years ended March 31, 2023, March 31, 2022 and March 31, 2021. The Special Purpose Combined Financial Statements have been prepared using the principles of consolidation as per Ind AS 110 – Consolidated Financial Statements and the Guidance Notes, to the extent applicable. However, unlike consolidated financial statements, the Special Purpose Combined Financial Statements does not have any parent company.

The procedures for preparing Special Purpose Combined Financial Statements are stated below –

i) Combine like items of assets, liabilities, equity, income, expenses and cash flows of the SPV's;

ii) The financial statements of all the SPVs were combined based on the assumption that all the SPVs were part of a single group for the entire period presented pursuant to the requirements as per SEBI circular.

iii) Intragroup assets, liabilities, equity, income, expenses and cash flows relating to transactions between SPVs of Trust are eliminated in full.

iv) Considering that the shareholders of the SPVs, other than the Sponsor or its related parties, will also be transferring their stake to the Trust, Non-controlling interest is not applicable.

v) In case of Investment Entity, the share of net profit/ (loss) is accounted for using equity method

Summary of Significant Accounting Policies

a. Current verses non-current classification

The Trust presents assets and liabilities in the Balance Sheet based on current/ non-current classification.
An asset is classified as current when it is:

- Expected to be realized or intended to be sold or consumed in normal operating cycle
- Held primarily for the purpose of trading
- Expected to be realized within twelve months after the reporting period, or
- Cash or cash equivalent unless restricted from being exchanged or used to settle a liability for at least twelve months after the reporting period.

All other assets are classified as non-current.

A liability is classified as current when:

- It is expected to be settled in normal operating cycle
- It is held primarily for the purpose of trading
- It is due to be settled within twelve months after the reporting period, or
- There is no unconditional right to defer the settlement of the liability for at least twelve months after the reporting period

The Trust classifies all other liabilities as non-current.

The Trust has identified 12 months as its operating cycle.

Deferred tax assets and liabilities are classified as non-current assets and liabilities.

Operating cycle

The operating cycle is the time between the acquisition of assets for processing and their realization in cash and cash equivalents. The SPV Group and Investment Entity has ascertained its operating cycle being a period of twelve months for the purpose of classification of assets and liabilities as current and non-current.

b. Fair Value Management

The SPV Group and Investment Entity measures financial instruments, such as, investment in debt and equity instruments at fair value at each balance sheet date.

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value measurement is based on the presumption that the transaction to sell the asset or transfer the liability takes place either:

- in the principal market for the asset or liability, or
- in the absence of a principal market, in the most advantageous market for the asset or liability.

The principal or the most advantageous market must be accessible to the SPV Group and Investment Entity.

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.

The Company 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 minimizing 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 (unadjusted) market prices in active markets for identical assets or liabilities

Level 2 — Valuation techniques for which the lowest level input that is significant to the fair value measurement is directly or indirectly observable

Level 3 — Valuation techniques for which the lowest level input that is significant to the fair value measurement is unobservable.

For assets and liabilities that are recognised in the financial statements on a recurring basis, the SPV Group and Investment Entity determines whether transfers have occurred between levels in the hierarchy by reassessing categorization (based on the lowest level input that is significant to the fair value measurement as a whole) at the end of each reporting period.

For the purpose of fair value disclosures, SPV Group and Investment Entity 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.

c. Revenue Recognition

Revenue from contracts with customers is recognised when control of the goods or services are transferred to the customer at an amount that reflects the consideration to which SPV Group and Investment Entity expects to be entitled in exchange for those goods or services.

Revenue towards satisfaction of a performance obligation is measured at the amount of transaction price (net of variable consideration) allocated to that performance obligation.

Utility Shifting Income is recognised as and when the work is completed and the same is certified by the Authority.

The accounting policies for the specific revenue streams of SPV Group as summarized below:

i) Income from Service Concession Arrangement

The SPV Group constructs or upgrades infrastructure (construction or upgrade services) used to provide a public service and operates and maintains that infrastructure (operation services) for a specified period of time. The arrangements may include infrastructure used in a public-to-private service concession arrangement for its entire useful life.

Under Appendix C to Ind AS 115 - Service Concession Arrangements, the arrangements are accounted for based on the nature of the consideration. The intangible asset model is used to the extent that the Company receives a right (i.e. a franchisee) to charge users of the public service. The financial asset model is used to the extent the Company has an unconditional contractual right to receive cash or another financial asset from or at the direction of the grantor for the construction services. When the unconditional right to receive cash covers only part of the service, the two models are combined to account separately for each component.

For service contracts (including maintenance contracts) in which the Company has the right to consideration from the customer in an amount that corresponds directly with the value to the customer of the Company's performance completed to date, revenue is recognized when services are performed and contractually billable. Service contracts that include multiple performance obligations are segmented between types of services. For contracts with multiple performance obligations, the Company allocates the transaction price to each performance obligation using an estimate of the stand-alone selling price of each distinct service in the contract.

In the financial asset model, the amount due from the grantor meets the definition of a receivable which is measured at fair value on initial recognition. Based on business model assessment, the SPV Group measures such

financial assets at amortised cost. The amount initially recognised plus the cumulative interest on that amount is calculated using the effective interest method calculated on fixed annuity in accordance with the Ind AS 109 and recognized under other income in the combined financial statements. Any asset carried under concession arrangements is derecognised on disposal or when no future economic benefits are expected from its future use or disposal or when the contractual rights to the financial asset expire.
When it is probable that total contract costs will exceed total contract revenue, expected loss, if any, on a contract is recognised as expense in the period in which it is foreseen, irrespective of the stage of completion of the contract.

ii) Variable consideration

SPV Group's claim for bonus, incentives and other claims in rates relating to execution of contracts are recognized as revenue in the year in which said claims are finally accepted by the clients. Claims under arbitration/disputes are accounted as income based on final award. Expenses on arbitration are accounted as incurred.

iii) Contract Balances

Contract assets

A contract asset is the right to consideration in exchange for goods or services transferred to the customer. If SPV Group performs by transferring goods or services to a customer before the customer pays consideration or before payment is due, a contract asset is recognised for the earned consideration that is conditional.

Contract assets represent revenue recognized in excess of amounts billed and include unbilled receivables. Unbilled receivables, which represent an unconditional right to payment subject only to the passage of time, are reclassified to accounts receivable when they are billed under the terms of the contract.

Receivable under the service concession agreement is initially recorded as a contract asset till the date of receipt of provisional commercial operation date (PCOD). On PCOD, an unconditional contractual right to receive cash is established under the service concession arrangement and accordingly the receivable is recorded as a financial asset from PCOD date.

Trade receivable

A trade receivable represents the Company's right to an amount of consideration that is unconditional (i.e., only the passage of time is required before payment of the consideration is due). Revenue earned from construction activities, but yet to be billed to customers, is initially recognised as contract assets and reclassified to trade receivables when the right to consideration becomes unconditional. We refer to the accounting policies on financial assets in this note for more information.

Contract liabilities

A contract liability is the obligation to transfer goods or services to a customer for which SPV Group has received consideration (or an amount of consideration is due) from the customer. If a customer pays consideration before SPV Group transfers goods or services to the customer, a contract liability is recognised when the payment is made, or the payment is due (whichever is earlier). Contract liabilities are recognised as revenue when SPV Group performs under the contract.

Amounts received before the related work is performed are disclosed in the balance sheet as contract liability and termed as advances received from customers.

iv) Recognition of interest income and insurance claim

Interest income for all debt instruments, measured at amortised cost or fair value through other comprehensive income, is recognised using the effective interest rate ('EIR') method and shown under interest income in the statement of profit and loss. The 'effective interest rate' is the rate that exactly discounts estimated future cash payments or receipts through the expected life of the financial instrument to:

- the gross carrying amount of the financial asset; or

- the amortised cost of the financial liability.

Interest income on investments and loans is accrued on a time basis by reference to the principal outstanding and the effective interest rate including interest on investments classified as fair value through profit or loss.

Insurance claims are accounted for on the basis of claims admitted/expected to be admitted and to the extent that there is no uncertainty in receiving the claims.

d. Income Tax

Income tax comprises of current and deferred tax. It is recognised in the Special Purpose Combined Statement of Profit and Loss except to the extent that it relates to an item recognised directly in equity or in OCI.

i) Current tax

Current tax comprises of the expected tax payable or receivable on the taxable income or loss for the year and any adjustment to the tax payable or receivable in respect of previous years. The amount of current tax reflects the best estimate of the tax amount expected to be paid or received after considering the uncertainty, if any, related to income taxes. It is measured using tax rates (and tax laws) enacted or substantively enacted by the reporting date.

ii) Deferred tax

Deferred tax is measured at the tax rates that are expected to apply to the period when the asset is realised or the liability is settled, based on the laws that have been enacted or substantively enacted by the reporting date. The measurement of deferred tax reflects the tax consequences that would follow from the manner in which SPV Group and Investment Entity expects, at the reporting date, to recover or settle the carrying amount of its assets and liabilities.

Deferred tax is recognised in respect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the corresponding amounts used for taxation purposes. Deferred tax is also recognised in respect of carried forward tax losses and tax credits.

Deferred tax assets are recognised to the extent that it is probable that future taxable profits will be available against which they can be used. Deferred tax liabilities are recognised for all taxable temporary differences. The existence of unused tax losses is strong evidence that future taxable profit may not be available. Therefore, in case of a history of recent losses, SPV Group and Investment Entity recognises a deferred tax asset only to the extent that it has sufficient taxable temporary differences or there is convincing other evidence that sufficient taxable profit will be available against which such deferred tax asset can be realised.

Deferred tax assets – unrecognised or recognised, are reviewed at each reporting date and are recognised/ reduced to the extent that it is probable/ no longer probable respectively that the related tax benefit will be realised. Deferred tax assets and liabilities are offset if there is a legally enforceable right to offset current tax liabilities and assets, and they relate to income taxes levied by the same tax authority on the same taxable entity, or on different tax entities, but they intend to settle current tax liabilities and assets on a net basis or their tax assets and liabilities will be realised simultaneously.

Current and deferred tax is recognised in profit or loss, except to the extent that it relates to items recognised in other comprehensive income or directly in equity. In this case, the tax is also recognized in other comprehensive income or directly in equity, respectively.

e. Borrowing cost

Borrowing costs are interest and other costs incurred in connection with the borrowing of funds. Borrowing costs directly attributable to acquisition or construction of an asset which necessarily take a substantial period of time to get ready for their intended use are capitalised as part of the cost of that asset. Other borrowing costs are recognised as an expense in the Special Purpose Combined Statement of Profit and Loss in the period in which they are incurred.

Capitalization of borrowing costs ceases when substantially all the activities necessary to prepare the qualifying assets for their intended uses are complete.

f. Impairment of non-financial assets

Assets are tested for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount and the impairment loss is recognized in the Statement of Profit and Loss. The recoverable amount is the higher of an asset's fair value less costs of disposal and value in use. The recoverable amount is determined for an individual asset, unless the asset does not generate cash inflows that are largely independent of those from other assets or group of assets. In assessing value is use, the estimated future cash flows are discounted to their present value using a pretax discount rate that reflects current market assumptions of the time value of money and the risks specified 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.

A previously recognised impairment loss, if any, is reversed when there is an indication of reversal, however, the carrying value after reversal is not increased beyond the carrying value that would have prevailed by charging usual depreciation / amortisation if there was no impairment.

g. Provisions and contingent liabilities

i) Provisions

A provision is recognised if, as a result of a past event, SPV Group and Investment Entity has a present legal or constructive obligation that can be estimated reliably, and it is probable that an outflow of economic benefits will be required to settle the obligation. Provisions are measure based on management's estimate required to settle the obligation at the balance sheet date and are discounted the expected future cash flows (representing the best estimate of the expenditure required to settle the present obligation at the balance sheet date) at a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability.

Provisions are reviewed at each balance sheet date and adjusted to reflect the current best estimate. If it is no longer probable that the outflow of resources would be required to settle the obligation, the provision is reversed.

ii) Contingent liabilities

Disclosure for a contingent liability is made when there is a possible obligation or a present obligation that may, but probably will not require an outflow of resources embodying economic benefits or the amount of such obligation cannot be measured reliably. When there is a possible obligation or a present obligation in respect of which likelihood of outflow of resources embodying economic benefits is remote, no provision or disclosure is made.

h. 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.

i) Financial assets

Initial recognition and measurement

Financial instruments i.e. Financial Assets and Financial Liabilities are recognised when the SPV Group and Investment Entity becomes a party to the contractual provisions of the instruments. Financial instruments are initially measured at fair value. Transaction costs that are directly attributable to the acquisition or issue of financial instruments (other than financial instruments at fair value through profit or loss) are added to or deducted from the fair value of the financial instruments, as appropriate, on initial recognition. Transaction costs directly attributable to the acquisition of financial instruments assets or financial liabilities at fair value through profit or loss are recognised in profit or loss.

Subsequent measurement

For the purposes of subsequent measurement, financial assets are classified in following categories:

a) Financial assets at amortised cost (debt instruments)
b) Financial assets at fair value through profit or loss

Financial assets at amortized cost (debt instruments)

A financial asset is measured at amortised cost if it meets both of the following conditions are met:
a) the asset is held within a business model whose objective is to hold assets to collect contractual cash flows; and
b) the contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

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 EIR amortisation is included in finance income in the profit or loss. The losses arising from impairment are recognised in the profit or loss. SPV Group's financial assets at amortised cost includes service concession receivable, trade receivables, security deposits.

Financial assets at fair Value through Profit and Loss (FVTPL)

All financial assets which are not classified as measured at amortized cost or FVOCI as described above, are measured at FVTPL. This includes all derivative financial assets. On initial recognition, SPV Group may irrevocably designate a financial asset that otherwise meets the requirements to be measured at amortised cost or at FVOCI as at FVTPL if doing so eliminates or significantly reduces an accounting mismatch that would otherwise arise.

Financial assets at FVTPL are measured at fair value at the end of each reporting period, with any gains or losses arising on remeasurement recognised in profit or loss. The net gain or loss recognized in profit or loss incorporates any dividend or interest earned on the financial asset.

Derecognition of financial assets

A financial asset is derecognised only when

i) The Company has transferred the rights to receive cash flows from the financial asset or
ii) retains the contractual rights to receive the cash flows of the financial asset, but assumes a contractual obligation to pay the cash flows to one or more recipients.

Where the SPV Group and Investment Entity has transferred an asset, the SPV Group evaluates whether it has transferred substantially all risks and rewards of ownership of the financial asset. In such cases, the financial asset is derecognised. Where the SPV Group and Investment Entity has not transferred substantially all risks and rewards of ownership of the financial asset, the financial asset is not derecognised.

Where the SPV Group and Investment Entity has neither transferred a financial asset nor retains substantially all risks and rewards of ownership of the financial asset, the financial asset is derecognised if the SPV Group and Investment Entity has not retained control of the financial asset. Where the SPV Group and Investment Entity retains control of the financial asset, the asset is continued to be recognised to the extent of continuing involvement in the financial asset.

Impairment of financial assets

At each reporting date, SPV Group and Investment Entity assesses whether financial assets carried at amortised cost are credit-impaired. A financial asset is 'credit-impaired' when one or more events that have a detrimental impact on the estimated future cash flows of the financial asset have occurred.

Evidence that a financial asset is credit-impaired includes the following observable data:

- significant financial difficulty of the borrower or issuer;
- a breach of contract such as a default or being past due for 90 days or more;
- the restructuring of a loan or advance by SPV Group and Investment Entity on terms that SPV Group and Investment Entity would not consider otherwise;
- it is probable that the borrower will enter bankruptcy or other financial reorganization; or
- the disappearance of an active market for a security because of financial difficulties.

Ind AS 109 requires expected credit losses to be measured through a loss allowance. SPV Group and Investment Entity measures loss allowances at an amount equal to lifetime expected credit losses for all trade receivable and/or contract assets that do not constitute a financing transaction, For all other financial assets, expected credit losses are measured at an amount equal to the 12 months expected credit losses or at an amount equal to the life time expected credit losses if the credit risk on the financial asset has increased significantly since initial recognition.

Loss allowances for financial assets measured at amortised cost are deducted from the gross carrying amount of the assets.

ii) 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, or as derivatives designated as not designated as hedging instruments, 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.

Subsequent measurement

For the purposes of subsequent measurement, financial liabilities are classified in two categories:
a) Financial liabilities measured at amortised cost
b) Financial liabilities measured at FVTPL (fair value through profit or loss)

a) Financial liabilities measured at amortised cost
After initial recognition, financial liabilities are subsequently measured at amortized cost using the EIR method. Gains and losses are recognised in the statement of profit and loss when the liabilities are derecognised as well as through the EIR amortization process. Amortized cost is calculated by taking into account any discount or premium on acquisition and fee or costs that are an integral part of the EIR. The EIR amortisation is included in finance costs in the statement of profit and loss.

b) Financial liabilities measured at fair value through profit or loss (FVTPL)
Financial liabilities at FVTPL include financial liabilities held for trading and financial liabilities designated upon initial recognition as at FVTPL. Financial liabilities are classified as held for trading if they are incurred for the purpose of repurchasing in the near term. Financial liabilities at fair value through profit or loss are carried in the statement of profit and loss at fair value with changes in fair value recognized in the statement of profit and loss.

Derecognition

A financial liability is derecognised when the obligation under the liability is discharged or cancelled or expires. When an existing financial liability is replaced by another from the same lender on substantially different terms, or the terms of an existing liability are substantially modified, such an exchange or modification is treated as the derecognition of the original liability and the recognition of a new liability. The difference in the respective carrying amounts is recognised in the statement of profit and loss.

Reclassification of financial instruments

The entity determines classification of financial assets and liabilities on initial recognition. After initial recognition, no reclassification is made for financial assets, such as equity instruments designated as FVTPL or FVOCI. 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.

i. Employee benefits

Defined contribution plans

The SPV Group and Investment Entity has defined contribution plans for post-employment benefits in the form of Provident Fund which is administered through Government of India. Provident Fund Scheme is classified as

defined contribution plans as the SPV Group has no further obligation beyond making the contributions. Payments to defined contribution retirement benefit plans are recognised as an expense when employees have rendered service entitling them to the contributions.

Defined benefits plans

The SPV Group and Investment Entity has an obligation towards gratuity, a defined benefit retirement plan covering eligible employees. The plan provides for a lump sum payment to vested employees at retirement, death while in employment or on termination of employment of an amount equivalent to 15 days of salary payable for each completed year of service. Vesting occurs upon completion of five years of service. The cost of providing benefits under the defined benefit plan is determined using the projected unit credit method. Remeasurements, comprising of actuarial gains and losses, the effect of the asset ceiling, excluding amounts included in net interest on the net defined benefit liability, are recognised immediately in the balance sheet with a corresponding debit or credit to retained earnings through other comprehensive income (OCI) in the period in which they occur. Remeasurements are not reclassified to statement of profit and loss in subsequent periods. Past service costs are recognised in statement of profit and loss on the earlier of:

- The date of the plan amendment or curtailment, and
- The date that NXT – Infra Trust recognises related restructuring costs

Net interest is calculated by applying the discount rate to the net defined benefit liability or asset. The SPV Group and Investment Entity recognises the following changes in the net defined benefit obligation as an expense in the Combined Statement of Profit and Loss:

- Service costs comprising current service costs, past-service costs, gains and losses on curtailments and non-routine settlements; and
- Net interest expense or income.

Termination benefits

A liability for a termination benefit is recognised at the earlier of when the entity can no longer withdraw the offer of the termination benefit and when the entity recognizes any related restructuring costs.

Other employee benefits

Accumulated leave, which is expected to be utilized within the next 12 months, is treated as short-term employee benefit. The SPV Group and Investment Entity measures the expected cost of such absences as the additional amount that it expects to pay as a result of the unused entitlement that has accumulated at the reporting date. The SPV Group recognizes expected cost of short-term employee benefit as an expense, when an employee renders the related service.

The SPV Group and Investment Entity treats accumulated leave expected to be carried forward beyond twelve months, as long- term employee benefit for measurement purposes. Such long-term compensated absences are provided for based on the actuarial valuation using the projected unit credit method at the reporting date. Actuarial gains / losses are immediately taken to the statement of profit and loss and are not deferred. The obligations are presented as current liabilities in the balance sheet if the entity does not have an unconditional right to defer the settlement for at least twelve months after the reporting date.

j. Operating segments

Operating segments are reported in a manner consistent with the internal reporting provided to the Chief Operating Decision Maker (CODM) of SPV Group and Investment Entity. The CODM is responsible for allocating resources and assessing performance of the operating segments of SPV Group and Investment Entity.

k. Cash and cash equivalents

Cash and cash equivalents comprise cash at bank and on hand and other short term highly liquid investments with an original maturity of three months or less that are readily convertible to a known amount of cash and are subject to an insignificant risk of changes in value.

For the purpose of combined 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 SPV Group and Investment Entity cash management.

l. Subsequent events

The Special Purpose Combined Financial Statements are adjusted to reflect events that occur after the reporting date but before the Special Purpose Combined Financial Statements are issued. The Special Purpose Combined Financial Statements have their own date of authorisation, which differs from that of the financial statements of the combining entities. Therefore, when preparing the Special Purpose Combined Financial Statements, management considers adjusting events up to the date of authorisation of the financial statements.

m. Combined Statement of net assets at fair value

The disclosure of Statement of Net Assets at Fair Value comprises of the fair values of the total assets and fair values of the total liabilities of individual SPV's. The fair value of the assets are reviewed regularly by Management with reference to independent assets and market conditions existing at the reporting date, using generally accepted market practices. The independent valuers are leading independent appraisers with a recognised and relevant professional qualification and with recent experience in the location. Judgment is also applied in determining the extent and frequency of independent appraisals. Such independent appraisals and the assumptions used are reviewed at each balance sheet date.

n. Statement of Total Returns at Fair Value

The disclosure of total returns at fair value comprises of the total Comprehensive Income as per the Combined Statement of Profit and loss and Other Changes in Fair Value of Total Assets which were not recognised in total Comprehensive Income.

o. Equity accounted investee

A joint venture is a type of joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the joint venture. Joint control is the contractually agreed sharing of control of an arrangement, which exists only when decisions about the relevant activities require unanimous consent of the parties sharing control.

Interests in WIPL is accounted for using the equity method, after initially being recognised at the net book value of the respective joint venture as at April 1, 2020. Currently investment in the Investment Entity is 49% and balance 51% stake would be acquired at an agreed consideration upon completion of 2 years following Provisional Commercial Operation Date ("PCOD") date (i.e. March 31, 2024 and approval from National Highway Authority of India (NHAI) (the Grantor).

Under the equity method of accounting, subsequent to initial recognition, the investments are adjusted to recognize the share of the post-acquisition profits or losses of the investee in the statement of profit and loss, and the share of other comprehensive income of the investee in other comprehensive income.

When the share of losses in an equity-accounted investment equals or exceeds its interest in the entity, the Trust does not recognize further losses, unless it has incurred obligations or made payments on behalf of the other entity.

The carrying amount of equity accounted investments are tested for impairment in accordance with Trust's policy on impairment of non-financial assets.

Unrealised gains on transactions between Trust and its Joint Venture are eliminated to the extent of Trust's interest in the entity. Unrealised losses are also eliminated unless the transaction provides evidence of an impairment of the asset transferred. Accounting policies of Investment Entity (equity accounted investees) are consistent with the policies adopted by the Trust except as follows:

(i) Revenue from Toll Contracts under Service Concession Arrangements

Income from Toll Operations is recognised in line with the Appendix C to Ind AS 115 – Service Concession Arrangements. The revenue is recognized in the period of collection which generally coincide as and when the traffic passes through toll plazas. Toll collected by the Investment Entity is shared with NHAI based on Letter

dated April, 02, 2022 NHAIPIUSNP/ NH-44/Bhagan Toll Plaza/2022/D-8575. Hence, revenue is recognised net-off the share of NHAI.

(ii) Provision for Resurfacing obligations

The Investment Entity provides for contractual obligations to restore the infrastructure at periodic intervals. Provisions are measured based on management's estimate required to settle the obligation at the balance sheet date and are discounted using a rate that reflects the time value of money. When discounting is used, the increase in the provision due to the passage of time is recognised as a finance cost. The same is reviewed at each balance sheet date and adjustments if any to the carrying amount is provided for accordingly.

(iii) Intangible Assets

Service Concession Arrangements

The Investment Entity constructs or upgrades infrastructure (construction or upgrade services) used to provide a public service and operates and maintains that infrastructure (operation services) for a specified period of time. The arrangements may include infrastructure used in a public-to-private service concession arrangement for its entire useful life.

Under the Concession Agreements, where the Investment Entity has received the right to charge users of the public service, such rights are recognised and classified as "Intangible Assets" in accordance with Appendix C- 'Service Concession Arrangements' of Ind AS 115 'Service Concession Arrangements'. Such right is not an unconditional right to receive consideration because the amounts are contingent to the extent that the public uses the service and thus are recognised and classified as intangible assets. Such an intangible asset is recognised by the Company at cost (which is the fair value of the consideration receivable for the construction services delivered) and is capitalized when the project is complete in all respects and receives the completion certificate from the authority as specified in the Concession Agreement. An asset carried under concession arrangements is derecognised on disposal or when no future economic benefits are expected from its future use or disposal.

Under the concession agreement, the Investment Entity has contractual right to receive cash support by way of grant from NHAI, Grantor, over the concession period. Such right has been reduced from 'Intangible assets – License to Toll Collection' on a discounted basis and corresponding grant receivable is recognised as financial asset.

Amortization

The tolling rights received in exchange for Construction Service rendered to the grantor of tolling rights are recognised as an intangible asset which is amortised over period of operation of the facility on straight line basis.

(iv) Borrowing costs

All borrowing costs are expensed in the period in which they occur. Borrowing costs consist of interest and other costs that an entity incurs in connection with the borrowing funds.

(v) Impairment of Toll assets

Impairment exists when the carrying value of an asset or cash generating unit exceeds its recoverable amount, which is the higher of its fair value less costs of disposal and its value in use. The fair value less costs of disposal calculation is based on available data for similar assets or observable market prices less incremental costs for disposing of the asset. The value in use calculation is based on a DCF model. The cash flows are derived from the budget generally covering a period of the concession agreements using expected revenue growth rates, traffic study, toll rates and major maintenance expenses that will enhance the asset's performance being tested. The recoverable amount is sensitive to the discount rate used for the DCF model as well as the expected future cash-inflows and the revenue growth rate used for extrapolation purposes.

Significant accounting judgements, estimates and assumptions

The preparation of the Special Purpose Combined Financial Statements requires management to make judgements, estimates and assumptions that affect the reported amounts of revenues, expenses, assets and liabilities, and the accompanying disclosures, and the disclosure of contingent liabilities. Uncertainty about the

assumptions and estimates could result in outcomes that require a material adjustment to the carrying amount of assets or liabilities affected in future periods.

The key assumptions concerning the future and other key sources of estimation uncertainty at the reporting date, that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year, are described below. SPV Group and Investment Entity based its assumptions and estimates on parameters available when the Special purpose combined financial statements were prepared. Existing circumstances and assumptions about future developments, however change due to market changes or circumstances arising that are beyond the control of SPV Group and Investment Entity. Such changes are reflected in the assumptions when they occur.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised prospectively.

The following are the significant judgements, apart from those involving estimations, that the investment manager have made in the process of applying SPV Group's accounting policies and that have the most significant effect on the amounts recognised in the financial statement:

a. Service Concession arrangements

Revenue recognition where the estimates are involved to determine the relative selling prices of performance obligations under service concessions arrangements. The HAM revenue model based on which the revenue and finance income are recognized under the service concessions arrangements assumes certain estimates and assumptions based which the project IRR is calculated for finance income recognition. The key inputs of the model comprise of annuity and interest on annuity inflows, estimations on cost to build and maintain the asset and other operational costs. The inputs are based on circumstances existing and management judgement / assumption on the future expectations based on current situations. Judgements include management view on expected earnings in future years, changes in interest rates, cost inflation, government policy changes, etc.

b. Taxes

The SPV Group and Investment Entity periodically assesses its liabilities and contingencies related to income taxes for all years open to scrutiny based on latest information available. The SPV Group and Investment Entity records its best estimates of the tax liability in the current tax provision. The management believes that they have adequately provided for the probable outcome of these matters.

Deferred tax assets are recognised for unused tax losses to the extent that it is probable that taxable profit will be available against which the losses can be utilised. Significant management judgment is required to determine the amount of deferred tax assets that can be recognised, based upon the likely ti

c. Fair Value Measurement

The fair value of financial instruments that are not traded in an active market is determined using valuation techniques. In applying the valuation techniques, management makes maximum use of market inputs and uses estimates and assumptions that are, as far as possible, consistent with observable data that market participants would use in pricing the instrument. Where applicable data is not observable, management uses its best estimate about the assumptions that market participants would make. The estimates may vary from the actual prices that would be achieved in an arm's length transaction at the reporting date. For details of the key assumptions used and the impact of changes to the assumptions.

d. Joint Control over WIPL

The sponsor has acquired 49% stake in WIPL and the balance 51% stake would be acquired upon completion of 2 years following Provisional Commercial Operation Date ("PCOD") date (i.e. March 31, 2024 and approval from National Highway Authority of India (NHAI) (the Grantor) as per Service Concession Agreement signed between WIPL and NHAI. Pursuant to the arrangement between the Sponsor and WEL, both parties are jointly controlling WIPL as all the relevant activities of WIPL that affect its variable returns will continue to be decided unanimously by both the parties.

Result of Operations basis the Special Purpose Combined Financial Statements

The following table sets forth certain information with respect to the results of operations of the Project SPVs for the periods indicated:

Particulars	September 30,2023 (in ₹ lakhs)	Percentage of Total Income	March 31, 2023 (in ₹ lakhs)	Percentage of Total Income in %	March 31, 2022 (in ₹ lakhs)	Percentage of Total Income in %	March 31, 2021 (in ₹ lakhs)	Percentage of Total Income in %
(I) Income								
Revenue from operations	3,981.65	18.85%	24,898.35	41.89%	52,504.51	62.61%	63,840.23	68.09%
Other income	17,143.72	81.15%	34,535.81	58.11%	31,355.02	37.39%	29,919.48	31.91%
Total Income	**21,125.37**	**100.00%**	**59,434.16**	**100.00%**	**83,859.53**	**100.00%**	**93,759.71**	**100.00%**
(II) Expenses								
Construction and Other Operating Expenses	2,787.12	13.19%	25,489.77	42.89%	52,293.64	62.36%	69,814.35	74.46%
Finance costs	15,247.09	72.17%	21,814.95	36.70%	19,551.44	23.31%	19,031.68	20.30%
Employee benefits costs	314.60	1.49%	-	-	-	-	-	-
Depreciation	2.00	0.01%	-	-	-	-	-	-
Other expenses	844.47	4.00%	837.21	1.41%	1,073.69	1.28%	1,186.88	1.27%
Total expenses	**19,195.28**	**90.86%**	**48,141.93**	**81.00%**	**72,918.77**	**86.95%**	**90,032.91**	**96.03%**
(III) Profit before share of profit/ (loss) of joint venture (I-II)	**1,930.09**	**9.14%**	**11,292.23**	**19.00%**	**10,940.76**	**13.05%**	**3,726.80**	**3.97%**
(IV) Share of profit / (loss) of joint venture (net of tax)	**(1,178.84)**	**(5.58%)**	**(1,396.69)**	**(2.35%)**	**428.53**	**0.51%**	**274.11**	**0.29%**
(V) Profit before Tax (IV+III)	**751.25**	**3.56%**	**9,895.54**	**16.65%**	**11,369.29**	**13.56%**	**4,000.91**	**4.27%**
(VI) Tax expense / (Income)								
- Current tax	569.72	2.70%	814.87	1.37%	37.73	0.04%	11.55	0.01%
- Deferred tax expense / (income)	(910.99)	(4.31%)	2,157.56	3.63%	2,557.79	3.05%	1,001.83	1.07%
Tax expense/ (Income)	**(341.27)**	**(1.62%)**	**2,972.43**	**5.00%**	**2,595.52**	**3.10%**	**1,013.38**	**1.08%**
(VII) Profit for the period / year (V-VI)	**1,092.52**	**5.17%**	**6,923.11**	**11.65%**	**8,773.77**	**10.46%**	**2,987.53**	**3.19%**

Particulars	September 30,2023 (in ₹ lakhs)	Percentage of Total Income	March 31, 2023 (in ₹ lakhs)	Percentage of Total Income in %	March 31, 2022 (in ₹ lakhs)	Percentage of Total Income in %	March 31, 2021 (in ₹ lakhs)	Percentage of Total Income in %
(VIII)Other comprehensive income								
Items that will not be reclassified to profit or loss								
- Remeasurement loss on defined benefit plan	**(2.37)**	**(0.01%)**	**-**	**-**	**-**	**-**	**-**	**-**
- Income tax effect on above	**0.60**	**0.00%**	**-**	**-**	**-**	**-**	**-**	**-**
Other comprehensive loss for the period / year	**(1.77)**	**(0.01%)**	**-**	**-**	**-**	**-**	**-**	**-**
(IX) Total comprehensive income for the period / year (VII+VIII)	**1,090.75**	**5.16%**	**6,923.11**	**11.65%**	**8,773.77**	**10.46%**	**2,987.53**	**3.19%**

Results of Operations for the six months period ended September 30, 2023

Income

Total income for the six months period ended September 30, 2023 was ₹21,125.37 lakhs, which primarily consists of other Income amounting to ₹17,143.72 lakhs.

Revenue from operations

Revenue from operations for the six months period ended September 30, 2023 was ₹3,981.65 lakhs, which was primarily attributable to revenue from operation and maintenances amounting to ₹ 2,266.70 lakhs.

Other Income

Other income for the six months period ended September 30, 2023 was ₹ 17,143.72 lakhs, which primarily consists of finance income on financial asset carried at amortised cost.

Expenses

Total expenses for the six months period ended September 30, 2023 was ₹ 19,195.28 lakhs, the breakup of which is provided below.

Construction and Other Operating Expenses

Construction and Other Operating Expenses for the six months period ended September 30, 2023 was ₹ 2,787.12 lakhs. This primarily comprises of sub-contracting charges amounting to ₹ 1,891.17 lakhs.

Employee benefits costs

Employee benefits costs for the six months period ended September 30, 2023 was ₹314.60 lakhs, which primarily consists of salaries, wages and bonus amounting to ₹ 282.45 lakhs

Other expenses

Other expenses for the six months period ended September 30, 2023 was ₹844.47 lakhs, which primarily consists of power and fuel and insurance cost amounting to ₹328.24 lakhs and ₹272.12 lakhs respectively.

Finance costs

Finance costs for the six months period ended September 30, 2023 was ₹15,247.09 lakhs, which primarily consists of interest on term loans and interest on unsecured optionally convertible debentures (OCD's) amounting to ₹9,458.68 lakhs and ₹5,529.75 lakhs.

Depreciation

Depreciation for the six months period ended September 30, 2023 was ₹ 2.0 lakhs, which was attributable to depreciation of property, plant and equipment of ₹ 2.0 lakhs.

Profit before tax

As a result of the factors outlined above, our profit before tax was ₹751.25 lakhs for the six months period ended September 30, 2023.

Tax expenses / (income)

Tax expenses / (income) for the six months period ended September 30, 2023 comprised of current tax of ₹569.72 lakhs and deferred tax expense / (income) of ₹(910.99) lakhs.

Total comprehensive income for the period

As a result of the factors outlined above, total comprehensive income for the six months period ended September 30, 2023 was ₹1090.75 lakhs.

Financial year ended March 31, 2023, Compared to financial year ended March 31, 2022

Total Income

Total income decreased by 29.13% from ₹ 83,859.53 lakhs in the fiscal year ended March 31, 2022 to ₹ 59,434.16 lakhs in the fiscal year ended March 31, 2023. This was primarily due to a decrease in the income arising from revenue from construction contract on account of substantial completion of construction contracts in the fiscal year ended March 31, 2022.

Revenue from operations

Revenue from operations decreased by 52.58% from ₹ 52,504.51 lakhs in the fiscal year ended March 31, 2022 to ₹ 24,898.35 lakhs in the fiscal year ended March 31, 2023. This was primarily attributable to a decrease in the revenue arising from construction contracts on account of completion of construction contracts in the fiscal year ended March 31, 2022.

Other Income

Other income increased by 10.14% from ₹31,355.02 lakhs in the fiscal year ended March 31, 2022 to ₹34,535.81 lakhs in the fiscal year ended March 31, 2023. This was due to increase in financial income on financial asset carried at amortised cost.

Total Expenses

Total expenses decreased by 33.98% from ₹72,918.77 lakhs in the fiscal year ended March 31, 2022 to ₹48,141.93 lakhs in the fiscal year ended March 31, 2023. This was primarily due to a decrease in construction and Other Operating Expenses on account of substantial completion of construction contracts in the fiscal year ended March 31, 2022.

Construction and Other Operating Expenses

Construction and Other Operating Expenses decreased by 51.26% from ₹52,293.64 lakhs in the fiscal year ended March 31, 2022 to ₹25,489.77 lakhs in the fiscal year ended March 31, 2023. This was primarily due to a decrease in sub-contracting charges due to substantial completion of construction contracts in the fiscal year ended March 31, 2022.

Other expenses

Other expenses decreased by 22.02% from ₹1,073.69 lakhs in the fiscal year ended March 31, 2022 to ₹837.21 lakhs in the fiscal year ended March 31, 2023. This was primarily due to reduction in rates and taxes.

Finance costs

Finance costs increased by 11.58% from ₹ 19,551.44 lakhs in the fiscal year ended March 31, 2022 to ₹ 21,814.95 lakhs in the fiscal year ended March 31, 2023. This was due to the increase in interest expense on unsecured optionally convertible debentures issued in December 2022.

Profit before tax

As a result of the above outlined factors, our profit before tax decreased by 12.96% from ₹11,369.29 lakhs in the fiscal year ended March 31, 2022 to ₹ 9,895.54 lakhs in the fiscal year ended March 31, 2023.

Tax expenses/ (income)

Tax expenses / (income) for the year increased by 14.52% from ₹ 2,595.52 lakhs in the fiscal year ended March 31, 2022 to ₹2,972.43 lakhs in the fiscal year ended March 31, 2023, which was primarily due to an increase in current tax.

Total comprehensive income for the year

As a result of the factors outlined above and on account of share of net loss of joint venture, total comprehensive income for the year decreased 21.09% from ₹ 8,773.77 lakhs in the fiscal year ended March 31, 2022 to ₹6,923.11 lakhs in the fiscal year ended March 31, 2023.

Financial year ended March 31, 2022 compared to financial year ended March 31, 2021

Total Income

Total income decreased by 10.56% from ₹93,759.71 lakhs in the fiscal year ended March 31, 2021 to ₹83,859.53 lakhs in the fiscal year ended March 31, 2022. This was primarily due to decrease in the income arising from revenue from construction contract.

Revenue from operations

Revenue from operations decreased by 17.76% from ₹ 63,840.23 lakhs in the fiscal year ended March 31, 2021 to ₹52,504.51 lakhs in the fiscal year ended March 31, 2022. This was primarily due to decrease in the income arising from revenue from construction contract.

Other Income

Other income increased by 4.80% from ₹29,919.48 lakhs in the fiscal year ended March 31, 2021 to ₹31,355.02 lakhs in the fiscal year ended March 31, 2022. This was primarily due to increase in financial income on financial asset carried at amortised cost.

Total Expenses

Total expenses decreased by 19.01% from ₹90,032.91 lakhs in the fiscal year ended March 31, 2021 to ₹72,918.77 lakhs in the fiscal year ended March 31, 2022. This was primarily due to the decrease in construction and Other Operating Expenses due to completion of construction contracts in the fiscal year ended March 31, 2021.

Construction and Other Operating Expenses

Construction and Other Operating Expenses decreased 25.10% from ₹69,814.35 lakhs in the fiscal year ended March 31, 2021 to ₹52,293.64 lakhs in the fiscal year ended March 31, 2022. This was primarily due to a decrease in sub-contracting charges due to completion of construction contracts in the fiscal year ended March 31, 2021.

Other expenses

Other expenses decreased by 9.54% from ₹ 1,186.88 lakhs in the fiscal year ended March 31, 2021 to ₹ 1,073.69 lakhs in the fiscal year ended March 31, 2022. This was primarily due to a decrease in construction insurance costs post fiscal year ended March 31, 2021 as the commercial operations date for certain contracts was achieved in fiscal year 2021.

Finance costs

Finance costs increased by 2.73% from ₹19,031.68 lakhs in the fiscal year ended March 31, 2021 to ₹19,551.44 lakhs in the fiscal year ended March 31, 2022. This was due to an increase in bank charges and other finance costs on prepayment charges incurred.

Profit before tax

As a result of the above outlined factors, our profit before tax increased by 184.17% from ₹4,000.91 lakhs in the fiscal year ended March 31, 2021 to ₹11,369.29 lakhs in the fiscal year ended March 31, 2022.

Tax expenses / (income)

Tax expenses / (income) for the year increased by 156.13% from ₹1,013.38 lakhs in the fiscal year ended March 31, 2021 to ₹2,595.52 lakhs in the fiscal year ended March 31, 2022, which was primarily due to an increase in deferred tax.

Total comprehensive income for the year

As a result of the factors outlined above, total comprehensive income for the year increased by 193.68% from ₹2,987.53 lakhs in the fiscal year ended March 31, 2021 to ₹8,773.77 lakhs in the fiscal year ended March 31, 2022.

Cash Flows

The following table sets forth certain information relating to the cash flows of the Project SPVs on a combined basis for the periods indicated:

(*In ₹ lakhs*)

Particulars	***Year ended March 31, 2023***	***Year ended March 31, 2022***	***Year ended March 31, 2021***
Net cash flow from/(used in) operating activities	(2,685.95)	14,917.16	(57,908.15)
Net cash flow from/ (used in) investing activities	1,453.53	8,032.54	3,357.06
Net cash flow from/ (used in) financing activities	(698.33)	(5,645.12)	52,315.31

Net cash flow from/ (used in) operating activities

Net cash flow from/ (used in) operating activities for Fiscal 2023 was ₹(2,685.95) lakhs, primarily arising out of increase in Service concession receivables for amount receivable from NHAI on account of Annuity and decrease in trade payable and other current liabilities on account of payment made to vendors and utilisation of mobilization advance received from NHAI

Net cash flow from/ (used in) operating activities for Fiscal 2022 was ₹14,917.16 lakhs, primarily arising out of increase in other current liabilities on account of receipt of mobilization advance received from NHAI .

Net cash flow from/ (used in) operating activities for Fiscal 2021 was ₹(57,908.15) lakhs, primarily arising out of decrease in Trade Payable on payments made to vendors during the year and increase in other non-current assets.

Net cash flow from/ (used in) from investing activities

Net cash flow from/ (used in) investing activities for Fiscal 2023 was ₹1,453.53 lakhs, primarily due to receipt of interest annuity which is getting reduced from loans given to WEL against pledge of shares of WIPL and investment in fixed deposit.

Net cash flow from/ (used in) investing activities for Fiscal 2022 was ₹8,032.54 lakhs, primarily due to receipt of interest annuity.

Net cash flow from/ (used in) investing activities for Fiscal 2021 was ₹3,357.06 lakhs, primarily due to receipt of interest annuity and proceeds from sale of current investments which is getting reduced from investment in fixed deposit.

Net cash flow from/ (used in) financing activities

Net cash flow from/ (used in) financing activities for Fiscal 2023 was ₹(698.33) lakhs, primarily due to retirement of compulsorily convertible debentures.

Net cash flow from/ (used in) financing activities for Fiscal 2022 was ₹(5,645.12) lakhs, primarily due to finance costs.

Net cash flow from/ (used in) financing activities for Fiscal 2021 was ₹52,315.31 lakhs, primarily due to proceeds received from long term borrowings for construction.

Indebtedness

(in ₹ lakhs)

Category of borrowing	**Principal Amount Outstanding as on September 30, 2023**	**Interest outstanding as on September 30, 2023**
Project SPVs		
WRIPL		
Secured	31,089.28	-
Unsecured (OCDs)	5,489.40	330.27
Total Borrowings	**36,578.68**	**330.27**
CGRG		

Category of borrowing	Principal Amount Outstanding as on September 30, 2023	Interest outstanding as on September 30, 2023
Secured	47,061.51	-
Unsecured (OCDs)	16,345.87	1,447.75
Total Borrowings	**63,407.38**	**1,447.75**
CTHPL		
Secured	49,736.78	-
Unsecured (OCDs)	46,021.81	4,103.38
Total Borrowings	**95,758.59**	**4,103.38**
DME		
Secured	29,917.18	-
Unsecured (OCDs)	4,617.70	413.09
Total Borrowings	**34,534.88**	**413.09**
GSY		
Secured	60,280.76	-
Unsecured (OCDs)	19,432.96	1,721.17
Total Borrowings	**79,713.72**	**1,721.17**
WIPL		
Secured	1,17,339.27	-
Unsecured (OCDs)	70,151.30	6,214.44
Total Borrowings	**1,87,490.57**	**6,214.44**
Total	**4,97,483.82**	**14,230.10**

Sufficiency of Working Capital

The Investment Manager has confirmed that the Trust will have the ability to meets its working capital requirements for at least 12 months from the date of the Draft Placement Memorandum through cash flows generated form the funds raised by the Trust.

Related Party Transactions

We have in the past engaged, and in the future may engage, in related party transactions. For a description of our related party transactions, see the section titled *"Related Party Transactions"* on page 265.

Seasonality

Our business model to the extent of being toll based is subject to seasonality of traffic and toll revenue. Traffic volumes tend to increase at the beginning and end of holiday seasons but decrease during the monsoon season and on the day of a holiday. The monsoon season may also restrict our ability to carry on activities related to our operation and maintenance of the SPVs. Such events may result in delays in periodic maintenance and reduce productivity, thereby materially and adversely affecting our business, financial condition and results of operations. Seasonality of traffic does not have an effect on our annuity based projects.

Unusual or Infrequent Events or Transactions

Except as described in this Draft Placement Memorandum, there have been no events or transactions to our knowledge which may be described as "unusual" or "infrequent".

Off-Balance Sheet Arrangements

We did not have any material off-balance sheet arrangements during the fiscal periods presented.

Quantitative and Qualitative Information on Market Risks

We are exposed to various financial risks. These risks are primarily categorised into credit risk, liquidity risk and market risk.

Credit Risk

The Trusts' exposure to credit risk primarily relates to investments, accounts receivable and cash and cash equivalents. The Trust monitors and limits its exposure to credit risk on a continuous basis.

Liquidity Risk

Liquidity risk is the risk that we may encounter difficulty in meeting our present and future obligations associated with financial liabilities that are required to be settled by delivering cash or another financial asset. We are exposed to liquidity risk due to borrowings and trade and other payables. We measure risk by forecasting cash flows. Our approach to managing liquidity is to ensure, as far as possible, that we will always have sufficient liquidity to meet our liabilities when due without incurring unacceptable losses or risking damage to our reputation. We ensure that we have sufficient fund to meet expected operational expenses, servicing of financial obligations.

Market Risk

Interest Rate Risk

Liabilities
Our policy is to minimise interest rate cash flow risk exposures on long-term financing. At the reporting periods end, we are exposed to changes in market interest rates through bank borrowings at variable interest rates.

Assets
Our fixed deposits are carried at amortised cost and are fixed rate deposits. They are therefore not subject to interest rate risk as defined in Ind AS 107 'Financial Instruments Disclosures', since neither the carrying amount nor the future cash flows will fluctuate because of a change in market interest rates.

Price Risk

We require for implementation (construction, operation and maintenance) of the projects various commodities such as cement, bitumen, steel and other construction materials which are exposed to price risk. We are able to manage our exposure to price increases through bulk purchases and negotiations. Hence, the sensitivity analysis is not required to be provided. Our exposure to price risk arises from investments held and classified at fair value through profit or loss. To manage the price risk arising from investments, we diversify our portfolio of assets through fixed rate investment like deposit with bank and investment in mutual funds (Growth Scheme).

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. We have no significant exposure to the risk of changes in foreign exchange rates.

New Services or Business

Other than as described in the section "Business" on page 163, there are no new services or business in which we operate.

Significant developments since September 30, 2023

Except as disclosed above and elsewhere in this Draft Placement Memorandum, to our knowledge no circumstances have arisen since September 30, 2023, that could materially and adversely affect or are likely to affect, our operations, trading or profitability, or the value of our assets or our ability to pay our material liabilities within the next 12 months.

Capitalisation Statement of the Trust on a combined basis

(in ₹ lakhs, unless otherwise stated)

	Pre issue as at September 30, 2023	**As adjusted for issue***
Financial Liabilities		
Non current borrowings	2,93,013.77	-
Current borrowings	24,822.73	-
Total Borrowings(A)	**3,17,836.50**	-
Equity		-
Equity share capital	4,561.37	-
Other equity	8,778.35	-
Total Equity(B)	**13,339.72**	-
Debt equity ratio [A/B]	**23.83**	-

** Corresponding details post initial issue are not available as on the date of adoption of the special purpose combined financial statements, hence the required disclosures in respect of the same have not been provided in the above table.*

Month-wise revenue

The month-wise operating revenue for the Project SPVs from the date of the latest financial statements included in this Draft Placement Memorandum until the completed month before the filing of this Draft Placement Memorandum has been provided below.

(*in ₹ lakhs*)

Company	For the month of		
	October, 2023	**November, 2023**	**December, 2023**
Welspun Road Infra Private Limited	95.61	92.52	95.61
Nxt-Infra CGRG Highways Limited	376.12	363.98	376.12
Chikhali- Tarsod Highways Private Limited	291.30	281.90	291.30
Welspun Delhi Meerut Expressway Private Limited	92.27	89.29	92.27
Nxt-Infra GSY Highways Limited	188.62	182.53	188.62
Welspun Infrafacility Private Limited*	1,531.22	1,493.32	1,539.29

**Note In relation to WIPL, accounting in Special Purpose Combined Financial Statements is as per equity method as per Ind AS 28, hence, only 49% share of profit/ loss is picked up considering joint control. All numbers with respect to WIPL, including in relation to projections are considered only to the extent of 49% in the document.*

RELATED PARTY TRANSACTIONS

In terms of Regulation 2(1)(zv) of the InvIT Regulations, related parties to the Trust, shall be as defined as under the Companies Act, 2013 or under the applicable accounting standards and shall also include: (i) Parties to the Trust; and (ii) promoters, directors, and partners of the Parties to the Trust. Further, related parties also include such persons and entities as defined in terms of the applicable accounting standards, being Ind AS 24 on "*Related Party Disclosures*" ("**Related Parties**") in relation to related party transactions. The Parties to the Trust, may, from time to time, enter into related party transactions, in accordance with applicable law.

Procedure for dealing with Related Party Transactions

To ensure proper approval, supervision and reporting of the transactions between the Trust and its Related Parties, the board of directors of the Investment Manager has adopted the Policy in relation to Related Party Transactions and conflict of interests, pursuant to its resolution dated December 27, 2023, to regulate the transactions between the Trust and its Related Parties. The key terms of the RPT Policy are provided below:

(i) In accordance with the InvIT Regulations, the Investment Manager will ensure that all future Related Party Transactions shall be:

(a) on an arm's length basis;

(b) in accordance with the relevant accounting standards;

(c) in the best interest of the Unitholders;

(d) consistent with the strategy and investment objectives of the Trust; and

(e) compliant with applicable law including InvIT Regulations.

(ii) Framework for approval of Related Party Transactions:

(a) All transactions with Related Parties shall be referred to the Audit and Risk Management Committee for prior approval.

(b) All Related Party transactions as approved by the Committee may be noted by the Board and the Related Party transaction that are not in ordinary course of business and/or not on arm's length basis are mandatorily required to be approved by the Board at a duly constituted meeting. In addition, the following kinds of transactions with related parties will also be placed before the Board for its approval:

i. Transactions in respect of which the Committee is unable to determine whether or not they are in the ordinary course of business and/or at arm's length basis and decides to refer the same to the Board for approval;

ii. Transactions which are in the ordinary course of business and at arm's length basis, but which as per Committee requires Board approval.

(c) Every Material Related Party Transaction involving the Investment Manager (as defined under the policy) shall require approval of the shareholders except Related Party transaction that are in ordinary course of business and on arm's length basis. Separately, all Related Party Transactions involving the Trust which require approval from the unit holders under the terms of the InvIT Regulations shall be referred to the unit holders for approval.

(iii) The Investment Manager will establish an internal control system so as to ensure that future InvIT Related Party Transactions are compliant with the InvIT Regulations and applicable accounting standards. The Investment Manager will convene meetings of the Unitholders in accordance with InvIT Regulations, and maintain records pertaining to such meetings in the manner prescribed under applicable law. The Investment Manager shall also ensure compliance with any additional guidelines issued in this regard by SEBI and other relevant regulatory or governmental authorities from time to time.

(iv) In addition to any other requirement that may be prescribed in terms of the InvIT Regulations or other applicable laws, all InvIT Related Party Transactions to be entered into in the future will be.

(a) decided by a majority vote of the Board, including the vote of majority of independent directors after satisfying itself that the transactions are conducted in accordance with the parameters set out in the policy; and

(b) reviewed and approved by the Committee.

(v) As a general rule, the Investment Manager must demonstrate to the Committee that future InvIT Related Party Transactions satisfy the criteria set out in in policy at the time of recommending the same for the approval of the Committee.

(vi) The Investment Manager will maintain a register to record all InvIT Related Party Transactions entered into by the Trust and the basis on which they are entered into.

(vii) The Investment Manager will also incorporate into its internal audit plan a review of all InvIT Related Party Transactions entered into by the Trust during each financial year.

(viii) The Committee shall review at least quarterly in each financial year the InvIT Related Party Transactions entered into during such quarter to ascertain that the guidelines and procedures established to monitor the InvIT Related Party Transactions have been complied with.

(ix) The review by the Committee will include the examination of the nature of the transaction and its supporting documents or such other data as may be deemed necessary by the Committee, including the following. Any member of the Committee who has a potential interest in any InvIT Related Party Transaction will recuse himself or herself and abstain from discussion and review of the InvIT Related Party Transaction.

(x) While considering a InvIT Related Party Transaction, any Director of the Board who has a potential interest in any InvIT Related Party Transaction will recuse himself or herself and abstain from discussion and voting on the InvIT Related Party Transaction.

Disclosure and Reporting

(i) InvIT Related Party Transactions shall be disclosed to the Trustee, stock exchanges and the Unitholders periodically, in accordance with the InvIT Regulations and the agreement to be entered into with the stock exchanges in relation to the listing of the Units. The Investment Manager shall adequately disclose the details of any fees or commissions received or to be received by any person or entity which is an associate of the Related Party to the stock exchanges.

(ii) Related Party Transactions shall be disclosed: (a) in the offer document with respect to any such transactions entered into prior to the offer of units and any such proposed transactions subsequent to the offer; and (b) to the stock exchanges and the Unitholders periodically, in accordance with the InvIT Regulations and the agreements to be entered into with the stock exchanges in relation to the listing of the Units.

(iii) In terms of the InvIT Regulations, the annual report to be submitted by the Investment Manager to all Unitholders, electronically or by physical copies, and to the stock exchanges within three months from the end of the financial year, shall contain, inter alia, details of all InvIT Related Party Transactions.

Related Party Transactions

Present and On-going Related Party Transactions

Related Party Transactions of the Trust in relation to the setting up of the Trust and this Issue

A number of present and on-going transactions with certain Related Parties have been, or will be, entered into in relation to the setting up of the Trust. The Trustee and the Investment Manager confirm that the following related party transactions have been, or shall be, entered into, on an arm's length basis in accordance with the relevant accounting standards, in the best interest of the Unitholders, consistent with:

(A) Securities Purchase Agreements

Please see the section titled "*Related Party Transactions – Acquisition of the Project SPVs by the Trust*" on page 24 for a description of the terms of the Securities Purchase Agreements.

(B) Trust Deed

Please see the section titled "*Parties to the Trust – Key Terms of the Trust Deed*" on page 86 for a description of the terms of the Trust Deed. The Trustee has received a sum ₹ 10,000 towards the initial settlement of the Trust from the Investment Manager.

(C) Investment Management Agreement

Please see the section titled "*Parties to the Trust – Key Terms of the Investment Management Agreement*" on page 100 for a description of the terms of the Investment Management Agreement.

(D) Trust Loan Agreements

Please see the section titled "*Use of Proceeds – Details of Utilisation of the Issue Proceeds*" on page 222 and "*Financial Indebtedness - Borrowings by the Project SPVs from the Trust*" for a description of the terms of the Trust Loan Agreements on page 229.

(E) Project Implementation and Management Agreement

Please see the section titled "*Parties to the Trust – Key terms of the Project Implementation and Management Agreement*" on page 114 for a description of the terms of the Project Implementation and Management Agreement.

Acquisition of the Project SPVs by the Trust

Securities Purchase Agreements

The Trust (acting through its Trustee) (the "**Buyer**"), proposes to enter into the Securities Purchase Agreements with Actis Highway Infra Limited (the "**Seller**"), the Investment Manager, and the respective Project SPVs for the acquisition of the equity shares of the Project SPVs by the Buyer. The Buyer shall allot units of the Trust to the Seller towards transfer of the equity shares in the manner stipulated in the Securities Purchase Agreements.

The key terms of the SPA are specified below:

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

Treatment of Claims:

(i) the entire economic and beneficial interest in any and all amounts due to the Project SPV in relation to the claims, made from since the period commencing from the acquisition date and as of the closing date, by the Project SPV as set out in Securities Purchase Agreements (the "**SPV Receivables**") shall be to the account of Seller. Subject to applicable law, the Buyer or the Project SPV shall, upon receipt of any SPV Receivables (or any part thereof), promptly transfer the same (net of any tax incidence on the Project SPV or any costs incurred by the Project SPV or payments to any contractor who has a claim against the Project SPV, in each case in relation to the SPV Receivables) to the Seller or to any Person as Seller may direct, in such manner as specified by Seller and in accordance with the Securities Purchase Agreements.

(ii) the entire economic and beneficial interest in any and all amounts due to the Project SPV in relation to any claims that are made by the Project SPV subsequent to the closing date but in relation to any events or circumstances that existed or arose from the period commencing from the acquisition date and prior to the closing date ("**Future SPV Receivables**"), shall be to the account of Seller. Subject to Applicable Law, the Buyer or the Project SPV shall, upon receipt of any Future SPV Receivables (or any part thereof), promptly transfer the same (net of any tax incidence on the Project SPV or any costs incurred by the Project SPV or payments to any contractor who has a claim against the Project SPV, in each case in relation to the Future SPV Receivables) to Seller or to any person as Seller may direct, in such manner as specified by Seller.

(iii) The Parties agree and acknowledge that the SPV Receivables and the Future SPV Receivables shall not form part of the assets of the Buyer and/or the Company, at any time or in any manner whatsoever. In respect of the Securities Purchase Agreements, the Parties shall not be required to execute and deliver any further instruments or documents or take any further action, unless specified otherwise in accordance with A\applicable law or as may be mutually decided.

Representations and Warranties

The representations and warranties provided by the Buyer and Seller under the Securities Purchase Agreements pertain to, amongst others:

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

(ii). due authorisation for consummation of the Securities Purchase Agreements;

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

(iv). no liquidation, dissolution, winding up, commencement of bankruptcy, insolvency, or similar proceedings, whether voluntary or involuntary, with respect to the Buyer is pending or has been pending, or to the knowledge of the Buyer, threatened.

Indemnity

The Seller ("**Indemnifying Party**") shall, assign its rights (including the right to make an indemnity claim directly against the Project SPV's indemnifying parties and obligations under the specified agreements to the Buyer, in accordance with the terms of the Securities Purchase Agreements. Upon such assignment, notwithstanding anything contained herein, save for any claims with respect to misrepresentation or breach of the warranties under the Securities Purchase Agreements, the Indemnified Parties shall have no recourse to the Seller or any of its Affiliates, whatsoever. However, the Seller shall provide reasonable cooperation as may be requested by the Buyer to make a claim against the Project SPV's indemnifying parties as may be requested by the Buyer (subject to the terms of the Specified Agreements).

Acquisition of WIPL by the Trust

ROFR Agreement

The Sponsor, the Trustee (acting on behalf of the Trust) and the Investment Manager, propose to enter into a ROFR Agreement, to enable the Trust to have the right to purchase 51% of the issued and paid-up equity share capital of WIPL. Some the key terms of the ROFR Agreement includes a right of first refusal. The Trust shall have a right of first refusal ("**ROFR**") over 51% of fully paid up equity shares ("**ROFR Shares**") of WIPL, upon the acquisition of the ROFR Shares by the Sponsor. The Sponsor shall, immediately upon acquisition of the ROFR Shares, make an irrevocable offer to the Trust, through the Trustee or the Investment Manager, for the acquisition of the ROFR Shares (the "**Offer**"). The Offer shall specify the details of proposed consideration payable in respect of the ROFR Shares ("**Offer Price**"). In the event the Trust is interested in the acquisition of the ROFR Shares set out in the Offer, the Trust shall communicate such interest in writing within a period of ninety working days from the date of receipt by the Trust of the Offer confirming that the Trust agrees to purchase all ROFR Shares at the Offer Price. The acceptance by the Trust shall be to acquire all ROFR Shares and not some of the ROFR Shares.

Deed of Assignment

The Sponsor, the Trustee (acting on behalf of the Trust) and the Investment Manager proposes to enter into a Deed of Assignment, pursuant to which the Sponsor propose to undertake a transfer of the entire equity shareholding held by the Sponsor in the Project SPVs, as of the date of the transfer, to the Trust, in lieu of units to be issued and allotted by the Trust. Pursuant to the Deed of Assignment, the Sponsor shall assign the Share Purchase Agreements in respect of: (i) 100% of the issued and paid-up equity share capital of DME, WRIPL, CGRG, GSY and CTHPL; and (ii) 49% of the issued and paid-up equity share capital of WIPL, to the Trust.

Borrowings from Related Parties

Depending upon market conditions and other considerations, the Trust may infuse funds, by way of debt, into the Project SPVs in accordance with applicable law.

Potential Conflicts of Interest

The Investment Manager has established certain procedures to deal with conflict of interest issues. For further details on management of potential conflicts of interest, please see the section titled "*Related Party Transactions – Procedure for dealing with Related Party Transactions*" on page 265.

REGULATIONS AND POLICIES

The following description is a summary of certain sector specific laws currently in force in India, which are applicable to the operations of the Trust and the Project SPVs. The information detailed in this section has been obtained from statutes, regulations, sector-specific policies and publications available in the public domain. The description below may not be exhaustive, and is only intended to provide general information to Bidders and is neither designed as, nor intended to substitute, professional legal advice. The information in this section is based on the current provisions of applicable law that are subject to change or modification by subsequent legislative, regulatory, administrative or judicial decisions in India. For information regarding regulatory approvals obtained by the Project SPVs, please see the section titled "Regulatory Approvals" on page 277.

Laws Relating to the Business and Operations of the Trust and the Project SPVs

The regulatory framework in India in the highways sector, implemented on a public-private partnership ("**PPP**") basis, mainly derives its source from the primary legislations of National Highways Authority of India Act, 1988 (the "**NHAI Act**") and the National Highways Act, 1956 (the "**NH Act**") enacted by the Indian parliament, each as amended or supplemented.

The National Highways Act, 1956

The policy of the MoRTH, in implementing the NH Act, is to vest the MoRTH with the power to declare a national highway and for acquisition of land for this purpose. The GoI, by notification, can declare the intention to acquire any land for a 'public purpose' as envisaged by the law and such land can be used for the purposes of building, maintenance and operation of the declared national highways throughout the country. The NH Act prescribes the procedure for such land acquisition. The procedure includes, *inter alia*, a declaration of an intention to acquire, entering and inspecting such land, hearing of objections, a declaration of the acquisition and the power to take possession. The NH Act also provides for payment of compensation to owners and any other person whose right of enjoyment or ownership in the land has been affected. The NH Act vests MoRTH with the power to appoint a competent authority for the effective implementation of the NH Act and its policies. The said appointed authority retains the right and power to (a) survey, make any inspection, valuation or enquiry; (b) take levels; (c) dig or bore into sub-soil; (d) set out boundaries and intended lines of work; (e) mark such levels, boundaries and lines placing marks and cutting trenches; or (f) do such other acts or things as may be laid down by rules made in this behalf by that government. All the notified national highways shall vest in the name of the Union and for the purposes, shall include all lands appurtenant thereto and all the bridges, culverts, tunnels and other enlisted constructions under the said NH Act. The Central Government shall assume the responsibility of maintaining and construction of national highways in proper condition in accordance to the law. The Central Government also retains the right to levy fee over the services and benefits rendered in relation to the use of such national highways.

The GoI is responsible for the development and maintenance of national highways. However, it may direct that such functions may also be exercised by the government of a state in which the highway is located or by any officer or authority subordinate to the GoI or to the state government. Further, the GoI has the power to enter into an agreement with any person for the development and maintenance of a part or whole of the highway. Such person would have the right to collect and retain fees at such rates as may be notified by the GoI and will also have the powers to regulate and control the traffic, for proper management of the highway, in accordance with the provisions of the Motor Vehicles Act, 1988, as amended. The GoI also has the power to make rules for carrying out the purposes of the NH Act.

The National Highways (Amendment) Act, 2017, entails the competent authority to issue reports to the Central Government in respect of any land (either acquired or proposed to be acquired) which is, either under incorrect revenue record or which is not required due to change in geometry or alignment of the construction, to issue order for the de-notification of such land from the acquisition for development and maintenance of the national highway. In pursuance of the foregoing amendment to the statute, the National Highways Rules, 1957, have been amended to ensure the exercise of the power under the NH Act. These rules provide for periodic regulatory compliance and reporting standards to be followed by the competent authority in reporting to the Central Government.

The National Highways Authority of India Act, 1988

The NHAI Act was enacted in pursuance of the powers of the Central Government for appointing a competent authority under the NH Act and provides for the constitution of an authority for the development, maintenance and management of national highways and for matters connected therewith or incidental thereto. In accordance with the NHAI Act, the GoI carries out development and maintenance of the national highways through NHAI. Subject to the provisions of the NHAI Act, the NHAI has the power to enter into and perform any contract necessary for the discharge of its functions. The NHAI has the power to acquire any land to discharge its functions, and such acquired land will be deemed to be land needed for a 'public purpose'. The NHAI Act prescribes a limit in relation to the value of the contracts that may be entered into by NHAI. However, the NHAI may enter into contracts exceeding the specified value, on obtaining prior approval of the GoI. The NHAI Act provides that the contracts for acquisition, sale, or lease of immovable property on behalf of the NHAI cannot exceed a term of 30 years unless previously approved by the GoI. NHAI's objective is to ensure that all contract awards and procurements conform to the best industry practices with regard to transparency of process, adoption of bid criteria to ensure healthy competition in award of contracts. In accordance with the NHAI Act, the NHAI shall consist of a full time chairman, not more than six full time members

and not more than six part time members who are being appointed by the Central Government. Additionally, various project implementation units headed by project director have been set at various sites to oversee timely completion of the projects.

In view of the challenging task of construction, development, and management of national highways being undertaken by NHAI, the Committee on Public Undertakings selected the subject "National Highways Authority of India (NHAI)" for comprehensive examination and report. The National Highways Authority of India (Amendment) Act, 2013, received the assent of the President of India on September 10, 2013, and aimed at increasing the institutional capacity of NHAI to help execute the powers delegated to it. National Highways Development Project ("**NHDP**") was launched in 1998 with the objective of developing roads of international standards which facilitate smooth flow of traffic. The NHDP envisages creation of roads with enhanced safety features, better riding surface, grade separator and other salient features.

As per the NHAI Works Manual, 2006, NHAI's mandate is the time and cost bound implementation of the NHDP. The sources of finance available to the NHAI include fund assistance from external funding agencies like the International Bank of Reconstruction and Development and the Asian Development Bank. NHAI's role encompasses involving the private sector in provision, maintenance, and operation of the national highways.

Financing of the NHDP

The GoI, under the Central Road and Infrastructure Fund Act, 2000 created a fund which is required to be utilized for the development and maintenance of national highways (the "**Central Road Fund**"). Section 18 of the NHAI Act also provides for the creation of a separate NHAI Fund. Any capital grant or aid received, loan taken, borrowing made, or any other sum received by the NHAI is credited to the NHAI Fund. Certain sources for financing of the NHDP are through dedicated accruals under the Central Road Fund by levy of cess on fuel as well as involving the private sector and encouraging public private partnerships. The NHDP is also financed through long-term external loans from the International Bank of Reconstruction and Development, the Asian Development Bank and the Japan Bank for International Cooperation as well as through tolling of roads for different projects undertaken by the NHAI.

Private Participation in NHDP

In an effort to attract private sector participation in the NHDP, the NHAI has issued model concession agreements ("**MCAs**") which have been formulated by Planning Commission of India or NITI Aayog and other departments of Central Government where a private entity, being the concessionaire, is, through an international competitive bidding process, awarded a concession (in form of a license) to build, own, operate and collect toll on a highway for a specified period of time. The concession to develop highway projects is given by the NHAI or other governmental authorities under various models of PPP like:

(i) Build, Operate, Transfer (BOT)/ Design, Build, Finance, Operate and Transfer (DBFOT) – In this model, the entire designing, financing and construction is undertaken by the concessionaire at its own cost. The concessionaire is entitled to collect toll or receive annuity payments from the NHAI, as the case may be, during the concession period after the construction of the highway project. The bid for the project may either be selected basis the lowest grant wanted by the private developer from the NHAI or the highest premium the private developer is willing to pay to NHAI, in the form of additional concession fee. The concessionaire at the end of the concession period transfers the highway project to the NHAI (free of charge and clear of all encumbrances). The concessionaire's investment in the highway project is recovered directly through user fees collected by way of tolls. Under the BOT model, the projects which are generally not viable based on toll revenue alone, the NHAI or the relevant governmental authority provides concessionaire with a capital grant upto certain percentage of the project cost to increase the viability of projects and the quantum of such grant is determined on a case to case basis. For certain projects with high traffic volumes, concessionaire also offers a negative grant (i.e., premium) to the NHAI.

(ii) Hybrid Annuity Model (HAM) – In this model, the NHAI or the relevant governmental authority invests 40% (forty percent) of the construction cost of the project in (five) equal instalments and the balance amount is infused by the private developer. The private developer recovers his investment in the form of annuity payments received by it over a period of 15 (fifteen) years. Additionally, there is no revenue risk for the private developer under HAM model because the toll is collected by the NHAI or relevant governmental authorities unlike the BOT model where the private developer collects it.

(iii) Toll, Operate and Transfer (TOT) – In this model, the road projects which are in operational phase are awarded by the NHAI or relevant governmental authorities to the concessionaire. The NHAI passes on the toll collection rights and operation and maintenance obligations to the concessionaire against payment of upfront concession fees quoted by the concessionaire as a part of the bidding process.

The bidding for the projects takes place in two stages as per the process provided below:

1. in the qualification (RFQ) stage, the NHAI selects certain applicants on the basis of technical and financial expertise, prior experience in implementing similar projects and previous track record; and

2. in the proposal (RFP) stage, the NHAI invites financial bids from the applicants qualified at the RFQ stage on the basis of which the concession is awarded to the successful bidder by the NHAI for implementation of the project.

Exit Policy

The CCEA in May 2015 approved a comprehensive exit policy framework with the objective to mobilize funds in the market. In pursuance thereto, NHAI, vide Circular No. NHAI/1103/CGM(FA)/4/2015 dated June 9, 2015 permitted divestment of 100% equity by concessionaires/developers after two years of completion of construction to facilitate unlocking of funds for new infrastructure projects. The equity divested is required to be invested by promoters in their new projects. This comprehensive exit policy framework is expected to harmonize certain conditions across all concessions signed prior to 2009 with the policy framework for post 2009 contracts which permit divestment of equity up to 100%, two years after completion of construction. In line with the spirit of quoted circular, the NHAI issued another circular dated September 9, 2015 followed by the circular dated November 19, 2015, on the same subject, allowing the promoter to use the proceeds from the sale of divested equity of the concessionaire in one or more of the following:

(i) to reinvest in incomplete NHAI projects;

(ii) To reinvest any other highway projects;

(iii) any other power sector projects; or

(iv) to retire their debt to financial institutions in any other infrastructure projects.

Relaxation in the 'change in ownership' clause in Hybrid Annuity Model (HAM) projects

The MoRTH, *vide* circular dated November 10, 2020 and November 27, 2020, read along with the NHAI circular dated December 31, 2020, amended the MCAs in respect of project implemented under the HAM model, and permitted the selected bidder/consortium members, for the new as well as subsisting national highways project under the HAM-model, to dilute their equity six months after COD is achieved for the respective project.

Rationalized Compensation

The CCEA in November 2015 approved a policy for rationalized compensation to concessionaires for languishing national highway projects in BOT mode for delays that are not attributable to the concessionaires. Under the policy, the NHAI is authorized to allow an extension of the concession period for BOT (Toll) projects while the tenure for the operations period as envisaged originally in the concession agreement may remain unchanged which would result in a corresponding increase in concession period. The NHAI has also been authorised to pay compensatory annuities to the concessionaire corresponding to the actual period of delay that is not attributable to the concessionaire upon successful completion of the project.

One Time Fund Infusion Scheme

The CCEA in October 2015 gave its approval to the NHAI for a one-time infusion of funds with the purpose of reviving and physically completing stalled projects in the advanced stages of completion. As per the policy, the amount of funds required in each case shall be approved by NHAI on a case to case basis.

Bidder Information

MoRTH has developed the Bidder Information Management System ("**BIMS**") to streamline the process of pre- qualification of bidders for EPC mode of contracts for all national highway works, with enhanced transparency and objectivity. BIMS works as a data base of bidder information that covers basic details, civil works experience, cash accruals and network, and annual turnover so that bidders' pre-qualification can be assessed based on evaluation parameters like threshold capacity and bid capacity from already stored data and the technical evaluation can be carried out in a faster manner.

Land Acquisition

While land is acquired for national highway projects under the NH Act, the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (the "**Land Acquisition Act**") must also be complied with. MoRTH has issued comprehensive guidelines on land acquisition for national highways taking into account the applicability of the Land Acquisition Act.

Arbitral Awards

CCEA on August 31, 2016 approved various measures to revive the construction sector. An office memorandum dated September 5, 2016 was issued by the National Institute for Transforming India with certain proposals. On November 20, 2019, the CCEA approved certain proposals in relation to the arbitrations by or against government entities, for the effective implementation of the CCEA's decision on August 31, 2016 on its initiatives to revive the construction sector. Initially, the CCEA had approved the proposal that government agencies will be required to pay 75% of the arbitral award to the concessionaire against a bank guarantee, in cases where the award already announced is challenged. However, pursuant to a press release dated November 20, 2019, the CCEA approved, inter-alia, that where a government entity has challenged an arbitral award, resultant of which the amount of the arbitral award has not been paid, 75% of such award will be paid by the government entity to the contractor or the concessionaire against a bank guarantee only for the said 75% and not for its interest

component. In relation to interest payable to the government entity, if a subsequent court order required the refund of 75% of the amount, the payment of such amounts will be required to be made as per the court orders.

Applicable Rules

As per the NH Act and the NHAI Act, the Central Government is empowered to make rules in order to further the objects of NH Act and NHAI Act. In exercise of such power, the Central Government has framed certain rules which are as follows:

- The National Highways Rules, 1957, as amended;
- National Highways Authority of India (Budget, Accounts Audit, Investment of Funds and Powers to enter Premises) Rules, 1990, as amended;
- The National Highways (Manner of Depositing the Amount by the Central Government with Competent Authority for Acquisition of Land) Rules, 1998;
- The National Highways Tribunal (Procedure for Appointment as Presiding Officer of the Tribunal) Rules, 2003, as amended;
- The Central Road Fund (State Roads) Rules, 2007;
- The National Highways Tribunal (Procedure) Rules 2003;
- National Highways Authority of India (The Term of Office and Other Conditions of Service of Members) Rules, 2003, as amended;
- The National Highways Tribunal (Financial and Administrative Powers) Rules, 2004;
- The National Highways Tribunal (Procedure for Investigation of Misbehaviour or Incapacity of Presiding Officer) Rules, 2003;
- The National Highways Fee (Determination of Rates and Collection) Rules, 2008, as amended;
- The Highway Administration Rules, 2004;
- The National Highways (Collection of Fees by any person for the use of Section of National Highways/Permanent Bridges/Temporary bridge on National Highways) Rules, 1997;
- The National Highways (Fee for the use of National Highways and Permanent Bridge public Funded Project) Rules, 1997; and
- The National Highways (Rate of Fee) Rules, 1997.
- Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 and Central Rule, 1998
- C.E.A. (Measures Relating to Safety and Electric Supply) Regulations, 2010
- Central Electronical Authority (Measures Relating to Safety and Electric Supply) Regulations, 2020
- Indian Electricity Rules, 1956

Other legislations relevant to the road sector

In addition to the above, there are also certain other legislations that are relevant to the road sector which include the Road Transport Corporation Act, 1950, Central Road and Infrastructure Act, 2000, etc.

Environmental Compliances and Regulations

Infrastructure projects must also ensure compliance with environmental legislations such as the Water (Prevention and Control of Pollution) Act, 1974 ("**Water Pollution Act**"), the Air (Prevention and Control of Pollution) Act, 1981 ("**Air Pollution Act**") and the Environment Protection Act, 1986 ("**Environment Act**", together with the Water Pollution Act and the Air Pollution Act, the "**Environment Protection Acts**"). The Water Pollution Act aims to prevent and control water pollution. This legislation provides for the constitution of a central pollution control board ("**Central Pollution Control Board**" or "**CPCB**") at the Central level and state pollution control boards ("**State Pollution Control Boards**" or "**SPCBs**", together with the Central Pollution Control Board, the "**PCBs**") at the State levels. The functions of the CPCB includes, among other things, coordination of activities of the SPCBs, collecting data relating to water pollution and the measures devised for the prevention and control of water pollution and prescription of standards for streams or wells. The SPCBs are responsible for, among other things, the planning for programmes for prevention and control of pollution of streams and wells, collecting and disseminating information

relating to water pollution and its prevention and control, inspection of sewage or trade effluents, works and plants for their treatment and to review the specifications and data relating to plants set up for treatment and purification of water, laying down or annulling the effluent standards for trade effluents and for the quality of the receiving waters, and laying down standards for treatment of trade effluents to be discharged. These authorities issue consent to establish and consent to operate which are to be required to be renewed periodically. These authorities also have the power of search, seizure and investigation if the authorities are aware of or suspect violation of such regulations. This legislation prohibits any person from establishing any industry, operation or process or any treatment and disposal system, which is likely to discharge trade effluent into a stream, well or sewer, or bring into use any new or altered outlet for discharge of sewage, or begin to make any new discharge of sewage without taking prior consent of the SPCBs.

In context of the environmental compliances and regulations, the National Green Tribunal Act, 2010 (the "**NGT Act**") is an important legislation which provides for the establishment of a National Green Tribunal ("**NGT**") for the effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. In accordance with the Forest (Conservation) Act, 1980, state governments are not permitted to make any order directing the use of forest land for a non-forest purpose, or assignment of any forest land through lease or otherwise to any private person or corporation without the approval of the GoI. The Ministry of Environment, Forest and Climate Change ("**MoEF**") mandates the Environment Impact Assessment ("**EIA**") must be conducted for specified projects. In the process, the MoEF receives proposals or the setting up of projects and assesses their impact on the environment before granting clearances to the projects. The EIA Notification S.O. 1533, issued on September 14, 2006 (the "**EIA Notification**") and amended from time to time, under the provisions of the Environment Protection Act, prescribes that new construction of specified projects require prior environmental clearance from the MoEF. The environment clearance must be obtained from MoEF according to the procedure specified in the EIA Notification. No construction work or preparation of land by the project management except for securing the land, relating to the setting up of a specified project can be undertaken until such clearance is obtained. Under the EIA Notification, the environmental clearance process for new projects consists of four stages – screening, scoping, public consultation and appraisal. After completion of public consultation, the applicant is required to make appropriate changes in the draft 'EIA Report' and the 'Environment Management Plan.' The final EIA Report has to be submitted to the concerned regulatory authority for appraisal. The regulatory authority is required to give its decision within 105 days of the receipt of the final EIA Report. The EIA Guidance Manual for Highways, 2010 explains the four stages of the environmental clearance process and the contents of the EIA Report required to be submitted by highway projects.

Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, impose an obligation and duty on the owners and operators of any facility or industry with a capability to create hazardous materials to safely dispose of such material in transport and other means of collecting and storing. Each occupier and operator of any facility generating hazardous waste is required to obtain an approval from the relevant state pollution control board for collecting, storing and treating the hazardous waste.

Green Highways (Plantation, Transplantation, Beautification and Maintenance) Policy, 2015

In September 2015, MoRTH has launched Green Highways (Plantation, Transplantation, Beautification and Maintenance) Policy, 2015, which will require road developers to earmark 1% of a project's total cost for planting of trees and shrubs along the national highways. Under this policy, the maintenance of such plantations will be outsourced through a bidding process to plantation agencies. MoRTH/NHAI will appoint the authorized agency for empanelment of such plantation agencies.

Public Liability Insurance Act, 1991

The Public Liability Insurance Act, 1991 (the "**Public Liability Act**"), imposes liability on the owner or controller of hazardous substances for any damage arising out of an accident involving such hazardous substances. A list of 'hazardous substances' covered by the legislation has been enumerated by the GoI by way of a notification. The owner or handler is also required to take out an insurance policy insuring against liability under the legislation. The rules made under the Public Liability Act mandate that the employer has to contribute towards the Environment Relief Fund, a sum equal to the premium paid on the insurance policies. This amount is payable to the insurer.

Other applicable law

The Motor Vehicles Act, 1988

The development, maintenance and management as well as control of the National Highways are regulated by the NH Act and the NHAI Act. Under the Motor Vehicles Act, 1988, some powers have been delegated to the Transport Department of the State Governments. Section 138 of the Motor Vehicles Act, 1988 further empowers the State Governments to make rules for the control of traffic, including for the purpose of the removal and the safe custody of vehicles including their loads which have broken down or which have been left standing or have been abandoned on roads; the installation and use of weighing devices; the maintenance and management of wayside amenities complexes; the exemption from all or any of the provisions of relating to fire brigade vehicles, ambulances and other special classes or descriptions of vehicle, subject to such conditions as may be

prescribed; the maintenance and management of parking places and stands and the fee, if any, which may be charged for their use; prohibiting the taking hold of or mounting of a motor vehicle in motion; prohibiting the use of foot-paths or pavements by motor vehicles, generally, the prevention of danger, injury or annoyance to the public or any person, or of danger or injury to property or of obstruction to traffic. The Motor Vehicles (Amendment) Act, 2019 is targeted towards bringing changes in the transport sector to encourage safer driving practices among Indian motor vehicle drivers. The draft for the amendment was put forward in the lower house of the Parliament, with a proposal to impose strict fines on the violators of traffic rules. The Act proposes to create a National Road Safety Board to be created by the Central Government through a notification. The Board will advise the Central and State governments on all aspects of road safety and traffic management.

Indian Trusts Act, 1882

The Indian Trusts Act, 1882 ("**Trusts Act**") governs all private trusts in India. The Trusts Act sets out the purpose for which private trusts can be established, the manner in which they may be created, executed and extinguished. The person creating a trust under the Trusts Act is the author of such trust, the person to whom the author grants the power and authority to regulate the trust is the trustee and the persons for whose benefit such trust has been created are the beneficiaries of such trust. The Trust Act sets out the rights, duties, liabilities and powers of the trustees and the beneficiaries *vis-a-vis* the trust. The Trust has been settled in accordance with the provisions of the Trusts Act.

Control of National Highways (Land and Traffic) Act, 2002

The Control of National Highways (Land and Traffic) Act, 2002 (the "**Control of NH Act**") provides for control of land within national highways, right of way and traffic moving on national highways and also for removal of unauthorised occupation thereon.

In accordance with the provisions of the Control of NH Act, the Central Government has established Highway Administrations. Under the Control of NH Act, all land that forms part of a highway which vests in the Central Government, or that which does not already vest in the Central Government but has been acquired for the purpose of highways shall be deemed to be the property of the Central Government. The Control of NH Act prohibits any person from occupying any highway land or discharging any material through on such land without the permission of the Highway Administration or any officer authorised by such administration. The Control of NH Act permits the grant of lease and license for use of highway land for temporary use.

Indian Tolls Act, 1851

In accordance with the Indian Tolls Act, 1851 (the "**Tolls Act**"), the state governments have been vested with the power to levy tolls at such rates as they deem fit, to be levied upon any road or bridge, made or repaired at the expense of the Central or any state government. The tolls levied under the Tolls Act, are deemed to be 'public revenue' and the collection of tolls can be placed under any person the State governments' deem fit. Such persons are enjoined with the same responsibilities as if they were employed in the collection of land revenue. Further, all police officers are bound to assist the toll collectors when required in the implementation of the Tolls Act. The Tolls Act further gives power for recovery of toll and exempts certain category of people from payment of toll.

National Highways Fee (Determination of Rates and Collection) Rules, 2008

The National Highways Fee (Determination of Rates and Collection) Rules, 2008 (the "**NH Fee Rules**"), regulates the collection of fee for the use of national highways. In accordance with the NH Fee Rules, the GoI may, by a notification, levy fee for use of any section of a national highway, permanent bridge, bypass or tunnel forming part of a national highway, as the case may be. However, the GoI may, by notification, exempt any section of a national highway, permanent bridge, bypass or tunnel constructed through a public funded project from levy of such fee. The NH Fee Rules supersede the National Highways (Temporary Bridges) Rules, 1964, the National Highways (Collection of Fees by any Person for the Use of Section of National Highways/ Permanent Bridge/ Temporary Bridge on National Highways) Rules, 1997, the National Highways (Fees for the use of National Highways Section and Permanent Bridges Public Funded Project) Rules, 1997 and the National Highways (Rate of Fees) Rules, 1997 other than in respect of things done or omitted to be done under such rules prior to supersession. The NH Fee Rules do not apply to agreements and contracts executed or bids invited prior to the publication of such rules i.e. prior to December 5, 2008. The collection of fee in case of a public funded project shall commence within 45 days from the date of completion of the project. The NH Fee Rules further provide for the base rate of fee applicable for the use of a section of the national highway for different categories of vehicles and the fees collected by the executing authority shall be remitted to the GoI. However, the GoI may, by notification, allow any or all of the executing authorities to appropriate the whole, or part of such fees for purposes as may be specified.

FASTag lanes on fee plazas is an initiative of the GoI in which there is an exclusive lane in the fee plaza for movement of vehicles fitted with FASTag. The FASTag is a device which is fitted on the front windscreen of vehicles to indicate online toll payment. The amended NH Fee Rules impose a penalty equivalent to two times the fee applicable if a vehicle not fitted with FASTag enters the exclusive FASTag lane. However, in case a user is unable to pay, due to malfunctioning electronic toll collection infrastructure, the user will be permitted to pass the fee plaza without payment. The NH Fee rules were also amended to provide that the driver or owner of a mechanical vehicle which is loaded in excess of permissible load specified for its category, (i) shall be liable to pay fee at such rate which is applicable for the next higher category of mechanical vehicles, and (ii) Payment of such fee shall not entitle the driver or owner, to use the national highway until the excess load has been remove

from such mechanical vehicle. However, in case no weighbridge has been installed at the toll plaza, no fee for overloading shall be levied.

The National Highways Rules, 1957 (the "NH Rules")

The NH Rules provide that in situations where the estimate cost of the execution of any original work on a national highway exceeds ₹ 1,000,000, a detailed estimated of the cost is to be forwarded to the GoI. An application for allotment of funds for meeting expenditure on an original work on a national highway must also be made to the GoI. The executing agency of the highway is required to furnish monthly progress reports and a completion report on the conclusion of the work. The NH Rules also give the consulting engineer of the GoI the right to inspect the work while it is in progress or after completion. Provisions under the Constitution of India and other legislations in relation to collection of toll Entry 59, List II of Schedule VII read with Article 246 of the Constitution of India vests state governments with the power to levy tolls. Further, in accordance with the Tolls Act, state governments have been vested with the power to levy tolls at such rates as they deem fit.

National Monetisation Pipeline (NMP)

NITI Aayog has developed the pipeline, in consultation with infrastructure line ministries, based on the mandate for 'Asset Monetisation' for roads and highways, amongst others, under Union Budget 2021-22. The framework for monetisation of core asset monetisation has three key imperatives: (i) monetization of 'rights' not 'ownership' i.e. assets will be handed back to the government at the end of transaction life; (ii) brownfield de-risked assets and stable revenue streams; and (iii) structured partnerships under defined contractual frameworks with strict performance standards. This shall include selection of de-risked and brownfield assets with stable revenue generation profile with the overall transaction structured around revenue rights. The primary ownership of the assets under these structures shall be with the government.

Foreign Investment Regulations

Foreign investment in Indian securities is governed by the provisions of the FEMA, read with the applicable FEMA Rules, the FEMA (Mode of payment and Reporting of Non-Debt Instruments) Regulations, 2019 and the consolidated FDI Policy issued by the Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government. Foreign investment is permitted (except in the prohibited sectors) either through the automatic route or the approval route, depending upon the sector in which foreign investment is sought to be made. Under the FEMA Rules and the current consolidated FDI Policy, effective from October 15, 2020, an infrastructure investment trust registered and regulated by the SEBI under the InvIT Regulations, being an 'investment vehicle', is permitted to receive foreign investment from a person resident outside India (subject to Press Note 3 (2020 series)), including an FPI or an NRI subject to the terms and conditions specified in the FEMA Rules.

Downstream investment by an infrastructure investment trust shall be regarded as indirect foreign investment if neither the sponsor nor the investment manager of such an infrastructure investment trust is Indian 'owned and controlled' as defined in FEMA Rules.

Downstream investment by an 'investment vehicle' shall have to conform to the sectoral caps and conditions/restrictions, if any, as applicable to the company in which the downstream investment is made as per the FDI Policy. Foreign investment of up to 100% through the automatic route is permitted in the infrastructure sector in India. An infrastructure investment trust that receives foreign investment shall be required to make such report and in such format to the RBI or to the SEBI as may be prescribed by them from time to time.

The payment for the units of an infrastructure investment trust acquired by a person resident or registered/ incorporated outside India shall be made by an inward remittance from abroad through banking channels or by way of swap of shares of an SPV, or out of funds held in a Non-resident External ("**NRE**") or Foreign Currency Non-resident Bank ("**FCNR(B)"**) account maintained in accordance with the Foreign Exchange Management (Deposit) Regulations, 2016.

Further, any person who is a non-resident and holds units of an infrastructure investment trust in accordance with the FEMA Rules may pledge such units (i) in favour of a bank in India to secure the credit facilities being extended to the Indian company for bona fide purposes; (ii) in favour of an overseas bank to secure the credit facilities being extended to the person, or a person resident outside India who is the promoter of the Indian company or the overseas group company of the Indian company; (iii) in favour of a Non-Banking Financial Company registered with the RBI to secure credit facilities being extended to the Indian company for bona fide purposes; and (iv) subject to the authorized dealer bank satisfying itself of the compliance of the conditions stipulated by the RBI in this regard.

Other Laws and Regulations

In addition to the aforementioned, the other laws and regulations that may be applicable to the Trust and the Project SPVs include the following:

- *Factories Act, 1948*[*]
- *The Contract Labour (Regulation and Abolition) Act, 1970*[*]

- *The Child Labour (Prohibition and Regulation) Act, 1986*
- *The Employees' Compensation Act, 1923*[**]
- *The Employees' State Insurance Act, 1948*[**]
- *The Employee's Provident Fund and Miscellaneous Provisions Act, 1952*[**]
- *The Equal Remuneration Act, 1976*[***]
- *The Maternity Benefit Act, 1961*[**]
- *The Minimum Wages Act, 1948*[***]
- *The Payment of Gratuity Act, 1972*[**]
- *The Payment of Bonus Act, 1965*[***]
- *The Payment of Wages Act, 1936*[***]
- *The Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013*
- *Industrial Disputes Act, 1917*
- *Shops and Commercial Establishments Acts, where applicable*

[*] *The Occupational Safety, Health and Working Conditions Code, 2020 (enacted by the Parliament of India and assented to by the President of India on September 28, 2020) will come into force on such date as may be notified in the official gazette by the Central Government and different dates may be appointed for different provisions of the Occupational Safety, Health and Working Conditions Code, 2020. Once effective, it will subsume, inter alia, the Factories Act, 1948 and the Contract Labour (Regulation and Abolition) Act, 1970.*

[**] *The Code on Social Security, 2020 (enacted by the Parliament of India and assented to by the President of India on September 28, 2020) has been notified to the extent of Section 142 of the Code and will come into force in its entirety on such date as may be notified in the official gazette by the Central Government and different date may be appointed for different provisions of the Code on Social Security, 2020. Once effective, it will subsume, inter alia, the Employees' Compensation Act, 1923, the Employees' State Insurance Act, 1948, the Employee's Provident Fund and Miscellaneous Provisions Act, 1952, the Maternity Benefit Act, 1961 and the Payment of Gratuity Act, 1972.*

[***] *The Code on Wages, 2019 (enacted by the parliament of India and assented to by the President of India on August 8, 2019) was notified in the official gazette by the Central Government on September 28, 2020 to the extent of the rules governing the constitution and functions of the central advisory board under the Code on Wages once notified and effective in its entirety, it will subsume the Equal Remuneration Act, 1976, the Minimum Wages Act, 1948, the Payment of Bonus Act, 1965 and the Payment of Wages Act, 1936.*

In addition to the above, compliance with the provisions of various tax-related legislations, intellectual-property related legislations and other applicable law for our day-to-day operations is also required.

REGULATORY APPROVALS

Provided below are the material approvals, consents, licenses, registrations and permissions from the government, various governmental agencies and other statutory and/or regulatory authorities with which the Trust can undertake the Issue and the Trust and the Project SPVs can undertake their respective current business activities, as applicable. Unless otherwise stated, these approvals are valid as of the date of this Draft Placement Memorandum. In the event that any of the approvals and licenses that are required for the Project SPVs' business operations expire in the ordinary course of business, the relevant Project SPV will apply for such renewal from time to time. For details in connection with the regulatory and legal framework within which the Trust and the Project SPVs operate, please see the section titled "Regulations and Policies" on page 269.

A. Approvals in relation to the Issue

1. Resolutions dated December 27, 2023 and January 5, 2024, passed by the board of directors and InvIT committee of the Investment Manager, respectively, in relation to the Issue and other incidental matters.

2. In-principle listing approval from NSE dated [●].

B. Approvals in relation to the Trust

1. Certificate of registration dated November 8, 2023 bearing registration number IN/INVIT/23-24/00028 issued by SEBI under Regulation 3 of the InvIT Regulations, for registration of the Trust as an infrastructure investment trust.

C. Material Business Approvals in Relation to the Project SPVs

I. WRIPL

a. Provisional completion certificate dated November 11, 2021 issued by G-ENG Advisory Services Private Limited JV Global Infra Solutions, certifying November 11, 2021 as the date of commencement of commercial operations of the project highway.

b. Completion certificate dated July 29, 2022 issued by G-ENG Advisory Services Private Limited JV Global Infra Solutions, AICONS Engineering Pvt Ltd Infrastructure and M.S. Consultant JV Krishna Techno Consult certifying July 29, 2022 as the date of completion of commercial operations of the project highway.

c. Legal identity identifier code issued by Legal Entity Identifier India Limited, valid until April 11, 2024.

d. Certificate of registration dated October 24, 2019 issued by Government of Maharashtra under Section 7 of the Building and Other Construction Work (Regulation of Employment and Condition of Service) Act, 1996.

e. Registration certificate of WRIPL certifying it as a commercial establishment under Delhi Shops and Establishment Act, 1954, dated December 15, 2023, issued by Department of Labour, Government of NCT of Delhi.

f. Employer registration issued by Employees' State Insurance Corporation under the Employees' State Insurance Act, 1948.

II. CGRG

a. Provisional completion certificate dated March 14, 2022 issued by LEA Associates South Asia Private Limited certifying February 17, 2022 as the date of commencement of commercial operations of the project highway.

b. Provisional completion certificate dated August 5, 2020 issued by LEA Associates South Asia Private Limited certifying August 5, 2020 as the date of commencement of commercial operations of the project highway.

c. Completion certificate dated October 7, 2022 issued by LEA Associates South Asia Private Limited certifying October 7, 2022 as the date of completion of commercial operations of the project highway.

d. Legal identity identifier code issued by Legal Entity Identifier India Limited, valid until May 15, 2024.

e. Registration certificate of CGRG certifying it as a commercial establishment under Delhi Shops and Establishment Act, 1954, establishment dated December 15, 2023 issued by Department of Labour, Government of NCT of Delhi.

f. Employer registration issued by Employees' State Insurance Corporation under the Employees' State Insurance Act, 1948.

III. CTHPL

a. Provisional completion certificate dated September 1, 2021 issued by Aarvee Associates Architects, Engineers and Consultants Private Limited certifying August 25, 2021 as the date of commencement of commercial operations of the project highway.

b. Completion certificate dated December 26, 2022 issued by Aarvee Associates Architects, Engineers and Consultants Private Limited certifying October 30, 2022 as the date of completion of commercial operations of the project highway.

c. Legal identity identifier code issued by Legal Entity Identifier India Limited, valid until March 27, 2024.

d. Registration certificate of CTHPL certifying it as a commercial establishment under Delhi Shops and Establishment Act, 1954, dated December 15, 2023, issued by Department of Labour, Government of NCT of Delhi certifying that.

e. Employer registration issued by Employees' State Insurance Corporation under the Employees' State Insurance Act, 1948.

IV. DME

a. Provisional completion certificate dated June 28, 2018 issued by SAI Systra Group certifying June 28, 2018 as the date of commencement of commercial operations of the project highway.

b. Completion certificate dated October 29, 2018 issued by SAI Systra Group certifying September 26, 2018 as the date of completion of commercial operations of the project highway.

c. Legal identity identifier code issued by Legal Entity Identifier India Limited, valid until August 17, 2024.

d. License dated August 30, 2023 issued by Office of Licensing Officer, Government of India under Section 12 of the Contract Labour (Regulation and Abolition) Act, 1970 valid until August 29, 2024.

e. Registration certificate of DME certifying it as a commercial establishment under Delhi Shops and Establishment Act, 1954, dated December 15, 2023, issued by Department of Labour, Government of NCT of Delhi.

f. Employer registration issued by Employees' State Insurance Corporation under the Employees' State Insurance Act, 1948.

V. GSY

a. Provisional completion certificate dated October 31, 2020 issued by LEA Associates South Asia Private Limited certifying October 31, 2020 as the date of commencement of commercial operations of the project highway.

b. Completion certificate dated February 10, 2022 issued by LEA Associates South Asia Private Limited certifying February 10, 2022 as the date of completion of commercial operations of the project highway.

c. Legal identity identifier code issued by Legal Entity Identifier India Limited, valid until May 15, 2024.

d. Registration certificate of GSY certifying it as a commercial establishment under Delhi Shops and Establishment Act, 1954, dated December 15, 2023, issued by Department of Labour, Government of NCT of Delhi certifying that.

e. Employer registration issued by Employees' State Insurance Corporation under the Employees' State Insurance Act, 1948.

VI. WIPL

a. Provisional completion certificate dated March 31, 2022 issued by SA Infrastructure Consultants Private Limited, certifying March 31, 2022 as the date of commencement of commercial operations of the project highway.

b. Provisional completion certificate dated April 25, 2023 issued by SA Infrastructure Consultants Private Limited, certifying March 28, 2023 as the date of commencement of commercial operations of the project highway.

c. Legal identity identifier code issued by Legal Entity Identifier India Limited, valid until March 11, 2024.

d. License dated September 21, 2023, issued by Office of Licensing Officer, Government of India under Section 12 of the Contract Labour (Regulation and Abolition) Act, 1970 valid until September 20, 2024 for both Haryana and Delhi section.

e. Registration certificate of WIPL certifying it as a commercial establishment under Delhi Shops and Establishment Act, 1954, dated December 15, 2023, issued by Department of Labour, Government of NCT of Delhi.

f. Approval letter dated December 20, 2023, issued by office of the Executive Engineer Electrical Inspectorate, Government of Haryana, Panipat to Welspun Enterprises Limited with respect to WIPL for annual inspection of HT installation 400KVAT/F& 125, 300 KVA DG Set under CEA (Measuring relating to safety and electric Supply) Regulation, 2010.

J. Approvals applied for, but not yet received

Except as stated below, as of the date of this Draft Placement Memorandum, there are no approvals required to be obtained by the Trust and the Project SPVs, for which applications have been made, but approvals have not been received:

a. Applications made by WDMEPL, CGRG, GSY, CTHPL and WIPL dated August 21, 2023, to obtain consent from NHAI for change in ownership;

b. Application made by WRIPL dated August 22, 2023 to obtain consent from PWD, Maharashtra for change in ownership;

c. Application made by GSY dated January 3, 2024, for inspection of DG set at toll plaza location at Sarsawa;

d. Application made by CGRG dated January 3, 2024, for inspection of DG set at toll plaza location at Sayyed Majra; and

e. Application made by CGRG dated January 3, 2024, for inspection of DG set at toll plaza location at Bhagawanpur.

f. Application dated November 27, 2023, made by CGRG before the NHAI for Form III in favour of sub-contractor to obtain the labour license from the relevant authority.

g. Application dated November 27, 2023, made by GSY before the NHAI for Form III in favour of sub-contractor to obtain the labour license from the relevant authority.

h. Application December 8, 2023, made by WRIPL before the PWD, Maharashtra for Form III in favour of sub-contractor to obtain the labour license from the relevant authority.

K. Approvals for which applications are yet to be made

Apart from this, as of the date of this Draft Placement Memorandum, there are no material approvals required to be obtained by the Trust or the Project SPVs for which applications are yet to be made. As disclosed in section titled "*Financial Indebtedness*" on page 226, the Trust is proposing to avail an InvIT Loan, which is proposed to be utilized, amongst others, for the purpose of pre-payment or repayment, in whole or part, of the existing outstanding secured or unsecured loans of the Project SPVs as may be permitted under the SEBI InvIT Regulations. In relation to the proposed financing, applications for refinancing approvals will be required to be made before the respective concessioning authority by the Project SPVs at an appropriate stage. Further, in the event that any other material approvals are required to be obtained by the Trust or the Project SPVs subsequently, applications in respect of such approvals shall be made appropriately.

LEGAL AND OTHER INFORMATION

Except as stated in this section, there is no material civil litigation or actions by regulatory authorities, in each case against all Project SPVs, the Trust, the Sponsor, the Investment Manager, the Project Manager, or any of their respective Associates, the Sponsor Group and the Trustee, that are currently pending as on the date of this Draft Placement Memorandum.

For the purpose of this section, details of all regulatory actions involving the Trust (including Project SPVs), the Sponsor, the Investment Manager, the Project Manager, or any of their respective Associates, the Sponsor Group and the Trustee, that are currently pending have been disclosed. All criminal matters involving the Trust (if any), the Sponsor, the Investment Manager, the Project Manager, or any of their respective Associates, the Sponsor Group and the Trustee, that are currently pending have been disclosed. All claims involving the Project SPVs that are currently pending have been disclosed. Further, any civil matter involving an amount equivalent to, or more than, the amount as disclosed below, in respect of the Trust, the Sponsor, the Project Manager, the Investment Manager and each of their respective Associates, the Sponsor Group, the Trustee and the Project SPVs has also been disclosed.

For the Trust (including the Holdcos and Project SPVs), the total income in accordance with the Special Purpose Combined Financial Statements for the year ended March 31, 2023 was ₹ 59,434.16 lakhs. Accordingly, in respect of the Trust (including the Holdcos and Project SPVs), all outstanding civil matters which involve an amount equivalent to or exceeding ₹ 2,971.70 lakhs (being 5% of the total income for the year ended March 31, 2023) have been considered material.

For the Sponsor and its Associates the net worth (i.e. the total of share capital and consolidated reserves and surplus) of the Sponsor was USD 2,678.78 lakhs as on September 30, 2023. Accordingly, in respect of the Sponsor and its Associates, all outstanding civil matters which involve an amount equivalent to or exceeding 1% of the net worth of the Sponsor as on September 20, 2023 have been considered material.

For the Investment Manager, all outstanding civil matters which involve an amount equivalent to or exceeding 10% of the net-worth of the Investment Manager as on September 30, 2023 have been considered material.

For the Trustee, the total consolidated income for was ₹ 8,391.63 lakhs as per its audited financials for the year ended March 31, 2023. Accordingly, in respect of the Trustee, all outstanding civil matters which involve an amount e amount equivalent to or exceeding 5% of the total consolidated income of the Trustee as per its audited financials for the year ended March 31,2023 have been considered material.

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 this Draft 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.

I. Litigation and Regulatory Actions against the Trust and its Associates

As at the date of this Draft Placement Memorandum, there are no outstanding criminal litigation, non-ordinary course regulatory actions or material civil litigation against the Trust and its Associates.

II. Litigation and Regulatory Actions against the Sponsor and its Associates and the Sponsor Group (other than the Trust and its Associates, the Project SPVs the Investment Manager, and the Project Manager and their Associates)

In accordance with the abovementioned there are no outstanding criminal litigation, non-ordinary course regulatory actions or material civil litigation against the Sponsor solely on the basis described above.

III. Litigation and Regulatory Actions involving the Project SPV

WIPL

Proceedings against WIPL

1. M/s Vidya Projects Pvt. Ltd. ("**Petitioner**") issued a notice of arbitration dated June 13, 2019, to WIPL for release of payment of ₹ 41 lakhs allegedly due to the Petitioner due to a transfer of liabilities including outstanding payments between the Petitioner and WIPL through substitution and amendment agreement dated June 25, 2023 ("**Agreement**"). WIPL filed a response dated December 13, 2021 stating that they are not liable to pay any amount since the Agreement did not confer any liability on WIPL since it wasn't a party to the contract, and refused to consent to any arbitrator. Subsequently, the Petitioner instituted an arbitration petition before the High Court of Delhi dated January 22, 2022 requesting the court to appoint an arbitrator to adjudicate the dispute. The matter is still pending.

2. WIPL received a show cause notice from Haryana State Pollution Control Board ("**HSPCB**") dated November 5, 2022 ("**SCN**") and levied environmental compensation on violation of CAQM directions issued under Graded Response Action Plan (GRAP) dated November 3, 2022 (For NH -44 at village –Sewah and Nangal Kheri, Panipat). The SCN was regarding pollution and other allied activities including (i) construction and demolition waste lying on the road; and (ii) proper water sprinklers or dust suppression system not present to control dust emission on site. WIPL responded to HSPCB by way of its letter dated November 8, 2022 informing that measures are being implemented by WIPL to curb activities and requested HSPCB to withdraw the said show cause notice. The matter is still pending.

3. WIPL received a notice dated November 29, 2021 from NHAI referred to WIPL pursuant to show cause notice dated November 26, 2021 received from Haryana State Pollution Control Board ("**HSPCB**") for action under Section 31-A of Air (Prevention and Control of Pollution) Act, 1981 and violation of direction issued by Central Pollution Control Board under Section 5 of Environmental (Protection) Act, 1986 due to non-implementation of proper dust control measures 1. NHAI, pursuant to the letter dated November 26, 2021 from HSPCB, requested WIPL by way of its letter dated December 24, 2021 to deposit Environmental Compensation of ₹ 20,00,000/- for violation of graded response action plan. WIPL responded to NHAI by way of its letter dated December 27, 2021 about the measures taken for control of dust emission. NHAI by way of its letter dated January 6, 2022 alleged that the compliance submitted by WIPL is not satisfactory, and requested for proper justification while directing WIPL to deposit environmental compensation of ₹ 20,00,000/-. WIPL by way of letter dated January 11, 2022 submitted a detailed justification and requested NHAI to relieve WIPL from the environmental compensation of ₹ 20,00,000/. The matter is still pending.

4. WIPL received a notice dated December 24, 2021 from NHAI in reference to the show cause notice dated December 10, 2021 issued by Haryana State Pollution Control Board to NHAI for environmental compensation of ₹ 20,00,000 due to C&D waste and garbage dumping on both sides of the highway since WIPL is bound to indemnify NHAI as per Article 42.1.1 of the concession agreement for WIPL. WIPL responded to NHAI by way of its letter dated December 27, 2021 and January 11, 2022 that WIPL has taken curative measures in accordance with graded response action plan issued by Central Pollution Control Board and thereby requested waiver of the environmental compensation of ₹ 20,00,000 levied by NHAI. The matter is still pending.

5. WIPL received a show cause notice dated November 15, 2022, by HSPCB (the "**SCN**") alleging that the air quality index maintained by WIPL is of poor quality due to appropriate measures not being undertaken by WIPL and requested WIPL to deposit an amount of ₹ 10,00,000 as environmental compensation. Further, NHAI vide its letter dated November 18, 2022 issued a letter to WIPL and directed to submit the comments/compliance report pursuant to the SCN. WIPL submitted a letter dated December 12, 2022 to the NHAI that appropriate measures are being implemented by WIPL to curb the pollution and requested NHAI to pursue HSPCB to relieve the environmental compensation of ₹ 10,00,000 imposed on WIPL. The matter is still pending.

6. SA Infrastructure Consultants Private Limited ("**SICPL**") *vide* its letter dated May 17, 2022 to NHAI alleged that WIPL will be liable to pay the damages on account of delays attributable to WIPL up to the provisional commercial operation date ("**PCOD**") and for the completion of punch list items and recommended to the NHAI for granting of extension of time ("**EOT**"). Further, SICPL vide its letter dated September 30, 2022, in reply to WIPL letter dated July 29, 2022, has recommended an additional EOT and alleged that WIPL is liable to pay damages for delay in completion of the punch list items. Thereafter, SICPL vide its letter dated October 13, 2022 has requested that there were certain calculation and typographical mistakes in their previous letter dated May 17, 2022 and recommended an interim EOT for completion of balance work for the non-provisional date of completion section, on account of force majeure event. Further, WIPL vide it letters dated October 21, 2022 and November 5, 2022 issued to SICPL, contested that the delay was not attributable to WIPL. Accordingly, SICPL vide its letter dated October 25, 20222 and November 12, 2022 reiterated that delay is attributable to WIPL and modified the EOT. Further, stated that only specific days delay is attributable to WIPL and balance delay is attributable to the force majeure event. Thereafter, WIPL vide its letter dated November 28, 2022 contested the SICPL's recommendation and requested for review. Further, SICPL vide its letter dated November 12, 2022 recommended for release of third tranche of equity support of ₹ 23,05,00,000 and alleged that damages of ₹ 11,82,26,160 for delay in completion of the punch list items to be recovered after review by the competent authority Again, WIPL *vide* its letter dated November 17, 2023 contested and requested SICPL to re-assess its recommendation and nullify the recovery of damages as the delay was not attributable to WIPL. NHAI *vide* its letter dated November 29, 2022 released the equity support amount of ₹ 22,58,90,000 net of tax and SICPL payment.

WRIPL

Proceedings against WRIPL

1. WRIPL as, on January 25, 2022, received a letter from PWD Maharashtra. The letter alleged that the royalty penalty imposed by Revenue Department in Pckg-91A claiming ₹ 10,89,600 though the order of the Tahsildar and Taluka Magistrate, Aarvi dated January 12, 2022 ("**Order**") wherein vehicles illegally carrying the murum sand have been confiscated at Mouja Karmabad on the Aarvi-Koundanypur road work and the said road work is in relation to WRIPL. Subsequently, WRIPL by way of its letter dated February 7, 2022 informed NHAI that its subcontractor, M/s Ajaydeep Infracon Pvt. Ltd. filed a writ petition before the High Court of Judicature of Bombay, Nagpur Bench (the "Bombay High Court") against Tahsildar Order. WRIPL has requested NHAI to not impose aforesaid penalty and await the decision of the Bombay High Court in this regard. The matter is currently pending.

CTHPL

Proceedings against CTHPL

2. CTHPL has, on March 26, 2022, received a letter from Aarvee Associates Architects Engineers & Consultants Pvt. Ltd. ("IE-1") alleging damages of ₹ 5,13,61,800 for delay in completion of punch list-A from November 23, 2021 to February 28, 2022. CTHPL by way of its letter dated March 29, 2022 contested the alleged damages and demonstrated its entitlement to extension of time for completion of punch list-A in accordance with the provisions of its concession agreement. Further, IE-1 by way of its letter dated May 6, 2022 and September 13, 2022 reassessed the damages days for non-completion of punch list items of ₹ 15,14,64,900 and withheld the said amount while releasing the payment to CTHPL towards the second annuity and second instalment of O&M payment. CTHPL responded to the withholding of the abovementioned amounts stating that the delay in completion of punch list items has not arisen due to events attributable to CTHPL by way of its letter dated September 29, 2022 and by way of letter dated October 20, 2022 requested IE-1 to release an amount of ₹ 15,14,64,900 from the payment of second annuity and the second instalment of O&M payment. Subsequently, IE-1 by way of its letter dated November 8, 2022, informed NHAI that since certain punch list items were delayed beyond the stipulated period of 90 (ninety) days for reasons not attributable to NHAI or force majeure. Further, IE-1 has assessed that, CTHPL is liable to pay the damages of ₹ 1,83,46,130 and damages of ₹ 15,14,64,900 may be suitably adjusted/released by NHAI. CTHPL by way of its letter dated November 9, 2022 requested IE-1 to reassess its recommendation and nullify the damages for delay in completion of punch list A items for the period from November 23, 2021 till March 21, 2022 as the same is not attributable to CTHPL. Further, IE-1 vide its letter dated June 29, 2023, to NHAI has opined that withheld amount of ₹ 1,83,46,130 may be release by NHAI at its discretion. Accordingly, CTHPL by way of its letter dated August 30, 2023, requested NHAI to release the aforesaid amount of ₹ 1,83,46,130. The matter is still pending.

IV. Litigation and Regulatory Actions against the Investment Manager, Project Manager and their Associates.

As at the date of this Draft Placement Memorandum, subject to the disclosures made in the section titled "*Legal and Other Information – Litigation and Regulatory Actions against the Sponsor (other than the Trust and its Associates, the Project SPVs, the Investment Manager and the Project Manager and their respective Associates)*" on page 280, there are no outstanding criminal litigation, non-ordinary course regulatory actions or material civil litigation against the Investment Manager, Project Manager and their Associates.

V. Litigation and Regulatory Actions against the Trustee

As at the date of this Draft Placement Memorandum, there are no material litigation or any outstanding criminal litigation or non-ordinary course regulatory actions against the Trustee.

Taxation Proceedings

The details of all outstanding tax disputes involving the Project SPVs and against the Trust, Sponsor, the Project Manager, the Investment Manager, their respective Associates and the Trustee, on the basis of abovementioned, are set forth below:

Name of the entity	Number of Proceedings	Tax Amount Involved (in ₹ lakhs)
Direct tax		
Trust	Nil	Nil
Sponsor	Nil	Nil
Investment Manager	Nil	Nil
Project Manager	Nil	Nil

Name of the entity	Number of Proceedings	Tax Amount Involved (in ₹ lakhs)
Associates of Sponsor / Project Manager / Investment Manager and the Sponsor Group	Nil	Nil
Project SPVs	4	5.78
Trustee	Nil	Nil
Indirect Tax		
Trust	Nil	Nil
Sponsor	Nil	Nil
Investment Manager	Nil	Nil
Project Manager	Nil	Nil
Associates of Sponsor / Project Manager / Investment Manager and the Sponsor Group	Nil	Nil
Project SPVs	23	27,200.53
Trustee	Nil	Nil

Note: Excludes amounts of penalty that may be determined on finalisation

SECURITIES MARKET OF INDIA

The information in this section has been extracted from documents available on the website of SEBI and the stock exchanges and has not been prepared or independently verified by the Parties to the Trust or the Placement Agents or any of their respective affiliates or advisors. The information below is given for the benefit of investors in the Offer. Investors are advised to make their independent investigations and ensure that they are eligible to subscribe to, purchase or otherwise acquire the Ordinary Units they Bid for under Indian laws or regulations.

The Indian Securities Market

India has a long history of organized securities trading. In 1875, the first stock exchange was established in Mumbai. The BSE and the NSE, together hold a dominant position among the stock exchanges in terms of the number of listed companies, market capitalisation and trading activity.

Stock Exchange Regulation

Indian stock exchanges are regulated primarily by SEBI, as well as by the Government acting through the Ministry of Finance, Capital Markets Division, under the Securities Contracts (Regulation) Act, 1956 ("**SCRA**") and the Securities Contracts (Regulation) Rules, 1957 ("**SCRR**"). SEBI, in exercise of its powers under the SCRA and the SEBI Act, notified the SCR (SECC) Regulations, which regulate *inter alia* the recognition, ownership and governance of stock exchanges and clearing corporations in India together with providing for minimum capitalisation requirements for stock exchanges. The SCRA, the SCRR and the SCR (SECC) Regulations along with various rules, bye-laws and regulations of the respective stock exchanges, regulate the recognition of stock exchanges, the qualifications for membership thereof and the manner, in which contracts are entered into, settled and enforced between members of the stock exchanges.

The SEBI Act empowers SEBI to regulate the Indian securities markets, including stock exchanges and intermediaries in the capital markets, promote and monitor self-regulatory organisations and prohibit fraudulent and unfair trade practices. Regulations concerning minimum disclosure requirements by public companies, rules and regulations concerning investor protection, insider trading, substantial acquisitions of shares and takeover of companies, buy-backs of securities, employee stock option schemes, stockbrokers, merchant bankers, underwriters, mutual funds, foreign portfolio investors, credit rating agencies and other capital market participants have been notified by the relevant regulatory authority.

Listing and Delisting of Units

The InvIT Regulations provide for listing and delisting of units of infrastructure investment trusts on the stock exchanges.

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. The NSE became the first exchange to grant approval to its members for providing internet-based trading services. Internet trading is possible on both the "equities" as well as the "derivatives" segments of the NSE.

Trading Hours

Trading on the NSE occurs from Monday to Friday, between 9:15 a.m. and 3:30 p.m. IST (excluding the 15 minutes pre-open session from 9:00 a.m. to 9:15 a.m. that has been introduced). The NSE is closed on public holidays. The recognised stock exchanges have been permitted to set their own trading hours (in the cash and equity derivatives segments) subject to certain conditions.

Trading Procedure

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 regulation of depositories in securities and for matters connected therewith or incidental thereto. Further, SEBI has 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.

SELLING AND TRANSFER RESTRICTIONS

The distribution of this Draft Placement Memorandum and the offer, sale or delivery of the Units is restricted by law in certain jurisdictions. Persons who may come into possession of this Draft Placement Memorandum are advised to consult with their own legal advisors as to what restrictions may be applicable to them and to observe such restrictions. This Draft Placement Memorandum may not be used for the purpose of an offer or invitation in any circumstances in which such offer or invitation is not authorized. Due to the following restrictions, investors are advised to consult legal counsel prior to purchasing Units or making any resale, pledge or transfer of the Units.

Each purchaser of the Units in this Issue will be deemed to have made acknowledgments and agreements as described under "Notice to Eligible Investors – Representations by the Eligible Investors" on page 2 of this Draft Placement Memorandum.

Republic of India

The Draft Placement Memorandum may not be distributed directly or indirectly in India or to residents of India and any Units may not be offered or sold directly or indirectly in India to, or for the account or benefit of, any resident of India except as permitted by applicable Indian laws and regulations, under which an offer is strictly on a private and confidential basis and is limited to Eligible Investors and is not an offer to the public. The Draft Placement Memorandum is neither a public issue nor a prospectus under the Companies Act, 2013 or an advertisement and should not be circulated to any person other than to whom this Issue is made. The Placement Memorandum and Final Placement Memorandum has not been and will not be registered as a prospectus with any Registrar of Companies in India.

No action has been taken or will be taken by the Trust, the Investment Manager or the Lead Managers that would permit a public offering of the Units to occur in any jurisdiction, or the possession, circulation or distribution of the Draft Placement Memorandum or any other material relating to the Trust or the Units in any jurisdiction where action for such purpose is required. Accordingly, the Units may not be offered or sold, directly or indirectly, and the Draft Placement Memorandum, any offering materials and any advertisements in connection with the offering of the Units may be distributed or published in or from any country or jurisdiction except under circumstances that will result in compliance with any applicable rules and regulations of any such country or jurisdiction. The Issue will be made in compliance with the applicable InvIT Regulations. Each purchaser of the Units in this Issue will be deemed to have made acknowledgments and agreements as described under "*Notice to Investors*" on page 1, "*Notice to Eligible Investors - Representations by the Eligible Investors*" on page 2 and these Selling and Transfer Restrictions.

United States

The Units offered hereby have not been and will not be registered with, or approved or disapproved by the SEC or any State securities commission in the U.S. or any other U.S. regulatory authority. Accordingly, the Units may not be offered, sold, resold or otherwise transferred within the U.S. or the territories or possessions thereof, except in a transaction exempt from the registration requirements of the Securities Act. The Units referred to in this Draft Placement Memorandum are being offered and sold in offshore transactions outside of the U.S. in compliance with Regulation S under the Securities Act to persons located in jurisdictions where such offer and sale of the Units is permitted under the laws of such jurisdictions. The offering to which this Draft Placement Memorandum relates is not, and under no circumstances is to be construed as, an offering of any Units for sale in the U.S. or as a solicitation therein of an offer to buy any of the said securities. Accordingly, you should not forward to transmit this Draft Placement Memorandum in or into the U.S. at any time. Furthermore, the foregoing authorities have not passed on or endorsed the merits of the offering or the accuracy or adequacy of this Draft Placement Memorandum. Any representation to the contrary is a criminal offense in the U.S.

Notice to Investors in certain other jurisdictions

The distribution of this Draft Placement Memorandum, the Placement Memorandum, the Final Placement Memorandum and the issue of the Units in certain jurisdictions may be restricted by law. As such, this Draft Placement Memorandum, the Placement Memorandum, the Final Placement Memorandum 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 authorised 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 Manager which would permit an issue of the Units in any jurisdiction other than India. Accordingly, the Units may not be offered or sold, directly or indirectly, and neither this Draft Placement Memorandum, the Placement Memorandum, the Final Placement Memorandum nor any Issue materials in connection with the Units be distributed or published in or from any country or jurisdiction that would require registration of the Units in such country or jurisdiction.

RIGHTS OF UNITHOLDERS

The rights and interests of Unitholders are included in this Draft Placement Memorandum and the InvIT Regulations. Under the Trust Deed and the Investment Management Agreement, these rights and interests are safeguarded by the Trustee and the Investment Manager, respectively. Any rights and interests of Unitholders as specified in this Draft Placement Memorandum would stand qualified by and deemed to be amended to the extent of any amendment to the InvIT Regulations.

Beneficial Interest

Each Unit represents an undivided beneficial interest in the Trust. The beneficial interest of each Unitholder shall be equal and limited to the proportion of the number of Units held by the Unitholder to the total number of Units. A Unitholder has no equitable or proprietary interest in the InvIT Assets and is not entitled to transfer of the InvIT Assets (or any part thereof) or any interest in the InvIT Assets (or any part thereof) of the Trust. A Unitholder's right is limited to the right to require due administration of the Trust in accordance with the provisions of the Trust Deed and the Investment Management Agreement.

Ranking

No Unitholder of the Trust shall enjoy superior voting or any other rights over another Unitholder. Further, the Units shall not have multiple classes. However, subordinate Units may be issued only to the Sponsor and its Associates, where such subordinate units carry only inferior voting or any other rights compared to other Units in the future in accordance with Regulation 4(2)(h) of the InvIT Regulations.

Redressal of grievances

The Investment Manager shall ensure adequate and timely redressal of all Unitholders' grievances pertaining to the activities of the Trust, and the Trustee shall periodically review the status of Unitholders' complaints and their redressal undertaken by the Investment Manager. The Investment Manager shall maintain records of the Unitholders' grievances and the actions taken thereon, including copies of correspondences made with the Unitholders.

Distribution

The Unitholders shall have the right to receive distribution in accordance with the InvIT Regulations and in the manner provided in this Draft Placement Memorandum. For details, please see the section titled "*Distributions*" on page 234.

Meeting of Unitholders

Meetings of Unitholders will be conducted in accordance with the InvIT Regulations.

Passing of resolutions

1. With respect to any matter requiring approval of the Unitholders:

   (i) a resolution shall be considered as passed when the votes cast by Unitholders, so entitled and voting, in favour of the resolution exceed a certain percentage as specified in the InvIT Regulations, of votes cast against;

   (ii) the voting may be done by postal ballot or electronic mode;

   (iii) a notice of not less than 21 days shall be provided to the Unitholders;

   (iv) voting by any Unitholder (including, the Sponsor in its capacity as a Unitholder), who is a related party in such transaction, as well as associates of such Unitholder(s) shall not be considered on the specific issue; and

   (v) the Investment Manager shall be responsible for all the activities pertaining to conducting of meeting of the Unitholder, subject to oversight by the Trustee. However, for issues pertaining to the Investment Manager, including a change in the Investment Manager, removal of Investment Manager or change in control of Investment Manager; the Trustee shall convene and handle all activities pertaining to conduct of the meetings. Additionally, for issues pertaining to the Trustee, including change in Trustee, the Trustee shall not be involved in any manner in the conduct of the meeting.

2. For the Trust:

   (i) an annual meeting of all Unitholders shall be held not less than once a year within 120 days from the end of each financial year and the time between two meetings shall not exceed 15 months;

   (ii) with respect to the annual meeting of Unitholders,

      a) any information that is required to be disclosed to the Unitholders and any issue that, in the ordinary course of business, may require approval of the Unitholders may be taken up in the meeting including:

- latest annual accounts and performance of the Trust;
- approval of auditors and fee of such auditors, as may be required;
- latest valuation reports;
- appointment of valuer, as may be required; and
- any other issue; and

b) for any issue taken up in such meetings which require approval from the Unitholders other than as specified in Regulation 22(6) of the InvIT Regulations and paragraph 4 below, votes cast in favour of the resolution shall be more than the votes cast against the resolution.

3. Notwithstanding generally of the foregoing, in case of the following, approval from the Unitholders shall be required where the votes cast in favour of the resolution shall be more than the votes cast against the resolution:

(i) any approval from the Unitholders required in terms of Regulation 18 (*Investment conditions and dividend policy)*, Regulation 19 (*Related Party Transactions*) and Regulation 21 *(Valuation of assets*) of the InvIT Regulations to the extent applicable;

(ii) any borrowings, in excess of the limits specified under Regulation 20(3) of the InvIT Regulations;

(iii) any transaction, other than any borrowing, the value of which is equal to or greater than 25% of the Trust Assets;

(iv) increasing period for compliance with investment conditions to one year in accordance with Regulation 18(5)(c) of the InvIT Regulations;

(v) any issue, in the ordinary course of business, which in the opinion of the Sponsor or the Trust or the Investment Manager, is material and requires approval of the Unitholders, if any;

(vi) de-classification of the status of the Sponsor; and

(vii) any issue for which SEBI or the designated stock exchange requires approval.

4. In case of the following, approval from the Unitholders shall be required where the votes cast in favour of the resolution shall not be less than one and a half times the votes cast against the resolution:

(i) any issue, not in the ordinary course of business, which in the opinion of the Sponsor or Investment Manager or the trustees of the Trust requires approval of the Unitholders;

(ii) any issue for which SEBI or the designated stock exchange requires approval;

(iii) any issue taken up on request of the Unitholders including:

a) removal of the Investment Manager and appointment of another investment manager to the Trust;

b) removal of the Auditors and appointment of another auditors to the Trust;

c) removal of the Valuer and appointment of another valuer to the Trust;

d) delisting of the Trust, if the Unitholders have sufficient reason to believe that such delisting would act in the interest of the Unitholders;

e) any issue which the Unitholders have sufficient reason to believe that is detrimental to the interest of the Unitholders; and

f) change in the Trustee, if Unitholders have sufficient reason to believe that acts of the Trustee are detrimental to the interest of Unitholders.

With respect to the rights of the Unitholders under clause 4(iii) above:

(i) save as set out in (iii) below, not less than 25% of the Unitholders by value, other than any party related to the transactions and its associates, shall apply, in writing, to the Trust for the purpose;

(ii) on receipt of such application, the Trust shall require, with the Investment Manager to place the issue for voting in the manner as specified in the InvIT Regulations; and

(iii) with respect to clause 4(iii)(f) above, not less than 60% of the Unitholders by value shall apply, in writing, to the Trust for the purpose.

(iv) any change in the Investment Manager including removal of the investment manager or change in control of the investment manager;

(v) any material change in investment strategy or any change in the management fees of the Trust; and

(vi) the Trustee and Investment Manager proposing to seek delisting of units of the Trust as per the InvIT Regulations.

Information rights

The Investment Manager, on behalf of the Trust, shall also submit such information to NSE and the Unitholders, on a periodical basis as may be required under the InvIT Regulations and the Listing Agreement to be entered into with NSE. The Investment Manager (on behalf of the Trust) shall disclose to NSE, the Unitholders and SEBI, all such information and in such manner as specified under the InvIT Regulations and such other requirements as may be specified by SEBI. The Investment Manager, on behalf of the Trust, shall also provide disclosures or reports specific to the sector or sub-sector in which the Trust has invested or proposes to invest, in the manner as may be specified by SEBI.

Nomination Rights

Unitholder holding minimum 10% of the Units shall have right to nominate one director on the board of Investment Manager.

Buyback of Units

Any buyback of Units shall be in accordance with the Trust Deed and the InvIT Regulations.

De-listing of Units

Any delisting of Units shall be in accordance with the Trust Deed and the InvIT Regulations.

DILUTION

Dilution is the amount by which the Issue Price exceeds the net asset value ("**NAV**") per Unit, immediately after the completion of this Issue. NAV per Unit is determined by subtracting the total liabilities of the Trust from the total assets of the Trust and dividing by the number of Units issued and outstanding immediately before this Issue. There was no *pro forma* NAV before this Issue for the Units.

The Trust will issue [●] Units at an Issue Price of ₹ [●] for each Unit, resulting in a combined NAV of the Trust of approximately ₹ [●] lakhs or ₹ [●] per Unit based on the total number of Units outstanding after the completion of this Issue. This represents an immediate dilution in combined NAV of approximately ₹ [●] per Unit to the Unitholders, subscribing in this Issue.

The following provides the per Unit dilution as on [●]:

Combined NAV per Unit before this Issue	Not applicable
Combined NAV per Unit after this Issue	[●]
Dilution in NAV per Unit to the Sponsor attributable to the Sponsor	[●]
Dilution in NAV per Unit to Unitholders (other than the Sponsor)	[●]
Dilution to Unitholders (other than the Sponsor) as a percentage of the Issue Price	[●]

ISSUE STRUCTURE

Initial offer through a private placement of up to [●] Units for cash at price of ₹ [●] per Unit, aggregating up to ₹ 1,90,000 lakhs by the Trust. In accordance with Regulation 14 of the InvIT Regulations, this Issue shall constitute at least [●] of the total outstanding Units on a post-Issue basis.

Particulars	Details
Number of Units available for Allotment/allocation	Up to [●] Units
Basis of Allotment/ allocation	Discretionary
Minimum Bid	Such number of Units that the Bid Amount is not less than ₹ 2,500 lakhs, and in multiples of [●] Units thereafter
Maximum Bid	Such number of Units (in multiples of [●] Units) not exceeding the size of this Issue, subject to applicable investment limits
Mode of Allotment	Compulsorily in dematerialised form
Bid Lot	A minimum of [●] Units, and in multiples of [●] Units thereafter
Allotment Lot	A minimum of [●] Units, and in multiples of [●] Units thereafter
Trading Lot[(1)]	Upon listing, such number of Units, the value of which is, or exceeds, ₹ [●] lakhs
Arrangements for Disposal of Odd Lots	The Stock Exchange will provide for an odd lot window to facilitate the trading of odd lots of Units that may be created from time to time on account of various events, including instances such as declaration of NAV and any distributions in respect of the Units
Who can apply	(i) Institutional Investors; and (ii) Bodies Corporate
Terms of Payment	Entire Bid Amount shall be payable along with the Application Form

(1) The trading lot post-listing of the Units may be modified in accordance with the InvIT Regulations and other applicable law.

In accordance with the InvIT Regulations, the maximum subscription from any investor other than the Sponsor, its related parties and its associates shall not be more than 25% of the total outstanding Units on a post-Issue basis. For details in relation to the lock-in of Units by Sponsor and Sponsor Group, please see the section titled "*Information Concerning the Units*" on page 221.

Indicative Issue Timeline

Event	Indicative Date
Bid/Issue Opening Date	[●]
Bidders to submit completed Application Forms	[●]
Bid/Issue Closing Date	[●]
Dispatch of CANs to successful Bidders	On or about [●]
Closing Date	On or about [●]
Designated Date	On or about [●]
Initiation of refunds, if any, in the event of any failure to obtain final listing and trading approval within 30 Working Days from the date of Allotment	On or about [●]
Listing Date	On or about [●]

The above timetable is indicative and does not constitute any obligation or liability on the Trust, the Investment Manager, the Trustee or the Lead Manager.

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 NSE is completed within 30 Working Days from the date of Allotment, the timetable may change due to various factors, such as, any extension of the Bid/Issue Period by the Investment Manager or any delay in receiving the final listing and trading approval from NSE. The commencement of trading of the Units will be entirely at the discretion of NSE and in accordance with applicable law.

ISSUE PROCEDURE

Below is a summary, intended to provide a general outline of the procedures for the bidding, application, payment, Allocation and Allotment of the Units to be offered pursuant to the Issue.

Eligible Investors are advised to inform themselves of any restrictions or limitations that may be applicable to them under applicable law to which they are subject, and should consult their respective advisors in this regard. Eligible Investors that apply in this Issue will be required to confirm, and will be deemed to have represented to the Trustee, the Investment Manager, the Lead Manager and their respective directors, officers, agents, affiliates and representatives, that they are eligible under all applicable laws, rules, regulations, guidelines and approvals to acquire the Units. The Investment Manager, the Sponsor and the Lead Manager and their respective directors, officers, agents, affiliates and representatives accept no responsibility or liability for advising any investor on whether such investor is eligible to acquire the Units.

Authority for the Issue

The Trust is making this Issue in accordance with Regulation 14(2) of the InvIT Regulations. The Issue was authorised and approved by the Board on December 27, 2023. The Board approved this Draft Placement Memorandum in its meeting dated December 27, 2023 and the InvIT Committee approved this Draft Placement Memorandum by way of a resolution dated January 5, 2024.

The Trust has received in-principle approval from the NSE, for listing of the Units on the NSE pursuant to a letter dated [●]. The Investment Manager has filed a copy of this Draft Placement Memorandum, and will file a copy of the Placement Memorandum and the Final Placement Memorandum with the SEBI and NSE, in compliance with the provisions of the InvIT Regulations.

Neither the Trust, Trustee, Project Manager, Investment Manager or any of its directors have been declared as 'Fraudulent Borrowers' by the lending banks or financial institution or consortium, in terms of RBI master circular dated July 1, 2016, as amended.

The Units have not been and will not be registered, listed or otherwise qualified in any 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 law of such jurisdiction. The Units shall not be offered or sold where such offer or sale would require registration, qualification or listing.

The Eligible Investors should note that Allotment to successful Bidders will only be in the dematerialised form. Application Forms which do not have the details of the Bidders' demat accounts including DP ID, PAN and Client ID will be treated as incomplete and rejected. Bidders will not have the option of receiving Allotment in physical form. On Allotment, the Units will be traded only on the dematerialized segment of NSE.

Issue Procedure

1. The Lead Manager, in consultation with the Investment Manager shall electronically or physically circulate serially numbered copies of the Placement Memorandum and the Application Form to Eligible Investors. The Application Form will be specifically addressed to each Eligible Investor. The list of Eligible Investors to whom the serially numbered copies of the Placement Memorandum and the Application Form will be circulated shall be determined by the Investment Manager, in consultation with the Lead Manager.

2. **Unless a serially numbered Placement Memorandum along with an Application Form is addressed to a particular Eligible Investor, no invitation 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 such person shall not be eligible to participate in the Issue.

3. Bidders may submit an Application Form to the Lead Manager only during the Bid/Issue Period and not later than the Bid/Issue Closing Date.

4. Bidders will be required, amongst other things, to indicate the following in the Application Form:

   (a) name of the Bidder to whom the Units are to be Allotted;

   (b) number of Units Bid for;

   (c) the details of the Bid Amount deposited by the Bidder into the Designated Account;

   (d) details of the demat accounts to which the Units should be credited;

   (e) a representation that such person is an "Institutional Investor" or a "Body Corporate" in terms of the InvIT Regulations;

(f) the details of Bidder's bank account along with fund transfer details, in case of any refund;

(g) that it is permitted to acquire the Units under the laws of any applicable jurisdiction and that it has necessary capacity and authority, and have obtained all necessary consents and authorisations to enable it to commit to this participation in the Issue and to perform its obligations in relation thereto (including, without limitation, on behalf of any person) and honour such obligations;

(h) it is eligible to invest in India and in the Units under applicable law, including the FEMA Rules, and has not been prohibited by the SEBI or any regulatory authority from buying, selling or dealing in units or securities; and

(i) any other information which may be relevant to the Bid.

Bids made by asset management companies or custodians of Mutual Funds, if permitted under applicable law, 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 and such Bids in respect of more than one scheme of the Mutual Fund will not be treated as multiple Bids provided that the Bids clearly indicate the scheme for which the Bid has been made. Bidders 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.

5. Each Bidder shall be required to make payment of the entire Bid Amount for the Units at the Issue Price, only through electronic transfer to the Designated Account during the Bid/Issue Period, along with the completed Application Form.

6. No payment shall be made by Bidders in cash. Please note that any payment of Bid Amount for Units shall be made from the bank account of the relevant Bidder applying for Units and the Lead Manager, on behalf of the Investment Manager, shall keep a record of the bank account from where such Bid Amounts have been received. The Bid 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 completed Application Form. Pending listing of the Units, all Bid Amounts received from Bidders shall be kept by in the Designated Account.

7. Once a duly completed Application Form is submitted by a Bidder on the basis of disclosures in the Placement Memorandum, such Application Form constitutes an irrevocable offer and cannot be withdrawn, subject to terms contained therein and the Placement Memorandum.

8. Upon receipt of the completed Application Form and the receipt of Bid Amount in the Designated Account, the Investment Manager shall, after Bid/Issue Closing Date, determine the number of the Units to be Allotted pursuant to the Issue, in consultation with the Lead Manager.

9. Upon determination of the Bidders to whom Allocation shall be made, the Lead Manager, on behalf of the Investment Manager, will send the CANs, along with serially numbered Final Placement Memorandums to the Bidders who have been Allocated Units. The dispatch of a CAN shall be deemed a valid, binding and irrevocable contract in respect of the number of Units Allocated to the Bidder. **Please note that the Allocation and Allotment will be at the absolute discretion of the Investment Manager, in consultation with the Lead Manager, and in accordance with the InvIT Regulations.**

10. Upon the dispatch of the CAN to successful Bidders, the Investment Manager shall Allot Units of the Trust as per the details in the CAN sent to the successful Bidders. The Investment Manager will intimate the Stock Exchange about the details of the Allotment and apply for approvals of the Units for listing and trading of the Units on the Stock Exchange after the credit of Units into the demat accounts of the successful Bidders.

11. Allottees are advised to instruct their respective Depository Participants' to accept the Units that may be Allotted to them pursuant to the Issue into their respective demat accounts.

12. In the event the Investment Manager is unable to Allot the Units or upon cancellation of the Issue, the Investment Manager shall be liable to refund the Bid Amounts with interest to the Bidders in accordance with applicable law. For each Bidder to whom any amounts are to be refunded, the refund shall be made to the same bank account from which the Bid Amount was remitted by such Bidder.

13. The Units that have been credited to the demat accounts of the Bidders shall be eligible for trading on the Stock Exchange only upon the receipt of final listing and trading approvals from the Stock Exchange. Bidders are advised to apprise themselves of the status of the receipt of the permissions from the Stock Exchange or the Investment Manager.

14. The Bid Amounts will be transferred to the account of the Trust from the Designated Account only after receipt of the final listing and trading approval for the Units from Stock Exchange.

Who can Bid?

Each Bidder should check if it is eligible to Bid under applicable law, including the FEMA Rules. Certain categories of Bidders may not be permitted to Bid in the Issue or hold Units in excess of the limits specified under applicable law.

Only Institutional Investors and Bodies Corporate are eligible to participate in the Issue.

An Institutional Investor is defined in Regulation 2(1)(ya) of the InvIT Regulations.

A Body Corporate is defined in Section 2(11) of the Companies Act, 2013 to include a company incorporated outside India, but does not include (i) a co-operative society registered under any law relating to co-operative societies; and (ii) any other body corporate (not being a company as defined in the Companies Act, 2013) which the Central Government may, by notification, specify in this regard.

Bodies Corporate incorporated outside India are permitted to participate in the Issue subject to compliance with Schedule VIII of the FEMA Rules.

All Non-Resident Investors should note that, in accordance with the Foreign Exchange Management (Non-debt Instruments) Rules, 2019, as amended, including Press Note No.3 (2020 Series), dated April 17, 2020 issued by the DPIIT, where the beneficial owner of a proposed investment into India is situated in or is a citizen of a country that shares land border with India (but is not a multilateral bank or fund of which India is a member), approval of the Government will be required prior to such investment.

The Trustee, the Valuer and the employees of the Valuer, who were involved in the valuation of the Project SPVs are not permitted to Bid in the Issue.

Bids by FPIs

Foreign Portfolio Investors (other than individuals, corporate bodies and family offices) are permitted to participate in the Issue subject to compliance with Schedule 8 of the FEMA Rules. In case of Bids by FPIs, the payment should be made as inward remittance from abroad through banking channels or out of funds held in NRE, SNRR or FCNR(B) accounts maintained in accordance with the Foreign Exchange Management (Deposit) Regulations, 2016, along with documentary evidence in support of the remittance. In case of Bids made by FPIs, a copy of the certificate of registration under the SEBI FPI Regulations is required to be attached with the Application Form. In case of Bids made by FPIs, a copy of the certificate of registration issued by the designated depository participant under the SEBI FPI Regulations is required to be attached along with the Application Form, failing which the Investment Manager, in consultation with the Lead Manager, reserves the right to reject the Bid.

Bids by SEBI registered VCFs and AIFs

The SEBI VCF Regulations prescribe, amongst others, the investment restrictions on VCFs registered with SEBI. Further, the SEBI AIF Regulations prescribe, amongst others, the investment restrictions on AIFs. Further, VCFs which have not re-registered as an AIF under the SEBI AIF Regulations shall continue to be regulated by the SEBI VCF Regulations until the existing fund or scheme managed by the fund is wound up and such funds shall not launch any new scheme after the notification of the SEBI AIF Regulations. VCFs and AIFs are subject to certain investment restrictions, including with respect to the percentage of investible funds held in each investee entity. Allotments made in respect of Bids by VCFs and AIFs in the Issue shall be subject to the rules and regulations that are applicable to each of them respectively.

Bids by Banking Companies

Bids may be made by banks, as permitted by the RBI, and are subject to the conditions specified in the Prudential Guidelines – Banks' investment in units of REITs and InvITs dated April 18, 2017. In case of Bids made by banking companies registered with the RBI, certified copies of (i) the certificate of registration issued by the RBI, and (ii) the approval of such banking company's investment committee are required to be attached to the Application Form. Failing this, any such Bid is liable to be rejected.

Bids by Provident Funds/Pension Funds

On March 2, 2015, the Ministry of Finance issued a notification allowing investments by non-government provident funds, pension funds, super-annuation funds and gratuity funds up to 5% in infrastructure investment trusts, as specified. On June 26, 2015, the Ministry of Labour and Employment issued a notification allowing investments by provident funds up to 5% in infrastructure investment trusts, as specified. The Pension Fund Regulatory and Development Authority issued circulars dated June 3, 2015, September 2, 2015, November 4, 2016 and May 4, 2017, respectively, allowing investments by national pension funds up to 5% in infrastructure investment trusts, as specified. However, such investments by provident funds and pension funds will be subject to, amongst others, the sponsor or in some cases the securities having a minimum of AA or equivalent rating from at least two credit rating agencies registered with SEBI. In case of Bids made by provident funds/ pension funds, subject to applicable law, with minimum corpus of ₹ 2,500 lakhs, a certified copy of certificate from a chartered accountant certifying the corpus of the provident fund/pension fund must be attached to the Application Form. Failing this, any such Bid is liable to be rejected.

Bids by NPS Schemes

The Pension Fund Regulatory and Development Authority issued circulars dated June 3, 2015 and September 2, 2015, respectively, allowing investments by national pension fund schemes ("**NPS Schemes**") up to 5% in infrastructure investment trusts, as specified. However, in accordance with the circular dated May 4, 2017 (effective from May 8, 2017), as amended by the circular dated May 8, 2018, issued by PFRDA, such investments by NPS Schemes will be subject to, amongst others, such securities having a minimum of 'A' or an equivalent rating in the applicable rating scale from at least two credit rating agencies registered with SEBI, subject to the maximum permissible amount of investments in securities rated between A- and AA. In case of Bids made by NPS Schemes, with minimum corpus of ₹ 2,50 lakhs, a certified copy of certificate from a chartered accountant certifying the corpus of the provident fund/pension fund must be attached to the Application Form. Failing this, any such Bid is liable to be rejected.

Bids by Mutual Funds

Bids may be made by mutual funds under all its schemes, existing and future, subject to the investment conditions and other restrictions prescribed under the Securities and Exchange Board of India (Mutual Funds) Regulations, 1996 (including, the circular on mutual funds dated February 28, 2017 and any other circulars, notifications and guidelines issued thereunder). In case of Bids made by Mutual Funds, a certified true copy of the issued by SEBI is required to be attached along with the Application Form, failing which the Investment Manager, in consultation with the Lead Managers, reserves the right to reject the Bid.

Bids by Eligible NRIs

In accordance with Schedule IV of the FEMA Rules, Eligible NRIs, including companies, trusts and partnership firms incorporated outside India which are owned and controlled by NRIs, are permitted to purchase units issued by an 'investment vehicle' without any limit, either on the stock exchange or outside it. The FEMA Rules define an 'investment vehicle' to mean an entity registered and regulated under the regulations framed by SEBI or any other authority designated for that purpose, including an InvIT governed by SEBI.

Investments by Eligible NRIs in the Units shall be on a non-repatriation basis, and shall be deemed to be domestic investment at par with investments made by residents of India.

Bids by Insurance Companies

Bids may be made by insurance companies as permitted by the Insurance Regulatory and Development Authority of India in terms of the Master Circular – Investments, 2016 and the circular issued by the IRDAI entitled, Investment in Units of Real Estate Investment Trusts (REIT) & Infrastructure Investment Trusts (InvIT) dated March 14, 2017.

Bids under Power of Attorney

In case of Bids made pursuant to a power of attorney by Institutional Investors or Bodies Corporate, a certified copy of the power of attorney or the relevant resolution or authority, as the case may be, along with a certified copy of the memorandum of association and articles of association and/or bye laws must be submitted along with the Application Form. Failing this, any such Bid is liable to be rejected.

The Investment Manager, in consultation with the Lead Manager, in its absolute discretion, reserves the right to relax the above condition of simultaneous lodging of the power of attorney along with the Application Form.

Allotments, if any, made to FVCIs in the Issue are subject to the respective rules and regulations that are applicable to each of them.

All Non-Resident Investors including Eligible NRIs and FPIs should note that refunds, dividends and other distributions, if any, will be payable in Indian Rupees only and net of bank charges and/or commission.

There is no reservation for NRIs, FPIs and FVCIs and all Bidders will be treated on the same basis with other categories for the purpose of allocation.

The Parties to the Trust and the Lead Manager are not liable for any amendment or modification or change to applicable law or regulations, which may occur after the date of the Placement Memorandum. Eligible Investors are advised to make their independent investigations and satisfy themselves that they are eligible to apply in the Issue. Eligible Investors are advised to ensure that any single application from them does not exceed the investment limits or maximum number of Units that can be held by them under applicable law or regulation or as specified in the Placement Memorandum.

Note: Affiliates or associates of the Lead Manager who are Eligible Investors may participate in the Issue in compliance with applicable law.

Maximum and Minimum Bid Size

(i) Each Bidder is required to Bid for a Minimum Bid Size of ₹2,500 lakhs and in multiples of [●] Units, thereafter.

(ii) No Bidder shall Bid for that number of Units which exceeds the Issue size.

Application Process

Application Form

Bidders shall only use the Application Forms provided by the Investment Manager for the purpose of making a Bid in terms of the Placement Memorandum.

A Bidder applying for the Units to be issued pursuant to the Issue must have at least one beneficiary account with a Depository Participant of either NSDL or CDSL prior to making the Bid. Allotment to a successful Bidder will be credited in electronic form directly to the beneficiary account (with the Depository Participant) of such Bidder.

By making a Bid for the Units through Application Forms, Bidders will be deemed to have made the following representations and warranties, respectively:

1. The Bidder confirms that it is an Institutional Investor or a Body Corporate, and is eligible to participate in the Issue;

2. The Bidder has deposited the Bid Amount in the Designated Account;

3. Subject to the terms of the Application Form and the Placement Memorandum and applicable law, the Bidder has no right to withdraw its Bid once such Bid is submitted to the Lead Manager;

4. The Bidder confirms that it is eligible to apply for, and hold, any Units that may be Allotted to the Bidder pursuant to the Issue. The Bidder further confirms that any such Allotment of Units to, and the holding of Units by, the Bidder does not, and shall not, exceed the level permissible as per any law applicable to the Bidder;

5. The Bidder understands and agrees that the Units offered hereby have not been registered with, or approved or disapproved by the SEC or any State securities commission in the U.S. or any other U.S. regulatory authority, and that the Units may not be offered, sold or resold or otherwise transferred within the U.S., except in a transaction exempt from the registration requirements of the Securities Act, and the Units are being offered and sold in an offshore transaction outside the U.S. in compliance with Regulation S to persons located in jurisdictions where such offer and sale of the Units is permitted under the laws of such jurisdiction. Accordingly, the Bidder confirms that it is outside the United States and it is purchasing the Units in an offshore transaction in reliance on Regulation S under the U.S. Securities Act.

6. The Bidder further confirms that no offer or sale of the Units is the result of any "directed selling efforts" in the United States (as such term is defined in Regulation S) and that Trust and the Lead Manager, and their respective affiliates and representatives (including legal counsels to each of the foregoing), will rely upon the truth and accuracy of the foregoing acknowledgements, representations, warranties and agreements and agree that, if at any time any of the acknowledgements, representations, warranties and agreements made in connection with the Units is no longer accurate, it shall immediately notify Trust and the Lead Manager in writing.

ELIGIBLE INVESTORS MUST PROVIDE THEIR DEMAT ACCOUNT DETAILS, THEIR DEPOSITORY PARTICIPANT'S NAME, DEPOSITORY PARTICIPANT IDENTIFICATION NUMBER, BENEFICIARY ACCOUNT NUMBER AND BANK ACCOUNT DETAILS 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 THE DEMAT ACCOUNT IS HELD.

Demographic details such as address and bank account details will be obtained from the Depositories as per the demat account details given in the Application Form.

Instructions for completing the Application Form

Bidders may note that forms not filled completely or correctly as per instructions provided in the Placement Memorandum and the Application Form are liable to be rejected. The Bids should adhere to the following:

(i) Bids must be made only in the prescribed application form;

(ii) Application Form must be completed in full, in BLOCK LETTERS in ENGLISH and in accordance with the instructions contained herein and in the Application Form. Incomplete Application Forms are liable to be rejected. Bidders must provide details of valid and active DP ID, Client ID and PAN clearly and without error. Invalid accounts, suspended accounts or where such account is classified as invalid or suspended shall not be considered for Allotment.

Bidders should note that the Lead Manager, Registrar and the Investment Manager will not be liable for errors in data entry due to incomplete or illegible Application Forms; and

(iii) Bidders are required to sign the Application Form. Bidders should ensure that the thumb impressions and signatures other than in the languages specified in the Eighth Schedule to the Constitution of India, are attested by a Magistrate or a Notary Public or a Special Executive Magistrate under official seal.

Submission of Application Form

All Application Forms must be duly completed with information including the name of the Bidder, the number of the Units applied for and the Bid Amount deposited in the Designated Account, and include details of the bank account from which payment of the Bid Amount was made as well as a confirmation of funds transfer. The Application Form shall be submitted to the Lead Manager either through electronic form or through physical delivery at the following address:

Axis Capital Limited
1st Floor, Axis House
C 2 Wadia International Centre
P. B. Marg, Worli
Mumbai 400 025
Maharashtra, India
Tel: +91 22 4325 2183
Email: nxt-infra.invit@axiscap.in
Contact person: Sagar Jatakiya/ Pavan Naik

The Lead Manager shall not be required to provide any written acknowledgement of the Application Form.

PAN

Each Eligible Investor must mention its PAN allotted under the IT Act. Each Eligible Investor is required to submit a copy of its PAN card along with the Application Form. Eligible Investors should not submit the general index registrar number ("**GIR**") instead of the PAN. Applications without this information will be considered incomplete and are liable to be rejected, except from Eligible Investors which are not required to hold a PAN under applicable law.

Bank Account for Payment of Bid Amount

The Investment Manager will open the Designated Account with [●], acting as the Escrow Collection Bank in terms of the arrangement among the Trust, the Investment Manager, the Lead Manager and the Escrow Collection Bank. Bidders are required to deposit the entire Bid Amount during the Bid/Issue Period, together with the completed Application Form, in favour of "[●]".

If the payment of the Bid Amount is not made favouring the Designated Account within the Bid/Issue Period, the Application Form of the Bidder is liable to be rejected.

The Trustee and the Investment Manager shall utilize the amount deposited in the Designated Account only for the purposes of: (i) adjustment against Allotment; or (ii) refund of application monies in case of any failure to allot Units in the Issue. For further details, please see the section titled "*Issue Procedure – Refunds*" on page 298.

Payment Instructions

The payment of Bid Amount shall be made by the Bidders in the name of the Designated Account as per the payment instructions provided in the Placement Memorandum and the Application Form. Payments are to be made only through electronic fund transfer. Payments through cheques or cash or any mode other than electronic mode shall be rejected.

Bidders' Demat Account and Bank Account Details

Bidders should note that on the basis of Bidders' PAN, DP ID and Client ID provided by them in the Application Form, the Registrar will obtain from the Depository the demographic details including the Bidders' address and bank account details (including the nine-digit Magnetic Ink Character Recognition ("**MICR**") code as appearing on a cheque leaf) (the "**Demographic Details**"), from the Depository. The Demographic Details will be used for giving refunds (including through direct credit, NACH, NECS, NEFT and RTGS) to the Bidders. It is mandatory to provide the bank account details in the space provided in the Application Form and Application Forms that do not contain such details are liable to be rejected. Hence, Bidders are advised to immediately update their bank account details, PAN and Demographic Details as appearing on the records of the Depository Participant and ensure that they are true and correct. Failure to do so could result in delays in credit of refunds to Bidders at their sole risk and none of the Lead Manager, Registrar, the Investment Manager or the Trustee will have any responsibility or undertake any liability for this. Accordingly, Bidders should carefully fill in their demat account details in the Application Form.

By signing the Application Form, the Bidder is deemed to have authorised the Depositories to provide to the Investment Manager and the Registrar, on request, the required Demographic Details as available in their records.

The Trustee, the Investment Manager or the Lead Manager will not be responsible or liable for the delay in the credit of the Units to be issued and transferred pursuant to the Issue due to errors in the Application Form, delay in payment of Bid Amount or otherwise on part of the Bidders.

Allocation

Build-up of the book

The Bidders shall submit their Bids for the Units within the Bid/Issue Period to the Lead Manager. The book shall be maintained by the Lead Manager.

Method of Allocation

The Investment Manager shall determine the Allocation in consultation with the Lead Manager on a discretionary basis. After finalization of the Allocation, the Investment Manager will update the Placement Memorandum with the Issue details and file the Final Placement Memorandum with SEBI and the Stock Exchange, and dispatch the CAN, together with a serially numbered Final Placement Memorandum to each successful Bidder.

THE DECISION OF THE INVESTMENT MANAGER, IN CONSULTATION WITH THE LEAD MANAGER, IN RESPECT OF ALLOCATION SHALL BE FINAL AND BINDING ON ALL BIDDERS. BIDDERS MAY NOTE THAT ALLOCATION OF THE UNITS IS AT THE SOLE AND ABSOLUTE DISCRETION OF THE INVESTMENT MANAGER, IN CONSULTATION WITH THE LEAD MANAGER, AND BIDDERS MAY NOT RECEIVE ANY ALLOCATION EVEN IF THEY HAVE SUBMITTED VALID APPLICATION FORMS. NEITHER THE INVESTMENT MANAGER NOR THE LEAD MANAGER ARE OBLIGED TO ASSIGN ANY REASON FOR ANY SUCH NON-ALLOCATION.

Confirmation of Allocation Note or CAN

Based on the Application Forms and Bid Amounts received from Bidders, the Investment Manager, in consultation with the Lead Manager, in their sole and absolute discretion, will decide the Bidders to whom the serially numbered CANs shall be sent, pursuant to which the details of Units Allocated to them shall be notified to such Bidders. Further, details of the amounts payable for Allotment of the Units in their respective names shall be notified to such Bidders. Additionally, the CAN will include the probable designated date, being the date of credit of the Units to the respective Bidder's demat account ("**Designated Date**").

Bidders, who have been Allocated Units, would also be sent a serially numbered Final Placement Memorandum either in electronic form or by physical delivery along with the serially numbered CAN. The dispatch of the serially numbered Final Placement Memorandum and the CAN to Bidders shall be deemed a valid, binding and irrevocable contract in respect of the number of Units Allocated to each successful Bidder.

Bidders are advised to instruct their Depository Participant to accept the Units that may be Allotted to them pursuant to the Issue.

Allotment of the Units

The Trustee and the Investment Manager will endeavour to complete the Allotment by the Closing Date.

In accordance with the InvIT Regulations, the Units will be issued and Allotment shall be made only in dematerialised form to the Allottees. The Investment Manager (on behalf of the Trust) and the Registrar have entered into:

(a) Agreement dated December 15, 2023 with NSDL; and

(b) Agreement dated December 22, 2023 with CDSL.

After the Bid/Issue Closing Date and the completion of the Formation Transactions, the Investment Manager will update the Placement Memorandum with the Issue details and file the Final Placement Memorandum with the SEBI and the Stock Exchange, within the timelines specified under applicable law.

Following the Allotment of Units, the Investment Manager will apply for final listing and trading approval from the Stock Exchange. The Investment Manager and the Lead Manager shall endeavour to list the Units on the Stock Exchange within 30 Working Days from date of Allotment.

Refunds

In the refunds are required to be made in accordance with Applicable Law, the Investment Manager shall be liable to refund the Bid Amounts with interest to the Bidders in accordance with applicable law. For each Bidder to whom any amounts are to

be refunded, the refund shall be made to the same bank account from which the Bid Amount was remitted by such Bidder. In the event of non-receipt of listing permission from the Stock Exchange, the Units shall not be eligible for listing. The Trust will ensure that refunds are made to the Bidders, along with interest at the rate of 15% per annum from the date of Allotment, in accordance with InvIT Regulations and other applicable law.

Other Instructions

Right to Reject Applications

The Investment Manager, in consultation with the Lead Manager, may reject Bids, in part or in full, without assigning any reason whatsoever. The decision of the Investment Manager and the Lead Manager in relation to the rejection of Bids shall be final and binding.

Units in Dematerialised form with NSDL or CDSL

The Allotment shall be only in dematerialised form (i.e., not in physical certificates but represented by the statement issued through the electronic mode).

A Bidder applying for the Units to be issued pursuant to the Issue must have at least one beneficiary account with a Depository Participant of either NSDL or CDSL prior to making the Bid. Allotment to a successful Bidder will be credited in electronic form directly to the beneficiary account (with the Depository Participant) of such Bidder.

Units in electronic form can be traded only on the stock exchanges having electronic connectivity with NSDL and CDSL. NSE has electronic connectivity with NSDL and CDSL. The trading of the Units would be in dematerialised form only for all Unitholders in the respective demat segment of NSE. For details in respect of the minimum trading lot, please see the section titled "*Issue Structure*" on page 291.

The Trustee, the Investment Manager or the Lead Manager, will not be responsible or liable for the delay in the credit of the Units to be issued and transferred pursuant to the Issue due to errors in the Application Form, delay in payment of Bid Amount or otherwise on part of the Bidders.

STATEMENT OF TAX BENEFITS

To
The Board of Directors
Walter Infra Manager Private Limited
(As Investment Manager of Nxt-Infra Trust)
Unit No. S-39, 2nd Floor, 'Vasant Square Mall' Plot No. A,
Community Centre, Pocket-V, Sector-B, Vasant Kunj,
New Delhi-110070

Dear Sirs,

Statement of Possible Tax Benefits available to Nxt-Infra Trust and its unitholders under the Indian Direct tax laws

1. We hereby confirm that the enclosed Annexure, prepared by Walter Infra Manager Private Limited ('the Investment Manager'), which states the possible direct tax benefits available to Nxt-Infra Trust and its unitholders under the Income-tax Act, 1961 ('the Act') as amended by the Finance Act 2023, read with Income tax Rules, 1962, i.e. applicable for the Financial Year 2023-24 relevant to the assessment year 2024-25 (referred to as 'the Direct Tax Law'). Several of these benefits are dependent on Nxt-Infra Trust or its unitholders fulfilling the conditions prescribed under the relevant provisions of the Direct Tax Law. Hence, the ability of Nxt-Infra Trust and / or its unitholders to derive the tax benefits is dependent upon their fulfilling such conditions, which based on business imperatives Nxt-Infra Trust faces in the future, Nxt-Infra Trust or its unitholders may or may not choose to fulfil.

2. The benefits discussed in the enclosed Annexure are not exhaustive and the preparation of the contents stated is the responsibility of the Investment Manager. We are informed that this statement is only intended to provide general information to the investors and is neither designed nor intended to be a substitute for professional tax advice. In view of the individual nature of the tax consequences and the changing Direct Tax Laws, each investor is advised to consult his or her own tax consultant with respect to the specific tax implications arising out of their participation in the proposed issue of units by Nxt-Infra Trust in accordance with the provisions of Securities Exchange Board of India ("SEBI") (Infrastructure Investment Trusts) Regulations, 2014, as amended and the guidelines an circulars issued thereunder (the ' Offering'). We are neither suggesting nor advising the investors to invest in the Offering relying on this Statement.

3. We do not express any opinion or provide any assurance as to whether:

   (i) Nxt-Infra Trust or its unitholders will obtain / continue to obtain these benefits in future;
   (ii) the conditions prescribed for availing the benefits have been / would be met with; and
   (iii) the revenue authorities/courts will concur with the views expressed herein.

   We assume no obligation to update the Annexure on any events subsequent to this date, which may have a material effect on the discussions herein.

4. The contents of the enclosed Annexure are based on information, explanations and representations obtained from Nxt-Infra Trust and the Investment Manager and on the basis of our understanding of the business activities and operations of Nxt-Infra Trust.

5. This Statement is prepared solely for the purpose of inclusion in the draft placement memorandum, placement memorandum and final placement memorandum in connection with the Offering, and is not to be used, referred to or distributed for any other purpose.

For S R B C & CO LLP
Chartered Accountants
ICAI Firm Registration Number: 324982E/E300003

per Suresh Yadav
Partner
Membership Number: 119878
UDIN: 23119878BGTCYG6255
Place of Signature: Mumbai
Date: December 29, 2023

ANNEXURE TO POSSIBLE TAX BENEFITS AVAILABLE TO NXT INFRA TRUST AND ITS UNITHOLDERS UNDER THE APPLICABLE LAWS IN INDIA

The information provided below sets out the possible tax benefits available to the Nxt-Infra Trust and its unitholders in a summary manner only based on provisions of Income-tax Act, 1961 ('Act') as amended by Finance Act 2023 read with income tax Rules, 1962, i.e. applicable for the Financial Year 2023-24 relevant to the assessment year 2024-25 (referred to as 'the Direct tax Law') and is not a complete analysis or listing of all potential tax consequences of purchase, ownership and disposal of 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 ability of the Nxt-Infra Trust or its unitholders to derive the tax benefits is dependent upon fulfilling conditions prescribed under the Act and SEBI regulations, which, based on the commercial imperatives, is at discretion of unitholders. Unitholders should Consult their own tax advisors concerning the India tax implications and consequences of purchasing, owning and disposing of units, including Tax implication on any distribution by/receipts from Nxt Infra Trust, in their particular situation. Further, the tax rates specified in this document are applicable for the Financial Year 2023-24 (i.e. Assessment Year 2024-25) as per the Finance Act, 2023.

1. Tax benefits available to Nxt Infra Trust under the Income-tax Act, 1961 (Act)

The following benefits are available to Nxt Infra Trust (hereinafter referred to as 'Trust') after fulfilling conditions as per the applicable provisions of the Act, the Direct Tax Law, and the guidelines prescribed by the Securities and Exchange Board of India (SEBI) i.e., Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended from time to time (SEBI Regulations).

1.1 Tax benefits in the hands of the Trust in respect of interest income and dividend income received/ `receivable from the underlying Special Purpose Vehicle(s) ('SPV Group'):

Interest and dividend received or receivable by the Trust from the SPV Group (being domestic Indian companies) shall be exempt from tax in case of receipt from special purpose vehicle as defined under section 10(23FC) of the Act. In this regard, the expression "special purpose vehicle" (SPV)as per explanation to section 10(23FC) 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.

Further, in view of the provisions of section 14A of the Act, any expenditure incurred in relation to earning the above exempt income shall not be tax deductible. In view of the same, the Trust has to identify the expenses which are attributable to interest and dividend income, which is claimed as exempt under section 10(23FC) of the Act. 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 Income-tax Rules, 1962 ('the Rules').

In addition, section 193 and section 194A(3)(xi) do not require a SPV to deduct tax at source ('TDS') in respect of interest paid or payable to the Trust.

In addition, second proviso to section 194 provides that no TDS is required to be deducted by a SPV in respect of dividend paid to the Trust.

1.2 Section 10(34A) of the Act Income from buy back of shares:

The provisions of section 115QA mandate domestic companies (SPVs) to pay an additional tax at the rate of 20% (plus applicable surcharge and cess) on buy-back of shares. Further, income arising from buy-back of shares shall not be taxable as per section 10(34A) of the Act in the hands of the shareholders. Accordingly, in case income arises in hands of the Trust from buy-back of shares undertaken by the SPV Group then such income shall be exempt in the hands of the Trust.

Also, in view of the provisions of section 14A of the Act, any expenditure incurred in relation to earning the above exempt income shall not be tax deductible in the hands of the trust. 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.

1.3 Section 115UA(2) read with section 111A and section 112/ 112A of the Act:

Subject to the provisions of section 111A and section 112 of the Act, the total chargeable income of a business trust other than income referred to in section 10(23FC) of the Act, shall be taxable at maximum marginal rate as per Section 115UA(2) of the Act. MMR is defined under section 2(29) 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.

Further, dividend and interest income earned by Trust from company other than SPV, shall be taxable at MMR. As per section 57 of the Act, no deduction shall be allowable against the dividend income (which is taxable in the hands of the Trust) other than deduction on account of interest expense incurred wholly and exclusively for the purpose of earning such

dividend and such interest expense shall not exceed 20% of the dividend income included in the total income for that year, without deduction under section 57 of the Act.

Further, section 112A is not explicitly mentioned in section 115UA(2) and hence an ambiguity exists on the tax rate to be applicable on the gains referred to in section 112A of the Act earned by the Trust.

In accordance with Section 2(29AA) read with section 2(42A) of the Act, the following assets on meeting the respective period of holding shall be classified as long-term capital asset otherwise the same shall be classified as short-term capital asset:

Sr.No	Type of asset	Period of Holding
1	Security (other than a unit) listed on a recognized stock exchange in India or unit of the Unit Trust of India or unit of an equity-oriented fund or zero- coupon bond	> 12 months
2	Shares of a company not being listed on a recognized stock exchange or an immovable property being land or building or both	> 24 months
3	Other assets including a unit of a mutual fund other than equity oriented mutual fund or unit of a business trust	> 36 months

As per section 50CA of the Act, where the consideration on transfer of unquoted shares of a company, is less than the fair market value of such share determined in such manner as may be prescribed, the value so determined shall for the purpose of section 48 of the Act, be deemed to the full value of consideration.

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 eligible business trust, transacted through a recognized stock exchange and subject to Securities Transaction Tax ('STT'), will be taxable at a concessional rate of 15% (plus applicable surcharge and cess if any).

However, as per second proviso to section 111A, the condition that the transaction is chargeable to STT is not required 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 paid or payable in foreign currency.

Short-term capital gains arising from transfer of short term capital asset other than the shares and securities covered under section 111A of the Act, will be taxed at MMR.

As per the provisions of section 112(1)(d) 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% (plus applicable surcharge and cess). As per proviso to section 112 where tax payable in respect of any income arising from the transfer of a long- term capital asset, being listed securities (other than a unit) or zero coupon bond, exceeds 10% of the amount of capital gains before giving effect to the provisions of the second proviso to section 48, then, such excess shall be ignored for the purpose of computing the tax payable by the taxpayer.

Further, as per section 112A, gains exceeding one lakh rupees arising on the transfer of long term capital asset, being an equity share in a company or a unit of an equity oriented fund or a unit of a business trust, transacted through a recognized stock exchange and subject to STT, shall be chargeable to tax in the hands of the business trust at the rate of 10.00% (plus applicable surcharge and cess) without applying the benefit under the first and second provisos to section 48 of the Act. The condition of STT shall not apply to a transaction undertaken on a recognized stock exchange located in any IFSC and where the consideration for such transaction is received or receivable in foreign currency

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 certain situations, in respect of long term capital gains, section 48 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 in respect of long term capital gains arising on listed bonds (other than specified bonds), debentures, listed equity shares in a company or units of equity oriented funds or units of a business trust referred to in section 112A of the Act

As per section 70 read with section 74 of the Act, short term capital loss arising during a year is allowed to be set-off against short term capital gains as well as long term capital gains. Balance loss, if any, shall be carried forward and set-off against any capital gains arising during subsequent eight assessment years.

Also, as per section 70 and 74 of the Act, long term capital loss arising during a year is allowed to be set-off only against long term capital gains. Balance loss, if any, shall be carried forward and set-off against long term capital gains arising during subsequent eight assessment years.

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. Tax benefits available to unit holders of Nxt Infra Trust under the Act

Following tax benefit is specifically available to the unitholders of the Trust subject to the fulfilment of the conditions specified in the Act and SEBI Regulations:

2.1 Section 10(23FD) of the Act - Tax exemption in respect of income distributed by the Trust:

As per the provisions of section 115UA(1) of the Act, the income distributed by the Trust shall be deemed to be of the same nature and in the same proportion in the hands of the unit holder as if such income was received by or accrued to Trust. Therefore, income taxable in the hands of unit holders shall be taxed in the same manner and nature as it would have been taxed in the hands of Trust.

As per the provisions of section 10(23FD), any income referred to in section 115UA(1) of the Act and distributed by the business trust shall not be included in the total income of the unit- holders except for the following income:

- Interest referred to in section 10(23FC); and
- Specified dividend i.e., dividend income received in cases where SPV has exercised the option under Section 115BAA of the Act.

Subject to fulfilment / compliance with certain conditions, SPV have an option to choose a concessional tax rate of 22 percent (plus applicable surcharge cess) under section 115BAA of the Act. In case, SPV has exercised the option under section 115BAA of the Act, any dividend distributed by the Trust out of the dividend paid by such SPV shall be taxable in the hands of unitholder at applicable tax rate for resident unitholders and at the rate of 20% (plus applicable surcharge and cess) for non-resident unitholders as per section 115A of the Act. In other cases, the dividend distributed by Trust out of the dividend paid by SPV which has not exercised the option under section 115BAA of the Act, shall be exempt in the hands of unitholders under section 10(23FD) of the Act.

Further, as per clause (iiac) of section 115A (1) of the Act read with section 194LBA of the Act, income in the nature of interest referred in section 10(23FC) shall be taxable in the hands of non-resident unitholders at the rate of 5% (subject to section 206AA and 206AB of the Act). The interest income would be taxable for resident unitholders at applicable tax rates.

In view of the provisions of section 14A of the Act, any expenditure incurred in relation to earning the above exempt income shall not be tax deductible. In case the Tax Authorities are not satisfied by the disallowance considered by the Trust, the quantum of disallowance shall be computed in accordance with the provisions of section 14A read with Rule 8D of the Rules.

As per section 57 of the Act, no deduction shall be allowable against the dividend income (which is taxable in the hands of the Trust) other than deduction on account of interest expense incurred wholly and exclusively for the purpose of earning such dividend and such interest expense shall not exceed 20% of the dividend income included in the total income for that year, without deduction under section 57 of the Act.

2.2 General benefit available to all unit holders of the Trust:

2.2.1 For resident and non-resident (other than FPI/FII) Unit-holder:

The Finance Act, 2023 has amended section 56(2) of the Act to add a new clause (xii) which provides that any distribution received by unitholders that is not covered under section 10(23FC) or 10(23FCA) of the Act and that which is not chargeable to tax under section 115UA(2) of the Act shall be charged to tax as 'income from other sources' provided such amount received (including similar distributions in earlier years to the same unitholder or any other unitholder) is in excess of the amount at which units are issued by the Trust, as reduced by the amount which would have been charged to tax earlier under this provision. Such income shall be chargeable to tax at the rates applicable based on the status of the unitholder.

Long-term capital gains:

Long Term Capital Gains (exceeding one lakh rupees) arising on transfer of units of the business trust, shall be chargeable to tax in the hands of the unit holders at a rate of 10.00% (plus applicable surcharge and cess) under section 112A of the Act (without giving effect to first and second proviso to section 48 of the Act) if the said units are long-term capital assets and transfer is through a recognized stock exchange and subject to STT. Income from transfer of units of the Trust, which is not undertaken on a recognized stock exchange and not subject to STT, shall be chargeable to tax at the rate of 20%, with indexation benefit (plus applicable surcharge and cess) under section 112 of the Act if the said units are long term capital assets. As per proviso to section 112 where tax payable in respect of any income arising from the transfer of a long- term capital asset, being listed securities (other than a unit) or zero coupon bond, exceeds 10% of the amount of capital gains before giving effect to the provisions of the second proviso to section 48, then, such excess shall be ignored for the purpose of computing the tax payable by the taxpayer.

The determinative period of holding for such units to qualify as long term capital asset is more than 36 months. Thus, where period of holding of such units is up to 36 months, the same shall qualify as short term capital asset.

In case of a Unit-holder 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.

Short-term capital gains:

Short-term capital gains arising on transfer of units of the Trust, which is not undertaken on a recognized stock exchange and which is not subject to STT, shall be chargeable to tax at applicable tax rates prescribed under the relevant Finance Act. Short-term capital gains arising on transfer of the units of the Trust will be chargeable to tax at the rate of 15% (plus applicable surcharge and cess) as per the provisions of section 111A of the Act provided such transaction is subject to STT.

In case of a resident unit holder 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.

Set-off of capital losses:

Short Term Capital Loss computed for the given year is allowed to be set-off against Short Term/ Long Term Capital Gains computed for the said year under section 70 of the Act. Balance loss, if any, as per section 74 of the Act, shall be carried forward and set-off against any capital gains arising during subsequent eight assessment years. Also, as per section 70 and 74 of the Act, long term capital loss arising during a year is allowed to be set-off only against long term capital gains. Balance loss, if any, shall be carried forward and set-off against long term capital gains arising during subsequent eight assessment years.

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.

As per the amendment made by the Finance Act, 2023, the amount of distribution to the extent not chargeable to tax under section 56(2)(xii) of the Act and not covered under sections 10(23FC), 10(23FCA) or 115UA(2) of the Act shall be reduced from the cost of units, for computing capital gains

Applicability of Minimum Alternate Tax (MAT) / Alternate Minimum Tax (AMT):

Where Unitholder is a 'domestic company':

In case the domestic company has opted for concessional tax regime under section 115BAA or 115BAB, then MAT provisions are not applicable to such domestic company. In case of domestic companies that are liable to pay MAT under provisions of Section 115JB of the Act, the gains arising, if any, on sale of units of Trust are to be included as part of book profits for the purpose of computing MAT liability. MAT paid by such companies should be available as credit for set-off against future tax liability.

Where Unitholder is a person 'other than company':

In case of unitholders, other than companies, that are liable to AMT under provisions of Section 115JC of the Act, the gains arising, if any, on sale of units of Trust 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 under section 115BAC or 115BAD of the Act.

Further, 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 section 592 of the Companies Act 1956 or section 380 of the Companies Act 2013.

2.2.2 For Unit Holders who are Foreign Portfolio Investors ('FPIs')/ Foreign Institutional Investors ('FIIs'):

In case of Foreign Institutional Investor or Foreign Portfolio Investor registered under SEBI (Foreign Portfolio Investors) Regulations 2014 ('FII/FPI'), as per section 2(14) of the Act, shares/ securities (other than those held as stock in trade) 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. Accordingly, any income from such transfer shall be deemed to be in the nature of capital gain.

Long-term capital gains:

Income arising on transfer of units of the Trust, which is not undertaken on a recognized stock exchange and not subject to STT, shall be chargeable to tax at 10%, without indexation benefit (plus applicable surcharge and cess) in accordance with section 115AD of the Act, if the said units qualify as long term capital assets. Further, as per section 115AD, in case of income arising from the transfer of a long-term capital asset referred to in section 112A, income-tax at the rate of ten per cent (plus applicable surcharge and cess) shall be calculated on such income exceeding INR 0.1m. The determinative period of holding for such units to qualify as long term capital asset is more than 36 months. Thus, for a period of holding of units up to 36 months, such units shall qualify as short term capital asset.

Short-term capital gain:

As per section 115AD, short-term capital gains arising on transfer of the units of the Trust will be chargeable to tax at the rate of 15% (plus applicable surcharge and cess) as per the provisions of section 111A of the Act. Short-term capital gains arising from transfer of units of the Trust, which is not undertaken on a recognized stock exchange and which is not subject to STT, shall be chargeable to tax @30% (plus applicable surcharge and cess) in accordance with section 115AD of the Act.

Set-off of capital losses:

Short Term Capital Loss computed for the given year is allowed to be set-off against Short Term/ Long Term Capital Gains computed for the said year under section 70 and 74 of the Act. Balance loss, if any, shall be carried forward and set-off against any capital gains arising during subsequent eight assessment years. Also, as per section 70 and 74 of the Act, long term capital loss arising during a year is allowed to be set-off only against long term capital gains. Balance loss, if any, shall be carried forward and set-off against long term capital gains arising during subsequent eight assessment years.

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.

Applicability of Minimum Alternate Tax:

As per the Explanation 4 to section 115JB, provisions of Minimum Alternate Tax shall not be applicable to any foreign company if:

(i) Such foreign company is a resident of country with which India has a DTAA and such foreign company does not have a permanent establishment in India; or

(ii) Such foreign company is a resident of country with which India does not have a DTAA and such foreign company is not required to seek registration under any law for the time being in force relating to companies.

Accordingly, provisions of MAT shall not apply to FPIs/ FIIs in case the above conditions hold true.

2.2.3 For unitholders who are Mutual Funds:

Under section 10(23D) of the IT 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 authorized 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.

As per section 196 of the IT Act, the business trust is not required to withhold tax on interest or dividend payment or any other payment to Mutual Fund set up under section 10(23D) of the IT Act.

2.2.4 Special tax benefits/ provisions applicable to Alternative Investment Fund (Category I and II)

1. Under section 10(23FBA) of the Act, any income of an investment fund other than the income chargeable under the head "Profits and gains of business or profession" is exempt from income tax.

2. As per section 115UB (4) of the Act, the total income of the investment fund shall be charged to tax:

a) at the rate or rates as specified in the Finance Act of the relevant year, where such fund is a company or a firm; or

b) at maximum marginal rate in any other case

3. The losses incurred by AIF shall be treated in accordance with the provisions of section 115UB(2) and 115UB(2A) of the Act.

2.2.5 Special tax benefits/ provisions applicable to certain specified person

As per section 10(23FE) of the Act, dividend, interest, income taxable under section 56(2)(xii) of the Act and long-term capital gains arising from investments made by 'specified person' in India, whether in the form of debt or share capital or unit, shall be exempt, if such investment is:

- made on or after the 01 April 2020 but on or before the 31 March 2024
- is held for at least 3 years
- inter alia, is in a business trust

Further, such specified person (subject to certain conditions prescribed in section 10(23FE) of the Act) shall include:

a) Wholly owned subsidiary of Abu Dhabi Investment Authority (ADIA) which is a resident of United Arab Emirates ('UAE') and makes investment directly or indirectly, out of funds owned by Government of UAE

b) Sovereign Wealth Funds (SWF)

c) Pension funds

2.2.6 For Unit-holders who are Venture Capital Companies ('VCC')/ Venture Capital Funds ('VCF'):

For VCF/VCC registered prior to 21May 2012

• Under Section 10(23FB) of the Act, any income from investment in a Venture Capital Undertaking ('VCU') arising to a VCC/ VCF (not being an investment fund specified in clause (a) of Explanation 1 to section 115UB) to whom a certificate of registration has been granted before 21 May 2012 under SEBI (Venture Capital Funds) Regulations, 1996, or as a subcategory of Category I Alternative Investment Fund ('AIF) as is regulated under SEBI (AIF Regulations), 2012 made 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 a VCC/ VCF would be taxable in the hands of the person making the 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 VCU.

For VCF/VCC registered post 21May 2012

• VCF/VCC registered post 21 May 2012 shall be classified as a Category 1 AIF which shall be governed by the SEBI (AIF) Regulations, 2012. For such fund, benefit of section 10(23FB) and section 115U shall not be applicable and the AIF shall be governed by section 115UB read with section 10(23FBA) and 10(23FBB) which states that business income earned by such AIF shall be taxable in the hands of the AIF 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 AIF and taxable in the hands of the unit holders.

• In respect of non-residents VCF/VCC, the tax rates and consequent taxation mentioned above will be further subject to any benefits available under the DTAA, if any, between India and the country in which the VCF/VCC has fiscal domicile. 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 VCF/VCC. Eligibility for DTAA benefit shall be subject to furnishing of relevant documents/ declarations viz. tax residency certificate, Form 10F, etc. by the non-resident VCF/VCC.

2.2.7 Benefits under 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.

Nature of income	**Rate of TDS**	
	Resident	**Non-resident**
Interest Income in the nature referred to in section 10(23FC)(a)	10%	5% (plus applicable surcharge and cess)
Dividend Income (only in cases where SPV opts for section 115BAA)	10%	10% (plus applicable surcharge and cess)

Further, no assurance can be provided that the treaty benefits should be available to the offshore unit holder or the terms of the tax treaty will not be subject to amendment or reinterpretation in the future. Also, the non- resident investor

will have to furnish a certificate of his being a tax resident in a country outside India and such other document as prescribed under the provision of section 90(4) to obtain the benefit of the applicable DTAA. Further, non-resident may also be required to furnish a suitable declaration stating that such non- resident does not have a fixed base/ permanent establishment in India.

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.

3. Tax Deduction at Source (TDS)[1]

3.1 Section 193, Section 194 and Section 194A – Certain income from remitted from SPVs to Trust

Section 193 and section 194A(3)(xi) do not require a SPV to deduct tax at source (TDS) in respect of interest paid or payable to the Trust. In addition, second proviso to section 194 provides that no TDS is required to be deducted by a SPV in respect of dividend paid to the Trust

3.2 Section 194LBA - Certain Income from Units of Trust:

As per section 194LBA of the Act, where the Trust distributes any income to its unit-holders, it is liable to deduct taxes at the time of credit of such payment to the account of the payee or at the time of payment thereof in cash or by the issue of a cheque or draft or by any other mode, whichever is earlier on the component of the distribution in the following manner:

As per section 194LBA(2A), if the SPV has not exercised the option of Section 115BAA of the Act, then no TDS is required to be deducted on the distribution of dividend by the Trust.

3.2 ***Other provision for tax deduction:***

No income tax is deductible at source from income by way of capital gains arising to a resident unitholder under the present provisions of the Act.

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 on income other than capital gains and interest income covered under section 194LD of the Act at the rate of 20% or the DTAA rates, whichever is lower, subject to the FPI/ FII furnishing a Tax Residency Certificate (referred to in Section 90(4) of the Act) 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.

Further, any distribution made by the Trust to Category I and Category II Alternative Investment Funds regulated under the Securities and Exchange Board of India (Alternative Investment Fund) Regulations, 2012, made under the Securities and Exchange Board of India Act, 1992 or under the International Financial Services Centres Authority Act, 2019 (for payments of the nature specified in section 10(23FBA) of the Act as per Notification No 51 / 2015 issued by Central Board of Direct Taxes) unitholders should not be subject to any withholding tax.

On certain distributions proposed to be considered as income for the unitholders, as per the amendment introduced in the Finance Act, 2023, it would be pertinent to note the Finance Act, 2023 has not introduced any separate withholding tax provisions with respect to such distributions. Accordingly, the Trust may not be required to withhold tax under section 195 of the Act.

Withholding at higher rate where PAN details are not furnished- section 206AA of the Act

As per section 206AA of the Act, where a taxpayer does not possess a PAN, taxes have to be withheld on payment of income to the taxpayer (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 20%

Further, CBDT has issued a notification no. 53/2016 for relaxation from deduction of tax at a higher rate under Section 206AA of the Act in the case of non-resident investor or a foreign company and not having PAN by inserting a new rule 37BC. The provisions of Section 206AA of the Act shall not apply in respect of payments in the nature of interest, royalty, fees for technical services and payments on transfer of any capital asset, if the deductee furnishes certain details and specified documents to the deductor. The Finance Act, 2021 had amended the aforesaid provision so as to provide that where the tax is required to be deducted under section 194Q of the Act and deductee has not furnished PAN to the deductor, then, the 5% should be considered as the rate for purpose of section 206AA of the Act and tax should be deducted accordingly. Please note that similar provisions are there under section 206CC of the Act in relation to TCS.

[1] *TDS rates mentioned in the given document may be subject to any concessions introduced/ allowed by the Government under any policy, press release, etc. Also, the same may also be subject to lower/ Nil withholding tax certificates which may be furnished by the unitholders*

Withholding at higher rate on non-filers of income tax return- section 206AB of the Act

The Finance Act, 2021 had introduced a new provision - section 206AB in the Act for deducting tax at higher rates on payments made to non-filers of income-tax returns. Section 206AB of the Act applies where any sum or income or amount is paid, or payable or credited, by a person to a specified person and tax is required to be deducted at source as per provisions of the Act (except under sections 192, 192A, 194B, 194BB, 194-IA, 194-IB, 194LBC, 194M or 194N of the Act). Specified person means a person who has not filed the return of income for the assessment year relevant to the previous year immediately preceding the financial year in which tax is required to be deducted for which time limit for furnishing return of income under section 139(1) of the Act has expired and the aggregate of TDS and TCS is INR 50,000 or more in the said previous year. Further, specified person shall not include a non-resident who does not have a permanent establishment in India or any other person who is not required to furnish return of income and is notified by the Government in this regard. In case the aforesaid section is applicable, tax shall be deducted at higher of the followings rates:

- twice the rate specified in the relevant provision of the Act; or
- twice the rate or rates in force; or
- the rate of 5%.

If provisions of section 206AA and section 206AB of the Act are applicable to a specified person, then, tax shall be deducted at higher of the two rates provided under the respective sections of the Act.

Please note that similar provisions are there under section 206CCA of the Act in relation to TCS.

4. Other applicable provisions

4.1. Section 94(1) of the Act:

As per section 94(1) of the Act, where any person owning securities sells or transfers the same or similar securities and buys back or reacquires those securities and the result of the transaction is that any interest becoming payable in respect of the securities is receivable otherwise than by such owner, the said interest, whether it would or would not have been chargeable to income-tax apart from the provisions of section 94(1) of the Act, would be deemed to be the income of the owner of the securities and not to be the income of any other person subject to certain specified conditions.

4.2 Section 94(2) of the Act:

As per section 94(2) of the Act, where any person has had at any time during any previous year any beneficial interest in any securities, and the result of any transaction relating to such securities or the income thereof is that, in respect of such securities within such year, either no income is received by him or the income received by him is less than the sum to which the income would have amounted if the income from such securities had accrued from day to day and been apportioned accordingly, then the income from such securities for such year shall be deemed to be the income of such person.

4.3 Section 94(7) of the Act (dividend stripping):

Vide Finance Act, 2022, the applicability of section 94(7) of the Act (dividend stripping) has been extended to the units of Trust as well (that with effect from Financial Year 2022-23) which provides that where:

(i) any person buys or acquires any securities or unit within a period of three months prior to the record date (Record date means a date fixed to entitle the holder of such securities or units to receive dividend, income, or additional securities or unit without consideration, as the case may be); and

(ii) 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; and

(iii) 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.

4.4 Section 94(8) of the IT Act (bonus stripping):

Vide Finance Act, 2022, the applicability of section 94(8) of the Act (bonus stripping) has been extended to the units of Trust as well (that with effect from Financial Year 2022-23) which provides that where:

(i) any person buys or acquires any securities or units within a period of three months prior to the record date (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); and

(ii) such person is allotted additional securities or units without any payment on the basis of holding of such securities or units on such record date; and

(iii) such person sells or transfers all or any of the securities or units within a period of nine months after the record date, while continuing to hold all or any of the additional securities or units referred in clause (ii) above,

then, the loss, if any, arising from the sale and purchase of all or any of the securities or 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 securities or units referred to in clause (ii) above as are held on the date of such sale or transfer.

4.5 Transaction not regarded as transfer under section 47(xvii) of the Act:

According to section 47(xvii) of the Act, any transfer of a capital asset, being share of a special purpose vehicle to a business trust in exchange of units allotted by that trust to the transferor shall not be regarded as transfer and accordingly not be liable to capital gains tax.

According to section 49(2AC) of the Act, the cost of units acquired in lieu of shares in SPV shall be deemed to be cost of acquisition of shares in SPV.

Further, as per clause (hc) of Explanation 1 of section 2(42A), for ascertaining the period of holding of such units, the period of holding of shares in SPV shall also be included.

Any notional gain or loss arising on transfer of shares of SPV to business trust in exchange of units allotted by the trust as referred under section 47(xvii) are to be excluded while calculating book profits for the purpose of MAT under section 115JB. Similarly, any notional gain or loss arising upon change in carrying amount of the units held by Unitholder are to be excluded in calculating book profits for the levy of MAT under section 115JB (clause (iie)/(fc) to explanation 1 to section 115JB).

Further, actual gain or loss on disposal of units held by the Unitholder as referred to in section 47 (xvii) are considered for the purpose of normal provisions of the Act and MAT under section 115JB by taking into account the cost of the shares exchanged with units referred to in the said clause or the carrying amount of the shares at the time of exchange where such shares are carried at a value other than the cost through statement of profit and loss, as the case may be (clause (iif)/(k) to explanation 1 to section 115JB).

However, if the Unitholder opts for concessional tax regime under section 115BAA / 115BAB then provisions of MAT under section 115JB shall not be applicable for the Unitholder and it shall forego its entire MAT credit available, if any, at the time of exercising concessional tax-regime.

5. General tax rates and provisions

5.1 The characterization of gains/ losses, arising from sale / transfer of units, as capital gains or business income would depend on the nature of holding in the hands of the unit holder and various other factors.

5.2 Where the gains arising on the transfer of the units of the Trust are included in the business income of an assessee assessable under the head "Profits and Gains from Business or Profession" and on which securities transaction tax has been charged, such securities transaction tax shall be a deductible expense from business income as per the provisions of section 36(1)(xv) of the Act.

5.3 The income-tax rates specified in this note are as applicable for the financial year 2023-24 (relevant to assessment year 2024-25), and are exclusive of surcharge and cess, if any. Rate of surcharge and cess are provided below:

<u>Surcharge:</u>

Domestic companies (other than companies who have opted for concessional tax regime under section 115BAA and 115BAB of the Act):

(i) If the total income does not exceed INR 100 Lakhs - Nil
(ii) If the total income exceeds INR 100 Lakhs but does not exceed INR 1000 Lakhs - 7 %
(iii) If the total income exceeds INR 1000 Lakhs - 12 %

Domestic companies (for companies who have opted for concessional tax regime under section 115BAA and 115BAB of the Act):

(i) At the rate of 10% on total income.

Foreign companies:
(i) If the total income does not exceed INR 100 Lakhs - Nil
(ii) If the total income exceeds INR 100 Lakhs but does not exceed INR 1000 Lakhs -2%
(iii) If the total income exceeds INR 1000 Lakhs -5%

For firms:
(i) If the total income does not exceed INR 100 Lakhs -Nil
(ii) If the total income exceeds INR 100 Lakhs -12 %

For individuals, Hindu Undivided Family ('HUF'), Association Of Person ('AOP') and Body Of Individual ('BOI') (including non-resident):

(i) If the total income does not exceed INR 50 Lakhs - Nil
(ii) If the total income exceeds INR 50 Lakhs but does not exceed INR 100 Lakhs -10%
(iii) If the total income exceeds INR 100 Lakhs but does not exceed INR 200 Lakhs -15%
(iv) If the total income (excluding dividend income or income under the provision of section 111A, section 112 and section 112A of the Act) exceeds INR 200 Lakhs but does not exceed INR 500 Lakhs -25%
(v) If the total income (excluding dividend income or income under the provision of section 111A, section 112 and section 112A of the Act) exceeds INR 500 Lakhs -37%
(vi) If total income is above 200 Lakhs (including dividend income or income under the provision of section 111A, section 112 and section 112A of the Act) but is not covered under (iv) and (v) above -15%

However, the applicable surcharge does not exceed 15% in case of dividend income or income under the provision of section 111A and section 112A of the Act included in such total income.

As per the Finance Act, 2023, in case of Individual/ HUF/ AOP (other than co-operative)/ BOI/ Artificial Juridical Person ('AJP') taxable under the New Regime prescribed under the Act, the surcharge on the amount income-tax shall not exceed 25% where taxable income exceeds INR 200 Lakhs

As per the Finance Act, 2023, in case of an AOP being a non-resident, and consisting of only companies as its members, surcharge shall be calculated at the rate of 10%, where the aggregate income exceeds INR 50 Lakhs but does not exceed INR 100 Lakhs; at the rate of 15%, where the aggregate income exceeds INR 100 Lakhs.

The above surcharge is subject to marginal tax benefit as per the Act.

Cess:

In all cases, Cess will be levied at the rate of 4 per cent of income-tax and surcharge.

5.5 Please note that the TDS rates mentioned in the given document may be subject to any concessions introduced/ allowed by the Government under any policy, press release, etc. Also, the same may also be subject to lower/ nil withholding tax certificates which may be furnished by the unit holders.

5.6 In respect of non-residents, the tax rates and the consequent taxation mentioned above shall be further subject to any benefits available under the applicable 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').

5.7 The tax implications/ benefits stated in this document are subject to General Anti Avoidance Rules (GAAR) provisions under the Act. GAAR may be invoked by the Indian income-tax authorities in case arrangements are found to be impermissible avoidance arrangements. Further, in case GAAR provisions are invoked, the onus to prove that the main purpose of an arrangement was not to obtain any tax benefit is on the taxpayer. Also, any resident or non-resident may approach the Authority for Advance Rulings to determine whether an arrangement can be regarded as an impermissible avoidance arrangement.

5.8 This statement does not discuss any tax consequences in the country outside India of an investment in the units of trust. The unit holders / investors in the country outside India are advised to consult their own professional advisors regarding possible Income tax consequences that apply to them.

5.9 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.

LEGAL MATTERS

Each of Cyril Amarchand Mangaldas and J Sagar Associates do not make, or purport to make, any statement in this Draft Placement Memorandum and are not aware of any statement in this Draft Placement Memorandum which purports to be based on a statement made by each of them, and make no representation, express or implied, regarding, and to the extent permitted by law take no responsibility for, any statement in or omission from this Draft Placement Memorandum.

INDEPENDENT ACCOUNTANTS

The Special Purpose Combined Financial Statements have been prepared in accordance with with Guidance Note on Reports in Company Prospectuses (Revised 2019), and the Guidance Note**s** using the recognition and measurement principles of Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 read with Section 133 of the Companies Act, 2013 ("**Ind AS**"), except Ind AS 33 earnings per share and other generally accepted accounting principles and other provisions relating to disclosures required as per of the InvIT Regulations and the SEBI Circular Financial Disclosures. The Special Purpose Combined Financial Statements included in this Draft Placement Memorandum have been audited by S R B C & Co LLP, Chartered Accountants, the statutory auditors of the Trust, as stated in their audit report dated December 29, 2023 included in this Draft Placement Memorandum.

MATERIAL CONTRACTS AND DOCUMENTS FOR INSPECTION

The following contracts, which are or may be deemed material have been entered or are to be entered into in due course. These contracts and also the documents for inspection referred to hereunder, may be inspected by the Eligible Investors at the office of the Trust at Mumbai, from 10:00 A.M. to 5:00 P.M., on all Working Days from the date of filing the Placement Memorandum until the date of listing of the Units pursuant to this Offer. Any of the contracts or documents mentioned in this Draft Placement Memorandum 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.

A. Material Contracts

1. The Trust Deed, between the Sponsor, Project Manager (acting as the settlor) and the Trustee, dated October 26, 2023;

2. The Investment Management Agreement, amongst the Trustee and the Investment Manager, dated October 26, 2023;

3. The Project Implementation and Management Agreement, amongst the Trustee, Investment Manager, Project Manager and the Project SPVs dated [●];

4. The securities purchase agreements dated [●], to be executed between the Trust (acting through the Trustee), the Investment Manager, the Sponsor, and the Project SPVs, in relation to the transfer of the equity shares of the Project SPVs.

5. The Placement Agreement entered into between the Trust (acting through the Trustee), the Investment Manager, the Sponsor, the Project Manager and the Lead Manager, dated January 5, 2024;

6. The Cash Escrow Agreement entered into between the Trust (acting through the Trustee), the Investment Manager, the Sponsor, the Lead Manager and the Escrow Collection Bank, /dated [●], 2024;

7. The concession agreement executed between CGRG and NHAI dated May 27, 2016.

8. The concession agreement executed between CTHPL and NHAI dated April 3, 2017.

9. The concession agreement executed between DME and NHAI dated March 4, 2016.

10. The concession agreement executed between GSY and NHAI dated May 27, 2016.

11. The concession agreement executed between WIPL and NHAI dated August 28, 2015.

12. The concession agreement executed between WRIPL and Principal Secretary, PWD – Government of Maharashtra ("PWD") dated January 10, 2019.

13. Trust Loan Agreement executed between the Trustee (on behalf of the Nxt-Infra Trust), the Investment Manager, and the Project SPVs dated [●].

14. The ROFR Agreement executed between the Sponsor, the Trustee (acting on behalf of the Trust) and the Investment Manager dated [●].

15. The Deed of Assignment executed between the Sponsor, the Trustee (acting on behalf of the Trust) and the Investment Manager dated [●].

16. The Securities Subscription and Purchase Agreement executed between Welspun Enterprises Limited, Actis Highway Infra Limited, Welspun Delhi Meerut Expressway Private Limited, Welspun Road Infra Private Limited, Welspun Infrafacility Private Limited, MBL (CGRG) Road Limited, MBL (GSY) Road Limited, Chikhali Tarsod Highways Private Limited dated June 9, 2022.

17. The Shareholders' Agreement executed between Welspun Enterprises Limited, Actis Highway Infra Limited and Welspun Infra Facility Private Limited dated December 22, 2022.

B. Material Documents

1. SEBI registration certificate for the Trust bearing number IN/INVIT/23-24/00028 dated November 8, 2023 as an infrastructure investment trust;

2. Board resolution of the Investment Manager dated December 27, 2023, authorising this Issue;

3. The resolutions of the Board dated December 27, 2023 and InvIT Committee dated January 5, 2024 approving this Draft Placement Memorandum;

4. Consents received from (i) Valuer; (ii) Technical Consultant; (iii) Traffic Consultant; (iv) Lead Manager to the Issue; (v) Legal adviser to the InvIT, Investment Manager and Sponsor, as to Indian law; (vi) Legal Advisor to the Lead Manager, as to India Law; (vii) Registrar; (viii) Compliance Officer; (ix) Trustee; (x) Sponsor; and (xi) Investment Manager;

5. Summary financial statements of the Sponsor for the period from March 24, 2022 to March 31, 2023;

6. Summary financial statements of the Investment Manager for the period from March 13, 2023 to June 30, 2023;

7. Special Purpose Combined Financial Statements along with the audit reports, dated December 29, 2023;

8. Projections of Revenue from Operations and Cash Flow from Operating Activities and the report thereon dated December 29, 2023;

9. Report on statement of tax benefits dated December 29, 2023;

10. Corporate governance polices of the Investment Manager;

11. In-principle listing approval dated [●] issued by NSE;

12. Tripartite Agreement dated December 15, 2023 among the Investment Manager (on behalf of the Trust), NSDL and the Registrar; and

13. Tripartite Agreement dated December 22, 2023 among the Investment Manager (on behalf of the Trust), CDSL and the Registrar.

Any of the contracts or documents mentioned in this Draft Placement Memorandum may be amended or modified at any time if so required in the interest of the Trust or if required by the other parties, without reference to the Unitholders, subject to compliance with applicable law.

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Draft Placement Memorandum is contrary to the provisions of the InvIT Regulations, the SCRA, the SEBI Act, or rules, regulations, and guidelines issued thereunder (as the case may be). We further certify that all the statements and disclosures in this Draft Placement Memorandum are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

SIGNED BY THE DIRECTOR OF THE INVESTMENT MANAGER

_____

Sumit Sen
Director

Date: January 5, 2024

Place: Mumbai

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Draft Placement Memorandum is contrary to the provisions of the InvIT Regulations, the SCRA, the SEBI Act, or rules, regulations, and guidelines issued thereunder (as the case may be). We further certify that all the statements and disclosures in this Draft Placement Memorandum are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

SIGNED BY THE DIRECTOR OF THE INVESTMENT MANAGER

_____

Ralf Nowack
Director

Date: January 5, 2024

Place: Mulheim an der Ruhr, Germany

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Draft Placement Memorandum is contrary to the provisions of the InvIT Regulations, the SCRA, the SEBI Act, or rules, regulations, and guidelines issued thereunder (as the case may be). We further certify that all the statements and disclosures in this Draft Placement Memorandum are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

SIGNED BY THE DIRECTOR OF THE INVESTMENT MANAGER

_____

Rakshit Jain
Director

Date: January 5, 2024

Place: Mumbai

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Draft Placement Memorandum is contrary to the provisions of the InvIT Regulations, the SCRA, the SEBI Act, or rules, regulations, and guidelines issued thereunder (as the case may be). We further certify that all the statements and disclosures in this Draft Placement Memorandum are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

SIGNED BY THE DIRECTOR OF THE INVESTMENT MANAGER

_____

Jyoti Davar
Independent Director

Date: January 5, 2024

Place: Delhi

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Draft Placement Memorandum is contrary to the provisions of the InvIT Regulations, the SCRA, the SEBI Act, or rules, regulations, and guidelines issued thereunder (as the case may be). We further certify that all the statements and disclosures in this Draft Placement Memorandum are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

SIGNED BY THE DIRECTOR OF THE INVESTMENT MANAGER

_____

Rajat Kumar Mishra
Independent Director

Date: January 5, 2024

Place: Delhi

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Draft Placement Memorandum is contrary to the provisions of the InvIT Regulations, the SCRA, the SEBI Act, or rules, regulations, and guidelines issued thereunder (as the case may be). We further certify that all the statements and disclosures in this Draft Placement Memorandum are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

SIGNED BY THE DIRECTOR OF THE INVESTMENT MANAGER

_____

Anil Kumar Chaudhary
Independent Director

Date: January 5, 2024

Place: New Delhi

DECLARATION

The Trustee (on behalf of the Trust) hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Draft Placement Memorandum is contrary to the provisions of the InvIT Regulations, the SCRA, the SEBI Act, or rules, regulations, and guidelines issued thereunder (as the case may be). We further certify that all the statements and disclosures in this Draft Placement Memorandum are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

SIGNED BY THE TRUSTEE (ON BEHALF OF THE TRUST)

For **CATALYST TRUSTEESHIP LIMITED**

_____

Date: January 5, 2024

Place: Mumbai

DECLARATION

Actis Highway Infra Limited hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Draft Placement Memorandum is contrary to the provisions of the InvIT Regulations, the SCRA, the SEBI Act, or rules, regulations, and guidelines issued thereunder (as the case may be). We further certify that all the statements and disclosures in this Draft Placement Memorandum are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

SIGNED BY THE DIRECTOR OF ACTIS HIGHWAY INFRA LIMITED

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Ravindranath Santosh Kumar Hazareesing
Director

Date: January 5, 2024

Place: Port Louis, Mauritius

DECLARATION

Actis Highway Infra Limited hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Draft Placement Memorandum is contrary to the provisions of the InvIT Regulations, the SCRA, the SEBI Act, or rules, regulations, and guidelines issued thereunder (as the case may be). We further certify that all the statements and disclosures in this Draft Placement Memorandum are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

SIGNED BY THE DIRECTOR OF ACTIS HIGHWAY INFRA LIMITED

_____

Kishore Sunil Banymandhub
Director

Date: January 5, 2024

Place: Port Lois, Mauritius

ANNEXURE I - PROJECTIONS OF REVENUE FROM OPERATIONS AND CASH FLOW FROM OPERATING ACTIVITIES

In this Draft Placement Memorandum, unless the context otherwise requires, a reference to "we", "us" and "our" refers to the Trust and the Project SPVs on a combined basis and as the context requires, WIPL. The Trust will own 49% equity interest in WIPL which holds the 8 laning of Mukarba Chowk – Panipat section of NH-1 (new NH-44) from km 15.500 to km 86.000 in the state of Haryana under NHDP-IV through PPP on toll basis pursuant to the WIPL Concession Agreement, and which is accounted for as an investee under the equity method of accounting. The interest of the Trust in WIPL is accounted for using the equity method in accordance with Ind AS 28, after initially being recognized at the net book value as at April 1, 2020. For details of accounting policies as required by Ind AS (read with Ind AS 28) relating to the accounting of WIPL as equity accounted investee, please refer to the sections titled "Presentation of Financial Data and Other Information" and "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results Of Operations and Cash Flows of the Project SPVs of the Trust" on pages 12 and 237 respectively.

In relation to WIPL, accounting in Special Purpose Combined Financial Statements is as per equity method as per Ind AS 28, hence, only 49% share of profit/ loss is picked up considering joint control. All numbers with respect to WIPL, including in relation to projections are considered only to the extent of 49% in the document.

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INDEPENDENT AUDITOR'S REPORT ON THE PROJECTIONS OF REVENUE FROM OPERATIONS AND CASH FLOW FROM OPERATING ACTIVITIES AND UNDERLYING ASSUMPTIONS

The Board of Directors
Walter Infra Manager Private Limited
(As an Investment Manager of NXT-Infra Trust)
Unit No. S-39, 2nd Floor, 'Vasant Square Mall' Plot No. A,
Community Centre, Pocket-V, Sector-B, Vasant Kunj,
New Delhi-110070

Dear Sirs,

1. We have examined the accompanying Statement of projections of revenue from operations and cash flow from operating activities and the underlying assumptions of Nxt-Infra Group (as defined below) which consists of NXT-Infra Trust ("Trust"),

    - Chikali-Tarsod Highways Private Limited ("CTHPL"),
    - Nxt-Infra CGRG Highways Limited (formerly known as MBL (CGRG) Road Limited ("CGRG"),
    - Nxt-Infra GSY Highways Limited (formerly known as MBL (GSY) Road Limited ("GSY"),
    - Welspun Delhi Meerut Expressway Private Limited ("DME")
    - Welspun Road Infra Private Limited ("WRIPL")

    (individually referred to as "SPV" and together referred to as "the SPV Group") and Welspun Infrafacility Private Limited (joint venture) ("Investment Entity" or "WIPL") (the Trust, SPV Group and Investment Entity hereinafter collectively referred to as the "Nxt-Infra Group") and each of Trust, CTHPL, CGRG, GSY, DME, WRIPL and WIPL for the years ending March 31, 2024, March 31, 2025 and March 31, 2026 along with the basis of preparation and other explanatory information and the significant assumptions (hereinafter referred to as "Statement of Projections") in accordance with the Standard on Assurance Engagement 3400, "The Examination of Prospective Financial Information", issued by the Institute of Chartered Accountants of India and the terms of our engagement agreed with you vide our engagement letter dated October 16, 2023 requesting us to carry out work on the projected information, proposed to be included in the Draft Placement Memorandum, Placement Memorandum and Final Placement Memorandum as required under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended from time to time, including the circulars, notifications, clarifications and guidelines issued thereunder ("InvIT Regulations") in connection with the proposed initial private placement of units of the Trust.

2. The preparation and presentation of Statement of Projections including the underlying assumptions and basis of preparation as set out in Note 2 and Note 3 to the Statement of Projections is the responsibility of the Investment Manager to the Trust and has been approved by the Board of Directors of the Investment Manager to the Trust. The Statement of Projections has been prepared by the Investment Manager using a set of assumptions that include hypothetical assumptions about future events, which are, by their nature subject to significant risks and uncertainties. Consequently, users are cautioned that these projections may not be appropriate or meaningful for any purpose other than described above.

3. Our responsibility is to examine the evidence supporting the assumptions (excluding hypothetical assumptions) and other information in the Statement of Projections on test basis. Our responsibility does not include verification of the accuracy of the Statement of Projections (including quantitative details). Therefore, we do not vouch for the accuracy of the same. The assumptions and estimates (including technical estimates) used for the preparation of the Statement of Projections have been provided to us by the Investment Manager to the Trust and have been relied upon by us.

4. We have examined the Statement of Projections taking into consideration:

   a. the terms of our engagement agreed with you as per our engagement letter requesting us to carry out work on the Statement of Projections, proposed to be included in the Draft Placement Memorandum, Placement Memorandum & Final Placement Memorandum; and

   b. Standard on Assurance Engagement 3400, "The Examination of Prospective Financial Information", issued by the Institute of Chartered Accountants of India.

5. Based on our examination of the evidence supporting the assumptions, nothing has come to our attention which causes us to believe that these assumptions do not provide a reasonable basis for the Statement of Projections. Further, in our opinion, the Statement of Projections, read together with the basis of preparation as set out in Note 2 to the Statement of Projections, is properly prepared on the basis of the assumptions as set out in Note 3 to the Statement of Projections and is on consistent basis with the accounting policies used for preparation of the historical Special Purpose Combined Financial Statements of the SPV Group and the Investment Entity and proposed to be included in the Draft Placement Memorandum, Placement Memorandum and Final Placement Memorandum which are prepared in accordance with Indian Accounting Standards prescribed under Section 133 of the Companies Act, 2013 read with the Companies (Indian Accounting Standards) Rules, 2015 except for Ind AS 33: Earning per share and in compliance with the requirements of Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended from time to time including the circulars notifications, clarifications and guidelines issued thereunder ('InvIT Regulations') and Guidance note on Combined and Carve-out Financial Statements issued by the Institute of Chartered accountants of India.

6. Events and circumstances frequently do not occur as expected. Even if the events anticipated under the hypothetical assumptions described in the Statement of Projections occur, actual results are still likely to be different from those stated in the Statement of Projections since other anticipated events frequently do not occur as expected and the variation may be material. The actual results may therefore differ materially from those forecasted and projected. For the reasons set out above, we do not express any opinion as to the possibility of achievement of the projections stated in the Statement of Projections.

7. This report is required by InvIT Regulations requiring the independent auditor to issue a report on the Statement of Projections and is issued for the sole purpose of the proposed initial private placement of units of the Trust under the InvIT Regulations. Our work has not been carried out in accordance with auditing or other standards and practices generally accepted in jurisdictions outside India, including in the United States of America, and accordingly should not be relied upon as if it had been carried out in accordance with those standards and practices. US securities regulations do not require profit forecasts to be reported on by a third party. This report should not be relied upon by prospective investors in the United States of America, including persons who

are Qualified Institutional Buyers as defined under Rule 144A under the United States Securities Act of 1933 participating in the offering. We accept no responsibility and deny any liability to any person who seeks to rely on this report and who may seek to make a claim in connection with any offering of securities on the basis that they had acted in reliance on such information under the protections afforded by United States of America law and regulation.

8. We have no responsibility to update our report for events and circumstances occurring after the date of the report.

9. This report is addressed to and is provided to Investment Manager solely for inclusion in the Draft Placement Memorandum, Placement Memorandum and Final Placement Memorandum in connection with the proposed initial private placement of the units of the Trust and is not to be used, referred to or distributed for any other purpose. Accordingly, we do not accept or assume any liability or any duty of care for any other purpose or to any other person to whom this report is shown or into whose hands it may come.

For S R B C & CO LLP
Chartered Accountants
Firm registration number: 324982E/E300003

per Suresh Yadav
Partner
Membership No.: 119878
UDIN: 23119878BGTCYF8401
Place: Mumbai
Date: December 29, 2023

Nxt-Infra Group

Statement of Projections of Revenue from Operations and Cash Flow from Operating activities

(All amounts are in rupees in lakhs unless otherwise stated)

Statement of projection of Revenue from Operations*

Particulars	For the year ended March 31, 2024	For the year ended March 31, 2025	For the year ended March 31, 2026
A. Combined projected revenue from operations			
Nxt-Infra Group	42,949.07	32,160.85	32,523.42
B. SPV wise projected revenue from operations			
Welspun Road Infra Private Limited (WRIPL)	2,550.71	6,627.00	1,164.34
Nxt-Infra CGRG Highways Limited (formerly known as MBL (CGRG) Road Limited (CGRG)	2,955.41	1,324.00	1,331.00
Chikhali- Tarsod Highways Private Limited (CTHPL)	3,877.48	1,451.00	1,391.00
Welspun Delhi Meerut Expressway Private Limited (DME)	1,149.32	907.20	4,662.20
Nxt-Infra GSY Highways Limited (formerly known as MBL (GSY) Road Limited) (GSY)	1,632.56	1,488.00	1,062.00
Welspun Infrafacility Private Limited (Refer Note 2 of Basis of preparation) (WIPL)	30,783.59	20,363.65	22,912.88
Nxt-Infra Trust	-	-	-

* Refer Note 3.1 for finance income on financial assets which are not included above as the same is disclosed as 'Other Income' in the special purpose combined financial statements of the SPV Group and Investment Entity.

Statement of projection of cash flow from operating activities

Particulars	For the year ended March 31, 2024	For the year ended March 31, 2025	For the year ended March 31, 2026
A. Combined projected cash flow from operating activities			
Nxt-Infra Group	45,174.46	34,754.60	45,008.95
B. SPV wise projected cash flow from operating activities			
Welspun Road Infra Private Limited (WRIPL)	6,665.46	488.08	10,328.23
Nxt-Infra CGRG Highways Limited (formerly known as MBL (CGRG) Road Limited (CGRG)	4,951.79	4,772.02	4,924.06
Chikhali- Tarsod Highways Private Limited (CTHPL)	4,981.28	4,156.48	4,442.01
Welspun Delhi Meerut Expressway Private Limited (DME)	3,303.63	2,798.89	(808.94)
Nxt-Infra GSY Highways Limited (formerly known as MBL (GSY) Road Limited) (GSY)	6,840.40	5,808.50	6,240.72
Welspun Infrafacility Private Limited (Refer Note 2 of Basis of preparation) (WIPL)	19,316.90	17,659.88	20,858.58
Nxt-Infra Trust	-	(885.00)	(929.25)

* Cash flow from operating activities are reported before taxes. Figures in bracket represents outflow.

The above statement should be read with basis of preparation and significant assumptions for these projections and other explanatory information.

For and on behalf of the Board of Directors of Walter Infra Manager Private Limited
(as an Investment Manager of Nxt-Infra Trust)

Rakshit Jain Director & CEO DIN: 06858141 Date – December 29, 2023	Sumit Sen Director DIN: 06734410 Date – December 29, 2023	Pratik Desai Company Secretary ICSI Membership no: ACS:30026 Date – December 29, 2023

Nxt-Infra Group

1. General information

Nxt-Infra Trust (the "Trust") was set up as a irrevocable infrastructure investment trust under the provisions of the Indian Trusts Act, 1882 via "Trust Deed" dated October 26,2023 between the Actis Highway Infra Limited (the "Sponsor") as the settlor and sponsor of the Trust and Catalyst Trustee Services Limited ("Trustee"). The Trust was registered under the Securities Exchange Board of India (Infrastructure Investment Trust) Regulations, 2014, as amended including circulars and guidelines issued thereunder ("**SEBI InvIT Regulations**") on November 08, 2023 having registration number IN/InvIT/23-24/0028. The Investment manager for the Trust is Walter Infra Manager Private Limited (the "Investment Manager" or the "Management"). The Trust is planning to acquire the following entities as per the Draft Placement Memorandum:-

1. Welspun Road Infra Private Limited (WRIPL)
2. Nxt-Infra CGRG Highways Limited (formerly known as MBL (CGRG) Road Limited (CGRG)
3. Chikhali- Tarsod Highways Private Limited (CTHPL)
4. Welspun Delhi Meerut Expressway Private Limited (DME)
5. Nxt-Infra GSY Highways Limited (formerly known as MBL (GSY) Road Limited) (GSY)

(individually referred to as "SPV" and together referred to as "SPV Group") and 6) Welspun Infrafacility Private Limited (WIPL or ' investment entity') (the Trust, SPV Group and Investment Entity together referred to as the "Nxt-Infra Group").

With respect to WIPL, the Trust will initially acquire 49% stake and the remaining 51% will be acquired upon completion of six months from the date of commercial operation date and after taking approval from NHAI as per the requirement of the concession agreement and NHAI circular no NH-24028/14/2014-H (Vol.II) dated November 27, 2020.

2. Basis of preparation of projections of revenue from operations and cash flow from operating activities

The projections of revenue from operations and cash flow from operating activities of the Nxt-Infra Group, Trust, each SPV and Investment Entity ("Projections") for the years ended 31st March 2024, 31st March 2025 and 31st March 2026 ("Projection period") have been prepared by the Investment Manager and approved by Board of Directors solely for inclusion in the Draft Placement Memorandum, Placement Memorandum and Final Placement Memorandum in connection with the private placement of the units of the Trust in accordance with the requirement of SEBI (Infrastructure Investment Trusts) Regulation, 2014, as amended and SEBI circular dated October 20, 2016 ('InvIT Regulations'). Therefore, the use of the Projections is not appropriate and should not be used or relied upon for any purpose other than described above.

The Projections are prepared based on the accounting policies for recognition and measurement used for preparation of the Special Purpose Combined Financial Statements of the SPV Group and Investment Entity in accordance with Indian Accounting Standards ("Ind AS") prescribed under Section 133 of the Companies Act, 2013 read with the Companies (Indian Accounting Standards) Rules, 2015 except for Ind AS 33: Earnings per share and in compliance with the requirements of the InvIT Regulations and the Guidance Note on Combined and Carve-out financial statements issued by the Institute of Chartered Accountants of India. The Projections only include the following information:

1. Projected revenue from operations and cash flow from operating activities for Nxt-Infra Group, the Trust, each SPV and Investment Entity for the financial years ended 31st March 2024, 31st March 2025 & 31st March 2026. The Projections for the year ended March 31, 2024 is based on the actual numbers for the six month period ended September 30, 2023 and the estimates for the period for the balance period from October 1, 2023 to March 31, 2024.
2. Basis and Notes to Projections
3. Significant assumptions underlying the Projections

Though the aforesaid Projections are prepared under the Ind-AS framework, they do not provide for all the detailed disclosures as required under Ind-AS.

Projected operating cash flows of the Nxt-Infra Group, Trust, each SPV and Investment Entity have been calculated using the direct method under Ind AS 7 – Statement of Cash Flows and is computed by deducting the projected operating expenses from the projected revenue from operations and adjusted for projected working capital changes and non-cash expenses (if any). Projected cash flow from operating activities do not include any items pertaining to financing or investing nature. Cash flows from operating activities are reported before taxes.

The Projections have been prepared based on the assumption that once the proposed private placement

of units of the Trust is complete, the Trust will acquire equity interest in the SPV Group and Investment Entity. As explained above, as the Trust will initially acquire 49% stake in the Investment Entity, the Investment Manager has assessed that there exists joint control on WIPL as per the Ind AS provisions and accordingly the same is accounted using the equity method in the special purpose combined financial statements of SPV Group and Investment Entity. Accordingly, the revenue from operations and cash flow from operating activities of the Investment Entity (WIPL) are not included in the aforesaid financial statements. However, in the Statement of Projections of revenue from operations and cash flow from operating activities above, it is included to the extent of existing equity stake of 49%.

The accounting year end of the Trust is March 31 of each year. Accordingly, the Projections are prepared for the years ending 31st March 2024, 31st March 2025 & 31st March 2026. However, the assumed date of acquisition of the SPV's by the Trust may be postponed and also considering that the consolidated financial statements of the Trust will be prepared by applying Ind AS 103 – Business Combination, the actual result in the first financial period of the Nxt-Infra Group as well as subsequent financial periods may be different from the projection period in the Projections.

The Projections are presented in INR which is also the functional currency of the Nxt-Infra Group. All values are rounded to the nearest lakhs rupees, unless otherwise stated.

The Projections contain forecasts and projections that relate to future events, which are,by their nature, subject to significant risks and uncertainties. The future events referred to involve risks, uncertainties and other factors which may cause the actual results or performance to be materially different from the Projections. Investors should therefore be aware that future events cannot be predicted with any certainty and there may be deviations from the figures projected in the Projections.

3. Significant assumptions for the Projections

The Projections have been prepared based on the significant assumptions summarized below. These are Investment Manager's best estimate assumptions and have been prepared by the Investment Manager solely for inclusion in the Draft Placement Memorandum, Placement Memorandum and Final Placement Memorandum in connection with the proposed Private Placement of Units of the Trust in accordance with the requirements of the InvIT Regulations. The Investment Manager considers the assumptions to be appropriate and reasonable as at the date of the report. However, the investors should consider these assumptions as well as the Projections and make their own assessment ofthe future performance of the Trust.

3.1 Revenue from Operations:

A) <u>SPV Group:</u>

SPV group constructs or upgrades infrastructure (construction) used to provide to public service and operates and maintains that infrastructure (operation service) for a specified period of time as per the concession agreement. Such arrangement consists of contracts on hybrid annuity Model (HAM) basis whereby the concessionaire provides unconditional right to receive fixed annuity after the construction period including interest thereon at prevailing bank rate plus 3% p.a. Revenue from operations of the SPV Group primarily consist of construction income, operation and maintenances (O&M) income and major maintenance income.

<u>Construction Income:</u>

All the SPVs have received Provisional Commercial Operation Date (PCOD) certificate from the respective authorities. As per concession agreement and PCOD issued to each SPV, the balance construction work has to be completed post PCOD once the work front is provided by the authority. Accordingly, the Investment Manager has estimated that the balance work will be completed in financial year 2023-24 as per their estimate.

<u>Operation and maintenance and major maintenance Income:</u>

This has been estimated after taking into considering operation and maintenances cost, major maintenance cost and other related cost expected to be incurred as per the O&M agreements and technical due diligence reports.

<u>Finance Income on financial assets (Other Income):</u>

SPV group has recognised a financial asset to the extent that it has an unconditional contractual right to receive fixed annuity including interest thereon as per the requirement of Appendix C to Ind AS 115 Service Concession

Arrangements whereby finance income is to be recognised on the financial assets based on effective interest rate. To determine effective interest rate, contractual inflow (milestone, annuity, interest on annuity, O&M, GST claim etc as specific in concession agreement and other communications with the authorities) and outflow (construction cost, O&M cost, major maintenance cost etc from technical due diligence report issued by independent technical consultants) for entire concession period are estimated.

In the special purpose combined financial statements, this is disclosed as part of 'Other Income' and accordingly the same is not included in the projected revenue from operations.

B) Investment Entity

The concession arrangement of the Investment Entity consists of design-build-operate-transfer (DBOT) contract to provide a public service whereby the concessionaire receives a right to charge users of the public service (i.e an intangible asset).

Revenue from operations for Investment Entity primarily comprises of revenue from toll operations which is recognized in the period of collection which generally coincide as and when the traffic passes through toll plazas. The same has been estimated based on the traffic study report provided by an independent agency. The tollable traffic growth rate has been considered at 4.79%, 9.31% and 8.43% and WPI rate has been considered at 5.02%, 5% and 5% for the years ended March 31, 2024, March 31, 2025 and March 31 2026 respectively. Further, Investment Manager has determination construction income / utility shifting income and change of scope income based on estimate of balance cost to be incurred as per the monthly progress report submitted to NHAI. This balance construction work / utility shifting and change of scope is expected to be completed during the year ended March 31, 2024.

C) Trust:

The Trust being only a holding entity of the SPV group and Investment Entity, revenue from operations for Trust have been assumed to be Nil over the Projection period.

The revenue projections as above cover only a period of 3 years.

3.2 Operating and maintenance cost

For the SPV's and the Investment entity, these mainly include routine operating, periodic / major maintenance, manpower costs and other operational expenses which are projected based on management assumptions and technical due diligence reports of the road assets provided by independent agencies. Further, it also includes project manager (PM) fees (which is allocated equally to all the SPV's) and is expected to be in line with Project implementation and management agreement to be executed.

The investment manager (IM) fees for the Trust is considered based on management estimates and is in line with Project implementation and management agreement executed between Investment Manager and the Trust.

3.3 Taxes

Direct taxes for SPVs and the Investment Entity:

The actual outflow on account of direct taxation would be dependent on various factors and hence, the cash flow from operating activities have been reported before taxes.

Indirect taxes:

GST on annuities, interest on annuities, O&M income etc have been considered at 18%.

3.4 Changes in Working Capital

For SPVs and Investment Entity:

We confirm that the changes in working capital are the difference in the net working capital amount from one accounting period to the next. Net working capital is defined as receivable under service concession (excluding change on account of interest annuity), current assets (financial / non-financial) and current liabilities (financial and non-financial), that are operating in nature.

For Nxt-Infra Group:

Changes in working capital for the Nxt-Infra Group over the Projection Period have been considered as the summation of the working capital changes in the SPVs and the Investment Entity during the Projection

Period.

For Trust:
Changes in working capital for the Trust has been considered as Nil during the Projection Period.

3.5 Other Assumptions

The Investment Manager has made the following additional assumptions in preparing the Projections:

i. The initial portfolio of Nxt Infra Group is assumed to remain unchanged throughout the Projection period. Further, the Projections have been prepared assuming the proposed InvIT structure from 1st April 2023. The actual structure shall come into existence after the Initial private placement of Units of the Trust which may be before 1st April 2024.

ii. No further assets are assumed to be acquired or no assets are assumed to be divested during the Projection period;

iii. No further capital is assumed to be raised during the Projection period;

iv. It is assumed that there will be no material change in taxation legislations or other applicable laws and regulations during the Projection period.

v. It is assumed that no outflows on account of any litigation related matters including current pending litigations / contingent liabilities is expected to become due during the Projection Period.

vi. It has been assumed that no liability or liquidated damages on account of default in concession agreement shall devolve upon the Trust / SPV Group / investment entity during the Projections Period.

vii. The relevant tax exemptions, tax remissions, and preferential tax treatments granted remain valid and applicable and that the terms and conditions thereto are complied with.

viii. The respective components of the Projections have been prepared using Ind AS standards and interpretations that are effective for the Ind AS financial statements for the year ended March 31, 2023. The Projections do not take into account the impact of any new Ind AS standard or interpretation not effective as at March 31, 2023. Ind AS standards or interpretations issued but not effective or not issued as at March 31, 2023 which may become effective during the Projections period mayhave an impact on the Projections and to that extent the actual figures may vary from the Projections;

ix. The Projections are based on assumptions and are subject to a number of factors. Investors should be aware that future events, including actual traffic growth rates (for investment entity), cannot be predicted with any certainty and there may be deviations from the figures projected in the Projections.

x. With respect to the investment entity, the Projections have been prepared based on the Traffic study Report provided by the independent agency. It includes most likely scenario for traffic volume growth rates, and no analysis has been performed to demonstrate the sensitivity of the Projections to changes in traffic volume growth rates or other assumptions.

xi. The Technical Due Diligence report and Traffic 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 the Investment Manager to the independent experts. There can be no assurance that the bases, estimates and assumptions adopted by the independent experts for the purposes of preparing the Technical Due Diligence report and Traffic Reports will prove to be accurate.

4. The combined cash flow from operating activities of the Nxt-Infra Group is derived by considering the following (in INR Lakhs):

Particulars	Year ended March 31, 2024	Year ended March 31, 2025	Year ended March 31, 2026
Revenue from operations*	**42,949.07**	**32,160.85**	**32,523.42**
Operating expenses^	409.51	(4,769.99)	(5,707.99)
Major maintenance expense	(134.39)	(4,692.76)	(3,725.35)
Changes in net working capital	1,950.27	12,056.50	21,918.87
Cash flow from operating activities	**45,174.46**	**34,754.60**	**45,008.95**

* Refer Note 3.1 for finance income on financial assets which are not included above as the same is disclosed as 'Other Income' in the special purpose combined financial statements of the SPV Group and Investment Entity.

^ Includes corporate social responsibility expenses

For and on behalf of the Board of Directors of Walter Infra Manager Private Limited
(as an Investment Manager to Nxt-Infra Trust)

Rakshit Jain Director & CEO DIN: 06858141 Date – December 29, 2023	Sumit Sen Director DIN: 06734410 Date – December 29, 2023	Pratik Desai Company Secretary ICSI Membership no: ACS:30026 Date – December 29, 2023

ANNEXURE II - SPECIAL PURPOSE COMBINED FINANCIAL STATEMENTS

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INDEPENDENT AUDITORS' REPORT

The Board of Directors
Walter Infra Manager Private Limited
(As Investment Manager of Nxt-Infra Trust)
Unit No. S-39, 2nd Floor, 'Vasant Square Mall' Plot No. A,
Community Centre, Pocket-V, Sector-B, Vasant Kunj,
New Delhi-110070

Report on the Audit of Special Purpose Combined Financial Statements

Opinion

We have audited the accompanying Special Purpose Combined Financial Statements comprising of :-

- Chikali-Tarsod Highways Private Limited,
- Nxt-Infra CGRG Highways Limited (formerly known as MBL (CGRG) Road Limited,
- Nxt-Infra GSY Highways Limited (formerly known as MBL (GSY) Road Limited,
- Welspun Delhi Meerut Expressway Private Limited and
- Welspun Road Infra Private Limited

(individually referred to as "SPV" and together referred to as "the SPV Group") and Welspun Infrafacility Private Limited (accounted using equity method) ("Investment Entity"), which comprise the Special Purpose Combined Balance Sheets as at September 30, 2023, March 31, 2023, March 31, 2022 and March 31, 2021, the Special Purpose Combined Statements of Profit and Loss (including Other Comprehensive Income), the Special Purpose Combined Statement of Changes in Equity, the Special Purpose Combined Cash Flow Statements for the six months period ended September 30, 2023 and for the years ended March 31, 2023, March 31, 2022 and March 31, 2021, the Combined Statement of Net Assets at Fair Value as at September 30, 2023, the Combined Statement of Total Returns at Fair Value for the six months period ended September 30, 2023 and year ended March 31, 2023 and notes to the special purpose combined financial statements including a summary of significant accounting policies and other explanatory information (collectively, the "Special Purpose Combined Financial Statements"). The Special Purpose Combined Financial Statement are prepared in connection with the proposed private placement of units to be issued by the NXT-Infra Trust ("Trust") as per Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended from time to time including the circulars notifications, clarifications and guidelines issued thereunder (the "SEBI InvIT Regulations").

The Special Purpose Combined Financial Statements have been prepared in accordance with the basis of preparation as set out in Note 2.1 to these Financial Statements.

In our opinion and to the best of our information and according to the explanations given to us and based on the consideration of reports of other auditors on separate financials statements of the SPVs and Investment Entity, the aforesaid Special Purpose Combined Financial Statements give a true and fair view in accordance with the basis of preparation as specified in Note 2.1 to the Special Purpose Combined Financial Statements in case of:

i. the combined balance sheet, of the state of affairs of the SPV Group and Investment Entity as at September 30, 2023, March 31, 2023, March 31, 2022 and March 31, 2021;
ii. the combined statement of profit and loss (including other comprehensive income) of the SPV Group and Investment Entity, of the profit for the six months period ended September 30, 2023, for the year ended March 31, 2023, March 31, 2022 and March 31, 2021;
iii. the combined statement of changes in equity, of the movement of the equity holders for the six months period ended September 30, 2023, for the year ended March 31, 2023, March 31, 2022 and March 31, 2021;
iv. the combined cash flow statement, of the cash movements of the SPV Group and Investment Entity for six months period ended September 30, 2023 and for the year ended March 31, 2023, March 31, 2022 and March 31, 2021;

v. the combined statement of net asset at fair value, of the net assets as at September 30, 2023; and
vi. the combined statement of total returns at fair values, of the total returns at fair values for the six months period ended September 30, 2023 and for the year ended March 31, 2023.

Basis of Opinion

We conducted our audit of the Special Purpose Combined Financial Statements in accordance with the Standards on Auditing (SAs) and other pronouncements issued by the Institute of Chartered Accountants of India (ICAI). Our responsibilities under those Standards are further described in the 'Auditor's Responsibilities for the Audit of the Special Purpose Combined Financial Statements' section of our report. We are independent of the SPV's and Investment Entity in accordance with the 'Code of Ethics' issued by the ICAI and we have fulfilled our other ethical responsibilities in accordance with the Code of Ethics. We believe that the audit evidence obtained by us is sufficient and appropriate to provide a reasonable basis for our audit opinion on the Special Purpose Combined Financial Statements.

Emphasis of matters

a. We draw attention to Note 2.1 of the Special Purpose Combined Financial Statements, which describes basis of preparation and presentation including the approach and the purpose for preparing them. The Special Purpose Combined Financial Statements have been prepared by the Investment Manager to meet the requirement of the SEBI InvIT Regulations. Consequently, the Special Purpose Combined Financial Statements may not necessarily be indicative of financial performance, financial position and cash flows of the SPV Group and Investment Entity that would have occurred if it had operated as a separate standalone group of entities during the periods presented.

   This Report is addressed to the Investment Manager solely for inclusion in the Draft Placement Memorandum, Placement Memorandum and Final Placement Memorandum in connection with the proposed initial private placement of units of Trust. As a result, the Special Purpose Combined Financial Statement may not be suitable for another purpose. Our report should not be used, referred to our distributed for any other purpose or to any party. Accordingly, we do not accept or assume any liability or any duty of care for any other purpose or to any other person to whom this report to shown or into whose hands it may come.

   The audit report of the SPV's and the Investment Entity on the special purpose interim financial statements as at and for the six months ended September 30, 2023 also include a similar emphasis of matter.

b. We draw attention to Note 35 of the Special Purpose Combined Financial Statements which describes certain adjustments as required under the SEBI InvIT Regulations to the general purpose audited financial statements of the SPV's and the Investment Entity for the years ended March 31, 2023, March 31, 2022 and March 31, 2021.

Our opinion is not modified in respect of the above matters.

Management's Responsibility for the Special Purpose Combined Financial Statements

The Board of Directors of the Investment Manager to the Trust are responsible for the preparation and presentation of these Special Purpose Combined Financial Statements that give a true and fair view of the combined financial position, combined financial performance including other comprehensive income, combined statement of changes in equity and combined cash flows, combined position of net assets at fair value and combined total return at fair value of the SPV Group and Investment Entity in accordance with the basis of preparation specified in Note 2.1 to the Special Purpose Combined Financial Statements.

The Board of Directors of the respective SPVs and Investment Entity and the Board of Directors of the Investment Manager are responsible for the maintenance of adequate accounting records in accordance with the provisions of the Companies Act, 2013 for safeguarding the assets of the SPV Group and Investment Entity and for preventing and detecting frauds and other irregularities; the selection and application of appropriate accounting policies; making judgements and estimates that are reasonable and prudent; and the design, implementation and maintenance of adequate internal financial controls, that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the Special Purpose Combined Financial Statements that give a true and fair view and are free from material misstatement, whether due to fraud or error, which have been used for the purpose of preparation of these Special Purpose Combined Financial Statements by the Investment Manager, as aforesaid.

In preparing the Special Purpose Combined Financial Statements, the Board of Directors of the respective SPVs, Investment Entity and Board of Directors of the Investment Manager are responsible for assessing the SPV's and Investment Entity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the SPV's and Investment Entity or to cease operations or has no realistic alternative but to do so.

The Board of Directors of the respective SPVs, Investment Entity and Board of Directors of the Investment Manager are also responsible for overseeing the financial reporting process.

Auditors' Responsibility for the audit of the Special Purpose Combined Financial Statements

Our objectives are to obtain reasonable assurance about whether the Special Purpose Combined Financial Statements as a whole 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 Special Purpose Combined Financial Statements.

As part of an audit in accordance with SAs and other pronouncements issued by ICAI, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the Special Purpose Combined Financial Statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal financial control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for expressing an opinion on the effectiveness of the SPV's and Investment Entity's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the SPV's and Investment Entity's ability to continue as going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the Special Purpose Combined Financial Statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the SPV's and Investment Entity to cease to continue as going concern.

- Evaluate the overall presentation, structure and content of the Special Purpose Combined Financial Statements, including the disclosures, and whether the Special Purpose Combined Financial Statements represent the underlying transactions and events in a manner that achieves fair presentation.

- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the SPV's and Investment Entity to express an opinion on the Special Purpose Combined Financial Statements. The SPV Group and Investment Entity included in the Special Purpose Combined Financial Statements have been audited by other auditors. Such other auditors remain responsible for the direction, supervision and performance of the audits carried out by them.
- We communicate with those charged with governance of the Investment Manager who are responsible for preparation of Special Purpose Combined Financial Statements, among other matters, the planned scope and timing of the audit and significant audit findings that we identify during our audit of these Special Purpose Combined Financial Statements.

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.

Other Matter

a) We did not audit the special purpose interim financial statements and other financial information in respect of 5 SPV's whose financial statements reflected total assets of Rs. 3,42,312.71 lakhs as at September 30, 2023 and total revenues of Rs. 3,981.65 lakhs and net cash outflows of Rs. (12,694.60) lakhs for the six months period ended September 30, 2023, included in the Special Purpose Combined Financial Statements.

The Special Purpose Combined Financial Statements also include the share of net loss accounted for using equity method of Rs. (1,178.84) lakhs for the six months period ended September 30, 2023, as considered in the Special Purpose Combined Financial Statements, in respect of the Investment Entity.

These interim financial statements and other financial information have been audited by the statutory auditors of those SPVs and Investment Entity for the six months period ended September 30, 2023, which financial statements, other information and auditors report have been furnished by Investment manager. Our opinion on the Special Purpose Combined Financial Statements, in so far as it relates to the amounts and disclosures included in respect of the above entities, is based solely on the reports of such other auditors.

b) We did not audit the financial statements and other financial information, as stated below:-

Particulars	March 31, 2023 (Rs in lakhs)	March 31, 2022 (Rs in lakhs)	March 31, 2021 (Rs in lakhs)
With respect to 5 SPV's:-			
Total assets	3,62,185.53	3,65,254.58	3,42,713.20
Total revenues	27,723.04	53,984.72	84,398.36
Net cash (outflows) / inflows	(1,930.75)	17,304.68	(2,235.78)
With respect to 1 Investment Entity:-			
Share of net profit / (loss) accounted for using equity method	(344.66)	55.85	(3.71)

The SPV's and the Investment Entity whose financial statements and other financial information for the above periods have been prepared in accordance with accounting principles generally accepted in India and which have been audited by other auditors under generally accepted auditing standards applicable in India. As stated in Note 35 of the Special Purpose Combined Financial Statements, certain adjustments have been made to the audited financial statements as required under SEBI InvIT Regulations, which have been audited by us. Our opinion in so far as it relates to the balances and affairs of such SPV's and Investment Entity are based on the report of other auditors and the adjustments prepared by the Investment Manager and audited by us.

Our opinion above on the Special Purpose Combined Financial Statements is not modified in respect of the above matters with respect to our reliance on the work done and the reports of the other auditors.

Report on Other Legal and Regulatory Requirements

As required by section 3.5.1(d) of SEBI Master Circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2023/115 dated 06 July 2023 ("SEBI Circular"), we report that:

a) We/the other auditors whose report we have relied upon have sought and have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit of the aforesaid Special Purpose Combined Financial Statements;

b) the Special Purpose Combined Balance Sheets, Special Purpose Combined Statements of Profit and Loss (including Other Comprehensive Income), Special Purpose Combined Statements of Changes in Equity and Special Purpose Combined Cash Flow Statements dealt with by this Report are in agreement with the books of account maintained for the purpose of preparation of the Special Purpose Combined Financial Statements;

c) In our opinion, the Special Purpose Combined Financial Statements comply with the basis of preparation as stated in Note 2.1 to the Special Purpose Combined Financial Statements.

For S R B C & CO LLP
Chartered Accountants
Firm registration number: 324982E/E300003

per Suresh Yadav
Partner
Membership No.: 119878
UDIN: 23119878BGTCYH3158
Place: Mumbai
Date: December 29, 2023

NXT- Infra Trust

Special Purpose Combined Balance Sheet
(All amounts in ₹ lakhs unless otherwise stated)

Particulars	Notes	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
ASSETS					
1. Non-current assets					
(a) Property, plant and equipment	3(a)	6.80	0.56	0.56	-
(b) Financial assets					
(i) Investment Accounted for using Equity Method	4	8,078.88	9,257.71	17,533.51	14,826.97
(ii) Receivable Under Service Concession Arrangements	5	1,88,112.04	1,95,422.07	2,00,282.92	1,37,351.27
(iii) Other financial assets	6	10,287.50	10,109.90	45.15	2,974.89
(iv) Loans	7	17,622.30	17,164.11	-	-
(c) Deferred tax assets (net)	32	7,790.84	6,733.38	150.72	818.99
(d) Non-current tax assets (net)	8	1,797.88	1,198.61	1,609.20	1,316.21
(e) Other non-current assets	9	9,670.04	10,567.30	57,755.64	1,22,817.99
Total Non current Assets		**2,43,366.28**	**2,50,453.64**	**2,77,377.70**	**2,80,106.32**
2. Current assets					
(a) Financial assets					
(i) Current investments	10	7,106.88	6,098.58	7,476.02	1,069.03
(ii) Trade receivables	11	12,161.11	4,878.37	6,801.54	18,354.29
(iii) Cash and cash equivalents	12	3,891.90	16,586.50	18,517.25	1,212.67
(iv) Bank balances other than (iii) above	13	11,724.52	6,977.52	3,974.63	25.28
(v) Receivable Under Service Concession Arrangements	14	56,486.40	53,604.44	73,995.95	22,252.23
(vi) Other financial assets	15	6.17	-	938.21	2,724.85
(b) Other current assets	16	7,569.45	10,120.87	11,137.80	26,155.04
Total current assets		**98,946.43**	**98,266.28**	**1,22,841.40**	**71,793.39**
Total assets		**3,42,312.71**	**3,48,719.92**	**4,00,219.10**	**3,51,899.71**
EQUITY AND LIABILITIES					
Equity					
(a) Equity share capital	17(a)	4,561.37	4,561.37	4,561.37	4,561.37
(b) Instruments in the nature of equity	17(b)	-	-	30,321.46	30,321.46
(c) Other equity	17(c)	8,778.35	15,407.35	49,165.02	38,113.26
Total Equity		**13,339.72**	**19,968.72**	**84,047.85**	**72,996.09**
LIABILITIES					
1. Non-current liabilities					
(a) Financial liabilities					
(i) Borrowings	18	2,93,013.77	2,98,940.60	2,23,468.40	2,08,915.33
(b) Provisions	19	25.46	-	-	-
(c) Deferred tax liabilities (net)	32	3,708.02	3,562.63	6,614.68	4,726.15
Total non-current liabilities		**2,96,747.25**	**3,02,503.23**	**2,30,083.08**	**2,13,641.48**
2. Current liabilities					
(a) Financial liabilities					
(i) Borrowings	20	24,822.73	18,356.17	42,462.11	43,075.41
(ii) Trade Payables	21	6,545.11	7,364.53	27,560.33	18,826.64
(iii) Other financial liabilities	22	3.11	0.83	0.83	136.47
(b) Provisions	23	0.40	-	-	-
(c) Other current liabilities	24	555.67	526.44	16,064.90	3,223.62
(d) Current tax liabilities (net)	25	298.72	-	-	-
Total current liabilities		**32,225.74**	**26,247.97**	**86,088.17**	**65,262.14**
Total equity and liabilities		**3,42,312.71**	**3,48,719.92**	**4,00,219.10**	**3,51,899.71**

The accompanying notes form an integral part of the special purpose combined financial statements and should be read in conjunction with the accompanying notes (1 - 44)

As per our report of even date
For S R B C & CO LLP
Chartered Accountants
ICAI Firm's Registration No :324982E/E300003

For and on behalf of the Board of Directors of
Walter Infra Manager Private Limited (As an Investment Manager to NXT - Infra Trust)

per Suresh Yadav
Partner
Membership No: 119878

Place: Mumbai
Date: December 29, 2023

Rakshit Jain
Director & CEO
DIN: 06858141

Sumit Sen
Director
DIN: 06734410

Pratik Desai
Company Secretary
ICSI Membership no. ACS:30026

Place: Mumbai
Date: December 27, 2023

NXT- Infra Trust

Special Purpose Combined Statement of Profit and Loss
(All amounts in ₹ lakhs unless otherwise stated)

Particulars	Notes	Six months period ended 30 September 2023	For the Year ended 31 March 2023	For the Year ended 31 March 2022	For the Year ended 31 March 2021
(I) Income					
Revenue from operations	26	3,981.65	24,898.35	52,504.51	63,840.23
Other Income	27	17,143.72	34,535.81	31,355.02	29,919.48
Total income		**21,125.37**	**59,434.16**	**83,859.53**	**93,759.71**
(II) Expenses					
Construction and Other Operating Expenses	28	2,787.12	25,489.77	52,293.64	69,814.35
Finance costs	29	15,247.09	21,814.95	19,551.44	19,031.68
Employee benefits costs	30	314.60	-	-	-
Depreciation	3(b)	2.00	-	-	-
Other expenses	31	844.47	837.21	1,073.69	1,186.88
Total expenses		**19,195.28**	**48,141.93**	**72,918.77**	**90,032.91**
(III) Profit before share of profit / (loss) of Joint Venture (I-II)		**1,930.09**	**11,292.23**	**10,940.76**	**3,726.80**
(IV) Share of profit / (loss) of Joint Venture (net of tax)	37	(1,178.84)	(1,396.69)	428.53	274.11
(V) Profit before Tax (IV+III)		**751.25**	**9,895.54**	**11,369.29**	**4,000.91**
(VI) Tax expense / (income)					
- Current tax	32	569.72	814.87	37.73	11.55
- Deferred tax expense / (income)	32	(910.99)	2,157.56	2,557.79	1,001.83
Tax expense / (income)		**(341.27)**	**2,972.43**	**2,595.52**	**1,013.38**
(VII) Profit for the period / year (V-VI)		**1,092.52**	**6,923.11**	**8,773.77**	**2,987.53**
(VIII) Other comprehensive income					
Items that will not be reclassified to profit or loss					
- Remeasurement loss on defined benefit plan		(2.37)	-	-	-
- Income tax effect on above		0.60	-	-	-
Other Comprehensive loss for the period		**(1.77)**	-	-	-
(IX) Total comprehensive income for the period / year(VII+VIII)		**1,090.75**	**6,923.11**	**8,773.77**	**2,987.53**
Earnings Per Unit	40				

The accompanying notes form an integral part of the special purpose combined financial statements and should be read in conjunction with the accompanying notes (1 - 44)

As per our report of even date

For S R B C & CO LLP
Chartered Accountants
ICAI Firm's Registration No :324982E/E300003

For and on behalf of the Board of Directors of
Walter Infra Manager Private Limited (As an Investment Manager to NXT - Infra Trust)

per Suresh Yadav
Partner
Membership No: 119878

Place: Mumbai
Date: December 29, 2023

Rakshit Jain
Director & CEO
DIN: 06858141

Sumit Sen
Director
DIN: 06734410

Pratik Desai
Company Secretary
ICSI Membership no. ACS:30026

Place: Mumbai
Date: December 27, 2023

NXT- Infra Trust

Special Purpose Combined Cash Flow Statement
(All amounts in ₹ lakhs unless otherwise stated)

Particulars	Six months period ended 30 September 2023	Year ended 31 March 2023	Year ended 31 March 2022	Year ended 31 March 2021
Cash flows from operating activities				
Net Profit before tax and Share of profit / (loss) of Joint Venture(net of tax)	751.25	9,895.54	11,369.29	4,000.91
Adjustments for				
Finance Income on financial assets carried at amortised cost	(15,607.19)	(32,718.29)	(30,945.12)	(26,079.25)
Finance cost	15,247.09	21,814.95	19,551.44	19,031.68
Share of profit / (loss) of Joint Venture(net of tax)	1,178.84	1,396.69	(428.53)	(274.11)
Interest Income on bank deposits and others	(864.92)	(560.42)	(115.61)	(24.67)
Interest income on loan given	(509.10)	(267.07)	-	-
Interest income on Financial assets measured at fair value through profit and loss ('FVTPL')	(140.58)	(543.15)	(52.18)	-
Net loss / (gain) on financial assets measured at fair value through profit and loss ('FVTPL')	(8.28)	130.49	(163.69)	16.80
Loss / (Gain) on sale of Investments	-	75.18	(28.85)	(135.49)
Liabilities Written back	-	(108.87)	-	-
Depreciation	2.00	-	-	-
Operating Profit before working capital changes	**49.11**	**(884.95)**	**(813.25)**	**(3,464.13)**
Decrease/ (Increase) in Service Concession and Trade Receivables	1,058.51	30,744.97	(10,178.80)	14,736.83
Decrease/ (Increase) in other non-current assets	902.26	1,593.34	1,533.63	(16,642.33)
Decrease/ (Increase) in other financial assets	(11.41)	873.47	1,775.77	(2,403.28)
Decrease/ (Increase) in other current assets	2,551.43	1,017.08	1,490.89	(9,965.84)
Increase/(Decrease) in trade and other payables	(819.42)	(20,086.92)	8,733.68	(30,749.53)
Increase/(Decrease) in other current liabilities	29.24	(15,538.46)	12,841.28	(9,503.22)
Increase/(Decrease) in other financial liabilities	2.29	-	(135.65)	(1,279.35)
Increase/(Decrease) in provisions	25.97	-	-	-
Cash flow from/(used in) operating activities	**3,787.98**	**(2,281.47)**	**15,247.55**	**(59,270.85)**
Tax paid / refund received (net)	(869.35)	(404.48)	(330.39)	1,362.70
Net cash flow from/(used in) operating activities (A)	**2,918.63**	**(2,685.95)**	**14,917.16**	**(57,908.15)**
Cash flows from investing activities				
Purchase of Property, plant and equipment	(8.24)	-	-	-
Loans given (Refer Note 37)	-	(16,923.75)	-	-
Proceeds from / (investment in) fixed deposits (net)	(4,924.50)	(12,919.47)	(973.89)	(2,902.08)
Proceeds from sale of current investments	-	12,608.40	4,881.10	10,003.55
Purchase of current investments	(1,000.00)	(11,481.24)	(11,084.74)	(7,744.38)
Interest Income on bank deposits and others	916.27	477.59	115.37	25.09
Interest income on Financial assets measured at fair value through profit and loss ('FVTPL')	140.58	543.15	35.49	-
Interest Annuity Received	11,692.76	29,148.85	15,059.21	3,974.88
Net cash flow from/ (used in) investing activities (B)	**6,816.87**	**1,453.53**	**8,032.54**	**3,357.06**
Cash flows from financing activities				
Proceeds from long term borrowings	-	2,07,025.17	2,58,734.58	1,09,318.93
Repayment of long term borrowing	(5,983.63)	(2,19,190.98)	(2,42,087.56)	(47,409.54)
Proceeds from short term borrowings	1,158.31	6,951.14	9,280.49	39,341.76
Repayment of short term borrowings	(16.37)	(20,974.34)	(12,993.78)	(34,544.88)
Proceeds from issue of optionally convertible debentures	-	91,907.93	-	-
Redemption of optionally convertible debentures	-	(16,830.60)	-	-
Proceeds from issue of compulsorily convertible debentures	-	-	-	6,333.00
Repayment towards compulsorily convertible debentures	-	(30,321.44)	-	-
Interim Dividend paid	(7,719.75)	-	-	-
Finance cost paid	(9,868.66)	(19,265.21)	(18,578.85)	(20,723.96)
Net cash flow from/ (used in) financing activities (C)	**(22,430.10)**	**(698.33)**	**(5,645.12)**	**52,315.31**
Net increase/(decrease) in cash and cash equivalents (A+B+C)	**(12,694.60)**	**(1,930.75)**	**17,304.58**	**(2,235.78)**
Cash and cash equivalents at the beginning of the year	16,586.50	18,517.25	1,212.67	3,448.45
Cash and cash equivalents at the end of the year	**3,891.90**	**16,586.50**	**18,517.25**	**1,212.67**
Components of cash and cash equivalents as per special purpose combined balance sheet				
Cash and cash equivalent (Refer note 12)	3,891.90	16,586.50	18,517.25	1,212.67
Total cash and cash equivalents	**3,891.90**	**16,586.50**	**18,517.25**	**1,212.67**

Note:
The above cash flows has been prepared under the 'Indirect Method' as set out in Ind AS 7, 'Statement of Cash Flows'.

NXT- Infra Trust

Special Purpose Combined Cash Flow Statement
(All amounts in ₹ lakhs unless otherwise stated)

Change in liabilities arising from financing activities in terms of Ind AS 7:

Particulars	As at 1 April 2023	Net Cash Flow	Others*	As at September 30 2023
Non-current Borrowings	2,24,069.14	(5,983.63)	(1,320.04)	2,18,085.51
Total	**2,24,069.14**	**(5,983.63)**	**(1,320.04)**	**2,18,085.51**
Particulars	As at 1 April 2022	Net Cash Flow	Others*	As at 31 March 2021
Non-current Borrowings	2,36,234.93	(12,165.81)	(1,327.52)	2,24,069.12
Total	**2,36,234.93**	**(12,165.81)**	**(1,327.52)**	**2,24,069.12**
Particulars	As at 1 April 2021	Net Cash Flow	Others*	As at 31 March 2020
Non-current Borrowings	2,19,587.92	16,647.02	(1,161.65)	2,36,234.95
Total	**2,19,587.92**	**16,647.02**	**(1,161.65)**	**2,36,234.95**
Particulars	As at 1 April 2020	Net Cash Flow	Others*	As at 31 March 2021
Non-current Borrowings	1,57,678.54	61,909.39	(3,333.69)	2,19,587.92
Total	**1,57,678.54**	**61,909.39**	**(3,333.69)**	**2,19,587.92**

** Others represent interest accrued and other borrowing cost.*

As per our report of even date

For S R B C & CO LLP
Chartered Accountants
ICAI Firm's Registration No :324982E/E300003

For and on behalf of the Board of Directors of
Walter Infra Manager Private Limited (As an Investment Manager to NXT - Infra Trust)

per Suresh Yadav
Partner
Membership No: 119878

Place: Mumbai
Date: December 29, 2023

Rakshit Jain
Director
DIN: 06734410

Sumit Sen
Director
DIN: 06734410

Pratik Desai
Company Secretary
ICSI Membership no. ACS:30026

Place: Mumbai
Date: December 27, 2023

NXT- Infra Trust

Special Purpose Combined Statement of Changes in Equity
(All amounts in ₹ lakhs unless otherwise stated)

A. Equity Share Capital (Equity Share of ₹ each issued, subscribed and fully paid (refer note 17(a))	Number of Shares	Amount
As at 1 April 2020	4,56,13,685	4,561.37
Add/(Less): Changes during the year	-	-
As at 31 March 2021	**4,56,13,685**	**4,561.37**
As at 1 April 2021	4,56,13,685	4,561.37
Add/(Less): Changes during the year	-	-
As at 31 March 2022	**4,56,13,685**	**4,561.37**
As at 1 April 2022	4,56,13,685	4,561.37
Add/(Less): Changes during the year	-	-
As at 31 March 2023	**4,56,13,685**	**4,561.37**
As at 1 April 2023	4,56,13,685	4,561.37
Add/(Less): Changes during the period	-	-
As at 30 September 2023	**4,56,13,685**	**4,561.37**

B. Instruments in the nature of equity (refer note 17(b))	Amount
As at 1 April 2020	33,555.00
(Less): Conversion of compulsorily convertible debentures into equity during the year	(9,565.00)
Add: Issue of optionally convertible debentures during the year (refer note 17(b))	5,272.00
Add: Issue of compulsorily convertible debentures during the year (refer note 17(b))	1,061.00
As at 31 March 2021	**30,323.00**
As at 1 April 2021	30,323.00
Add/(Less): Changes during the year	-
As at 31 March 2022	**30,323.00**
As at 1 April 2022	30,323.00
(Less): Repayment of compulsorily convertible debentures due to change in ownership	(30,323.00)
As at 31 March 2023	**-**
As at 1 April 2023	-
Add/(Less): Changes during the period	-
As at 30 September 2023	**-**

C. Other Equity (refer note 17(c))	Retained Earnings	Securities Premium	Share of equity in joint venture	Total
Balance as at 1 April 2020 (Refer Note 35(iv))	9,019.05	-	14,552.86	23,571.91
Premium on conversion of compulsory convertible debentures into equity	-	11,553.82	-	11,553.82
Profit for the year	2,987.53	-	-	2,987.53
Total comprehensive income for the year	**2,987.53**	**11,553.82**	**-**	**14,541.35**
As at 31 March 2021	**12,006.58**	**11,553.82**	**14,552.86**	**38,113.26**
Balance as at 1 April 2021	12,006.58	11,553.82	14,552.86	38,113.26
Increase in share of equity in Joint Venture (refer Note (17(c))	-	-	2,277.99	2,277.99
Profit for the year	8,773.77	-	-	8,773.77
Total comprehensive income for the year	**8,773.77**	**-**	**2,277.99**	**11,051.76**
As at 31 March 2022	**20,780.35**	**11,553.82**	**16,830.85**	**49,165.02**
Balance as at 1 April 2022	20,780.35	11,553.82	16,830.85	49,165.02
Profit for the year	6,923.11	-	-	6,923.11
Decrease in share of Joint Venture on account of redemption of optionally convertible debentures (refer Note (17(c))	-	-	(6,879.11)	(6,879.11)
Prepayments adjusted in equity (net of tax) (Refer Note 35(v))	(33,801.67)	-	-	(33,801.67)
Total comprehensive income for the year	**(26,878.56)**	**-**	**(6,879.11)**	**(33,757.67)**
As at 31 March 2023	**(6,098.21)**	**11,553.82**	**9,951.74**	**15,407.35**
Balance as at 1 April 2023	(6,098.21)	11,553.82	9,951.74	15,407.35
Profit for the period	1,092.52	-	-	1,092.52
Other comprehensive loss for the period (net of tax)	(1.77)	-	-	-
Interim Dividend paid during the period	(7,719.75)	-	-	(7,719.75)
Total comprehensive income for the period	**(6,628.99)**	**-**	**-**	**(6,628.99)**
As at 30 September 2023	**(12,727.21)**	**11,553.82**	**9,951.74**	**8,778.36**

The accompanying notes form an integral part of the special purpose combined financial statements and should be read in conjunction with the accompanying notes (1 - 44)

As per our report of even date
For S R B C & CO LLP
Chartered Accountants
ICAI Firm's Registration No :324982E/E300003

For and on behalf of the Board of Directors of
Walter Infra Manager Private Limited (As an Investment Manager to NXT - Infra Trust)

per Suresh Yadav
Partner
Membership No: 119878

Place: Mumbai
Date: December 29, 2023

Rakshit Jain
Director
DIN: 06734410

Sumit Sen
Director
DIN: 06734410

Pratik Desai
Company Secretary
ICSI Membership no. ACS:30026

Place: Mumbai
Date: December 27,

NXT- Infra Trust

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

Disclosures as required by Securities and Exchange Board of India Circular No. CIR/IMD/DF/114/2016 dated October 20, 2016

A. Statement of Net Assets at Fair Value as at 30 September 2023 (refer note (iii) below):

Particulars	Book value	Fair value
A. Assets	3,42,312.71	5,53,758.00
B. Liabilities (at book value)	3,28,972.99	3,28,972.99
C. Net assets (A-B)	13,339.72	2,24,785.01
D. Number of units	Refer note (i) below	Refer note (i) below
E. NAV (C/D)	Refer note (i) below	Refer note (i) below

Notes:

(i) The number of units that Trust will issue to investors in the proposed initial private placement is not presently ascertainable. Hence the disclosures in respect of No. of units and Net Asset Value (NAV) per Unit have not been given.

(ii) **Project wise break up of Fair value of Assets as at 30 September 2023:**

Particulars	Fair value
WRIPL	81,414.00
DME	38,958.00
CTHPL	88,275.00
CGRG	62,750.00
GSY	82,755.00
WIPL (Refer Note Below)	1,99,606.00
Total	**5,53,758.00**

Note: Sponsor entity owns 49% stake in WIPL (refer note 2.4(d) and has Joint control. Accordingly the fair value numbers reflected above are 49% of WIPL's fair value of assets.

(iii) Project wise break up of fair value of total assets as at 30 September 2023 as disclosed above are based on solely on the fair valuation report dated December 27, 2023 of the independent valuer appointed by Investment Manager under the InvIT Regulations.

B. Statement of Total Return at Fair Value (Refer note (i) below) :

Particulars	Six month period ended 30 September 2023	For the year ended 31 March 2023
Total comprehensive income for the year (As per the Special Purpose Combined Statement of Profit and Loss)	1,090.75	6,923.11
Add: Other changes in fair value (excluding tax) of total assets for the period / year not recognized in Total Comprehensive Income (Note (i))	178.51	(41,771.80)
Total return	**1,269.26**	**(34,848.69)**

Note:

(i) In the above statement, Other changes in fair value for the six months ended 30 September 2023 and year ended 31 March 2023 has been computed based on the difference in fair values of total assets as at 30 September 2023, as at 31 March 2023 and as at 31 March 2022 respectively. The fair values of total assets as at 30 September 2023 and as at 31 March 2023 are based solely on the valuation report dated December 27, 2023 of an independent valuer appointed by Investment Manager under the InvIT Regulations. Further, the fair value of total assets as at 31 March 2022 is based solely on the valuation report dated December 27, 2023 of another independent valuer appointed by Investment Manager under the InvIT Regulations.

As per our report of even date

For S R B C & CO LLP
Chartered Accountants
ICAI Firm's Registration No :324982E/E300003

For and on behalf of the Board of Directors of
Walter Infra Manager Private Limited (As an Investment Manager to NXT - Infra Trust)

per Suresh Yadav
Partner
Membership No: 119878

Place: Mumbai
Date: December 29, 2023

Rakshit Jain
Director & CEO
DIN: 06858141

Sumit Sen
Director
DIN: 06734410

Pratik Desai
Company Secretary
ICSI Membership no. ACS:30026

Place: Mumbai
Date: December 27, 2023

NXT- Infra Trust

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

Disclosures as required by Securities and Exchange Board of India Circular No. CIR/IMD/DF/114/2016 dated 20 October 2016

A. Operating Cash Flow from projects (Project wise)

Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
WRIPL	3,517.31	(8,343.87)	15,372.94	(35,167.14)
DME	1,132.97	3,075.86	2,513.84	3,803.82
CTHPL	(560.57)	1,053.62	(12,440.00)	(9,505.63)
CGRG	(2,405.45)	(307.93)	4,954.32	(6,161.02)
GSY	1,234.37	1,836.36	4,516.06	(10,878.19)
Total	**2,918.63**	**(2,685.96)**	**14,917.16**	**(57,908.16)**

Operating Cash Flow from WIPL (Joint Venture)

Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
WIPL*	10,429.62	13,634.87	(7,072.69)	(2,838.65)
Operating Cash inflow / (outflow)	**10,429.62**	**13,634.87**	**(7,072.69)**	**(2,838.65)**

* Sponsor entity owns 49% stake in WIPL (refer note 2.4(d) and has Joint control as per the IND AS provisions and accordingly the same is accounted using the equity method in the combined financial statements. However, for the purpose of above disclosure, the numbers reported are 49% of WIPL's operating cash flows for the respective periods.

B. Capitalisation Statement

Particulars	Pre issue as at 30 September	As adjusted for issue
Financial Liabilities		
Non current borrowings	2,93,013.77	
Current borrowings	24,822.73	
Total Borrowings(A)	**3,17,836.50**	
Equity		**Refer Note below**
Equity share capital	4,561.37	
Other equity	8,778.35	
Total Equity(B)	**13,339.72**	
Debt equity ratio [A/B]	23.83	

Note: Corresponding details post initial issue are not available as on the date of adoption of the special purpose combined financial statements, hence the required disclosures in respect of the same have not been provided in the above table.

C. Debt payment history

Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
WRIPL				
Carrying amount of debt at the beginning of the year/period	**32,013.28**	**34,497.19**	**32,097.19**	**-**
Additional borrowings during the year/period	-	2,054.29	2,400.00	32,215.17
Repayments during the year/period	(924.00)	(4,538.20)	-	(117.98)
Carrying amount of debt at the end of the year/period	**31,089.28**	**32,013.28**	**34,497.19**	**32,097.19**
Loan Processing Fees	(464.00)	(498.00)	(659.00)	(871.00)
Interest Accrued	-	-	213.00	198.00
Carrying amount of debt at the end of the year/period	**30,625.28**	**31,515.28**	**34,051.19**	**31,424.19**
Interest Payments (cash outflow)	1,428.99	2,949.26	2,372.38	1,318.51
DME				
Carrying amount of debt at the beginning of the year/period	**31,621.66**	**36,368.33**	**38,920.45**	**41,252.60**
Additional borrowings during the year/period	-	34,205.94	1,438.43	19,441.57
Repayments during the year/period	(1,704.48)	(38,952.61)	(3,990.55)	(21,773.72)
Carrying amount of debt at the end of the year/period	**29,917.18**	**31,621.66**	**36,368.33**	**38,920.45**
Loan Processing Fees	(42.00)	(39.08)	-	-
Interest Accrued	-	-	122.00	137.81
Carrying amount of debt at the end of the year/period	**29,875.18**	**31,582.58**	**36,490.33**	**39,058.26**
Interest Payments (cash outflow)	1,324.91	2,775.24	2,931.33	3,280.91
CTHPL				
Carrying amount of debt at the beginning of the year/period	**51,221.86**	**54,002.29**	**40,509.76**	**23,438.42**
Additional borrowings during the year/period	-	54,772.75	70,052.59	37,806.88
Repayments during the year/period	(1,485.08)	(57,553.18)	(56,560.07)	(20,735.54)
Carrying amount of debt at the end of the year/period	**49,736.78**	**51,221.86**	**54,002.28**	**40,509.76**
Loan Processing Fees	(49.04)	(51.14)	(164.86)	(374.46)
Interest Accrued	-	-	-	3.00
Carrying amount of debt at the end of the year/period	**49,687.74**	**51,170.72**	**53,837.42**	**40,138.30**
Interest Payments (cash outflow)	2,126.93	3,864.84	4,378.10	3,183.00
CGRG				
Carrying amount of debt at the beginning of the year/period	**47,080.42**	**45,784.62**	**46,389.80**	**40,733.70**
Additional borrowings during the year/period	-	53,018.26	76,526.31	7,834.26
Repayments during the year/period	(18.91)	(51,722.46)	(77,131.49)	(2,178.16)
Carrying amount of debt at the end of the year/period	**47,061.51**	**47,080.42**	**45,784.62**	**46,389.80**
Loan Processing Fees	(324.00)	(307.41)	(271.79)	(342.39)
Interest Accrued	-	-	-	-
Carrying amount of debt at the end of the year/period	**46,737.51**	**46,773.01**	**45,512.83**	**46,047.41**
Interest Payments (cash outflow)	1,993.63	3,779.14	3,678.25	4,470.00
GSY				
Carrying amount of debt at the beginning of the year/period	**62,131.92**	**65,582.52**	**61,670.72**	**52,253.82**
Additional borrowings during the year/period	-	62,973.93	1,08,317.25	12,021.04
Repayments during the year/period	(1,851.16)	(66,424.53)	(1,04,405.46)	(2,604.14)
Carrying amount of debt at the end of the year/period	**60,280.76**	**62,131.92**	**65,582.51**	**61,670.72**
Loan Processing Fees	(441.00)	(431.89)	(401.00)	(923.00)
Interest Accrued	-	-	-	-
Carrying amount of debt at the end of the year/period	**59,839.76**	**61,700.03**	**65,181.51**	**60,747.72**
Interest Payments (cash outflow)	2,584.14	5,068.37	4,767.66	5,881.54

NXT- Infra Trust

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

Debt payment history WIPL (Joint venture)

Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
WIPL				
Carrying amount of debt at the beginning of the year/period	**1,16,409.30**	**1,11,403.03**	**79,437.19**	**-**
Additional borrowings during the year/period	46,514.38	1,28,746.45	67,140.98	80,186.54
Repayments during the year/period	(45,584.41)	(1,23,740.18)	(35,175.14)	(749.35)
Carrying amount of debt at the end of the year/period	**1,17,339.27**	**1,16,409.30**	**1,11,403.03**	**79,437.19**
Loan Processing Fees	(161.00)	(170.08)	(43.05)	(43.07)
Interest Accrued	-	-	-	-
Carrying amount of debt at the end of the year/period	**1,17,178.27**	**1,16,239.22**	**1,11,359.98**	**79,394.12**
Interest Payments (cash outflow) (Net of TDS)	5,230.10	7,987.00	0.90	0.00

(This place has been left blank intentionally)

NXT- Infra Trust

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

Debt payment history WIPL (Joint venture)

Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
WIPL				
Carrying amount of debt at the beginning of the year/period	**1,16,409.30**	**1,11,403.03**	**79,437.19**	**-**
Additional borrowings during the year/period	46,514.38	1,28,746.45	67,140.98	80,186.54
Repayments during the year/period	(45,584.41)	(1,23,740.18)	(35,175.14)	(749.35)
Carrying amount of debt at the end of the year/period	**1,17,339.27**	**1,16,409.30**	**1,11,403.03**	**79,437.19**
Loan Processing Fees	(161.00)	(170.08)	(43.05)	(43.07)
Interest Accrued	-	-	-	-
Carrying amount of debt at the end of the year/period	**1,17,178.27**	**1,16,239.22**	**1,11,359.98**	**79,394.12**
Interest Payments (cash outflow) (Net of TDS)	5,230.10	7,987.00	0.90	0.00

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1. Corporate Information

The Special Purpose Combined Financial Statements of comprising of:-

- Chikali-Tarsod Highways Private Limited (“CTHPL”),
- Nxt-Infra CGRG Highways Limited (formerly known as MBL (CGRG) Road Limited) (“CGRG”),
- Nxt-Infra GSY Highways Limited (formerly known as MBL (GSY) Road Limited) (“GSY”),
- Welspun Delhi Meerut Expressway Private Limited (“DME”)
- Welspun Road Infra Private Limited (“WRIPL”)

(individually referred to as “SPV” and together referred to as “the SPV Group") and Welspun Infrafacility Private Limited (accounted using equity method) (“Investment Entity'” or “WIPL”). Out of 5 SPVs, 3 are private limited companies and 2 are public limited companies registered under Companies Act, 2013. All the SPVs are domiciled in India. These SPV’s and Investment Entity have entered into concession agreements either with National Highways Authorities of India (NHAI) / Public Works Department of Maharashtra (PWD-MH) to construct road projects under the Build, Operate and Transfer (BOT) model or under the Hybrid Annuity Model (HAM) in various locations in India.

All the SPV’s have been acquired by Actis Highway Infra Limited (“Actis”) from Welpsun Enterprises Limited (“WEL”) and are wholly owned by Actis except for WIPL where Actis has initially acquired 49% equity stake and the balance 51% will be acquired from WEL upon completion of 2 years following the Provisional Commercial Operation Date (“PCOD”) (i.e., March 31, 2024) and approval from NHAI as per requirement of concession agreement and NHAI circular no NH-24028/14/2014-H (Vol.II) dated November 27, 2020. Also, Refer Note 2.4(d).

Actis, acting as the sponsor entity has set up NXT-Infra Trust (‘Trust’) as an irrevocable trust under the Indian Trust Act, 1882 pursuant to Trust Deed dated October 26, 2023. As the trust is not existence as at September 30, 2023, these special purpose financial statement do not include the financial statement of the trust. The Trust has been settled for an initial sum of ₹ 10,000. The Trust has been registered as an Infrastructure Investment Trust (‘InvIT’) with Securities Exchange Board of India (‘SEBI’) under the Securities Exchange Board of India (Infrastructure Investment Trust) Regulations, 2014 vide Certificate of Registration (IN/INVIT/23-24/00028) dated November 08, 2023. The principal place of business of the Trust is located at office no. 501, 5th Floor, Vikas Hub, Vikas Center, next to cubic mall, Dr. G C Road, Wadavali Village, Chembur, East, Mumbai, 400074, Maharashtra, India. The Trustee to the Trust is Catalyst Trusteeship Limited (the “Trustee”) and the Investment manager for the Trust is Walter Infra Project Manager Private Limited (the "Investment Manager”). The object and purpose of the Trust, as described in the Trust Deed, is to carry on the activity of an infrastructure investment trust as permissible under the InvIT Regulations to raise funds through the Trust, to make investments in accordance with the InvIT Regulations and the investment strategy and to carry on the activities as may be required for operating the Trust, including incidental and ancillary matters thereto.

The Special Purpose Combined Financial Statements have been prepared in connection with the proposed initial private placement of units of Trust for the purpose of acquisition of shares from Actis. These financial statements were approved for issue in accordance with resolution passed by the Board of Directors of the Investment Manager, acting on behalf of the Trust on December 27, 2023.

2. Significant accounting policies

2.1 Basis of preparation

The Special Purpose Combined Financial Statements comprising of the SPV Group and Investment Entity comprise the Special Purpose Combined Balance Sheet as at September 30, 2023, March 31, 2023, March 31, 2022, March 31, 2021 and the Special Combined Statement of Profit and Loss (including Other Comprehensive Income), Special Purpose Combined Statement of Changes in Equity, Special Purpose Combined Cash Flow Statement for the six months period ended September 30, 2023, for the years ended March 31, 2023, March 31, 2022 and March 31, 2021, the Combined Statement of net assets at fair value as at September 30, 2023, the Combined Statement of Total Returns at Fair Value for the six months period ended September 30, 2023 and year ended March 31, 2023 and notes to the special purpose combined financial statements including a summary of significant accounting policies and other explanatory information (collectively, the "Special Purpose Combined Financial Statements").

The Special Purpose Combined Financial Statements have been prepared in accordance with Indian Accounting Standards prescribed under Section 133 of the Companies Act, 2013 read with the Companies (Indian Accounting Standards) Rules, 2015 ("Ind AS") except for Ind AS 33: Earning per share. Further, the Special Purpose Combined Financial Statements are in compliance with the SEBI (Infrastructure Investment Trusts) Regulations, 2014 as amended from time to time including circulars, notifications, clarifications and guidelines issued thereunder ("InvIT Regulations") and the Guidance Note on Combined and Carve-Out Financial Statements issued by the Institute of Chartered Accountants of India ("Guidance Note").

The details of various entities included in the Special Purpose Combined Financial Statements is as given below:

Name of SPV	Principal Activities	Proposed Shareholding by Trust	Nature of Proposed Investment	Project Type	Country of incorporation
CTHPL	Construction of Road	100%	Subsidiary	HAM	India
CGRG	Construction of Road	100%	Subsidiary	HAM	India
GSY	Construction of Road	100%	Subsidiary	HAM	India
DME	Construction of Road	100%.	Subsidiary	HAM	India
WRIPL	Construction of Road	100%	Subsidiary	HAM	India
WIPL	Construction of Road	49%*	Joint Venture*	BOT	India

*Presently, 51% of the issued and paid-up equity share capital of WIPL is held by Welspun Enterprises Limited ("WEL"). In terms of the securities subscription and purchase agreement dated June 9, 2022 ("SSPA") entered into between Actis Highway Infra Limited ('Sponsor') and WEL, the Sponsor is entitled to acquire 100% of the equity share capital of WIPL. In terms of the requirements prescribed by the NHAI, a change in ownership of WIPL may be undertaken only with the prior approval of the NHAI, and only after a period of two years from the commercial operation date of WIPL. Therefore, the acquisition of the equity shares presently held by WEL may only be undertaken after the completion of the period prescribed by the Concessioning Authority. Also, Refer Note 2.4(d).

The Special Purpose Combined Financial Statements have been prepared by Investment Manager, acting on behalf of the Trust ('Trust Management') to meet the requirements of InvIT Regulations and for inclusion in the Draft Placement Memorandum, Placement Memorandum and Final Placement Memorandum prepared by the Investment Manager in connection with the proposed initial private placement of units of Trust. As a result, the Special Purpose Combined Financial Statements may not be suitable for another purpose. Further, Special Purpose Combined Financial Statements do not comply with all the presentation and disclosure requirements of Division II of Schedule III notified under the Companies Act, 2013 (as amended) nor the Special Purpose Combined Financial Statements comply with all the presentation and disclosure requirements of Ind AS. Specific attention is drawn to the following aspects:

- In preparing these Special Purpose Combined Financial Statements, "Equity Share Capital" represent shareholder's investment in the SPVs.

- The number of units that NXT – Infra Trust will issue to the investors is not presently ascertainable. Hence, the Earnings per unit could not be computed.

In accordance with requirements of the InvIT Regulations, since the Trust was registered as an InvIT on October 26, 2023. It has been in existence for a period lesser than three completed financial years before the filing of offer documents. Accordingly, Financial information of the Trust has not been included in the Special Purpose Combined Financial Statements from that date. The special purpose interim financial statements of the SPVs as at and for the six months period ended September 30, 2023 and general purpose financial statements of the SPVs as at and for the years ended March 31, 2023, March 31, 2022 and March 31, 2021 were audited by firms of Chartered Accountants other than S R B C & CO LLP.

Further, as required by the InvIT regulations, the Special Purpose Combined Financial Statements are prepared, based on an assumption that 100% stake in all SPV entities is held by Trust for such period when the Trust was not in existence. However, in case of WIPL the share of net profit/ (loss) is accounted for using equity method as the Sponsor has purchased 49% stake in and the balance 51% stake would be acquired at an agreed consideration upon completion of 2 years following Provisional Commercial Operation Date ("PCOD") date (i.e. March 31, 2024 and approval from National Highway Authority of India (NHAI) (the Grantor) is obtained.

Further, in accordance with section 3.3.4 of SEBI Master Circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2023/115 dated 06 July 2023 the Special Purpose Combined Financial Statements have been presented after making necessary adjustments and accordingly, these may be different from the general purpose audited financial statements of the SPV's. Refer Note 35 for details of adjustments made in these Special Purpose Combined Financial Statements.

The Special Purpose Combined Financial Statements are presented in INR, which is the functional currency of the Trust. The Trust does not have any foreign operation and has assessed the functional currency to be INR. All values are rounded to the nearest Lakh rupees, unless otherwise indicated. Certain amounts that are required to be disclosed and do not appear due to rounding-off are expressed as 0.00.

These Special Purpose Combined Financial Statements correspond to classification provisions contained in Ind AS 1 'Presentation of Financial Statements'. These Special Purpose Combined Financial Statements have been prepared on a historical cost convention and on an accrual basis except for certain financial assets (refer accounting policy regarding financial instruments).

2.2 Basis of Combination

The Special Purpose Combined Financial Statements have been prepared using uniform accounting policies for like transactions and other events in similar circumstances. The financial statements / information of all the SPV's and the Investment Entity are transferred and used for the purpose of combination and are drawn up to the same reporting

date i.e. for the six months period ended September 30, 2023, for the years ended March 31, 2023, March 31, 2022 and March 31, 2021. The Special Purpose Combined Financial Statements have been prepared using the principles of consolidation as per Ind AS 110 – Consolidated Financial Statements and the Guidance Notes, to the extent applicable. However, unlike consolidated financial statements, the Special Purpose Combined Financial Statements does not have any parent company.

The procedures for preparing Special Purpose Combined Financial Statements are stated below –

i) Combine like items of assets, liabilities, equity, income, expenses and cash flows of the SPV's;
ii) The financial statements of all the SPVs were combined based on the assumption that all the SPVs were part of a single group for the entire period presented pursuant to the requirements as per SEBI circular.
iii) Intragroup assets, liabilities, equity, income, expenses and cash flows relating to transactions between SPVs of Trust are eliminated in full.
iv) Considering that the shareholders of the SPVs, other than the Sponsor or its related parties, will also be transferring their stake to the Trust, Non-controlling interest is not applicable.
v) In case of Investment Entity, the share of net profit/ (loss) is accounted for using equity method

2.3 Summary of Significant Accounting Policies

a. Current verses non-current classification

The Trust presents assets and liabilities in the Balance Sheet based on current/ non-current classification. An asset is classified as current when it is:

- Expected to be realized or intended to be sold or consumed in normal operating cycle
- Held primarily for the purpose of trading
- Expected to be realized within twelve months after the reporting period, or
- Cash or cash equivalent unless restricted from being exchanged or used to settle a liability for at least twelve months after the reporting period.

All other assets are classified as non-current.

A liability is classified as current when:
- It is expected to be settled in normal operating cycle
- It is held primarily for the purpose of trading
- It is due to be settled within twelve months after the reporting period, or
- There is no unconditional right to defer the settlement of the liability for at least twelve months after the reporting period

The Trust classifies all other liabilities as non-current.

The Trust has identified 12 months as its operating cycle.

Deferred tax assets and liabilities are classified as non-current assets and liabilities.

Operating cycle

The operating cycle is the time between the acquisition of assets for processing and their realization in cash and cash equivalents. The SPV Group and Investment Entity has ascertained its operating cycle being a period of twelve months for the purpose of classification of assets and liabilities as current and non-current.

b. Fair Value Measurement

The SPV Group and Investment Entity measures financial instruments, such as, investment in debt and equity instruments at fair value at each balance sheet date.

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value measurement is based on the presumption that the transaction to sell the asset or transfer the liability takes place either:

- in the principal market for the asset or liability, or
- in the absence of a principal market, in the most advantageous market for the asset or liability.

The principal or the most advantageous market must be accessible to the SPV Group and Investment Entity.

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.

The Company 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 (unadjusted) market prices in active markets for identical assets or liabilities
Level 2 — Valuation techniques for which the lowest level input that is significant to the fair value measurement is directly or indirectly observable
Level 3 — Valuation techniques for which the lowest level input that is significant to the fair value measurement is unobservable.

For assets and liabilities that are recognised in the financial statements on a recurring basis, the SPV Group and Investment Entity determines whether transfers have occurred between levels in the hierarchy by re-assessing categorization (based on the lowest level input that is significant to the fair value measurement as a whole) at the end of each reporting period.

For the purpose of fair value disclosures, SPV Group and Investment Entity 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.

c. Revenue Recognition

Revenue from contracts with customers is recognised when control of the goods or services are transferred to the customer at an amount that reflects the consideration to which SPV Group and Investment Entity expects to be entitled in exchange for those goods or services.

Revenue towards satisfaction of a performance obligation is measured at the amount of transaction price (net of variable consideration) allocated to that performance obligation.

Utility Shifting Income is recognised as and when the work is completed and the same is certified by the Authority.

The accounting policies for the specific revenue streams of SPV Group as summarized below:.

i) Income from Service Concession Arrangement

The SPV Group constructs or upgrades infrastructure (construction or upgrade services) used to provide a public service and operates and maintains that infrastructure (operation services) for a specified period of time. These arrangements may include infrastructure used in a public-to-private service concession arrangement for its entire useful life.

Under Appendix C to Ind AS 115 - Service Concession Arrangements, these arrangements are accounted for based on the nature of the consideration. The intangible asset model is used to the extent that the Company receives a right (i.e. a franchisee) to charge users of the public service. The financial

asset model is used to the extent the Company has an unconditional contractual right to receive cash or another financial asset from or at the direction of the grantor for the construction services. When the unconditional right to receive cash covers only part of the service, the two models are combined to account separately for each component.

For service contracts (including maintenance contracts) in which the Company has the right to consideration from the customer in an amount that corresponds directly with the value to the customer of the Company's performance completed to date, revenue is recognized when services are performed and contractually billable. Service contracts that include multiple performance obligations are segmented between types of services. For contracts with multiple performance obligations, the Company allocates the transaction price to each performance obligation using an estimate of the stand-alone selling price of each distinct service in the contract.

In the financial asset model, the amount due from the grantor meets the definition of a receivable which is measured at fair value on initial recognition. Based on business model assessment, the SPV Group measures such financial assets at amortised cost. The amount initially recognised plus the cumulative interest on that amount is calculated using the effective interest method calculated on fixed annuity in accordance with the Ind AS 109 and recognized under other income in the combined financial statements. Any asset carried under concession arrangements is derecognised on disposal or when no future economic benefits are expected from its future use or disposal or when the contractual rights to the financial asset expire.
When it is probable that total contract costs will exceed total contract revenue, expected loss, if any, on a contract is recognised as expense in the period in which it is foreseen, irrespective of the stage of completion of the contract.

ii) Variable consideration

SPV Group's claim for bonus, incentives and other claims in rates relating to execution of contracts are recognized as revenue in the year in which said claims are finally accepted by the clients. Claims under arbitration/disputes are accounted as income based on final award. Expenses on arbitration are accounted as incurred.

iii) Contract Balances

Contract assets

A contract asset is the right to consideration in exchange for goods or services transferred to the customer. If SPV Group performs by transferring goods or services to a customer before the customer pays consideration or before payment is due, a contract asset is recognised for the earned consideration that is conditional.

Contract assets represent revenue recognized in excess of amounts billed and include unbilled receivables. Unbilled receivables, which represent an unconditional right to payment subject only to the passage of time, are reclassified to accounts receivable when they are billed under the terms of the contract.

Receivable under the service concession agreement is initially recorded as a contract asset till the date of receipt of provisional commercial operation date (PCOD). On PCOD, an unconditional contractual right to receive cash is established under the service concession arrangement and accordingly the receivable is recorded as a financial asset from PCOD date.

Trade receivable

A trade receivable represents the Company's right to an amount of consideration that is unconditional (i.e., only the passage of time is required before payment of the consideration is due). Revenue earned from construction activities, but yet to be billed to customers, is initially recognised as contract assets and reclassified to trade receivables when the right to consideration becomes unconditional. We refer to the accounting policies on financial assets in this note for more information.

Contract liabilities

A contract liability is the obligation to transfer goods or services to a customer for which SPV Group has received consideration (or an amount of consideration is due) from the customer. If a customer pays consideration before SPV Group transfers goods or services to the customer, a contract liability is recognised when the payment is made, or the payment is due (whichever is earlier). Contract liabilities are recognised as revenue when SPV Group performs under the contract.

Amounts received before the related work is performed are disclosed in the balance sheet as contract liability and termed as advances received from customers.

iv) Recognition of interest income and insurance claim

Interest income for all debt instruments, measured at amortised cost or fair value through other comprehensive income, is recognised using the effective interest rate ('EIR') method and shown under interest income in the statement of profit and loss. The 'effective interest rate' is the rate that exactly discounts estimated future cash payments or receipts through the expected life of the financial instrument to:

- the gross carrying amount of the financial asset; or
- the amortised cost of the financial liability.

Interest income on investments and loans is accrued on a time basis by reference to the principal outstanding and the effective interest rate including interest on investments classified as fair value through profit or loss.

Insurance claims are accounted for on the basis of claims admitted/expected to be admitted and to the extent that there is no uncertainty in receiving the claims.

d. Income Tax

Income tax comprises of current and deferred tax. It is recognised in the Special Purpose Combined Statement of Profit and Loss except to the extent that it relates to an item recognised directly in equity or in OCI.

i) Current tax

Current tax comprises of the expected tax payable or receivable on the taxable income or loss for the year and any adjustment to the tax payable or receivable in respect of previous years. The amount of current tax reflects the best estimate of the tax amount expected to be paid or received after considering the uncertainty, if any, related to income taxes. It is measured using tax rates (and tax laws) enacted or substantively enacted by the reporting date.

ii) Deferred tax

Deferred tax is measured at the tax rates that are expected to apply to the period when the asset is realised or the liability is settled, based on the laws that have been enacted or substantively enacted by the reporting date. The measurement of deferred tax reflects the tax consequences that would follow from the manner in which SPV Group and Investment Entity expects, at the reporting date, to recover or settle the carrying amount of its assets and liabilities.

Deferred tax is recognised in respect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the corresponding amounts used for taxation purposes. Deferred tax is also recognised in respect of carried forward tax losses and tax credits.

Deferred tax assets are recognised to the extent that it is probable that future taxable profits will be available against which they can be used. Deferred tax liabilities are recognised for all taxable temporary differences. The existence of unused tax losses is strong evidence that future taxable profit may not be available. Therefore, in case of a history of recent losses, SPV Group and Investment Entity recognises a deferred tax asset only to the extent that it has sufficient taxable temporary differences or there is convincing other evidence that sufficient taxable profit will be available against which such deferred tax asset can be realised. Deferred tax assets – unrecognised or recognised, are reviewed at each reporting date and are recognised/ reduced to the extent that it is probable/ no longer probable respectively that the related tax benefit will be realised.

Deferred tax assets and liabilities are offset if there is a legally enforceable right to offset current tax liabilities and assets, and they relate to income taxes levied by the same tax authority on the same taxable entity, or on different tax entities, but they intend to settle current tax liabilities and assets on a net basis or their tax assets and liabilities will be realised simultaneously.

Current and deferred tax is recognised in profit or loss, except to the extent that it relates to items recognised in other comprehensive income or directly in equity. In this case, the tax is also recognised in other comprehensive income or directly in equity, respectively.

e. Borrowing cost

Borrowing costs are interest and other costs incurred in connection with the borrowing of funds. Borrowing costs directly attributable to acquisition or construction of an asset which necessarily take a substantial period of time to get ready for their intended use are capitalised as part of the cost of that asset. Other borrowing costs are recognised as an expense in the Special Purpose Combined Statement of Profit and Loss in the period in which they are incurred.

Capitalization of borrowing costs ceases when substantially all the activities necessary to prepare the qualifying assets for their intended uses are complete.

f. Impairment of non-financial assets

Assets are tested for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount and the impairment loss is recognized in the Statement of Profit and Loss. The recoverable amount is the higher of an asset's fair value less costs of disposal and value in use. The recoverable amount is determined for an individual asset, unless the asset does not generate cash inflows that are largely independent of those from other assets or group of assets. In assessing value is use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assumptions of the time value of money and the risks specified 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.

A previously recognised impairment loss, if any, is reversed when there is an indication of reversal, however, the carrying value after reversal is not increased beyond the carrying value that would have prevailed by charging usual depreciation / amortisation if there was no impairment.

g. Provisions and contingent liabilities

i) Provisions

A provision is recognised if, as a result of a past event, SPV Group and Investment Entity has a present legal or constructive obligation that can be estimated reliably, and it is probable that an outflow of economic benefits will be required to settle the obligation. Provisions are measure based on management's estimate required to settle the obligation at the balance sheet date and are discounted the expected future cash flows (representing the best estimate of the expenditure required to settle the present obligation at the balance sheet date) at a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability.

Provisions are reviewed at each balance sheet date and adjusted to reflect the current best estimate. If it is no longer probable that the outflow of resources would be required to settle the obligation, the provision is reversed.

ii) Contingent liabilities

Disclosure for a contingent liability is made when there is a possible obligation or a present obligation that may, but probably will not require an outflow of resources embodying economic benefits or the amount of such obligation cannot be measured reliably. When there is a possible obligation or a present obligation in respect of which likelihood of outflow of resources embodying economic benefits is remote, no provision or disclosure is made.

h. 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.

i) Financial assets

Initial recognition and measurement

Financial instruments i.e. Financial Assets and Financial Liabilities are recognised when the SPV Group and Investment Entity becomes a party to the contractual provisions of the instruments. Financial instruments are initially measured at fair value. Transaction costs that are directly attributable

to the acquisition or issue of financial instruments (other than financial instruments at fair value through profit or loss) are added to or deducted from the fair value of the financial instruments, as appropriate, on initial recognition. Transaction costs directly attributable to the acquisition of financial instruments assets or financial liabilities at fair value through profit or loss are recognised in profit or loss.

Subsequent measurement

For the purposes of subsequent measurement, financial assets are classified in following categories:

a) Financial assets at amortised cost (debt instruments)
b) Financial assets at fair value through profit or loss

Financial assets at amortized cost (debt instruments)

A financial asset is measured at amortised cost if it meets both of the following conditions are met:
a) the asset is held within a business model whose objective is to hold assets to collect contractual cash flows; and
b) the contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

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 EIR amortisation is included in finance income in the profit or loss. The losses arising from impairment are recognised in the profit or loss. SPV Group's financial assets at amortised cost includes service concession receivable, trade receivables, security deposits.

Financial assets at fair Value through Profit and Loss (FVTPL)

All financial assets which are not classified as measured at amortized cost or FVOCI as described above, are measured at FVTPL. This includes all derivative financial assets. On initial recognition, SPV Group may irrevocably designate a financial asset that otherwise meets the requirements to be measured at amortised cost or at FVOCI as at FVTPL if doing so eliminates or significantly reduces an accounting mismatch that would otherwise arise.

Financial assets at FVTPL are measured at fair value at the end of each reporting period, with any gains or losses arising on remeasurement recognised in profit or loss. The net gain or loss recognised in profit or loss incorporates any dividend or interest earned on the financial asset.

Derecognition of financial assets

A financial asset is derecognised only when

i) The Company has transferred the rights to receive cash flows from the financial asset or
ii) retains the contractual rights to receive the cash flows of the financial asset, but assumes a contractual obligation to pay the cash flows to one or more recipients.

Where the SPV Group and Investment Entity has transferred an asset, the SPV Group evaluates whether it has transferred substantially all risks and rewards of ownership of the financial asset. In such cases, the financial asset is derecognised. Where the SPV Group and Investment Entity has not transferred substantially all risks and rewards of ownership of the financial asset, the financial asset is not derecognised.

Where the SPV Group and Investment Entity has neither transferred a financial asset nor retains substantially all risks and rewards of ownership of the financial asset, the financial asset is derecognised if the SPV Group and Investment Entity has not retained control of the financial asset. Where the SPV Group and Investment Entity retains control of the financial asset, the asset is continued to be recognised to the extent of continuing involvement in the financial asset.

Impairment of financial assets

At each reporting date, SPV Group and Investment Entity assesses whether financial assets carried at amortised cost are credit-impaired. A financial asset is 'credit-impaired' when one or more events that have a detrimental impact on the estimated future cash flows of the financial asset have occurred. Evidence that a financial asset is credit-impaired includes the following observable data:

- significant financial difficulty of the borrower or issuer;
- a breach of contract such as a default or being past due for 90 days or more;
- the restructuring of a loan or advance by SPV Group and Investment Entity on terms that SPV Group and Investment Entity would not consider otherwise;
- it is probable that the borrower will enter bankruptcy or other financial reorganization; or
- the disappearance of an active market for a security because of financial difficulties.

Ind AS 109 requires expected credit losses to be measured through a loss allowance. SPV Group and Investment Entity measures loss allowances at an amount equal to lifetime expected credit losses for all trade receivable and/or contract assets that do not constitute a financing transaction, For all other financial assets, expected credit losses are measured at an amount equal to the 12 months expected credit losses or at an amount equal to the life time expected credit losses if the credit risk on the financial asset has increased significantly since initial recognition.

Loss allowances for financial assets measured at amortised cost are deducted from the gross carrying amount of the assets.

ii) 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, or as derivatives designated as not designated as hedging instruments, 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.

Subsequent measurement

For the purposes of subsequent measurement, financial liabilities are classified in two categories:
a) Financial liabilities measured at amortised cost
b) Financial liabilities measured at FVTPL (fair value through profit or loss)

a) Financial liabilities measured at amortised cost

After initial recognition, financial liabilities are subsequently measured at amortized cost using the EIR method. Gains and losses are recognised in the statement of profit and loss when the liabilities are derecognised as well as through the EIR amortization process. Amortized cost is calculated by taking into account any discount or premium on acquisition and fee or costs that are an integral part of the EIR. The EIR amortisation is included in finance costs in the statement of profit and loss.

b) Financial liabilities measured at fair value through profit or loss (FVTPL)

Financial liabilities at FVTPL include financial liabilities held for trading and financial liabilities designated upon initial recognition as at FVTPL. Financial liabilities are classified as held for trading if they are incurred for the purpose of repurchasing in the near term. Financial liabilities at fair value through profit or loss are carried in the statement of profit and loss at fair value with changes in fair value recognized in the statement of profit and loss.

Derecognition

A financial liability is derecognised when the obligation under the liability is discharged or cancelled or expires. When an existing financial liability is replaced by another from the same lender on substantially different terms, or the terms of an existing liability are substantially modified, such an exchange or modification is treated as the derecognition of the original liability and the recognition of a new liability. The difference in the respective carrying amounts is recognised in the statement of profit and loss.

Reclassification of financial instruments

The entity determines classification of financial assets and liabilities on initial recognition. After initial recognition, no reclassification is made for financial assets, such as equity instruments designated as FVTPL or FVOCI. 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.

i. Employee benefits

Defined contribution plans

The SPV Group and Investment Entity has defined contribution plans for post-employment benefits in the form of Provident Fund which is administered through Government of India. Provident Fund Scheme is classified as defined contribution plans as the SPV Group has no further obligation beyond making the contributions. Payments to defined contribution retirement benefit plans are recognised as an expense when employees have rendered service entitling them to the contributions.

Defined benefits plans

The SPV Group and Investment Entity has an obligation towards gratuity, a defined benefit retirement plan covering eligible employees. The plan provides for a lump sum payment to vested employees at retirement, death while in employment or on termination of employment of an amount equivalent to 15 days of salary payable for each completed year of service. Vesting occurs upon completion of five years of service. The cost of providing benefits under the defined benefit plan is determined using the projected unit credit method. Remeasurements, comprising of actuarial gains and losses, the effect of the asset ceiling, excluding amounts included in net interest on the net defined benefit liability, are recognised immediately in the balance sheet with a corresponding debit or credit to retained earnings through other comprehensive income (OCI) in the period in which they occur. Remeasurements are not reclassified to statement of profit and loss in subsequent periods. Past service costs are recognised in statement of profit and loss on the earlier of:

- The date of the plan amendment or curtailment, and

- The date that NXT – Infra Trust recognises related restructuring costs

Net interest is calculated by applying the discount rate to the net defined benefit liability or asset. The SPV Group and Investment Entity recognises the following changes in the net defined benefit obligation as an expense in the Combined Statement of Profit and Loss:

- Service costs comprising current service costs, past-service costs, gains and losses on curtailments and non-routine settlements; and

- Net interest expense or income.

Termination benefits

A liability for a termination benefit is recognised at the earlier of when the entity can no longer withdraw the offer of the termination benefit and when the entity recognizes any related restructuring costs.

Other employee benefits

Accumulated leave, which is expected to be utilized within the next 12 months, is treated as short-term employee benefit. The SPV Group and Investment Entity measures the expected cost of such absences as the additional amount that it expects to pay as a result of the unused entitlement that has accumulated at the reporting date. The SPV Group recognizes expected cost of short-term employee benefit as an expense, when an employee renders the related service.

The SPV Group and Investment Entity treats accumulated leave expected to be carried forward beyond twelve months, as long- term employee benefit for measurement purposes. Such long-term compensated absences are provided for based on the actuarial valuation using the projected unit credit method at the reporting date. Actuarial gains / losses are immediately taken to the statement of profit and loss and are not deferred. The obligations are presented as current liabilities in the balance sheet if the entity does not have an unconditional right to defer the settlement for at least twelve months after the reporting date.

j. Operating segments

Operating segments are reported in a manner consistent with the internal reporting provided to the Chief Operating Decision Maker (CODM) of SPV Group and Investment Entity. The CODM is responsible for allocating resources and assessing performance of the operating segments of SPV Group and Investment Entity.

k. Cash and cash equivalents

Cash and cash equivalents comprise cash at bank and on hand and other short term highly liquid investments with an original maturity of three months or less that are readily convertible to a known amount of cash and are subject to an insignificant risk of changes in value.

For the purpose of combined 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 SPV Group and Investment Entity cash management.

l. Subsequent events

The Special Purpose Combined Financial Statements are adjusted to reflect events that occur after the reporting date but before the Special Purpose Combined Financial Statements are issued. The Special Purpose Combined Financial Statements have their own date of authorisation, which differs from that of the financial statements of the combining entities. Therefore, when preparing the Special Purpose Combined Financial Statements, management considers adjusting events up to the date of authorisation of these financial statements.

m. Combined Statement of net assets at fair value

The disclosure of Statement of Net Assets at Fair Value comprises of the fair values of the total assets and fair values of the total liabilities of individual SPV's. The fair value of the assets are reviewed regularly by Management with reference to independent assets and market conditions existing at the reporting date, using generally accepted market practices. The independent valuers are leading independent appraisers with a recognised and relevant professional qualification and with recent experience in the location. Judgment is also applied in determining the extent and frequency of independent appraisals. Such independent appraisals and the assumptions used are reviewed at each balance sheet date.

n. Statement Of Total Returns at Fair Value

The disclosure of total returns at fair value comprises of the total Comprehensive Income as per the Combined Statement of Profit and loss and Other Changes in Fair Value of Total Assets which were not recognised in total Comprehensive Income.

o. Equity accounted investee

A joint venture is a type of joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the joint venture. Joint control is the contractually agreed sharing of control of an arrangement, which exists only when decisions about the relevant activities require unanimous consent of the parties sharing control.

Interests in WIPL is accounted for using the equity method, after initially being recognised at the net book value of the respective joint venture as at April 1, 2020. Currently investment in the Investment Entity is 49% and balance 51% stake would be acquired at an agreed consideration upon completion of 2 years following Provisional Commercial Operation Date ("PCOD") date (i.e. March 31, 2024 and approval from National Highway Authority of India (NHAI) (the Grantor).

Under the equity method of accounting, subsequent to initial recognition, the investments are adjusted to recognize the share of the post-acquisition profits or losses of the investee in the statement of profit and loss, and the share of other comprehensive income of the investee in other comprehensive income.

When the share of losses in an equity-accounted investment equals or exceeds its interest in the entity, the Trust does not recognize further losses, unless it has incurred obligations or made payments on behalf of the other entity.

The carrying amount of equity accounted investments are tested for impairment in accordance with Trust's policy on impairment of non-financial assets.

Unrealised gains on transactions between Trust and its Joint Venture are eliminated to the extent of Trust's interest in the entity. Unrealised losses are also eliminated unless the transaction provides evidence of an impairment of the asset transferred. Accounting policies of Investment Entity (equity accounted investees) are consistent with the policies adopted by the Trust except as follows:

(i) Revenue from Toll Contracts under Service Concession Arrangements

Income from Toll Operations is recognised in line with the Appendix C to Ind AS 115 – Service Concession Arrangements. The revenue is recognized in the period of collection which generally coincide as and when the traffic passes through toll plazas.

Toll collected by the Investment Entity is shared with NHAI based on Letter dated April, 02, 2022 NHAIPIU-SNP/NH-44/Bhagan Toll Plaza/2022/D-8575. Hence, revenue is recognised net-off the share of NHAI.

(ii) Provision for Resurfacing obligations

The Investment Entity provides for contractual obligations to restore the infrastructure at periodic intervals. Provisions are measured based on management's estimate required to settle the obligation at the balance sheet date and are discounted using a rate that reflects the time value of money. When discounting is used, the increase in the provision due to the passage of time is recognised as a finance cost. The same is reviewed at each balance sheet date and adjustments if any to the carrying amount is provided for accordingly.

(iii) Intangible Assets

Service Concession Arrangements

The Investment Entity constructs or upgrades infrastructure (construction or upgrade services) used to provide a public service and operates and maintains that infrastructure (operation services) for a specified period of time. These arrangements may include infrastructure used in a public-to-private service concession arrangement for its entire useful life.

Under the Concession Agreements, where the Investment Entity has received the right to charge users of the public service, such rights are recognised and classified as "Intangible Assets" in accordance with Appendix C-'Service Concession Arrangements' of Ind AS 115 'Service Concession Arrangements'. Such right is not an unconditional right to receive consideration because the amounts are contingent to the extent that the public uses the service and thus are recognised and classified as intangible assets. Such an intangible asset is recognised by the Company at cost (which is the fair value of the consideration receivable for the construction services delivered) and is capitalized when the project is complete in all respects and receives the completion certificate from the authority as specified in the Concession Agreement. An asset carried under concession arrangements is derecognised on disposal or when no future economic benefits are expected from its future use or disposal.

Under the concession agreement, the Investment Entity has contractual right to receive cash support by way of grant from NHAI, Grantor, over the concession period. Such right has been reduced from 'Intangible assets – License to Toll Collection' on a discounted basis and corresponding grant receivable is recognised as financial asset.

Amortization

The tolling rights received in exchange for Construction Service rendered to the grantor of tolling rights are recognised as an intangible asset which is amortised over period of operation of the facility on straight line basis.

(iv) Borrowing costs

All borrowing costs are expensed in the period in which they occur. Borrowing costs consist of interest and other costs that an entity incurs in connection with the borrowing funds.

(v) Impairment of Toll assets

Impairment exists when the carrying value of an asset or cash generating unit exceeds its recoverable amount, which is the higher of its fair value less costs of disposal and its value in use. The fair value less costs of disposal calculation is based on available data for similar assets or observable market prices less incremental costs for disposing of the asset. The value in use calculation is based on a DCF model. The cash flows are derived from the budget generally covering a period of the concession agreements using expected revenue growth rates, traffic study, toll rates and major maintenance expenses that will enhance the asset's performance being tested. The recoverable amount is sensitive to the discount rate used for the DCF model as well as the expected future cash-inflows and the revenue growth rate used for extrapolation purposes.

2.4 Significant accounting judgements, estimates and assumptions

The preparation of the Special Purpose Combined Financial Statements requires management to make judgements, estimates and assumptions that affect the reported amounts of revenues, expenses, assets and liabilities, and the accompanying disclosures, and the disclosure of contingent liabilities. Uncertainty about these assumptions and estimates could result in outcomes that require a material adjustment to the carrying amount of assets or liabilities affected in future periods.

The key assumptions concerning the future and other key sources of estimation uncertainty at the reporting date, that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year, are described below. SPV Group and Investment Entity based its assumptions and estimates on parameters available when the Special purpose combined financial statements were prepared. Existing circumstances and assumptions about future developments, however change due to market changes or circumstances arising that are beyond the control of SPV Group and Investment Entity. Such changes are reflected in the assumptions when they occur.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised prospectively.

The following are the significant judgements, apart from those involving estimations, that the investment manager have made in the process of applying SPV Group's accounting policies and that have the most significant effect on the amounts recognised in the financial statement:

a. Service Concession arrangements

Refer Note 2.3.C(i) which explains revenue recognition where the estimates are involved to determine the relative selling prices of performance obligations under service concessions arrangements. The HAM revenue model based on which the revenue and finance income are recognized under the service concessions arrangements assumes certain estimates and assumptions based which the project IRR is calculated for finance income recognition. The key inputs of the model comprise of annuity and interest on annuity inflows, estimations on cost to build and maintain the asset and other operational costs. These inputs are based on circumstances existing and management judgement / assumption on the future expectations based on current situations. Judgements include management view on expected earnings in future years, changes in interest rates, cost inflation, government policy changes, etc.

b. Taxes

The SPV Group and Investment Entity periodically assesses its liabilities and contingencies related to income taxes for all years open to scrutiny based on latest information available. The SPV Group and Investment Entity records its best estimates of the tax liability in the current tax provision. The management

believes that they have adequately provided for the probable outcome of these matters.

Deferred tax assets are recognised for unused tax losses to the extent that it is probable that taxable profit will be available against which the losses can be utilised. Significant management judgment is required to determine the amount of deferred tax assets that can be recognised, based upon the likely timing and the level of future taxable profits.

c. Fair Value Measurement

The fair value of financial instruments that are not traded in an active market is determined using valuation techniques. In applying the valuation techniques, management makes maximum use of market inputs and uses estimates and assumptions that are, as far as possible, consistent with observable data that market participants would use in pricing the instrument. Where applicable data is not observable, management uses its best estimate about the assumptions that market participants would make. These estimates may vary from the actual prices that would be achieved in an arm's length transaction at the reporting date. For details of the key assumptions used and the impact of changes to these assumptions (Refer note 34).

d. Joint Control over WIPL

As detailed in Note 37, the sponsor has acquired 49% stake in WIPL and the balance 51% stake would be acquired upon completion of 2 years following Provisional Commercial Operation Date ("PCOD") date (i.e. March 31, 2024 and approval from National Highway Authority of India (NHAI) (the Grantor) as per Service Concession Agreement signed between WIPL and NHAI. Pursuant to the arrangement between the Sponsor and WEL, both parties are jointly controlling WIPL as all the relevant activities of WIPL that affect its variable returns will continue to be decided unanimously by both the parties.

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

3(a) Property, plant and equipment

Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
Net Carrying Value	6.80	0.56	0.56	-
	6.80	**0.56**	**0.56**	**-**

Particulars	Computers	Freehold Land	Total
Gross carrying amount (cost)			
As at 1 April 2020	-	-	-
Additions	-	-	-
Disposals	-	-	-
As at 31 March 2021	**-**	**-**	**-**
Additions	-	0.56	0.56
Disposals	-	-	-
As at 31 March 2022	**-**	**0.56**	**0.56**
Additions	-	-	-
Disposals	-	-	-
As at 31 March 2023	**-**	**0.56**	**0.56**
Additions	8.24	-	8.24
Disposals	-	-	-
As at 30 September 2023	**8.24**	**0.56**	**8.80**

3(b)

Particulars	Computers	Freehold Land	Total
Accumulated depreciation			
As at 1 April 2020	-	-	-
Additions	-	-	-
Deletions	-	-	-
As at 31 March 2021	**-**	**-**	**-**
Additions	-	-	-
Deletions	-	-	-
As at 31 March 2022	**-**	**-**	**-**
Additions	-	-	-
Deletions	-	-	-
As at 31 March 2023	**-**	**-**	**-**
Additions	2.00	-	2.00
Deletions	-	-	-
As at 30 September 2023	**2.00**	**-**	**2.00**

Net Carrying Value:	Amount
As at 30 September 2023	6.80
As at 31 March 2023	0.56
As at 31 March 2022	0.56
As at 31 March 2021	-

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NXT- Infra Trust

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

S.no	Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
4	**Non current financial assets**				
	(A) Investment Accounted for using Equity Method				
	(i) Investment in Joint Venture (Unquoted) (refer note 37):-				
	Welspun Infrafacility Private Limited	9,257.71	17,533.51	14,826.97	14,552.86
	Add/ (Less): Share of equity share issued and securities premium	-	-	2,278.01	-
	Add/ (Less): Share of Optionally convertible debenture redeemed	-	(6,879.11)	-	-
	Add/ (Less): Share of profit/ (loss) during the year / period	(1,178.84)	(1,396.69)	428.53	274.11
	Total	**8,078.88**	**9,257.71**	**17,533.51**	**14,826.97**
	Note:				
	Percentage Ownership Interest	49.00%	49.00%	49.00%	49.00%
	Net assets	16,487.48	18,893.28	35,782.68	30,259.12
	Share of net assets	**8,078.88**	**9,257.71**	**17,533.51**	**14,826.97**
5	**Non current financial assets (at amortised cost)**				
	Receivable Under Service Concession Arrangements	1,88,112.04	1,95,422.07	2,00,282.92	1,37,351.27
	Total	**1,88,112.04**	**1,95,422.07**	**2,00,282.92**	**1,37,351.27**
6	**Non-current financial assets - others**				
	(Unsecured considered good, unless otherwise stated)				
	Security deposit (at amortised cost)	110.15	109.90	45.15	34.29
	Bank deposit having original maturity of more than twelve months (towards DSRA obligation)	-	-	-	2,940.60
	Bank deposits with maturity for more than 12 months (refer note 37)	10,177.35	10,000.00	-	-
	Total	**10,287.50**	**10,109.90**	**45.15**	**2,974.89**
7	**Loans**				
	Loans (refer note 37) #	17,622.30	17,164.11	-	-
	Total	**17,622.30**	**17,164.11**	**-**	**-**
	# including interest accrued of Rs. 240 lakhs (net of Tax Deducted at Source)				
8	**Non-current tax assets (net)**				
	Income tax assets (net of provision)	1,797.88	1,198.61	1,609.20	1,316.21
	Total	**1,797.88**	**1,198.61**	**1,609.20**	**1,316.21**
9	**Non-current assets - others**				
	Balances with government authorities^	9,665.04	10,567.30	13,036.64	17,903.27
	Capital Advance	5.00	-	-	-
	Prepayments (refer note 35 (v))	-	-	44,719.00	41,386.00
	Contract Asset under service concession arrangement	-	-	-	63,528.72
	Total	**9,670.04**	**10,567.30**	**57,755.64**	**1,22,817.99**
	^ Includes payment under protest of Rs. 3,160 lakhs for 31 March 2023 and Rs. 3,900 lakhs for all other periods				
10	**Current financial assets - Investments**				
	Investments at fair value through profit and loss (FVTPL)				
	Investments in Mutual Funds				
	September 30, 2023: 82,536.86 units in Axis overnight fund - Direct growth	1,011.00	-	-	-
	March 31, 2021: 3,126,275.29 units in SBI Savings Fund, Growth*	-	-	-	1,069.03
	March 31, 2023: 69,190.80 units in SBI Overnight Fund, Growth	-	2,545.66	-	-
	September 30, 2023: 72,327.16 units in SBI Liquid fund - Direct Growth	2,636.77	-	-	-
	Total	**3,647.77**	**2,545.66**	**-**	**1,069.03**
	Investments in Bonds*				
	6.87% IRFC 14/04/2032	402.23	421.34	427.91	-
	7.40% REC 26 NOV 2024	99.78	97.78	-	-
	6.44% NABARD 04/12/2030	-	-	291.93	-
	6.85% NABARD 21/03/2031	1,276.10	1,277.96	1,816.85	-
	7.17% POWER FINANCE CORPORATION LTD 22/05/2025	-	-	2,244.55	-
	7.62% EXIM BONDS (SERIES T) 01/09/2026	1,250.16	1,314.64	1,392.82	-
	6.87% NHAI 14/04/2032	430.84	284.33	560.19	-
	6.92% IRFCL 31/08/2031	-	-	578.81	-
	6.87% NHAI 14/04/2032	-	156.87	162.96	-
	Total	**3,459.11**	**3,552.92**	**7,476.02**	**-**
	Grand Total	**7,106.88**	**6,098.58**	**7,476.02**	**1,069.03**
	* Towards Debt Service Reserve Account (DSRA) obligation				
11	**Trade receivables**				
	Unsecured - considered good	12,161.11	4,878.37	6,801.54	18,354.29
	Total	**12,161.11**	**4,878.37**	**6,801.54**	**18,354.29**

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

S.no	Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
12	**Cash and cash equivalents**				
	Balances with banks in current accounts	3,891.90	16,586.50	18,517.25	1,212.67
	Total	**3,891.90**	**16,586.50**	**18,517.25**	**1,212.67**
13	**Bank balances (other than cash and cash equivalents)**				
	Balances with banks				
	-Deposit Accounts having original maturity of more than three months but less than twelve months	4,659.78	-	3,948.14	-
	- Held as security with government authority	7,064.74	6,977.52	26.49	25.28
	Total	**11,724.52**	**6,977.52**	**3,974.63**	**25.28**
14	**Current financial assets- others**				
	Receivable Under Service Concession Arrangements	56,486.40	53,604.44	73,995.95	22,252.23
	Total	**56,486.40**	**53,604.44**	**73,995.95**	**22,252.23**
15	**Other current financial assets**				
	(Unsecured considered good unless otherwise stated)				
	Security Deposits	6.07	-	-	-
	Insurance claim receivables	-	-	1.01	2,350.00
	Other receivables from related parties	0.10	-	937.20	374.85
	Total	**6.17**	**-**	**938.21**	**2,724.85**
16	**Other current assets**				
	(Unsecured considered good, unless otherwise stated)				
	Advance to suppliers				
	- Related Party	-	-	229.50	6,255.84
	- Others	2,185.57	3,001.05	633.50	2,130.22
	Balances with government authorities	4,996.79	6,682.77	10,060.06	3,962.25
	Prepaid Expenses	387.09	437.05	214.74	279.82
	Contract Assets under Service Concession arrangement	-	-	-	13,526.91
	Total	**7,569.45**	**10,120.87**	**11,137.80**	**26,155.04**

NXT- Infra Trust

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

17 Share capital and other equity

17(a) - Equity share capital

Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
Authorised share capital #				
5,00,00,000 (31 March 2023: 5,00,00,000; 31 March 2022: 5,00,00,000; 31 March 2021: 5,00,00,000) Equity Shares of Rs.10 each for WRIPL	5,000.00	5,000.00	5,000.00	5,000.00
10,00,000 (31 March 2023: 10,00,000; 31 March 2022: 10,00,000; 31 March 2021: 10,00,000) equity Shares of Rs.10 each for CTHPL	100.00	100.00	100.00	100.00
50,00,000 (31 March 2023: 5,000,000; 31 March 2022: 50,00,000; 31 March 2021: 50,00,000) equity shares of Rs 10 each for DME	500.00	500.00	500.00	500.00
50,00,000 (31 March 2023: 50,00,000; 31 March 2022: 50,00,000; 31 March 2021:50,00,000) equity shares of Rs 10 each for CGRG	500.00	500.00	500.00	500.00
50,00,000 (31 March 2023: 50,00,000; 31 March 2022: 50,00,000; 31 March 2021: 50,00,000) equity shares of Rs 10 each for GSY	500.00	500.00	500.00	500.00

Particulars	As at 30 September	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
Issued, subscribed and paid up #				
3,95,13,685 (31 March 2023: 3,95,13,685; 31 March 2022: 3,95,13,685; 31 March 2021: 3,95,13,685) Equity Shares of Rs.10 each for WRIPL	3,951.37	3,951.37	3,951.37	3,951.37
10,00,000 (31 March 2023: 10,00,000; 31 March 2022: 10,00,000; 31 March 2021: 10,00,000) equity Shares of Rs.10 each for CTHPL	100.00	100.00	100.00	100.00
50,00,000 (31 March 2023: 5,000,000; 31 March 2022: 50,00,000; 31 March 2021: 50,00,000) equity shares of Rs 10 each for DME	500.00	500.00	500.00	500.00
50,000 (31 March 2023: 50,000; 31 March 2022: 50,000; 31 March 2021: 50,000) equity shares of Rs 10 each for CGRG	5.00	5.00	5.00	5.00
50,000 (31 March 2023: 50,000; 31 March 2022: 50,000; 31 March 2021: 50,000) equity shares of Rs 10 each for GSY	5.00	5.00	5.00	5.00
	4,561.37	**4,561.37**	**4,561.37**	**4,561.37**

#Equity capital of the SPV group is line by line aggregate of the authorized share capital and paid-up share capital of each of the SPVs. It does not represent legal share capital of the SPV Group.

A. Reconciliation of share outstanding at the beginning and at the end of the year/period.

Particulars	As at 30 September 2023		As at 31 March 2023		As at 31 March 2022		As at 31 March 2021	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount
At the beginning of the year/period	4,56,13,685	4,561.37	4,56,13,685	4,561.37	4,56,13,685	4,561.37	4,56,13,685	4,561.37
Add/(Less): Changes during the year/period	-	-		-	-	-	-	-
Outstanding at the end of the year/period	4,56,13,685	4,561.37	4,56,13,685	4,561.37	4,56,13,685	4,561.37	4,56,13,685	4,561.37

B. Rights, preferences and restrictions attached to equity shares

The SPV's in the SPV Group have a only one class of equity shares having par value of ₹ 10 per share. Each holder of equity share is entitled to one vote per share. The SPV's declares and pays dividend in Indian rupees. The dividend proposed by board of directors is subject to the approval of the shareholders in the annual general meeting. In the event of liquidation, the holders of equity shares will be entitled to receive the remaining assets, after distribution of all preferential amounts. The distribution will be in proportion to the number of equity shares held by the shareholders.

17(b) - Instrument entirely equity in nature

(i) Nature of Instruments	Name of SPV	As at 30 September	31 March 2023	31 March 2022	31 March 2021
Nil (31 March 2023: Nil; 31 March 2022: 61,88,600; 31 March 2021: 61,88,600) Compulsorily convertible debentures of Rs.100 each fully paid up and issued to Welspun Enterprise Limited.	CTHPL	-	-	6,188.60	6,188.60
Nil (31 March 2023: Nil; 31 March 2022: 32,79,250; 31 March 2021: 32,79,250) Compulsorily convertible debentures of Rs.100 each fully paid up and issued to Welspun Enterprise Limited.	CGRG	-	-	3,279.25	3,279.25
Nil (31 March 2023: Nil; 31 March 2022: 28,23,455; 31 March 2021: 28,23,455) Compulsorily convertible debentures of Rs.100 each fully paid up and issued to RGY Roads Private Limited.	CGRG	-	-	2,823.46	2,823.46
Nil (31 March 2023: Nil; 31 March 2022: 41,53,800; 31 March 2021: 41,53,800) Compulsorily convertible debentures of Rs.100 each fully paid up and issued to Welspun Enterprise Limited.	GSY	-	-	4,153.80	4,153.80
Nil (31 March 2023: Nil; 31 March 2022: 35,49,455; 31 March 2021: 35,49,455) Compulsorily convertible debentures of Rs.100 each fully paid up and issued to RGY Roads Private Limited.	GSY	-	-	3,549.46	3,549.46
Nil (31 March 2023: Nil; 31 March 2022: 21,55,000; 31 March 2021: 21,55,000) Compulsorily convertible debentures of Rs.100 each fully paid up and issued to Welspun Enterprise Limited.	DME	-	-	2,155.00	2,155.00
Total (i)		**-**	**-**	**22,149.57**	**22,149.57**

Terms/Rights attached to Compulsory Convertible Debenture (CCDs)
The CCDs shall be unsecured, non marketable, non transferable and shall not carry any interest. Each debenture shall be compulsory convertible into 10 equity shares of Rs 10/- each of the Company at the end of the tenure. The Debenture holder and the SPV may mutually agree to convert the debenture into equity share at any time before the expiry of tenure.

(ii) Nature of Instruments	Name of SPV	As at 30 September	31 March 2023	31 March 2022	31 March 2021
Nil (31 March 2023: Nil; 31 March 2022: 37,72,988; 31 March 2021: 37,72,988) Optionally convertible debentures of Rs. 100 each fully paid up and issued to Welspun Enterprise Limited.	CTHPL	-	-	3,772.99	3,772.99
Nil (31 March 2023: Nil; 31 March 2022: 29,00,000; 31 March 2021: 29,00,000) Optionally convertible debentures of Rs. 100 each fully paid up and issued to Welspun Enterprise Limited.	DME	-	-	2,900.00	2,900.00
Nil (31 March 2023: Nil; 31 March 2022: 14,98,895; 31 March 2021: 14,98,895) Optionally convertible debentures of Rs. 100 each fully paid up and issued to Welspun Enterprise Limited.	WRIPL	-	-	1,498.90	1,498.90
Total (ii)		**-**	**-**	**8,171.89**	**8,171.89**
Grand Total [(i)+(ii)]		**-**	**-**	**30,321.46**	**30,321.46**

Terms and conditions of unsecured Optionally convertible debentures ('OCDs')
Each debenture having face value of Rs 1.00 each shall be convertible at the option of the holder at any time during the tenure of the debentures into 10 equity shares of Rs 10 each. As per the term, debentures shall be redeemable at the discretion of the Issuer, any-time after a period of 3 months from the date of issue but not later than 18 years.

NXT- Infra Trust

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

17(c) - Other equity

Particulars	As at 30 September	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
a) Retained earnings				
Opening Balance	**(6,098.21)**	**20,780.35**	**12,006.58**	**9,019.05**
Prepayments adjusted in equity (net of tax) (Refer Note 35(v))	-	(33,801.67)	-	-
Interim Dividend paid during the period	(7,719.75)	-	-	-
Profit for the period / year	1,092.52	6,923.11	8,773.77	2,987.53
Other comprehensive loss for the period (net of tax)	(1.77)	-	-	-
Closing Balance	**(12,727.21)**	**(6,098.21)**	**20,780.35**	**12,006.58**
b) Securities Premium				
Opening Balance	**11,553.82**	**11,553.82**	**11,553.82**	**11,553.82**
Changes during the year/period	-	-	-	-
Closing Balance	**11,553.82**	**11,553.82**	**11,553.82**	**11,553.82**
c) Share of equity in joint venture				
Opening Balance	**9,951.74**	**16,830.85**	**14,552.86**	**14,552.86**
Share of increase in equity in Joint Venture on issue of equity	-	-	2,277.99	-
Share of optionally convertible debentures in joint venture redeemed	-	(6,879.11)	-	-
Closing Balance	**9,951.74**	**9,951.74**	**16,830.85**	**14,552.86**
Grand Total	**8,778.35**	**15,407.35**	**49,165.02**	**38,113.26**

Nature and purpose of components of Other Equity are as follows:

Retained earnings
Retained earnings represents the profit that the SPV have earned till date and can be distributed as dividends considering the requirements of the Companies' Act, 2013.

Securities premium
Securities premium is used to record the premium on issue of shares. The reserve can be utilised only for limited purposes such as issuance of bonus shares in accordance with the provisions of the Companies Act, 2013.

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NXT- Infra Trust
Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

18 Borrowings - Non-current
At amortised cost

Particulars	As at September 30,2023	As at March 31,2023	As at March 31,2022	As at March 31,2021
Secured:				
a) Term Loan				
- from Banks	2,16,763.54	2,22,742.52	2,15,389.90	1,48,201.97
-from Financial Institutions	-	-	19,681.69	69,214.25
(Less): Current Maturities of Long-Term Borrowings	(15,657.51)	(15,709.66)	(11,603.19)	(8,500.89)
Sub-total (A)	**2,01,106.03**	**2,07,032.86**	**2,23,468.40**	**2,08,915.33**
				`
Unsecured:				
Optionally Convertible Debentures	91,907.74	91,907.74	-	-
Sub-total (B)	**91,907.74**	**91,907.74**	**-**	**-**
Total Non Current Borrowings (A + B)	**2,93,013.77**	**2,98,940.60**	**2,23,468.40**	**2,08,915.33**

Non- current financial liabilities - Borrowings(Secured)
Term Loan from Bank

Sr.no	Name of SPV	As at September 30,2023	As at March 31,2023	As at March 31,2022	As at March 31,2021
1	CTHPL Interest and Repayment Terms:	**49,685.89** As on September 30,2023: i) Rate of interest : Repo+2.30% (quarterly reset) ii)Repayment terms: 27 half yearly instalments commencing from November 2022. The borrowings have been utilised for the purpose it was raised.	**51,170.71** As on March 31,2023: i) Rate of interest : Repo+2.30% (quarterly reset) ii)Repayment terms: 27 half yearly instalments commencing from November 2022. The borrowings have been utilised for the purpose it was raised. During the current year, loan taken has been repaid during the year. Further, in respect of loan repaid during the year, satisfaction of charge is filed by the Company with the Registrar of Companies.	**53,837.00** As on March 31,2022: i) Rate of Interest: 1Y MCLR + 0.10% 1Y MCLR 1Y MCLR + 0.10% 1Y MCLR + 1.50 % ii) Repayment terms: Axis Bank Limited :The loan is repayable in 28 half-yearly instalments starting from May 2022 and ending in November 2035. During the current year, loan taken from IndusInd Bank Limited , PTC India Financial Services Limited , Karnataka Bank Limited, Indian Bank and Punjab National Bank has been repaid during the year. Further, in respect of loan repaid during the year to PTC India Financial Services Limited, satisfaction of charge is yet to be filed by the Company with the Registrar of Companies as no due certificate is yet to be received from the lender for the loan repaid during the year.	**33,292.94** As on March 31,2021: i) Rate of interest: 1Y MCLR + 0.10% 1Y MCLR + 0.10% 1Y MCLR 1Y MCLR + 0.10% 1Y MCLR + 1.50 % ii) Repayment terms: The loan is repayable in 28 half-yearly instalments starting from April 2022 and ending in September 2035.
2	GSY Interest and Repayment Terms:	**59,839.85** As on September 30,2023: i) Rate of interest: AAA Repo+2.05% Quarterly reset - AA-/ AA /AA+ Repo+2.3% Quarterly reset ii) Repayment terms: 25 half yearly instalment commencing from 31st December 2022.	**61,700.53** As on March 31,2023: i) Rate of interest: AAA Repo+2.05% Quarterly reset - AA-/ AA /AA+ Repo+2.3% Quarterly reset ii) Repayment terms: 25 half yearly instalment commencing from 31st December 2022.	**45,499.51** As on March 31,2022: i) Rate of interest: 6M MCLR 6M MCLR + 40 bps 6M MCLR + 40 bps ii) Repayment terms: Biannual instalment commencing from 30th June 2021 and ending on 31 Dec 2034. Biannual instalment commencing from 31st Dec 2021 and ending on 31 Dec 2034.	**23,646.45** As on March 31,2021: i) Rate of interest: LTRR minus 760 bps 1Y MCLR PLR 1Y MCLR ii) Repayment terms: Term loan is repayable in 28 half yearly installments starting from 2021 and ending in 2034.

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(All amounts in ₹ lakhs unless otherwise stated)

Sr.no	Name of SPV	As at September 30,2023	As at March 31,2023	As at March 31,2022	As at March 31,2021
3	DME	**29,875.00**	**31,582.40**	**36,490.20**	**39,058.26**
	Interest and Repayment Terms:	As on September 30,2023: i) Rate of interest: Repo+2.30% Quarterly reset ii) Repayments: 19 half yearly installments commencing from 30 September 2023.The borrowings have been utilised for the purpose it was raised.	As on March 31,2023: i) Rate of interest: 6 month MCLR plus 0.42% p.a. 1 year MCLR plus 0.52% p.a. 6 month MCLR plus 0.52% p.a ii) Repayments: 20 half yearly instalments commencing from March 2023. During the current year, loan taken from banks has been repaid during the year. Further, in respect of loans repaid during the year, satisfaction of charge is yet to be filed by the Company with the Registrar of Companies as no due certificates is yet to be received from the lender for the loan repaid during the year.	As on March 31,2022: i) Rate of interest: 6 month MCLR plus 0.42% p.a. 1 year MCLR plus 0.52% p.a. 6 month MCLR plus 0.52% p.a ii) Repayments: Term loans are repayable in half yearly installments starting from 2019 and ending in 2032.	As on March 31,2021: i) Rate of interest: 6 month MCLR plus 0.42% p.a. 1 year MCLR plus 0.52% p.a. 6 month MCLR plus 0.52% p.a ii) Repayments: Term loans are repayable in half yearly installments starting from 2020 and ending in 2032.
4	CGRG	**46,737.84**	**46,773.26**	**45,512.83**	**20,780.25**
	Interest and Repayment Terms:	As on September 30,2023: i) Rate of interest: AAA Repo+2.05% Quarterly reset AA-/ AA /AA+ Repo+2.3% Quarterly reset ii) Repayment terms: 24 half yearly instalment commencing from 31st Mar 2023.	As on March 31,2023: i) Rate of interest: AAA Repo+2.05% Quarterly reset AA-/ AA /AA+ Repo+2.3% Quarterly reset ii) Repayment terms: 24 half yearly instalment commencing from 31st Mar 2023.	As on March 31,2022: i) Rate of interest: 6M MCLR+40 bps 6M MCLR+40 bps 6M MCLR+40 bps ii) Repayment terms Biannual instalment commencing from 31st March 2021 and ending on 30 September 2034.	As on March 31,2021: i) Rate of interest: LTRR minus 760 bps 1Y MCLR PLR 1Y MCLR ii) Repayment terms Term loan is repayable in 28 half yearly installments starting from 2020 and ending in 2034.
5	WRIPL	**30,624.96**	**31,515.62**	**34,050.36**	**31,424.07**
	Interest and Repayment Terms:	As on September 30,2023: i) Rate of Interest - Bank rate plus 3% ii) Repayment terms: Payable in 16 half-yearly installments starting 2022-23 and ending in F.Y. 2029-30.	As on March 31, 2023: i) Rate of Interest - Bank rate plus 3% ii) Repayment terms: Payable in 16 half-yearly installments starting 2022-23 and ending in F.Y. 2029-30.	As on March 31, 2022: i) Rate of Interest - Bank rate plus 3% ii) Repayment terms: Payable in 16 half-yearly installments starting 2022-23 and ending in F.Y. 2029-30.	As on March 31, 2021: i) Rate of Interest - Bank rate plus 3% ii) Repayment terms: Payable in 16 half-yearly installments starting 2022-23 and ending in F.Y. 2029-30.
	Total	**2,16,763.54**	**2,22,742.52**	**2,15,389.90**	**1,48,201.97**

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

Optionally Convertible Debentures

Nature of Instrument	Name of SPV	As at			
		September 30,2023	March 31,2023	March 31,2022	March 31,2021
4,60,21,808 units (31 March 2023: 4,60,21,808; 31 March 2022: Nil; 31 March 2021: Nil) 12% Optionally convertible debentures of Rs. 100 each fully paid up and issued to Actis Infrastructure India PCC Limited.	CTHPL	46,021.81	46,021.81	-	-
1,94,32,964 units (31 March 2023: 1,94,32,964; 31 March 2022: Nil; 31 March 2021: Nil) 12% Optionally convertible debentures of Rs. 100 each fully paid up and issued to Actis Infrastructure India PCC Limited.	GSY	19,432.96	19,432.96	-	-
46,17,697 units (31 March 2023: 46,17,697; 31 March 2022: Nil; 31 March 2021: Nil) 12% Optionally convertible debentures of Rs. 100 each fully paid up and issued to Actis Infrastructure India PCC Limited.	DME	4,617.70	4,617.70	-	-
54,89,398 units (31 March 2023: 54,89,398; 31 March 2022: Nil; 31 March 2021: Nil) 12% Optionally convertible debentures of Rs. 100 each fully paid up and issued to Actis Infrastructure India PCC Limited.	WRIPL	5,489.40	5,489.40	-	-
16,345,873 units (31 March 2023: 16,345,873; 31 March 2022: Nil; 31 March 2021: Nil) 12% Optionally convertible debentures of Rs. 100 each fully paid up and issued to Actis Infrastructure India PCC Limited.	GSY	16,345.87	16,345.87	-	-
Total		**91,907.74**	**91,907.74**	-	-

Terms and conditions of unsecured Optionally convertible debentures ('OCDs')
The OCDs shall be unsecured and non-marketable. The holder of the OCDs will have right to convert the OCDs into equity shares any time after the issue date by issuing a notice to the company. On conversion, the number of share to be issued will be based on the conversion price which is higher of fair value of equity shares on the date of conversion and face value of equity shares. Subject to applicable laws, the SPV can redeem the OCDs any time after the issue date, with the prior written consent of the OCD holder and they shall be redeemable at face value. OCD will have a fixed coupon of 12% per annum or such other interest rate as may be prescribed by financing document. The accured interest on the OCDs shall be payable to holder on payable when able basis.

S.no	Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
19	**Non-Current Provisions**				
	Provision for employee benefits				
	- Leave encashment	6.23	-	-	-
	- Gratuity (Refer Note 36)	19.23	-	-	-
	Total	**25.46**	**-**	**-**	**-**
20	**Short Term Borrowings**				
	Unsecured				
	Loans repayable on demand(Interest Free)				
	- Related party	1,000.00	-	14,027.93	17,741.63
	-Others	149.65	4.85	-	-
	Interest Accrued but not due on optionally Convertible Debentures ('OCDs')	8,015.57	2,641.66	-	-
	Unsecured optionally Convertible Debentures ('OCDs')#	-	-	16,830.99	16,830.99
	Nil (31 March 2023: Nil; 31 March 2022: 1,68,30,990; 31 March 2021: 1,68,30,990) Optionally convertible debentures of Rs. 100 each fully paid up				
	Secured				
	Current maturities of long-term borrowings	15,657.51	15,709.66	11,603.19	8,502.79
	Total	**24,822.73**	**18,356.17**	**42,462.11**	**43,075.41**

**Optionally convertible debentures ('OCD')**

Nature of Instrument	Name of SPV	As at			
		September 30,2023	March 31,2023	March 31,2022	March 31,2021
Nil (31 March 2023: Nil; 31 March 2022: 19,54,000; 31 March 2021: 19,54,000) Optionally convertible debentures of Rs. 100 each fully paid up and issued to Welspun Enterprise Limited.	CTHPL	-	-	1,954.00	1,954.00
Nil (31 March 2023: Nil; 31 March 2022: 65,63,395; 31 March 2021: 65,63,395) Compulsorily convertible debentures of Rs. 100 each fully paid up and issued to Welspun Enterprise Limited.	CGRG	-	-	6,563.40	6,563.40
Nil (31 March 2023: Nil; 31 March 2022: 83,13,595; 31 March 2021: 83,13,595) Compulsorily convertible debentures of Rs. 100 each fully paid up and issued to Welspun Enterprise Limited.	GSY	-	-	8,313.60	8,313.60
Total	**GSY**	**-**	**-**	**16,831.00**	**16,831.00**

Terms and conditions of unsecured Optionally convertible debentures ('OCDs')
1,68,30,990 Optionally Convertible Debenture (OCDs) of Rs. 100 each issued to Welspun Enterprises Limited. The OCDs shall be unsecured and non-marketable.
i) Conversion:
Each OCDs shall be convertible, at the option of the holder or the SPV into 10 equity shares of Rs.10/- each of the SPV at any time after the expiry of 5 years and such conversion option shall be available till the expiry of the Tenure (10 years from the date of allotment) unless redeemed earlier.
ii) Redemption:
a) The Debenture holder as well as the SPV has the right to seek redemption or do redemption, as the case may be, any time.
b) If the debentures are not converted into equity as mentioned above nor redeemed until the expiry of the Tenure, the debentures shall be redeemed at the expiry of the Tenure.
iii) Payment of interest:
The debentures shall not carry any interest
As part of share purchase agreement (SPA) between Welspun Enterprises Limited (WEL) and Actis Highway Infra Limited (AHIL), the loans and optionally convertible debentures outstanding in the respective project SPV towards WEL have been redeemed with the proceeds received from Actis Infrastructure India PCC Limited (Subsidiary of AHIL) on issue of optionally convertible debentures by the respective project SPV.

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(All amounts in ₹ lakhs unless otherwise stated)

S.no	Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
21	**Trade Payables**				
	- Related party	-	-	27,019.70	17,040.12
	- Others	6,545.11	7,364.53	540.63	1,786.52
	Total	**6,545.11**	**7,364.53**	**27,560.33**	**18,826.64**
22	**Current financial liabilities - others**				
	Retention money payable	1.00	0.83	0.83	136.47
	Payable to employees	2.11	-	-	-
	Total	**3.11**	**0.83**	**0.83**	**136.47**
23	**Current Provision**				
	- Leave encashment	0.13	-	-	-
	- Gratuity (Refer Note 36)	0.27	-	-	-
	Total	**0.40**	**-**	**-**	**-**
24	**Other current liabilities**				
	Statutory dues payable	410.48	314.84	430.96	309.23
	Contract liabilities				
	- Advance against Construction Contract	145.19	211.60	15,633.94	2,914.39
	Total	**555.67**	**526.44**	**16,064.90**	**3,223.62**
25	**Current tax liability**				
	Provision for tax (Net of Advance Tax)	298.72	-	-	-
	Total	**298.72**	**-**	**-**	**-**

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

S.no	Particulars	For the period ended	For the Year ended 31 March 2023	For the Year ended 31 March 2022	For the Year ended 31 March 2021
26	**Revenue from operations**				
	Revenue from contracts with customers				
	Construction Revenue	1,714.95	20,010.14	48,106.33	62,225.30
	Revenue from operation and maintenances	2,266.70	4,888.21	4,398.18	1,614.93
	Total	**3,981.65**	**24,898.35**	**52,504.51**	**63,840.23**

Disclosure as required by the Appendix D of Ind AS 115

(a) Disaggregation of Revenue

Particulars	For the period ended	For the year ended March 31, 2023	For the year ended March 31, 2022	For the year ended March 31, 2021
Revenue from Contract with Customers				
Construction Revenue	1,714.95	20,010.14	48,106.33	62,225.30
Revenue from operation and maintenances	2,266.70	4,888.21	4,398.18	1,614.93
Total Revenue from Contract with Customers	**3,981.65**	**24,898.35**	**52,504.51**	**63,840.23**

(b) Reconciliation of revenue recognised in the statement of profit and loss with the contracted price

There are no reconciling items in the revenue recognized in the statement of profit and loss with contracted price.

(c) Performance Obligation

Outstanding Performance	Total	Time for expected conversion to Revenue					
		Up to 1 years	1 to 2 years	2 to 3 years	3 to 4 years	4 to 5 years	Beyond 5 years
As at 30 September 2023	3,524.14	3,524.14	-	-	-	-	-
As at 31 March 2023	2,838.00	2,838.00	-	-	-	-	-
As at 31 March 2022	21,520.00	18,683.00	2,838.00	-	-	-	-
As at 31 March 2021	65,680.00	44,158.00	18,683.00	2,838.00	-	-	-

(d) Contract balances

Particulars	Amount			
	Contract Assets	Contract Liability	Trade Receivables	Service concession receivable
Opening balance as at 1 April 2020	-	-	-	-
Closing balance as at 31 March 2021	13,526.91	2,914.39	18,354.29	1,59,603.50
Net Increase/(Decrease)	**13,526.91**	**2,914.39**	**18,354.29**	**1,59,603.50**
Opening balance as at 1 April 2021	13,526.91	2,914.39	18,354.29	1,59,603.50
Closing balance as at 31 March 2022	-	15,633.94	6,801.54	2,74,278.87
Net Increase/(Decrease)	**(13,526.91)**	**12,719.55**	**(11,552.75)**	**1,14,675.37**
Opening balance as at 1 April 2022	-	15,633.94	6,801.54	2,74,278.87
Closing balance as at 31 March 2023	-	211.60	4,878.37	2,49,026.51
Net Increase/(Decrease)	**-**	**(15,422.34)**	**(1,923.17)**	**(25,252.36)**
Opening balance as at 1 April 2023	-	211.60	4,878.37	2,49,026.51
Closing balance as at 30 September 2023	-	145.19	12,161.11	2,44,598.43
Net Increase/(Decrease)	**-**	**(66.41)**	**7,282.74**	**(4,428.08)**

Contract assets have been transferred to receivable under service concessions arrangement on the respective provisional commercial operation date (PCOD) of the SPV.

Trade receivables are non-interest bearing and are generally on terms less than 6 Months.

Contract Liabilities - The balances represent advances received from customers (authority) which are adjusted against milestone / annuity billings and is generally expected to be completed within a period of one year.

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

S.no	Particulars	For the period ended 30 September 2023	For the Year ended 31 March 2023	For the Year ended 31 March 2022	For the Year ended 31 March 2021
27	**Other Income**				
	Finance Income on financial assets carried at amortised cost	15,607.19	32,718.29	30,945.12	26,079.25
	Interest income on				
	- Bank deposits	862.92	557.86	112.37	21.08
	- income tax refund	8.93	81.48	27.41	133.34
	- loans	509.10	267.07	-	-
	- others	2.00	2.56	3.25	3.58
	Interest income on financial assets at fair value through profit and loss (' FVTPL')	140.58	543.15	52.18	-
	Gain on sale of Investments (Net)	-	-	28.85	135.49
	Net gain on financial assets measured at fair value through profit and loss (' FVTPL')	8.28	-	163.69	-
	Liabilities Written back	-	108.87	-	-
	Insurance claim	4.72	253.12	22.04	3,546.74
	Miscellaneous Income	-	3.41	0.11	-
	Total	**17,143.72**	**34,535.81**	**31,355.02**	**29,919.48**
28	**Construction and Other Operating Expenses**				
	Sub-contracting Charges	1,891.17	20,512.75	47,634.51	67,625.64
	Sub-contracting Charges- Routine & Maintenance	809.79	4,874.17	4,398.18	1,786.94
	Project Monitoring Charges	10.88	29.90	81.75	234.86
	Technical Consultancy Charges	75.28	72.95	179.20	166.91
	Total	**2,787.12**	**25,489.77**	**52,293.64**	**69,814.35**
29	**Finance costs**				
	Interest expenses on				
	- term loans	9,458.68	18,436.85	18,127.72	18,133.26
	- others	82.61	10.90	73.95	627.52
	- Unsecured optionally Convertible Debentures ('OCDs')	5,529.75	2,935.79	-	-
	Other borrowing cost	176.05	431.41	1,349.77	270.90
	Total	**15,247.09**	**21,814.95**	**19,551.44**	**19,031.68**
30	**Employee Benefit Costs**				
	Salaries, wages and bonus	282.45	-	-	-
	Gratuity expense (Refer Note 36)	17.02	-	-	-
	Contribution to provident and other funds (Refer Note 36)	6.13	-	-	-
	Staff Wellfare Expense	9.00	-	-	-
	Total	**314.60**	**-**	**-**	**-**
31	**Other expenses**				
	Power and fuel	328.24	210.39	14.31	2.96
	Insurance costs	272.12	114.16	53.95	666.65
	Legal & Professional fees	68.70	196.91	151.87	115.15
	Rates and taxes	12.63	33.90	799.05	321.22
	Loss on sale of investments (Net)	-	75.18	-	-
	Travelling and conveyance	34.49	-	-	0.18
	Rent	3.29	-	-	-
	Repairs and maintenance	36.11	-	-	-
	Payment to auditors :-				
	- Audit fees paid to respective auditors of SPV's (including fees for limited review)	11.17	17.00	13.12	11.13
	- Other matters	0.62	1.39	3.43	1.70
	Net loss on financial assets measured at fair value through profit and loss (' FVTPL')	-	130.49	-	16.80
	Corporate social responsibilities expenses	62.91	49.79	20.91	-
	Miscellaneous expenses	14.19	8.00	17.05	51.09
	Total	**844.47**	**837.21**	**1,073.69**	**1,186.88**

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Notes forming part of Special Purpose Combined Financial Statements
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32 Tax expense

The major component of income tax expenses for the period ended 30 September 2023 and years ended March 31, 2023, March 31, 2022 and March 31, 2021 are as under:

A) Income tax related to items recognised in Statement of profit and loss:-

Particulars	For the period ended 30 September 2023	For the Year ended 31 March 2023	For the Year ended 31 March 2022	For the Year ended 31 March 2021
Current tax	569.72	814.87	37.74	11.55
Deferred tax	(910.99)	2,157.56	2,557.79	1,001.83
Total income tax expense / (income)	**(341.27)**	**2,972.43**	**2,595.53**	**1,013.38**

B) Reconciliation of tax expense and the accounting profit multiplied by India's domestic tax rate:-

Particulars	For the period ended 30 September 2023	For the Year ended 31 March 2023	For the Year ended 31 March 2022	For the Year ended 31 March 2021
Accounting profit before tax	1,930.09	11,292.23	10,940.76	3,726.80
Statutory income tax rate (weighted average in %)	25.55%	25.28%	25.44%	25.87%
Expected income tax expenses at applicable statutory income tax rate	493.20	2,854.93	2,782.90	964.04
Tax effect of adjustments to reconcile expected income tax expenses to reported income tax expenses				
Write off of deferred tax assets on carried forward losses no longer available (refer note 32(E))	-	390.89	-	-
Benefit u/s 80-IA of Income Tax Act	(760.90)	-	-	-
Effect of other permanent allowances / disallowances	(73.57)	(273.39)	(187.37)	49.34
Income tax expenses reported in the statement of profit and loss	**(341.27)**	**2,972.43**	**2,595.53**	**1,013.38**

C) Deferred tax :

Particulars	For the period ended 30 September 2023	For the Year ended 31 March 2023	For the Year ended 31 March 2022	For the Year ended 31 March 2021
Deferred tax labilities (net)	3,708.02	3,562.63	6,614.68	4,726.15
Deferred tax assets (net)	(7,790.84)	(6,733.38)	(150.72)	(818.99)
Total	**(4,082.82)**	**(3,170.75)**	**6,463.96**	**3,907.16**

The movement in deferred tax assets / (liabilities) during the six month period ended 30 September 2023 and years ended 31 March 2023, 31 March 2022 and 31 March 2021 is as given below:

Six months period ended 30 September 2023	As at 1 April 2023	Recognised in profit or loss during the period	Recognised in Other Equity during the period	As at 30 September 2023
Deferred tax liabilities				
Difference in carrying value and tax base on measurement of financial assets under service concession arrangement/ intangible assets	(3,367.04)	(598.60)	-	(3,966.11)
Difference in carrying value and tax base of borrowing	335.08	-	-	335.08
Others	110.55	(0.77)	-	109.78
	(2,921.41)	**(599.37)**	**-**	**(3,521.25)**
Deferred tax assets				
Carried forward income tax losses	249.34	311.63	-	560.97
Others	-	0.60	-	0.60
	249.34	**312.23**	**-**	**561.57**
Net Deferred tax (assets) / liabilities	**(3,170.75)**	**(911.60)**	**-**	**(4,082.82)**

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For the year ended 31 March 2023	As at 1 April 2022	Recognised in profit or loss during the period	Recognised in Other Equity during the period	As at 31 March 2023
Deferred tax liabilities				
Difference in carrying value and tax base on measurement of financial assets under service concession arrangement/ intangible assets	7,028.21	1,397.03	(11,794.12)	(3,367.04)
Difference in carrying value and tax base of borrowing	376.82	(41.74)	-	335.08
Others	0.66	109.89	-	110.55
	7,405.69	**1,465.18**	**(11,794.12)**	**(2,921.41)**
Deferred tax assets				
Carried forward income tax losses	814.64	(565.30)	-	249.34
Mat credit entitlement	127.09	(127.09)	-	-
	941.73	**(692.39)**	**-**	**249.34**
Net Deferred tax (assets) / liabilities	**6,463.96**	**2,157.57**	**(11,794.12)**	**(3,170.75)**

For the year ended 31 March 2022	As at 1 April 2021	Recognised in profit or loss during the period	Recognised in Other Equity during the period	As at 31 March 2022
Deferred tax liabilities				
Difference in carrying value and tax base on measurement of financial assets under service concession arrangement/ intangible assets	4,151.05	2,878.15	-	7,028.21
Difference in carrying value and tax base of borrowing	631.87	(255.05)	-	376.82
Others	1.80	(1.14)	-	0.66
	4,784.72	**2,621.96**	**-**	**7,405.69**
Deferred tax assets				
Carried forward income tax losses	788.21	26.43	-	814.64
Mat credit entitlement	89.35	37.74	-	127.09
	877.56	**64.17**	**-**	**941.73**
Net Deferred tax (assets) / liabilities	**3,907.16**	**2,557.79**	**-**	**6,463.96**

For the year ended 31 March 2021	As at 1 April 2020	Recognised in profit or loss during the period	Recognised in Other Equity during the period	As at 31 March 2021
Deferred tax liabilities				
Difference in carrying value and tax base on measurement of financial assets under service concession arrangement/ intangible assets	2,986.97	1,164.71	-	4,151.05
Difference in carrying value and tax base of borrowing	-	631.87	-	631.87
Others	-	1.80	-	1.80
	2,986.97	**1,798.38**	**-**	**4,784.72**
Deferred tax assets				
Carried forward income tax losses	-	788.21	-	788.21
Mat credit entitlement	81.00	8.34	-	89.35
	81.00	**796.55**	**-**	**877.56**
Net Deferred tax (assets) / liabilities	**2,905.97**	**1,001.83**	**-**	**3,907.16**

NXT- Infra Trust

Special Purpose Combined Balance Sheet

(All amounts in ₹ lakhs unless otherwise stated)

D) The SPV Group has following unutilised MAT credit under Income Tax Act, 1961 which is included in deferred tax assets as at Balance sheet date :

Particulars	March 2023		March 2022		March 2021	
	Carried forward losses available	Expiry assessment year	Carried forward losses available	Expiry assessment year	MAT credit available	Expiry assessment year
AY 2017-2018	-	-	-	-	6.20	2032-33
AY 2020-2021	-	-	-	-	0.35	2035-36
Total	**-**	**-**	**-**	**-**	**6.55**	

The MAT credit has been utilised in F.Y. 21-22.

E) The SPV Group has following available carried forward losses under Income Tax Act, 1961 for which deferred tax has been recognised as at Balance sheet date :

Particulars	March 2023		March 2022		March 2021	
	Carried forward losses available	Expiry assessment year	Carried forward losses available	Expiry assessment year	Carried forward losses available	Expiry assessment year
AY 2018-19	-	-	102.64	2026-27	102.64	2026-27
AY 2021-22	-	-	2,613.77	2029-30	3,293.10	2029-30
AY 2022-23	-	-	543.49	2030-31	-	-
AY 2023-24	990.26	2031-32	-	-	-	-
Total	**990.26**		**3,259.90**		**3,395.74**	

As per section 79 of Income Tax Act, 1961, on change in shareholding from Welspun Enterprises Limited to Actis Highway Infra Limited in FY 2022-2023 all brought forward business losses will not be available for set off and accordingly deffered tax asset on such losses prior to the acquisition have been written off.

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NXT- Infra Trust

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

33 a) Fair value measurements

On comparison by the class of the carrying amounts and fair value of the company's financial instruments, the carrying amounts of the financial instruments reasonably approximates fair value

Financial instruments by category

Particulars	As at 30 September 2023		As at 31 March 2023		As at 31 March 2022		As at 31 March 2021	
	Carrying Value	Fair Value	Carrying Value	Fair Value	Carrying Value	Fair Value	Carrying Value	Fair Value
(a) Financial assets measured at amortised cost								
Non-current assets								
Receivable Under Service Concession Arrangements	1,88,112.04	1,88,112.04	1,95,422.07	1,95,422.07	2,00,282.92	2,00,282.92	1,37,351.27	1,37,351.27
Other financial assets	10,287.50	10,287.50	10,109.90	10,109.90	45.15	45.15	2,974.89	2,974.89
Investment Accounted for using Equity Method	8,078.88	8,078.88	9,257.71	9,257.71	17,533.51	17,533.51	14,826.97	14,826.97
Loans	17,622.30	17,622.30	17,164.11	17,164.11	-	-	-	-
Current assets								
Trade receivables	12,161.11	12,161.11	4,878.37	4,878.37	6,801.54	6,801.54	18,354.29	18,354.29
Cash and cash equivalents	3,891.90	3,891.90	16,586.50	16,586.50	18,517.25	18,517.25	1,212.67	1,212.67
Bank balances other than cash & cash equivalents	11,724.52	11,724.52	6,977.52	6,977.52	3,974.63	3,974.63	25.28	25.28
Receivable Under Service Concession Arrangements	56,486.40	56,486.40	53,604.44	53,604.44	73,995.95	73,995.95	22,252.23	22,252.23
Other financial assets	6.17	6.17	-	-	938.21	938.21	2,724.85	2,724.85
Total Financial assets measured at amortised cost	**3,08,370.82**	**3,08,370.82**	**3,14,000.62**	**3,14,000.62**	**3,22,089.16**	**3,22,089.16**	**1,99,722.45**	**1,99,722.45**
(b) Financial assets mandatory measured at Fair value through profit & loss								
Current Investments	7,106.88	7,106.88	6,098.58	6,098.58	7,476.02	7,476.02	1,069.03	1,069.03
Total Financial assets measured at FVTPL	**7,106.88**	**7,106.88**	**6,098.58**	**6,098.58**	**7,476.02**	**7,476.02**	**1,069.03**	**1,069.03**
Total financial assets (a+b)	**3,15,477.69**	**3,15,477.69**	**3,20,099.20**	**3,20,099.20**	**3,29,565.18**	**3,29,565.18**	**2,00,791.48**	**2,00,791.48**
Financial liabilities measured at amortised cost								
Non-current liabilities								
Borrowings	2,93,013.77	2,93,013.77	2,98,940.60	2,98,940.60	2,23,468.40	2,23,468.40	2,08,915.33	2,52,965.43
Current liabilities								
Borrowings	24,822.73	24,822.73	18,356.17	18,356.17	42,462.11	42,462.11	43,075.41	59,451.73
Trade payables	6,545.11	6,545.11	7,364.53	7,364.53	27,560.33	27,560.33	18,826.64	36,779.67
Other financial liabilities	3.11	3.11	0.83	0.83	0.83	0.83	136.47	136.47
Total financial liabilities	**3,24,384.72**	**3,24,384.72**	**3,24,662.13**	**3,24,662.13**	**2,93,491.67**	**2,93,491.67**	**2,70,953.85**	**3,49,333.30**

Fair value hierarchy

Financial assets and financial liabilities measured at fair value in the Special Purpose Combined Balance Sheet are divided into three levels of fair value hierarchy. The three levels are defined based on the observability of significant inputs to the measurement, as follows:

Level 1: quoted (unadjusted) prices in active markets for identical assets or liabilities.
Level 2: The fair value of financial instruments that are not traded in an active market is determined using valuation techniques which maximise the use of observable market data rely as little as possible on entity specific estimates.
Level 3: If one or more of the significant inputs is not based on observable market data, the instrument is included in level 3.

The following table provides the fair value measurement hierarchy of the SPV Group's assets and liabilities:

Particulars	Fair value measurement as at September 30, 2023		
	Level 1	Level 2	Level 3
Financial assets measured at Fair Value Through Profit and Loss (FVTPL)			
Investment in Mutual funds	3,647.77	-	-
Investment in Bonds	-	3,459.11	-

Particulars	Fair value measurement as at March 31, 2023		
	Level 1	Level 2	Level 3
Financial assets measured at Fair Value Through Profit and Loss (FVTPL)			
Investment in Mutual funds	2,545.66	-	-
Investment in Bonds	-	3,552.92	-

Particulars	Fair value measurement as at March 31, 2022		
	Level 1	Level 2	Level 3
Financial assets measured at Fair Value Through Profit and Loss (FVTPL)			
Investment in Mutual funds	-	-	-
Investment in Bonds	-	7,476.02	-

Particulars	Fair value measurement as at March 31, 2021		
	Level 1	Level 2	Level 3
Financial assets measured at Fair Value Through Profit and Loss (FVTPL)			
Investment in Mutual funds	1,069.03	-	-
Investment in Bonds	-	-	-

The SPV Group is required to present the Statement of total assets at fair value and Statement of total returns at fair value as per section 3.3.4 of SEBI Master Circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2023/115 dated 06 July 2023 as a part of these Special purpose combined financial statements - Refer Statement of Net assets at fair value and Statement of Total Returns at fair value.

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

34 Financial risk management objectives and policies

The Company's principal financial liabilities mainly comprise borrowings and other payables. The main purpose of these financial liabilities is to finance the Company's operations. The Company's principal financial assets includes loans, service concession receivables, other receivables, and cash and cash equivalents that derive directly from its operations.

The Company is exposed to market risk, credit risk and liquidity risk. The Company's management oversees the management of these risks.

A) Market risk

Market risk is the risk that the fair value of future cash flow of financial instrument will fluctuate because of changes in market prices. Market Risk comprises three types of risk: interest rates risk, currency risk and other price risk, such as equity prices risk and commodity risk. Financial instruments affected by market risk include loans and borrowings, deposits and debt.

The sensitivity analyses in the following sections relate to the position as at 30 September 2023, 31 March 2023 , 31 March 2022 and 31 March 2021.

Interest rate risk

Interest risk is the risk that the Company's fair value of future cash flow of financial instrument will fluctuate beacuse of changes in market interest rates. The group's exposure to the risk of changes in market interest rates relates primarily to the group's long term debt obligation with floating interest rates

(i) Interest rate risk exposure

Particuar	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
Financial Asset				
Loans	17,622.30	17,164.11	-	-
Financial Liabilities				
Borrowings	3,08,671.29	3,14,650.26	2,35,071.59	2,17,418.12

Interest rate sensitivity

The following table demonstrates the sensitivity to a reasonably possible change in interest rates on that portion of loans and borrowings affected. With all other variables held constant, the Company's profit before tax is affected through the impact of change in interest rate of borrowings, as follows:

Particulars	For the period ended 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
Interest rates : (Increase) by 50 basis points				
Financial Assets	88.11	85.82	-	-
Financial Laibilities	(1,543.36)	(1,573.25)	(1,175.36)	(1,087.09)
Interest rates : Decrease by 50 basis points				
Financial Assets	(88.11)	(85.82)	-	-
Financial Laibilities	1,543.36	1,573.25	1,175.36	1,087.09

Foreign Currency risk

Currency risk is the risk that the fair value or future cash flows fluctuate because of changes in market prices of various currencies against the functional currency. However the Company is currently not exposed to foreign currency risk.

B) Credit risk

Credit risk arises from the possibility that counter party may not be able to settle their obligations as agreed. To manage this, the Company periodically assesses the financial reliability of customers, taking into account the financial condition, current economic trends, and analysis of historical bad debts and ageing of accounts receivable. Individual risk limits are set accordingly. As the customer of the Company is body corporate representing government, the credit risk is insignificant.

The carrying amount of following financial assets represents the maximum credit exposure:

Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
Service concession receivables				
Non-current	1,88,112.04	1,95,422.07	2,00,282.92	1,37,351.27
Current	56,486.40	53,604.44	73,995.95	22,252.23
Trade Receivable	12,161.11	4,878.37	6,801.54	18,354.29
Security deposit				
Non-current	110.15	109.90	45.15	34.29
Current	6.07	-	-	-
Contract Asset				
Non-current	-	-	-	63,528.72
Current	-	-	-	13,526.91
Total	**2,56,875.77**	**2,54,014.78**	**2,81,125.56**	**2,55,047.71**

C) Liquidity risk

Liquidity risk is defined as the risk that the Company will not be able to settle or meet its obligations on time or at a reasonable price. The Company's treasury department is responsible for liquidity, funding as well as settlement. In addition, processes and policies related to such risks are overseen by senior management. Management monitors the Company's net liquidity position through rolling forecasts on the basis of expected cash flows.

a) Exposure to liquidity risk

The table below summarises the maturity profile of the Company's financial liabilities based on contractual undiscounted payments.

Expected Maturity of Financials Liabilities	Up to 1 Year	1 to 5 Years	5+ Years	Total	Carrying Value
30th September, 2023					
Long Term Borrowings	-	79,795.72	2,14,537.08	2,94,332.80	2,93,013.77
Short Term Borrowings	24,822.73	-	-	24,822.73	24,822.73
Trade Payables	6,545.11	-	-	6,545.11	6,545.11
Other Financial Liability	3.11	-	-	3.11	3.11
31st March, 2023					
Long Term Borrowings	-	90,224.28	2,10,042.93	3,00,267.21	2,98,940.60
Short Term Borrowings	18,356.17	-	-	18,356.17	18,356.17
Trade Payables	7,364.53	-	-	7,364.53	7,364.53
Other Financial Liability	0.83	-	-	0.83	0.83
31st March, 2022					
Long Term Borrowings	-	90,316.24	1,34,315.51	2,24,631.75	2,23,468.40
Short Term Borrowings	42,462.11	-	-	42,462.11	42,462.11
Trade Payables	27,560.33	-	-	27,560.33	27,560.33
Other Financial Liability	0.83	-	-	0.83	0.83
31st March, 2021					
Long Term Borrowings	-	64,705.00	1,46,380.14	2,11,085.14	2,08,915.33
Short Term Borrowings	43,075.41	-	-	43,075.41	43,075.41
Trade Payables	18,826.64	-	-	18,826.64	18,826.64
Other Financial Liability	136.47	-	-	136.47	136.47

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

35 The Special Purpose Combined Financial Statements are prepared after considering the adjustments as required pursuant to section 3.3.4 of SEBI Master Circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2023/115 dated 06 July 2023.
Below disclosure compiles the adjustments made to the general purpose annual financial statements of the SPV Group for the financial years ended 31 March 2022, 31 March 2021 and 31 March 2020 respectively, while preparing these Special Purpose Combined Financial Statements:

(i) Impact on Combined Balance Sheet

Particulars	Footnotes as per 35(v)	As at 31 March 2023			As at 31 March 2022			As at 31 March 2021		
		General purpose audited financial statements	Adjustments	Special Purpose Financial Statements (Adjusted)	General purpose audited financial statements	Adjustments	Special Purpose Financial Statements (Adjusted)	General purpose audited financial statements	Adjustments	Special Purpose Financial Statements (Adjusted)
ASSETS										
1. Non-current assets										
(a) Property, plant and equipment		0.56	-	0.56	0.56	-	0.56	-	-	-
(b) Financial assets										
(i) Investment Accounted for using Equity Method		-	9,257.71	9,257.71	-	17,533.51	17,533.51	-	14,826.97	14,826.97
(ii) Receivable Under Service Concession Arrangements	A, B, C, E, O	2,29,954.43	(34,532.36)	1,95,422.07	2,59,472.98	(59,190.06)	2,00,282.92	2,73,477.27	(1,36,126.00)	1,37,351.27
(iii) Other financial assets	C, K	43.70	10,066.21	10,109.90	34.04	11.11	45.15	2,940.60	34.29	2,974.89
(iv) Loans	K	-	17,164.11	17,164.11			-			-
(c) Deferred tax assets (net)	P	165.49	6,567.88	6,733.38	738.16	(587.44)	150.72	614.88	204.11	818.99
(d) Non-current tax assets (net)		1,198.61	-	1,198.61	1,609.20	-	1,609.20	1,316.21	-	1,316.21
(e) Other non-current assets	A, E, F	11,335.95	(768.65)	10,567.30	12,547.84	45,207.80	57,755.64	14,265.49	1,08,552.50	1,22,817.99
Total Non current Assets		**2,42,698.74**	**7,754.89**	**2,50,453.63**	**2,74,402.78**	**2,974.92**	**2,77,377.70**	**2,92,614.45**	**(12,508.13)**	**2,80,106.32**
2. Current assets										
(a) Contract assets	G	-	-	-	-	-	-	1,311.14	(1,311.14)	-
(b) Financial assets										
(i) Current investments		6,098.58	-	6,098.58	7,476.02	-	7,476.02	1,069.03	-	1,069.03
(ii) Loans	K	17,164.13	(17,164.13)	-	-	-	-	-	-	-
(iii) Trade receivables	B	20.36	4,858.01	4,878.37	20.36	6,781.18	6,801.54	20.36	18,333.93	18,354.29
(iv) Cash and cash equivalents		16,586.50	-	16,586.50	18,517.25	-	18,517.25	1,212.67	-	1,212.67
(v) Bank balances other than (iii) above	K	16,977.52	(10,000.00)	6,977.52	3,974.63	-	3,974.63	25.28	-	25.28
(vi) Receivable Under Service Concession Arrangements	A, B, C, E, O	52,403.11	1,201.34	53,604.45	47,600.22	26,395.73	73,995.95	27,327.37	(5,075.14)	22,252.23
(vii) Other financial assets	C, D	347.73	(347.73)	-	949.40	(11.19)	938.21	2,758.19	(33.34)	2,724.85
(c) Other current assets	E, F	9,888.86	232.02	10,120.87	12,313.92	(1,176.12)	11,137.80	16,374.71	9,780.33	26,155.04
Total current Assets		**1,19,486.79**	**(21,220.49)**	**98,266.29**	**90,851.80**	**31,989.60**	**1,22,841.40**	**50,098.75**	**21,694.64**	**71,793.39**
Total Assets		**3,62,185.53**	**(13,465.59)**	**3,48,719.92**	**3,65,254.58**	**34,964.52**	**4,00,219.10**	**3,42,713.20**	**9,186.51**	**3,51,899.71**
EQUITY AND LIABILITIES										
Equity										
(a) Equity share capital		4,561.37	-	4,561.37	4,561.37	-	4,561.37	4,561.37	-	4,561.37
(b) Instruments in nature of equity	H	-	-	-	25,049.56	5,271.90	30,321.46	25,050.11	5,271.35	30,321.46
(c) Other equity	L, P	28,250.46	(12,843.11)	15,407.35	18,597.16	30,567.86	49,165.02	13,953.93	24,159.33	38,113.26
Total Equity		**32,811.83**	**(12,843.11)**	**19,968.72**	**48,208.09**	**35,839.76**	**84,047.85**	**43,565.41**	**29,430.68**	**72,996.09**
LIABILITIES										
1. Non-current liabilities										
(a) Financial liabilities										
(i) Borrowings		2,98,940.60	-	2,98,940.60	2,23,468.40	-	2,23,468.40	2,08,915.33	-	2,08,915.33
(b) Deferred tax liabilities (net)	P	4,174.13	(611.50)	3,562.63	2,250.93	4,363.75	6,614.68	804.65	3,921.50	4,726.15
(c) Other non current liabilities	O	-	-	-	-	-	-	14,463.49	(14,463.49)	-
Total Non current Liabilities		**3,03,114.73**	**(611.50)**	**3,02,503.23**	**2,25,719.33**	**4,363.75**	**2,30,083.08**	**2,24,183.47**	**(10,541.99)**	**2,13,641.48**
2. Current liabilities										
(a) Contract liabilities	I	211.60	(211.60)	-	15,498.75	(15,498.75)	-	2,804.57	(2,804.57)	-
(b) Financial liabilities										
(i) Borrowings	H, M	18,356.17	-	18,356.17	47,733.99	(5,271.88)	42,462.11	39,843.91	3,231.50	43,075.41
(ii)Trade payables	J	7,364.53	-	7,364.53	27,690.10	(129.77)	27,560.33	23,257.33	(4,430.69)	18,826.64
(iii) Other financial liabilities		0.83	-	0.83	0.83	-	0.83	8,639.47	(8,503.00)	136.47
(c) Other current liabilities	I	325.84	200.60	526.44	403.49	15,661.41	16,064.90	419.04	2,804.58	3,223.62
Total current Liabilities		**26,258.97**	**(10.99)**	**26,247.97**	**91,327.16**	**(5,238.99)**	**86,088.17**	**74,964.32**	**(9,702.18)**	**65,262.14**
Total Liabilities		**3,29,373.70**	**(622.49)**	**3,28,751.20**	**3,17,046.49**	**(875.24)**	**3,16,171.25**	**2,99,147.79**	**(20,244.17)**	**2,78,903.62**
Total equity and liabilities		**3,62,185.53**	**(13,465.61)**	**3,48,719.92**	**3,65,254.58**	**34,964.52**	**4,00,219.10**	**3,42,713.20**	**9,186.51**	**3,51,899.71**

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

(ii) Impact on Combined statement of profit and loss and total comprehensive income

Particulars	Footnotes as per 35(v)	For the year ended 31 March 2023			For the year ended 31 March 2022			For the year ended 31 March 2021		
		General purpose audited financial statements	Adjustments	Special Purpose Financial Statements (Adjusted)	General purpose audited financial statements	Adjustments	Special Purpose Financial Statements (Adjusted)	General purpose audited financial statements	Adjustments	Special Purpose Financial Statements (Adjusted)
(I) Income										
Revenue from operations	A, D, J, O	27,723.04	(2,824.69)	24,898.35	53,984.72	(1,480.22)	52,504.51	84,398.36	(20,558.14)	63,840.23
Other Income	A, D	34,392.80	143.02	34,535.81	25,906.36	5,448.66	31,355.02	22,382.36	7,537.12	29,919.48
Total income		**62,115.84**	**(2,681.67)**	**59,434.16**	**79,891.08**	**3,968.44**	**83,859.53**	**1,06,780.72**	**(13,021.02)**	**93,759.71**
(II) Expenses										
Construction and Other Operating Expenses	A, J, N, O	21,342.78	4,146.99	25,489.77	46,814.37	5,479.27	52,293.64	75,719.95	(5,905.60)	69,814.35
Finance costs	L	22,927.51	(1,112.57)	21,814.95	20,723.28	(1,171.84)	19,551.44	20,203.75	(1,172.07)	19,031.68
Employee benefits costs		-	-	-	-	-	-	-	-	-
Other expenses	N, O	5,934.45	(5,097.24)	837.21	7,520.44	(6,446.75)	1,073.69	8,901.34	(7,714.46)	1,186.88
Total expenses		**50,204.75**	**(2,062.82)**	**48,141.93**	**75,058.09**	**(2,139.32)**	**72,918.77**	**1,04,825.04**	**(14,792.13)**	**90,032.91**
(III) Profit before share of profit / (loss) of Joint Venture (I-II)		**11,911.09**	**(618.85)**	**11,292.23**	**4,832.99**	**6,107.76**	**10,940.76**	**1,955.68**	**1,771.11**	**3,726.80**
(IV) Share of profit / (loss) of Joint Venture (net of tax)	R	(344.66)	(1,052.04)	(1,396.69)	55.85	372.69	428.53	(3.70)	277.81	274.11
(V) Profit before Tax (IV+III)		**11,566.43**	**(1,670.89)**	**9,895.54**	**4,888.84**	**6,480.45**	**11,369.29**	**1,951.98**	**2,048.92**	**4,000.91**
(VI) Tax expense/(Income)										
- Current tax		814.87	-	814.87	37.73	-	37.73	11.55	-	11.55
- Deferred tax	P	2,495.43	(337.87)	2,157.56	1,323.40	1,234.39	2,557.79	857.62	144.21	1,001.83
Total Tax expense / (income)		**3,310.30**	**(337.87)**	**2,972.43**	**1,361.13**	**1,234.39**	**2,595.52**	**869.17**	**144.21**	**1,013.38**
(VII) Profit for the year (V-VI)		**8,256.13**	**(1,333.02)**	**6,923.11**	**3,527.70**	**5,246.06**	**8,773.77**	**1,082.81**	**1,904.71**	**2,987.53**
Other comprehensive income for the year		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Total comprehensive (loss)/ income for the year		**8,256.13**	**(1,333.02)**	**6,923.11**	**3,527.70**	**5,246.06**	**8,773.77**	**1,082.81**	**1,904.71**	**2,987.53**

(iii) Impact on Combined cash flow

Particulars	Footnotes as per 35(v)	For the year ended 31 March 2023			For the year ended 31 March 2022			For the year ended 31 March 2021		
		General purpose audited financial statements	Adjustments	Special Purpose Financial Statements (Adjusted)	General purpose audited financial statements	Adjustments	Special Purpose Financial Statements (Adjusted)	General purpose audited financial statements	Adjustments	Special Purpose Financial Statements (Adjusted)
A. Cash flows from operating activities	P, Q	27,417.25	(30,103.20)	(2,685.95)	31,588.68	(16,671.53)	14,917.16	(53,011.78)	(4,896.38)	(57,908.15)
B. Cash Flows from Investing Activities	P, Q	(27,595.00)	29,048.53	1,453.53	(7,057.00)	15,089.54	8,032.54	(520.00)	3,877.06	3,357.06
C. Cash Flows from Financing Activities	P	(1,753.00)	1,054.67	(698.33)	(7,227.00)	1,581.88	(5,645.12)	51,296.00	1,019.31	52,315.31
Net Increase in cash and cash equivalents		(1,930.75)	-	(1,930.75)	17,304.58	-	17,304.58	(2,235.78)	-	(2,235.78)
Cash and cash equivalents at the beginning of the year		18,517.25	-	18,517.25	1,212.67	-	1,212.67	3,448.45	-	3,448.45
Cash and cash equivalents at the end of the year		**16,586.50**	**-**	**16,586.50**	**18,517.24**	**-**	**18,517.25**	**1,212.67**	**-**	**1,212.67**

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

(iv) Impact on Retained earnings as at 1 April, 2020

Particulars	Notes	Amount
A. Retained earnings as per General purpose audited financial statements as at 1 April 2020		(444.02)
Adjustment:		
(i) Adjustment on revision of construction cost and recognition of prepayments	A	36,778.27
(ii) Adjustment to receivable under service concession arrangement as per revised allocation of consideration to performance obligation for the purpose of revenue recognition	A	(18,639.96)
(iii) Adjustment on incorrect accrual of insurance claim income	D	(5,102.04)
(iv) Deferred tax adjustment on above	P	(3,573.20)
B. Total Impact on adjustments		**9,463.07**
C. Retained earnings as adjusted as at 1 April 2020 (A+B)		**9,019.05**

(v) Footnotes

A. SPV's has entered into service concession agreement with the grantor and the same has been accounted by applying financial asset model in accordance with Appendix C – "Service Concession Agreement" to IND AS – 115 – Revenue from Contracts with Customers.

The SPV's had entered into agreement with Welspun Enterprises Limited ('WEL'), the parent at that time, for sub-contracting construction, major maintenance and routine maintenance obligation under the SCA.

Accordingly, the SPV's are required to allocate consideration from the customer (grantor) against each performance obligation in proportion to their relative value for revenue recognition, and correspondingly charge amount paid/ payable/ attributable towards services received as the sub-contractor renders services. As the amounts attributable to services received are not readily available, and the same has been estimated based on the information that is reasonably available to the SPV's.

Given the principles of IND AS and basis estimated allocation determined, the excess revenue recognised during the construction period has been adjusted with corresponding reduction to the cost of construction and receivable under service concession arrangement. While the same would have been adjusted against the services to be rendered by the EPC contractor (Welspun Enterprises Limited or WEL), but given that WEL has sold the SPV's to Sponsor, the operation and maintenance contract with Welspun Enterprises Limited has been mutually terminated. In accordance with IND AS, the impact of any transaction with the shareholder is accounted through equity and accordingly the aforesaid difference has been adjusted in Equity (net of tax). Also, consequential change in interest income as per EIR method due to change in financial asset has been accounted in the statement of profit and loss.
The entity-wise and year-wise details of reduction to the cost of construction and recognition of prepayments (classified in other non current assets) is as given below:-

Particulars	CGRG	CTHPL	GSY	DME	Total
Reduction to the cost of construction and recognition of prepayments up to 1 April 2020	9,474.00	11,050.00	4,255.00	12,000.00	36,779.00
Reduction to the cost of construction during the year 31 March 2021	51.00	4,482.00	74.00	-	4,607.00
Prepayments as at 31 March 2021	9,525.00	15,532.00	4,329.00	12,000.00	41,386.00
Reduction to the cost of construction during the year 31 March 2022	180.00	2,926.00	228.00	-	3,334.00
Prepayments as at 31 March 2022	9,705.00	18,458.00	4,557.00	12,000.00	44,720.00
Reduction to the cost of construction during the year 31 March 2023	296.00	538.00	41.00	-	875.00
Prepayments as at 31 March 2023*	10,001.00	18,996.00	4,598.00	12,000.00	45,595.00

* Written off to equity (net of tax) Rs.33,801.67 lakhs on account of termination of maintenance contract between the SPVs and erstwhile shareholder Welspun Enterprises Limited (WEL).

B. Reclassification of amounts billed and outstanding from receivable under service concession arrangements to trade receivable for all periods presented above.

C. Rectification of classification of receivable under service concession arrangements / security deposits between current and non current for all periods presented above.

D. Reversal of insurance claim receivable due to incorrect income accrual, reclassification of insurance claim income from revenue from operation to other income and adjustments made to recognise insurance claim income in certain SPV's in the correct period by applying the recognition criteria as per IND-AS.

E. Reclassification of receivable under service concession arrangement recorded till the date of receipt of provisional commercial operation date (PCOD) to other current / non current assets (contract assets) as the unconditional contractual right to receive cash is established only from this date.

F. Reclassification of balance with government authorities (goods and services input tax credit) between current and non current for all periods presented above.

G. Reclassification of advance to supplier from contract assets to other current assets (contract assets).

H. Reclassification of optionally convertible debentures from borrowings to instruments in the nature of equity as per the terms of the instruments in 31 March 2022 and 31 March 2021 in accordance with requirements of IND-AS 32.

I. Reclassification of mobilisation advance received from contract liability to other current liability (contract liability) for all periods presented above.

J. Rectification of under/over accrual of construction cost recorded in 31 March 2021 and 31 March 2022.

K. Reclassification of bank deposits and loan from current to non current as per assessment of expected period in which they will be settled for 31 March 2023.

L. De-recognition of equity portion of financial guarantee commission and corresponding expense being integral part of borrowings, for all the periods presented above.

M. Reclassification of current maturity of long term borrowings into short term borrowings in 31 March 2021.

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

N. Reclassification of operating expenses from other expenses to construction and other operating expenses for all the periods presented above.

O. Revenue was accounted gross of indirect taxes (GST) along with recording of corresponding cost. As per IND AS, the grossing up impact on cost & revenue and correspondingly to liabilities and receivable under service concessions arrangement has been rectified.

P. Adjustments in other equity has been made consequent to the adjustments (explained above) along with corresponding impacts to tax expense/ deferred tax assets/ deferred tax liability including related cash flow adjustments, wherever applicable for all the periods presented above.

Q. Presentation of change in receivable under service concession arrangements on account of interest annuity received from 'cash flows from operation activities' to 'cash flows from investing activities" for all the periods presented above.

R. Adjustments made with respect to the audited profit / loss of WIPL (Investment Entity) is as follows:-

	Particulars	**Rs in lakhs**		
		For the Year ended 31 March 2023	**For the Year ended 31 March 2022**	**For the Year ended 31 March 2021**
	Profit / (loss) after tax of WIPL as per audited financial statements	(703.38)	113.97	(7.55)
	Adjustments for:-			
i	Impact on account of recognition of grant received from authority (financial asset) on accrual basis as against cash basis followed earlier and unwinding (EIR) impact on financial asset	1,405.33	1,053.74	785.47
ii	Provision for major maintenance (MMR) recognised in accordance with Ind AS, including unwinding impact on MMR provision	(5,296.35)	-	-
iii	Reduction in intangible asset amortisation (due to grant recognition, rectification of amortisation period and adjustments for other costs considered in capitalisation)	819.63	-	-
iv	Under accrual of revenue at period end	96.91	-	-
v	Deferred tax adjustment on above	827.44	(293.15)	(218.52)
	Adjusted profit / (loss) after tax of WIPL	**(2,850.41)**	**874.56**	**559.40**
	49% share of profit / (loss) of Adjusted profit after tax	**(1,396.70)**	**428.54**	**274.11**

(The space has been left blank intentionally)

36 Gratuity and other post-employment benefit plans

(a) Defined contribution plan

The eligible employees of the SPV Group are entitled to receive benefits under provident fund schemes which are in substance, defined contribution plans, in which both covered employees and the SPV's make monthly contributions at a specified percentage of the covered employees' salary (currently 12% of employees' salary). The contributions are paid to provident and pension funds. The SPV's contributions during the year to Provident Funds are recognised in the Statement of Profit and Loss.

The following amount recognized as an expense in Statement of profit and loss on account of provident fund and other funds. There are no other obligations other than the contribution payable to the respective authorities.

Particulars	For the period ended 30 September 2023	For the year ended 31 March 2023	For the year ended 31 March 2022	For the year ended 31 March 2021
Contribution to Provident Fund	6.13	-	-	-

(b) Defined benefit plan

(i) Gratuity

The Gratuity benefit is unfunded. Under the gratuity plan, every employee who has completed atleast five years of service gets a gratuity on departure @ 15 days of last drawn salary for each completed year of service. The following tables summaries the components of net benefit expense recognised in the Statement of profit and loss and the unfunded status and amounts recognised in the balance sheet for the gratuity plan:

Particulars	For the period ended 30 September 2023	For the year ended 31 March 2023	For the year ended 31 March 2022	For the year ended 31 March 2021
	(unfunded)			
Statement of profit and loss				
Net employee benefit expense recognised in the employee cost				
Current service cost	2.34	-	-	-
Past Service Cost	14.68	-	-	-
Interest cost on defined benefit obligation	0.00	-	-	-
Interest Income on Plan Assets	-	-	-	-
Components of Defined benefits cost recognised in profit & loss (a)	**17.02**	**-**	**-**	**-**
Remeasurements Gain/(Loss) due to Financial Assumptions	(2.37)	-	-	-
Remeasurements Gain/(Loss) due to Experience Assumptions	-	-	-	-
Remeasurements Gain/(Loss)- returns on assets	-	-	-	-
Components of Defined benefits cost recognised in Other Comprehensive Income (b)	**(2.37)**	**-**	**-**	**-**
Total Defined Benefits Cost recognised in P&L and OCI (a+b)	**14.65**	**-**	**-**	**-**
Changes in the present value of the defined benefit obligation are as follows:				
Opening defined benefit obligation	0.10	-	-	-
Current service cost	2.34	-	-	-
Past Service Cost	14.68	-	-	-
Interest cost	0.00	-	-	-
Actuarial losses/(gain) on obligation	2.37	-	-	-
Benefits paid	-	-	-	-
Closing defined benefit obligation	**19.49**	**-**	**-**	**-**
Amounts recognised in the Balance Sheet				
Defined benefit obligation	(19.49)	-	-	-
Fair value of plan assets	-	-	-	-
Unfunded Status	**(19.49)**	**-**	**-**	**-**

The principal assumptions used in determining gratuity benefit obligation for the company's plans are shown below:

Particulars	For the period ended 30 September 2023	For the year ended 31 March 2023	For the year ended 31 March 2022	For the year ended 31 March 2021
Discount rate	7.50%	-	-	-
Salary escalation rate	6.00%	-	-	-
Mortality rate	100% of IALM (2012 - 14)	-	-	-
Withdrawal Rate	1 - 3%			
Normal Retirement Age	60 Years	-	-	-
Average Future Service	17 years	-	-	-

The sensitivity analysis below have been determined based on reasonably possible change of the respective assumptions occurring at the end of the reporting period, while holding all other assumptions constant.

Particulars	Discount rate (0.5% movement)	Future salary increase (0.5% movement)
For the period ended 30 September 2023		
Increase	(1.45)	1.61
Decrease	1.63	(1.27)
For the year ended 31 March 2023		
Increase	-	-
Decrease	-	-
For the year ended 31 March 2022		
Increase	-	-
Decrease	-	-
For the year ended 31 March 2021		
Increase	-	-
Decrease	-	-

The sensitivity analyses above have been determined based on a method that extrapolates the impact on defined benefit obligation as a result of reasonable changes in key assumptions occurring at the end of the reporting period. The estimates of future salary increases, considered in actuarial valuation, is based on inflation, seniority, promotion and other relevant factors, such as supply and demand in the employment market.

The overall expected rate of return on assets is determined based on the market prices prevailing on that date, applicable to the period over which the obligation is to be settled. There has been significant change in expected rate of return on assets due to change in the market scenario.

Retirement benefit in the form of provident fund is a defined contribution scheme. The contributions to the provident fund are charged to the statement of profit and loss for the year when the contributions are due. The company has no obligation, other than the contribution payable to the provident fund.

37 Investment in Joint Venture

Pursuant to the share purchase agreement entered between Actis Highway Infra Limited ('Sponsor') and Welspun Enterprises Limited (WEL), the Sponsor has purchased 49% stake in Welspun Infra Facility Private Limited (WIPL) and the balance 51% stake would be acquired at an agreed consideration of Rs 26,924 lakhs (plus interest on advance and term deposit as stated in this note) upon completion of 2 years following Provisional Commercial Operation Date ("PCOD") date (i.e. March 31, 2024 and approval from National Highway Authority of India (NHAI) (the Grantor) as per the Service Concession Agreement. Further, the Sponsor has also entered into Advance and Pledge Agreement with WEL and Chikhali Tarsod Highways Private Limited (CTHPL) pursuant to which 51% stake in WIPL has been pledged by WEL in favour of CTHPL and CTHPL has paid interest bearing construction advance amounting to Rs.16,924 lakhs which would be utilised by WEL towards providing engineering, procurement and construction services to WIPL. The said advance would be repaid by WEL to CTHPL on completion of specified events and fulfilment of certain conditions. The said advance has been disclosed as loans under non current financial asset (Refer note 7) in the combined financial statements.

Pursuant to the aforesaid agreement, CTHPL has placed an amount of Rs 10,000 lakhs in term deposit with a bank for a period of 30 months which has been disclosed as Non-current financial assets - others (refer Note 6) in the combined financial statements where CTHPL and a designated person nominated by WEL are jointly authorised signatories. The aforesaid term deposit is earmarked against the acquisition of balance 51% stake as stated above.

Refer note 2.4(d) which state that the interest in WIPL is accounted for using the Equity Method in the Combined Financial Statements. Summarised financial information of the Joint Venture, based on its Special Purpose Financial Statements' and reconciliation with the carrying amount of the investment in Special Purpose Combined Financial Statements are set out below:

Summarised Balance Sheet

Particulars	As at September 30, 2023	As at March 31, 2023	As at March 31, 2022	As at March 31, 2021
Current assets, including cash and cash equivalents	21,043.42	22,448.49	23,584.82	26,012.97
Non-current assets	2,11,117.24	2,05,018.11	1,66,437.90	1,21,631.45
Current liabilities, including tax payable	(29,116.95)	(22,543.82)	(45,224.97)	(39,433.27)
Non-Current Liabilities	(1,86,556.22)	(1,86,029.51)	(1,09,015.07)	(77,952.03)
Equity	**16,487.48**	**18,893.27**	**35,782.68**	**30,259.12**
49% Share	8,078.88	9,257.71	17,533.51	14,826.97
Carrying amount of the investment in combined financial statements	**8,078.88**	**9,257.71**	**17,533.51**	**14,826.97**

Summarised statement of profit and loss:

Particulars	For the period ended 30 September 2023	For the Year ended 31 March 2023	For the Year ended 31 March 2022	For the Year ended 31 March 2021
Total Income	30,901.19	80,765.42	42,683.41	64,020.22
Construction Expenses	16,735.92	60,319.82	41,072.87	62,879.06
Depreciation and Amortisation	7,714.49	11,974.48	-	-
Finance cost	9,105.81	10,527.00	0.90	-
Employee Benefit Expenses	155.33	371.46	26.44	-
Other expense	414.17	1,143.32	361.46	355.69
Profit before tax	**(3,224.53)**	**(3,570.66)**	**1,221.74**	**785.47**
Income tax expense	(819.08)	(720.27)	347.18	226.07
Profit/ (Loss) for the year	**(2,405.45)**	**(2,850.39)**	**874.56**	**559.40**
Other comprehensive income (net of tax)	(0.34)	-	-	-
Total comprehensive income	**(2,405.79)**	**(2,850.39)**	**874.56**	**559.40**
Group's share of profit/(loss) for the year/period	**(1,178.84)**	**(1,396.69)**	**428.53**	**274.11**

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Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

38 Related Party Disclosure

SPV group has identifies related parties and related party transactions as per IND AS 24. The list of related parties and their transactions given in these Combined Financial Statements are a line-by-line combination of all the transactions with related parties entered into by the SPVs and balances between the SPVs and does not include any adjustments arrising from Note 35 with respect to related parties. Additionally that Sponsor, Investment Manager and Trustee have been identified as related parties and all transactions with them have been included in the list below.

a) List of related party as per requirement of IND AS-24

Entity	Related Party	Relation
Nxt-Infra CGRG Highways Limited [Formerly know as MBL (CGRG) Road Limited]	Actis Highway Holding Limited	Ultimate Holding Company (w.e.f. 22nd December, 2022)
	Actis Highway Infra Limited	Holding Company (w.e.f. 22nd December, 2022)
	Welspun Enterprises Limited	Co-venturer (upto 22nd December, 2022)
	RGY Road Private Limited	Co-venturer (upto 22nd December, 2022)
	MBL (GSY) Road Limited	Joint arrangement having a common co-venturer (upto 22nd December, 2022)
	Actis Infrastructure India PCC Limited	Fellow Subsidiary (w.e.f. 22nd December, 2022)
	Welspun Projects (Himmatnagar Bypass) Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Project (Kim Mandvi Corridor) Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Dewas Waterprojects Works Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Build-Tech Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	ARSS Bus Terminal Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Grenoble Infrastructure Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	DME Infra Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Sattanathapuram Nagapattinam Road Private	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Infraconstruct Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welsteel Enterprises Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Aunta-Simaria Project Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun-Kaveri Infraprojects JV Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Infrafacility Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Delhi Meerut Expressway Private Limited	Fellow Subsidiary
	Welspun Road Infra Private Limited	Fellow Subsidiary
	Chikali-Tarsod Higways Private Limited	Fellow Subsidiary (w.e.f. 22nd December, 2022)
	Nxt-Infra GSY Highways Limited (Formerly know as MBL (GSY) Road Limited)	Fellow Subsidiary (w.e.f. 22nd December, 2022)
	Mr. Mohan Manikkan	Director (upto 26th June, 2019)
	Mr. Navin Sinha	Director (upto 9th July, 2019)
	Mr. Harshit Khandelwal	Nominee Director (upto 16th December, 2020)
	Ms. Mala Todarwal	Director (upto 16th October 2020)
	Mr. Raj Kumar Jain	Director (upto 16th October 2020)
	Mr. Lalit Kumar Jain	Nominee Director (upto 22nd December 2022)
	Mr. Jitendra Jain	Nominee Director (upto 30th June 2020)
	Mrs Jayanti Venkatraman	Nominee Director (w.e.f. 22nd June 2020 upto 22nd December 2022)
	Mr Sunil Agrawal	Director (w.e.f. 14th January 2021 upto 22nd December 2022)
	Ms. Jayanta Neelkanth Dixit	Director (w.e.f. 12th June 2023)
	Mr Sumit Sen	Director (w.e.f. 22nd December 2022)
	Mr Ralf Winfried Friedrich Nowack	Director (w.e.f. 22nd December 2022)
	Mr. Ravi Thanvi	Director (w.e.f. 22nd December 2022)

Chikhali-Tarsod Highways Private Limited	Actis Highway Holding Limited	Ultimate Holding Company (w.e.f. 22nd December, 2022)
	Actis Highway Infra Limited	Holding Company (w.e.f. 22nd December, 2022)
	Welspun Enterprises Limited	Co-venturer (upto 22nd December, 2022)
	Corbello Trading Private Limited	Co-venturer (upto 5th Spetember, 2023)
	Corbello Trading Private Limited	Fellow subsidiary (w.e.f. 5th September, 2022)
	Actis Infrastructure India PCC Limited	Fellow Subsidiary (w.e.f. 22nd December, 2022)
	RGY Roads Private Limited	Fellow Subsidiary (w.e.f. 20th September 2022 upto 22nd December 2022)
	Welspun EDAC JV Private Limited	Fellow Subsidiary (w.e.f. 6th June 2022 upto 22nd December, 2022)
	Welspun Projects (Himmatnagar Bypass) Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Project (Kim Mandvi Corridor) Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Dewas Waterprojects Works Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Build-Tech Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Natural Resources Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	ARSS Bus Terminal Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Grenoble Infrastructure Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	DME Infra Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Sattanathapuram Nagapattinam Road	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Infraconstruct Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welsteel Enterprises Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Aunta-Simaria Project Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun-Kaveri Infraprojects JV Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Infrafacility Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Delhi Meerut Expressway Private Limited	Fellow Subsidiary
	Nxt-Infra GSY Highways Limited (Formerly know as MBL (GSY) Road Limited)	Fellow Subsidiary
	Nxt-Infra CGRG Highways Limited (Formerly know as MBL (CGRG) Road Limited)	Fellow Subsidiary
	Welspun Road Infra Private Limited	Fellow Subsidiary
	Mr. Mohan Manikkan	Director (upto 17th April, 2019)
	Mr. Navin Sinha	Director (upto 30th June, 2020)
	Mr. Lalit Kumar Jain	Nominee Director (w.e.f. from 24th June 2020 upto 22nd December 2022)
	Mr. Jitendra Jain	Director (w.e.f. from 9th July 2019 upto 30th June 2020)
	Mrs. Jayanti Venkatraman	Nominee Director (w.e.f. 9th January 2021 upto 22nd December, 2022)
	Mr. Vinoo Sanjay	Nominee Director (upto 22nd December, 2022)
	Mr. Rakesh Sharma	Nominee Director (upto 22nd December, 2022)
	Mr Sumit Sen	Director (w.e.f. 22nd December, 2022)
	Mr Ralf Winfried Friedrich Nowack	Director (w.e.f. 22nd December, 2022)
	Mr. Gaurav Chaturvedi	Director (w.e.f 12th June, 2023)

NXT- Infra Trust (Trust)

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

Entity	Related Party	Relation
Welspun Delhi Meerut Expressway Private Limited	Actis Highway Holding Limited	Ultimate Holding Company
	Actis Highway Infra Limited	Holding Company
	Welspun Enterprises Limited	Holding Company (upto 22nd December, 2022)
	Corbello Trading Private Limited	Fellow Subsidiaries(w.e.f. 5th September, 2022 upto 22nd December 2022)
	Actis Infrastructure India PCC Limited	Fellow Subsidiary (upto 22nd December, 2022)
	RGY Roads Private Limited	Fellow Subsidiaries(w.e.f. 28th September, 2022 upto 22nd Decenber 2022)
	Welspun EDAC JV Private Limited	Fellow Subsidiary (w.e.f. 6th June 2022 upto 22nd December, 2022)
	Welspun Projects (Himmatnagar Bypass) Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Project (Kim Mandvi Corridor) Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Dewas Waterprojects Works Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Build-Tech Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Natural Resources Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	ARSS Bus Terminal Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Grenoble Infrastructure Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	DME Infra Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Sattanathapuram Nagapattinam Road Private Lim	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Infraconstruct Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welsteel Enterprises Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Aunta-Simaria Project Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun-Kaveri Infraprojects JV Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Infrafacility Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Nxt-Infra GSY Highways Limited[Formerly know as MBL	Fellow Subsidiary
	Nxt-Infra CGRG Highways Limited[Formerly know as MBL	Fellow Subsidiary
	Chikhali-Tarsod Highways Private Limited	Fellow Subsidiary
	Welspun Road Infra Private Limited	Fellow Subsidiary
	Mr. Navin Sinha	Director (upto 9th July, 2019)
	Mr. Lalit Kumar Jain	Director (w.e.f. from 25th June 2020 upto 22nd December 2022)
	Mr. Jitendra Jain	Director (upto 30th June 2020)
	Mr. Rakesh Prasad	Director (upto 22nd December 2022)
	Mr. Devendra Patil	Director (upto 14th June 2021)
	Mrs. Amita Karia	Director (upto 1st October, 2020)
	Mrs. Aruna Sharma	Additional Director (w.e.f. from 19th March 2020 upto 14th August 2020)
	Mr. Shriniwas Kargutkar	Director (upto 31st October, 2019)
	Mr. Dhruv Subodh Kaji	Additional Director (upto 9th August 2019)
	Mr. Yogen Babulal Lal	Additional Director (upto 22nd December 2022)
	Ms. Priya Pakhare	Company Secretary (upto 23rd October 2020)
	Mr Sumit Sen	Director (w.e.f. 22nd December, 2022)
	Mr Ralf Winfried Friedrich Nowack	Director (w.e.f. 22nd December, 2022)
	Mr. Kiran Ashok Kakkar	Director (w.e.f. 12th June, 2023)

Nxt-Infra GSY Highways Limited [Formerly know as MBL (GSY) Road Limited]	Actis Highway Holding Limited	Ultimate Holding Company
	Actis Highway Infra Limited	Holding Company
	Welspun Enterprises Limited	Co-venturer (upto 22nd December, 2022)
	RGY Road Private Limited	Co-venturer
	MBL Infrastructures Limited	Co-venturer
	Actis Infrastructure India PCC Limited	Fellow Subsidiary (w.e.f. 22nd December, 2022)
	Welspun Projects (Himmatnagar Bypass) Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Project (Kim Mandvi Corridor) Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Dewas Waterprojects Works Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Build-Tech Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Natural Resources Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	ARSS Bus Terminal Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Grenoble Infrastructure Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	DME Infra Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Sattanathapuram Nagapattinam Road Private Lim	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Infraconstruct Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welsteel Enterprises Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Aunta-Simaria Project Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun-Kaveri Infraprojects JV Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Infrafacility Private Limited	Fellow Subsidiary (upto 22nd December, 2022)
	Welspun Delhi Meerut Expressway Private Limited	Fellow Subsidiary
	Nxt-Infra CGRG Highways Limited[Formerly know as MBL	Fellow Subsidiary
	Welspun Road Infra Private Limited	Fellow Subsidiary
	Chikhali-Tarsod Highways Private Limited	Fellow Subsidiary
	Mr. Mohan Manikkan	Director (upto 26th June 2019)
	Mr. Navin Sinha	Director (upto 9th July 2019)
	Mr. Harshit Khandelwal	Nominee Director (upto 16th December 2020)
	Ms. Mala Todarwal	Director (upto 16th October 2020)
	Mr. Raj Kumar Jain	Director (up to 16th October 2020)
	Mr. Lalit Kumar Jain	Nominee Director (w.e.f. 25th June 2019 up to 22nd December 2022)
	Mr. Jitendra Jain	Nominee Director (up to 30th June 2020)
	Mrs Jayanti Venkatraman	Nominee Director (w.e.f. 22nd June 2020 up to 22nd December 2022)
	Mr Sunil Agrawal	Nominee Director (w.e.f from 14th January 2021 up to 22nd December 2022)
	Mr Sumit Sen	Director (w.e.f. 22nd December, 2022)
	Mr Ralf Winfried Friedrich Nowack	Director (w.e.f. 22nd December, 2022)
	Mr. Ravi Thanvi	Director (w.e.f. 22nd December, 2022)
	Ms. Jayanta Dixit	Director (w.e.f. 12th June, 2023)

NXT- Infra Trust (Trust)

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

Entity	Related Party	Relation
Welspun Road Infra Private Limited	Actis Highway Holding Limited	Ultimate holding
	Actis Highway Infra Limited	Holding Company
	Welspun Enterprises Limited	Holding Company(up to 22nd December, 2022)
	Actis Infrastructure India PCC Limited	Fellow Subsidiary (w.e.f. 22nd December, 2022)
	Welspun Projects (Himmat Nagar Bypass) Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Welspun Project (Kim Mandvi Corridor) Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Dewas Water projects Works Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Welspun Build-Tech Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Welspun Natural Resources Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	ARSS Bus Terminal Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Grenoble Infrastructure Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	DME Infra Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Welspun Sattanathapuram Nagapattinam Road Private Lim	Fellow Subsidiary (up to 22nd December, 2022)
	Welspun Infraconstruct Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Welsteel Enterprises Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Welspun Aunta-Simaria Project Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Welspun-Kaveri Infraprojects JV Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Welspun Infrafacility Private Limited	Fellow Subsidiary (up to 22nd December, 2022)
	Welspun Delhi Meerut Expressway Private Limited	Fellow Subsidiary
	NXT-Infra CGRG Highways Limited[Formerly know as MBL (CGRG) Road Limited]	Fellow Subsidiary
	NXT-Infra GSY Highways Limited [Formerly know as MBL (GSY) Road Limited]	Fellow Subsidiary
	Chikhali-Tarsod Highways Private Limited	Fellow Subsidiary
	Mr. Harshit Khandelwal	Director (up to 16th December 2020)
	Mr. Vinoo Sanjay	Director (up to 1st February 2022)
	Mrs. Aruna Sharma	Director (w.e.f. 30th July 2020 up to 22nd December 2022)
	Mr. Sandeep Garg	Additional Director (up to 22nd December, 2022)
	Mr. Shriniwas Kargutkar	Director (up to 22nd December 2022)
	Mr. Yogen Babulal Lal	Director (w.e.f. 31st October 2019 up to 22nd December 2022)
	Mr. Ved mani Tiwari	CEO (w.e.f. 27th October 2020 up to 3rd December 2020)
	Mr. Kevin Daftary	CFO (w.e.f. 27th October 2020 up to 22nd December 2022)
	Mr. Prateek Roongta	Additional Director (w.e.f. 27th January 2021 up to 1st December 2021)
	Mr. Varun Batra	Company Secretary (w.e.f. 27th October 2020 up to 28th October 2021)
	Mr. Ajay Hans	Additional Director (w.e.f. 1st February 2022 up to 8th August 2022)
	Mr. Akshay Vora	Company Secretary(w.e.f. 1st February up to 22nd December 2022)
	Mr Sumit Sen	Director (w.e.f. 22nd December, 2022)
	Mr Ralf Winfried Friedrich Nowack	Director (w.e.f. 22nd December, 2022)
	Mr. Rakshit Jain	Director (w.e.f. 12th June 2023)
	Mr. Pankaj Sharma	Company Secretary (w.e.f. 1st August 2023)

b) List of related parties as per requirement of InvIT regulation

i) Parties of Trust

Sponsor - Actis Highway Infra Limited
Project Manager - Walter Infra Project Manager Private Limited
Investment Manager - Walter Infra manager Private Limited
Trustee - Catalyst Trusteeship Limited

ii) Promoters, Directors and Partners of the persons mentioned in clause (b)

Particulars	Sponsor	Project Manager	Investment Manager	Trustee
Promotors	Actis Highway Holding Limited	Actis Highway Infra Limited	Actis Highway Infra Limited	-
Directors	Ravindranath Santosh Kumar Hazareesing	Sumit Sen	Anil Chaudhary	Umesh Salvi
	Kishore Sunil Banymandhub	Jayanta Dixit	Jyoti Davar	Ravindra Marathe
		Gaurav Chaturvedi	Rajat Mishra	Jayesh Pandit
			Sumit Sen	Pravin Kutumbe
			Ralf Nowack	Rewati Paithankar
			Rakshit Jain	
Partners	Not applicable	Not applicable	Not applicable	Not applicable

Note: The SPV Group and Investment Entity have not entered into any transaction with the Sponsor, Investment Manger, Project Manager and the Trustee during all the periods.

NXT- Infra Trust (Trust)
Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

c) Transactions during the year/period	For the period ended September 30, 2023	For the year ended March 31, 2023	For the year ended March 31, 2022	For the year ended March 31, 2021
Sub-contracting Charges	**-**	**22,473.32**	**44,105.98**	**69,660.25**
Welspun Enterprises Limited	-	22,473.32	44,105.98	69,660.25
Sub-contracting Charges- Routine & Maintenance	**-**	**4,224.66**	**4,398.18**	**1,786.94**
Welspun Enterprises Limited	-	4,224.66	4,398.18	1,786.94
Project Monitoring Charges	**-**	**21.85**	**81.75**	**234.94**
Welspun Enterprises Limited	-	21.85	81.75	234.94
Interest expenses on OCDs	**5,529.59**	**2,322.24**	**-**	**-**
Actis Infrastructure India PCC Limited	5,529.59	2,322.24	-	-
Interest expenses on LC discounting		**-**	**-**	**234.70**
Welspun Enterprises Limited	-	-	-	234.70
Interest expenses - Others		**-**	**-**	**47.01**
Welspun Enterprises Limited	-	-	-	47.01
Mobilization advances given to		**-**	**-**	**1,470.68**
Welspun Enterprises Limited	-	-	-	1,470.68
Mobilisation Advance repaid/adjusted		**-**	**1,311.14**	**4,482.31**
Welspun Enterprises Limited	-	-	1,311.14	4,482.31
Proceeds from short term borrowings	**1,000.00**	**13,851.07**	**9,280.44**	**35,055.97**
Welspun Enterprises Limited	-	13,851.07	9,280.44	35,055.97
Welspun Infrafacility Private Limited	1,000.00	-	-	-
Repayment of short term borrowings	**-**	**11,744.30**	**12,993.79**	**14,944.99**
Welspun Enterprises Limited	-	11,744.30	12,993.79	14,944.99
Proceeds from issue unsecured optionally convertible debentures	**-**	**91,907.74**	**-**	**-**
Actis Infrastructure India PCC Limited	-	91,907.74	-	-
Repayment of compulsory convertible debentures		**22,150.78**	**-**	**-**
RGY Roads Private Limited	-	3,549.46	-	-
Welspun Enterprises Limited	-	18,601.32	-	-
Conversion of borrowing to optionally convertible debentures		**-**	**-**	**5,781.63**
Welspun Enterprises Limited	-	-	-	5,781.63
Redemption of Optionally Convertible Debentures		**25,002.87**	**-**	**-**
Welspun Enterprises Limited	-	25,002.87	-	-
Conversion of Loan to Compulsorily Convertible Debentures issued		**-**	**-**	**1,060.50**
Welspun Enterprises Limited	-	-	-	1,060.50
Trade advance given		**-**	**562.00**	**-**
Welspun Enterprises Limited	-	-	562.00	-
Other receivables received		**937.02**	**-**	**-**
Welspun Enterprises Limited	-	937.02	-	-
Director Sitting Fee	**0.20**	**0.68**	**0.75**	**3.56**
Raj Kumar Jain	-	-	-	1.43
Mala Todarwal	-	-	-	1.43
Amita Karia	-			0.20
Mrs. Aruna Sharma	0.20	0.68	0.75	0.50

NXT- Infra Trust (Trust)
Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

Transactions during the year/period	For the period ended September 30, 2023	For the year ended March 31, 2023	For the year ended March 31, 2022	For the year ended March 31, 2021
Director's Remuneration	**145.08**	-	-	-
Mr. Gaurav Chaturvedi	22.28	-	-	-
Mr. Kiran Kakkar	14.60	-	-	-
Mr. Jayanta Nilkanth Dixit	48.28	-	-	-
Mr. Rakshit Jain	59.92	-	-	-
Conversion of Compulsorily convertible debentures to equity shares				**9,565.47**
Welspun Enterprises Limited				9,565.47
Conversion of borrowing to equity shares				**5,840.00**
Welspun Enterprises Limited				5,840.00
Corporate Social Responsibility Expenses	**-**	**49.79**	**20.91**	**-**
Welspun Foundation for Health and Knowledge	-	49.79	20.91	-

d) **Closing Balances as at**	For the period ended September 30, 2023	For the year ended March 31, 2023	For the year ended March 31, 2022	For the year ended March 31, 2021
Compulsorily Convertible Debentures	**-**	**-**	**22,150.97**	**22,150.97**
Welspun Enterprises Limited	-	-	12,684.55	12,684.55
Corbello Trading Private Limited	-	-	3,093.51	3,093.51
RGY Road Pvt Ltd	-	-	6,372.91	6,372.91
Optionally Convertible Debentures	**91,907.74**	**91,907.74**	**25,002.87**	**25,002.87**
Actis Infrastructure India PCC Limited	91,907.74	91,907.74	-	-
Welspun Enterprises Limited	-	-	25,002.87	25,002.87
Mobilization advances given	**-**	**-**	**-**	**1,311.14**
Welspun Enterprises Limited	-	-	-	1,311.14
Other Receivable	**-**	**-**	**937.02**	**374.85**
Welspun Enterprises Limited	-	-	937.02	374.85
Trade Payables	**-**	**-**	**27,019.53**	**21,469.63**
Actis Highway Infra Limited	-	-	-	-
Welspun Enterprises Limited	-	-	27,019.53	21,469.63
Borrowings	**1,000.00**	**155.93**	**14,027.86**	**17,741.63**
Welspun Enterprises Limited	-	-	14,027.86	17,741.63
Actis Highway Infra Limited	-	155.93	-	-
Welspun Infrafacility Private Limited	1,000.00	-	-	-
Trade Advances	**-**		-	**6,255.84**
Welspun Enterprises Limited	-	-	-	6,255.84
Performance guarantee outstanding	**-**	**-**	**4,323.00**	**9,167.00**
Welspun Enterprises Limited	-	-	4,323.00	9,167.00
Corporate Guarantee for performance security	**-**	**-**	**6,080.00**	**6,080.00**
Welspun Enterprises Limited	-	-	6,080.00	6,080.00
Advance against goods and services	**-**	**-**	**229.50**	**-**
Welspun Enterprises Limited	-	-	229.50	-
Interest payable on OCDs	**8,015.66**	**2,642.02**	**-**	**-**
Actis Infrastructure India PCC Limited	8,015.66	2,642.02	-	-

During the earlier years, Welspun Enterprises Ltd.("WEL") had given guarantee to the lenders of the SPVs for debt obligations. These guarantees have been extinguished on acquisition by Actis Highway Infra Limited as on 22nd December, 2022. These guarantees have been revoked and a fresh undertaking has been provided to the SPV lenders by Actis Infra Highway Limited.
All transactions with related parties are made on arm's length basis in the ordinary course of business.

NXT- Infra Trust

Notes forming part of Special Purpose Combined Financial Statements
(All amounts in ₹ lakhs unless otherwise stated)

39 Disclosure pursuant to Appendix E of Ind AS 115 for Service Concession Arrangements

Under service concession arrangements (SCA), where a special purpose vehicle (SPV) has acquired contractual right to receive specified determinable amount (Annuity) for use of assets, such amounts are recognised as "financial assets" and are disclose as "receivable under service concession arrangement. Below is additional disclosure requirement pursuant to Appendix E of IND AS 115 - Service Concession Arrangement (SCA).

Name of concession	Start of concession period under concession agreement (Appointed date)	End of concession period under concession agreement	Period of concession since the appointment date (in years)	Construction completed date or the schedule completion date under the concession agreement as applicable
Welspun Infra facility Private Limited (WIPL)	8-3-2019	7-2-2034	14.9	19-12-2021
Welspun Road Infra Private Limited (WRIPL)	28-5-2019	11-11-2031	12.5	27-11-2021
Welspun Delhi Meerut Expressway Private Limited (DME)	28-11-2016	28-6-2033	16.6	27-5-2019
Chikali Tarsod Highways Private Limited (CTHPL)	16-1-2019	11-10-2036	17.7	11-10-2021
NXT-INFRA CGRG Highways Limited (CGRG)	28-2-2018	5-8-2035	17.4	5-8-2020
NXT-INFRA GSY Highways Limited (GSY)	3-2-2018	31-10-2035	17.8	31-10-2020

Note:-
(i) 40% of the total bid project cost shall be due and payable to the company during the construction period and balance 60% in half yearly annuity in 15 years in accordance with the provision of service concession agreement.

(ii) Interest shall be due and receivable on the reducing balance of completion cost at an interest rate equal to the applicable rate specified in the concession agreement. Such interest shall be due and receivable in half yearly annuity in accordance with provision of the concession agreement

40 The number of units that Trust will issue to investors in the proposed initial private placement is not presently ascertainable. Hence the disclosures in respect of Earnings per Unit have not been given in these Special Purpose Combined Financial Statements.

41 Contingent liabilities and Commitments

A Contingent liabilities (to the extent not provided for)

Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
Claims against the company not acknowledged as liabilities	-	117.24	110.00	-
Indirect tax matters (GST on construction services)#	15,752.11	-	-	-
Total	**15,752.11**	**117.24**	**110.00**	**-**

Includes GST on Hybrid Annuity Projects (HAM) projects for which certain entities in the SPV Group have received a show cause notice cum demand for payment of GST upfront on the entire consideration (project bid cost) mentioned in Service Concession Agreement. Basis SPV groups' and Investment Manager's assessment of the GST provisions, the Concession Agreements, the NHAI clarifications/letters on GST relating to HAM projects and the various writ petitions filed by other industry players in Courts on the same matter, the management believes the liability would be payable as and when the balance annuity payments become due from NHAI (and not upfront). Accordingly, the SPV Group would take necessary legal remedies to defend the show cause cum demand notice received.

B Commitments

Particulars	As at 30 September 2023	As at 31 March 2023	As at 31 March 2022	As at 31 March 2021
Estimate amount of EPC contract remaining to be executed (net of advances)*	5,974.14	9,511.18	46,046.58	1,06,273.45
Total	**5,974.14**	**9,511.18**	**46,046.58**	**1,06,273.45**

* Amounts includes share of trust in Joint Venture (WIPL) amounting to Rs. 40,593.45 lakhs, Rs. 24,526.58 lakhs, Rs. 6,673.18 lakhs, Rs. 2,450 lakhs as at 31 March 2021, 31 March 2022, 31 March 2023 & 30 September 2023 respectively.

42 Segment reporting
The NXT - Infra group is engaged in the business of infrastructure development which in the opinion of the management is the only business segment in the context of Ind AS 108. The NXT - Infra group operates in a single geographical segment i.e. India. There are only two customer which contribute to the total revenue of the SPV's i.e. National Highway Authorities of India (NHAI) and Public Works Department (PWD).

43 Event after reporting date
There were no significant adjusting events that occurred subsequent to the reporting period other than the events disclosed in the relevant notes.

44 Figures for the previous year are re-classified/ re-arranged/ re-grouped, wherever necessary to be in conformity with the figures of the current year's classification/ disclosure.

For S R B C & CO LLP
Chartered Accountants
ICAI Firm's Registration No :324982E/E300003

per Suresh Yadav
Partner
Membership No: 119878

Place: Mumbai
Date: December 29, 2023

For and on behalf of the Board of Directors of
Walter Infra Manager Private Limited (As an Investment Manager to NXT - Infra Trust)

Rakshit Jain
Director & CEO
DIN: 06858141

Sumit Sen
Director
DIN: 06734410

Pratik Desai
Company Secretary
ICSI Membership no. ACS:30026

Place: Mumbai
Date: December 27, 2023

ANNEXURE III - VALUATION REPORT

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Prepared for:

Nxt-Infra Trust (“the Trust”)

Walter Infra Manager Private Limited
(“the Investment Manager”)

Valuation as per SEBI (Infrastructure Investment Trusts) Regulations, 2014 as amended

Fair Enterprise Valuation

Valuation Date: 30th September 2023

Mr. S Sundararaman,
Registered Valuer,
IBBI Registration No - IBBI/RV/06/2018/10238

RV/SSR/R/2024/29 **Date: 27th December 2023**

Nxt-Infra Trust
(acting through Catalyst Trusteeship Limited [in its capacity as "the Trustee" of the Trust])
501, 5th Floor, Vikas Hub, Vikas Centre,
Next to Cubic Mall, Dr. G C Road,
Wadavali Village, Chembur East,
Mumbai – 400074
Maharashtra, India

Walter Infra Manager Private Limited
(acting as the Investment Manager to Nxt-Infra Trust)
Unit No. S-39, 2nd Floor, 'Vasant Square Mall'
Plot No. A, Community Centre, Pocket-V, Sector-B, Vasant Kunj,
New Delhi-110070.

Sub: Financial Valuation as per SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended ("the SEBI InvIT Regulations")

Dear Sir(s)/Madam(s),

I, Mr. S. Sundararaman ("**Registered Valuer**" or "**RV**" or "**I**" or "**My**" or "**Me**") bearing IBBI registration number IBBI/RV/06/2018/10238, have been appointed vide letter dated 1st November 2023 as an independent valuer, as defined under the SEBI InvIT Regulations, by Walter Infra Manager Private Limited ("**WIMPL**" or "**the Investment Manager**") acting as the investment manager for Nxt-Infra Trust ("**the Trust**" or "**InvIT**"), an infrastructure investment trust, registered with the Securities Exchange Board of India ("**SEBI**") and Catalyst Trusteeship Limited ("**the Trustee**") acting as the trustee for the Trust, for the purpose of the financial valuation of the special purpose vehicles (defined hereinafter below) as per the requirements of the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended ("**the SEBI InvIT Regulations**"). The SPVs will be forming part of the Initial Portfolio of Assets and are proposed to be transferred to the Trust as per the extant provisions of the SEBI InvIT Regulations where WIMPL is acting as the Investment Manager and Actis Highway Infra Limited ("**the Sponsor**" or "**AHIL**") is acting as the Sponsor within the meaning of SEBI InvIT Regulations.

Following special purpose vehicles are proposed to be transferred to the Trust:

Sr. No.	Name of the SPV	Term	Project Type
1	Welspun Road Infra Private Limited	Am-2	State HAM
2	Nxt-Infra CGRG Highways Limited	CGRG	NHAI HAM
3	Chikhali- Tarsod Highways Private Limited	CTHPL	NHAI HAM
4	Welspun Delhi Meerut Expressway Private Limited	DME	NHAI HAM
5	Nxt-Infra GSY Highways Limited	GSY	NHAI HAM
6	Welspun Infrafacility Private Limited	MCP	BOT-Toll

(Hereinafter all the six companies mentioned above are together referred to as "**the SPVs"**)

I understand that the InvIT, acting through the Trustee, shall acquire the controlling equity stake in the SPVs, mentioned in the above table, following which units of the Trust shall be issued to the Sponsor by the Trust, which are to be listed on one or more Indian Stock Exchanges consequent to a private placement of the Trust ("**Proposed Transaction**").

In this regard, the Investment Manager and the Trustee intends to undertake the fair enterprise valuation of the SPVs as on 30th September 2023 as per the provisions of the SEBI InvIT Regulations. I am enclosing the Report providing opinion on the fair enterprise value of the SPVs as defined hereinafter on a going concern basis as at 30th September 2023 ("**Valuation Date**").

Enterprise Value ("**EV**") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or cash equivalents to meet those liabilities. The attached Report details the valuation methodologies used, calculations performed and the conclusion reached with respect to this valuation.

I was further requested by the Investment Manager to provide the adjusted enterprise value of the SPVs as at 30th September 2023, where the adjusted enterprise value ("Adjusted EV") is derived as EV as defined above plus cash or current investment of the SPVs as at 30th September 2023.

This Report has been prepared solely for the purpose of inclusion as part of the Draft Placement Memorandum ("DPM") and such other documents as may be required in accordance with the independent valuation required as per the SEBI InvIT Regulations.

I have relied on explanations and information provided by the Investment Manager. Although, I have reviewed such data for consistency, those are not independently investigated or otherwise verified. My team and I have no present or planned future interest in the Trust, the SPVs or the Investment Manager except to the extent of this appointment as an independent valuer and the fee for this **Valuation Report** ("**Report**") which is not contingent upon the values reported herein. The valuation analysis should not be construed as investment advice, specifically, I do not express any opinion on the suitability or otherwise of entering into any financial or other transaction with the Trust.

The analysis must be considered as a whole. Selecting portions of any analysis or the factors that are considered in this Report, without considering all factors and analysis together could create a misleading view of the process underlying the valuation conclusions. The preparation of a valuation is a complex process and is not necessarily susceptible to partial analysis or summary description. Any attempt to do so could lead to undue emphasis on any particular factor or analysis.

The information provided to me by the Investment Manager in relation to the SPVs included but not limited to historical financial statements, forecasts/projections, other statements and assumptions about future matters like forward-looking financial information prepared by the Investment Manager. The forecasts and projections as supplied to me are based upon assumptions about events and circumstances which are yet to occur. I have not tested individual assumptions or attempted to substantiate the veracity or integrity of such assumptions in relation to the forward-looking financial information, however, I have made sufficient enquiry to satisfy myself that such information has been prepared on a reasonable basis.

Notwithstanding anything above, I cannot provide any assurance that the forward looking financial information will be representative of the results which will actually be achieved during the cash flow forecast period.

The valuation provided by RV and the valuation conclusion are included herein and the Report complies with the SEBI InvIT Regulations and guidelines, circular or notification issued by SEBI thereunder.

Please note that all comments in the Report must be read in conjunction with the caveats to the Report, which are contained in Section 10 of this Report. This letter, the Report and the summary of valuation included herein can be provided to Trust's advisors and may be made available for the inspection to the public and with the SEBI, the stock exchanges and any other regulatory and supervisory authority, as may be required.

RV draws your attention to the limitation of liability clauses in Section 10 of this Report.

This letter should be read in conjunction with the attached Report.

Yours faithfully,

_____

S. Sundararaman
Registered Valuer
IBBI Registration No.: IBBI/RV/06/2018/10238
Place: Chennai
UDIN: 23028423BGYWJG5597

Definition, abbreviation & glossary of terms

Abbreviations	Meaning
AM-2	Welspun Road Infra Private Limited
BOT	Build, Operate and Transfer
Capex	Capital Expenditure
CCM	Comparable Companies Multiples
CGRG	Nxt-Infra CGRG Highways Limited
COD	Commercial Operation Date
CTM	Comparable Transactions Multiples
CTHPL	Chikhali- Tarsod Highways Private Limited
DBFOT	Design, Build, Finance, Operate and Transfer
DCF	Discounted Cash Flow
DME	Welspun Delhi Meerut Expressway Private Limited
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EV	Enterprise Value
FCFF	Free Cash Flow to the Firm
FDI	Foreign Direct Investment
FY	Financial Year Ended 31st March
GSY	Nxt-Infra GSY Highways Limited
HAM	Hybrid Annuity Model
Ind AS	Indian Accounting Standards
INR	Indian Rupee
Investment Manager/ WIMPL	Walter Infra Manager Private Limited
IVS	ICAI Valuation Standards 2018
Kms	Kilometres
MCP	Welspun Infrafacility Private Limited
MMR	Major Maintenance and Repairs
Mn	Million
MoRTH	Ministry of Road Transport and Highways
NAV	Net Asset Value Method
NCA	Net Current Assets Excluding Cash and Bank Balances
NH	National Highway
NHAI	National Highways Authority of India
NHDP	National Highways Development Project
NS-EW	North- South and East-West Corridors
PPP	Public Private Partnership
PWD(M)	Public Works Department, Government of Maharshtra.
RFID	Radio Frequency Identification
RV	Registered Valuer
SEBI	Securities and Exchange Board of India
SEBI InvIT Regulations	SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended
SH	State Highway
Sponsor/ AHIL	Actis Highway Infra Limited
SPV	Special Purpose Vehicle
Trustee	Catalyst Trusteeship Limited

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1. Executive Summary

1.1. Background

The Trust

1.1.1. Nxt-Infra Trust ("**the Trust**"), was established on 8th November 2023. The Trust is registered with Securities and Exchange Board of India ("SEBI") pursuant to the SEBI (Infrastructure Investment Trust) Regulations, 2014 ("SEBI InvIT Regulations") with effect from 8th November 2023, bearing registration number IN/InvIT/23-24/0028. The Trust has proposed to acquire the SPVs and would be responsible for holding the SPVs in trust and for the benefit of the unitholders, undertaking the activities and other duties specified as per the SEBI InvIT Regulations.

1.1.2. The objective and purpose of the InvIT is to carry on the activities of an infrastructure investment trust, as permissible under the InvIT Regulations, to raise funds through the InvIT, to make Investments in accordance with the InvIT Regulations and the Investment Strategy and to carry on the activities as may be required for operating the InvIT including incidental and ancillary matters thereto.

1.1.3. Catalyst Trusteeship Limited ("**the Trustee**") has been appointed as the Trustee of the Nxt-Infra Trust.

The Sponsor

1.1.4. Actis Highway Infra Limited ("**the Sponsor**" or "**AHIL**") has floated an infrastructure investment trust under the SEBI InvIT Regulations called Nxt-Infra Trust ("**the Trust**" or "**InvIT**").

Actis Highway Infra Limited

Actis Highway Infra Limited is a company duly incorporated under the laws of Mauritius and is a wholly owned subsidiary of the Actis Long Life Infrastructure Fund (ALLIF). AHIL is backed by a leading global investor group in sustainable infrastructure, Actis Group.

The Shareholding of AHIL on 30th September 2023 is as follows:

Name of Shareholder	Nos. of Shares	Shareholding
Actis Highway Holdings Limited	64,489,200	100%
Total	**64,489,200**	**100%**

Source: Investment Manager

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1.1.5. Investment Manager

Walter Infra Manager Private Limited ("**WIMPL**" or "**the Investment Manager**") has been appointed as the Investment Manager to the Trust by the Trustee and will be responsible to carry out the duties of such person as mentioned under the SEBI InvIT Regulations.

Name of Shareholder	Nos. of Shares	Shareholding
Actis Highway Infra Limited	1,19,88,000	99.90%
Actis Highway Holdings Limited	12,000	0.10%
Total	**1,20,00,000**	**100%**

Source: Investment Manager

1.1.6. Project Manager

Walter Infra Project Manager Private Limited ("**WIPMPL**" or "**the Project Manager**") has been appointed as the Project Manager to the Trust pursuant to a resolution passed by the Board of Directors of the Investment Manager and will be responsible to carry out the duties of such person as mentioned under the SEBI InvIT Regulations.

Name of Shareholder	Nos. of Shares	Shareholding
Actis Highway Infra Limited	19,98,200	99.90%
Actis Highway Holdings Limited	2,000	0.10%
Total	**20,00,200**	**100%**

Source: Investment Manager

1.1.7. Financial Assets to be Valued

The financial assets under consideration are valued at Enterprise Value and Adjusted Enterprise Value of the following the SPVs:

Sr. No.	Name of the SPV	Term
1	Welspun Road Infra Private Limited	AM-2
2	Nxt-Infra CGRG Highways Limited	CGRG
3	Chikhali- Tarsod Highways Private Limited	CTHPL
4	Welspun Delhi Meerut Expressway Private Limited	DME
5	Nxt-Infra GSY Highways Limited	GSY
6	Welspun Infrafacility Private Limited	MCP

(Together referred to as "the **SPVs**")

1.1.8. Purpose of Valuation

I understand that the proposed InvIT, acting through the Trustee, shall acquire the controlling equity stake in the SPVs, mentioned in the above table, following which units of InvIT shall be issued to the Sponsor by the Trust, which are to be listed on one or more Indian Stock Exchanges consequent to a private placement of the Trust ("**Proposed Transaction**").

1.1.9. In this regard, the Investment Manager has appointed me, S. Sundararaman ("**Registered Valuer**" or "**RV**" or "**I**" or "**My**" or "**Me**") bearing IBBI registration number IBBI/RV/06/2018/10238 to undertake fair valuation of the SPVs at the enterprise level as per the extant provisions of the SEBI InvIT Regulations issued by SEBI. Enterprise Value ("**EV**") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or cash equivalents to meet those liabilities.

1.1.10. I declare that:

i. I am competent to undertake the financial valuation in terms of the SEBI InvIT Regulations;

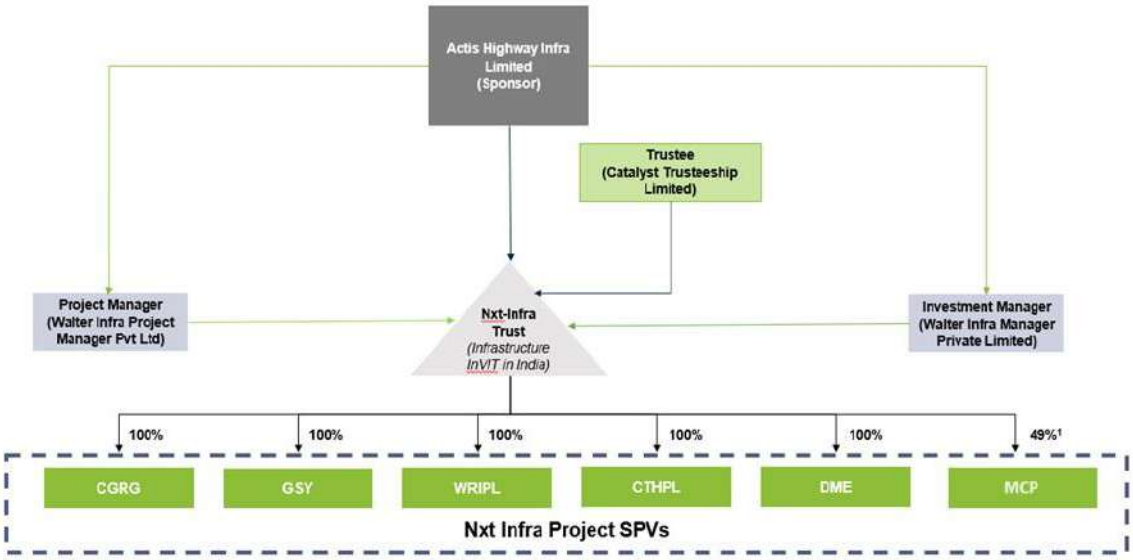
ii. I am not an associate of the Sponsor or investment manager or trustee and I have not less than five years of experience in valuation of infrastructure assets;

iii. I am independent and have prepared the Report on a fair and unbiased basis;

iv. I have valued the SPVs based on the valuation standards as specified / applicable as per SEBI InvIT Regulations.

1.1.11. This Report covers all the disclosures required as per the SEBI InvIT Regulations and the Valuation of the SPVs is impartial, true and fair and in compliance with the SEBI InvIT Regulations.

1.1.12. **Proposed Group Structure of the Trust:**



Source: Investment Manager

[1] Presently, 51% of the issued and paid-up equity share capital of MCP is held by Welspun Enterprises Limited ("WEL") and 49% is held by Actis Highway Infra Limited ("AHIL"). As represented by the Investment Manager, the InvIT can currently purchase only 49% equity stake of MCP as per the terms of the Concession Agreement. However, the Trust, will be entitled to acquire 100% of the equity share capital of MCP only after a period of one year from the COD of MCP which is as per the terms of the requirements prescribed by the NHAI and as per the Concession Agreement.

1.2. Scope of Valuation

1.2.1. Nature of the Asset to be Valued

The RV has been mandated by the Investment Manager to arrive at the Enterprise Value of the SPVs. Enterprise Value is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash and cash equivalents to meet those liabilities.

Further, on the request of the Investment Manager, I have calculated Adjusted Enterprise Value of the SPVs which is derived as the EV as defined above plus cash and current investment of the SPVs as at the valuation date.

1.2.2. Valuation Base

Valuation Base means the indication of the type of value being used in an engagement. In the present case, I have determined the fair value of the SPVs at the enterprise level. Fair Value Bases defined as under:

Fair Value

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the valuation date. It is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction in the principal (or most advantageous) market at the measurement date under current market conditions (i.e. an exit price) regardless of whether that price is directly observable or estimated using another valuation technique. Fair value or Market value is usually synonymous to each other except in certain circumstances where characteristics of an asset translate into a special asset value for the party(ies) involved.

1.2.3. Valuation Date

Valuation Date is the specific date at which the value of the assets to be valued gets estimated or measured. Valuation is time specific and can change with the passage of time due to changes in the condition of the asset to be valued. Accordingly, valuation of an asset as at a particular date can be different from other date(s).

The Valuation Date considered for the fair enterprise valuation of the SPVs is 30th September 2023 ("**Valuation Date**"). The RV is not aware of any other events having occurred since 30th September 2023 till date of this Report which he deems to be significant for his valuation analysis.

1.2.4. Premise of Value

Premise of Value refers to the conditions and circumstances how an asset is deployed. In the present case, RV has determined the fair enterprise value of the SPVs on a Going Concern Value defined as under:

Going Concern Value

Going Concern value is the value of a business enterprise that is expected to continue to operate in the future. The intangible elements of going concern value result from factors such as having a trained work force, an operational plant, necessary licenses, systems, and procedures in place etc. For current valuation exercise, we have determined the fair enterprise value of the SPVs on a Going Concern Value, till the end of the tenure of their respective Concession Agreement.

1.3. Summary of Valuation

I have assessed the fair enterprise value of each of the SPVs on a stand-alone basis by using the Discounted Cash Flow ("**DCF**") method under the income approach. Following table summarizes my explaination on the usage or non usage of different valuation methods:

Valuation Approach	Valuation Methodology	Used	Explanation
Cost Approach	Net Asset Value	No	NAV does not capture the future earning potential of the business. Hence, NAV method has been considered for background reference only.
Income Approach	Discounted Cash Flow	Yes	The revenue of HAM SPVs is mainly derived from the annuity fees that are typically pre-determined by the relevant government authority and cannot be modified to reflect prevailing circumstances, other than annual adjustments to account for inflation and interest rate changes wherever applicable, as specified in the concession agreements. The Toll SPV derive almost all of their revenue from their toll-road operations. The Toll SPV is substantially dependent on the accuracy of the traffic volume forecasts for their respective projects. Accordingly, since all the Assets are generating income based on pre-determined agreements / mechanism and since the Investment Manager has provided me the financial projections for the balance tenor of the concessions agreements, DCF Method under the income approach has been considered as the appropriate method for the present valuation exercise.
Market Approach	Market Price	No	The equity shares of the SPVs are not listed on any recognized stock exchange in India. Hence, I was unable to apply the market price method.
	Comparable Companies	No	In the absence of any exactly comparable listed companies with characteristics and parameters similar to that of the SPVs, I am unable to consider this method for the current valuation.

	Comparable Transactions	No	In the absence of adequate details about the Comparable Transactions, I was unable to apply the CTM method.

Under the DCF Method, the Free Cash Flow to Firm ("**FCFF**") has been used for the purpose of valuation of each of the SPVs. In order to arrive at the fair EV of the individual SPVs under the DCF Method, I have relied on the provisional financial statements as at 30th September 2023 prepared in accordance with the Indian Accounting Standards (Ind AS) and the financial projections of the respective SPVs prepared by the Investment Manager as at the Valuation Date based on their best judgement.

The discount rate considered for the respective SPVs for the purpose of this valuation exercise is based on the Weighted Average Cost of Capital ("**WACC**") for each of the SPVs.

Five out of six of the SPVs under considerations have executed projects under the HAM model and the remaining one under the BOT-Toll model, the operating rights of the underlying assets shall be transferred back to the appointing authority after the expiry of the concession period. At the end of the agreed concession period, the operating rights in relation to the roads and the obligation to maintain the road revert to the government entity that granted the concession by the SPVs. Accordingly, terminal period value i.e. value on account of cash flows to be generated after the expiry of concession period has not been considered.

Based on the methodology and assumptions discussed further, RV has arrived at the fair enterprise value of the SPVs as on the Valuation Date:

INR Lakhs

Sr. No.	SPVs	Last Date	Approximate Balance Period	Enterprise Value*	Adjusted Enterprise Value**
1	AM 2	11-Nov-31	~8 Years 1 Months	69,993	76,756
2	CGRG	05-Aug-35	~11 Years 10 Months	59,209	62,743
3	CTHPL	25-Aug-36	~12 Years 11 Months	56,915	70,406
4	DME	25-Jul-33	~9. Years 10 Months	34,405	38,565
5	GSY	30-Oct-35	~12 Years 1 Months	77,697	82,648
6	MCP***	26-Sep-37	~14 Years 0 Months	3,78,462	3,98,001
	Total			**6,76,680**	**7,29,119**

*** Enterprise Value ("**EV**") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any non-current cash and cash like items to meet those liabilities.*

**** Further, on the request of the Investment Manager, I have calculated Adjusted Enterprise Value of the SPVs which is derived as the EV as defined above plus non-current cash and cash like items (includes cash and cash equivalents and current investments) of the SPVs as at the Valuation Date.*
(Refer Appendix 1 & 2 for the detailed workings)

**** Presently, 51% of the issued and paid-up equity share capital of MCP is held by Welspun Enterprises Limited ("WEL") and 49% is held by Actis Highway Infra Limited ("AHIL"). As represented by the Investment Manager, the InvIT can currently purchase only 49% equity stake of MCP as per the terms of the Concession Agreement. However, the Trust, will be entitled to acquire 100% of the equity share capital of MCP only after a period of one year from the COD of MCP which is as per the terms of the requirements prescribed by the NHAI and as per the Concession Agreement.*

The above mentioned EV and Adjusted EV represents the value EV calculated at 100% equity stake level for MCP and since InvIT is currently proposing to acquire only 49% equity stake in MCP, the above mentioned values should be adjusted in this context for 49% equity stake level. In this regard, I have calculated EV and Adjusted EV at 100% equity stake level and 49% equity stake level in the below table for MCP:

SPVs	Enterprise Value		Adjusted Enterprise Value	
	at 100% equity stake level	at 49% equity stake level	at 100% equity stake level	at 49% equity stake level
MCP	3,78,462	1,85,446	3,98,001	1,95,020

1.3.1. The fair EV of the SPVs is estimated using DCF method. The valuation requires Investment Manager to make certain assumptions about the model inputs including forecast cash flows, discount rate, and credit risk.

1.3.2. Valuation is based on estimates of future financial performance or opinions, which represent reasonable expectations at a particular point of time, but such information, estimates or opinions are not offered as

predictions or as assurances that a particular level of income or profit will be achieved, a particular event will occur or that a particular price will be offered or accepted. Actual results achieved during the period covered by the prospective financial analysis will vary from these estimates and the variations may be material.

1.3.3. Accordingly, I have conducted sensitivity analysis on certain model inputs, the results of which are as indicated below:

a) WACC by increasing / decreasing it by 0.5%
b) WACC by increasing / decreasing it by 1.0%
c) Total Expenses by increasing / decreasing it by 20%
d) Total Revenue by increasing / decreasing it by 10% for Toll Asset.

Sensitivity Analysis of Enterprise Value

a) Fair Enterprise Valuation Range based on WACC parameter (0.5%)

INR Lakhs

Sr. No.	SPVs	WACC +0.50%	EV	Base WACC	EV	WACC -0.50%	EV
1	AM2	8.18%	68,664	7.68%	69,993	7.18%	71,363
2	CGRG	8.38%	57,992	7.88%	59,209	7.38%	60,474
3	CTHPL	8.49%	55,813	7.99%	56,915	7.49%	58,059
4	DME	8.47%	33,775	7.97%	34,405	7.47%	35,055
5	GSY	8.08%	76,025	7.58%	77,697	7.08%	79,436
6	MCP*	10.61%	3,67,012	10.11%	3,78,462	9.61%	3,90,450
	Total		**6,59,281**		**6,76,680**		**6,94,836**

b) Fair Enterprise Valuation Range based on WACC parameter (1.0%)

INR lakhs

Sr. No.	SPVs	WACC +1.00%	EV	Base WACC	EV	WACC -1.00%	EV
1	AM2	8.68%	67,376	7.68%	69,993	6.68%	72,777
2	CGRG	8.88%	56,821	7.88%	59,209	6.88%	61,788
3	CTHPL	8.99%	54,750	7.99%	56,915	6.99%	59,245
4	DME	8.97%	33,164	7.97%	34,405	6.97%	35,726
5	GSY	8.58%	74,417	7.58%	77,697	6.58%	81,245
6	MCP*	11.11%	3,56,072	10.11%	3,78,462	9.11%	4,03,007
	Total		**6,42,600**		**6,76,680**		**7,13,789**

c) Fair Enterprise Valuation Range based on Expenses parameter (20%)

INR Lakhs

Sr. No.	SPVs	EV at Expenses -20%	EV at Base Expenses	EV at Expenses +20%
1	AM2	71,275	69,993	68,805
2	CGRG	61,505	59,209	57,263
3	CTHPL	59,729	56,915	54,696
4	DME	35,612	34,405	33,116
5	GSY	79,285	77,697	76,023

6	MCP*	3,86,395	3,78,462	3,73,676
	Total	**6,93,801**	**6,76,680**	**6,63,578**

d) Fair Enterprise Valuation Range based on Revenue parameter (10%)

INR Lakhs

Sr. No.	SPVs	EV at Revenue -10%	EV at Base Revenue	EV at Revenue +10%
1	MCP*	3,35,901	3,78,462	4,24,075

** Presently, 51% of the issued and paid-up equity share capital of MCP is held by Welspun Enterprises Limited ("WEL") and 49% is held by Actis Highway Infra Limited ("AHIL"). As represented by the Investment Manager, the InvIT can currently purchase only 49% equity stake of MCP as per the terms of the Concession Agreement. However, the Trust, will be entitled to acquire 100% of the equity share capital of MCP only after a period of one year from the COD of MCP which is as per the terms of the requirements prescribed by the NHAI and as per the Concession Agreement.*

The above mentioned EV and Adjusted EV represents the value EV calculated at 100% equity stake level for MCP and since InvIT is currently proposing to acquire only 49% equity stake in MCP, the above mentioned values should be adjusted in this context for 49% equity stake level.

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2. Procedures adopted for current valuation exercise

2.1. I have performed the valuation analysis, to the extent applicable, in accordance with ICAI Valuation Standards 2018 ("**IVS**") issued by the Institute of Chartered Accountants of India.

2.2. In connection with this analysis, I have adopted the following procedures to carry out the valuation analysis:

2.2.1. Requested and received financial and qualitative information relating to the SPVs;

2.2.2. Obtained and analyzed data available in public domain, as considered relevant by me;

2.2.3. Discussions with the Investment Manager on:

- Understanding of the business of the SPVs – business and fundamental factors that affect its earning-generating capacity including strengths, weaknesses, opportunities and threats analysis and historical and expected financial performance;

2.2.4. Undertook industry analysis:

- Research publicly available market data including economic factors and industry trends that may impact the valuation;
- Analysis of key trends and valuation multiples of comparable companies/comparable transactions, if any, using proprietary databases subscribed by me;

2.2.5. Analysis of other publicly available information;

2.2.6. Selection of valuation approach and valuation methodology/(ies), in accordance with IVS, as considered appropriate and relevant by me;

2.2.7. Determination of fair value of the EV and Adjusted EV of the SPVs on a going concern basis at the Valuation Date.

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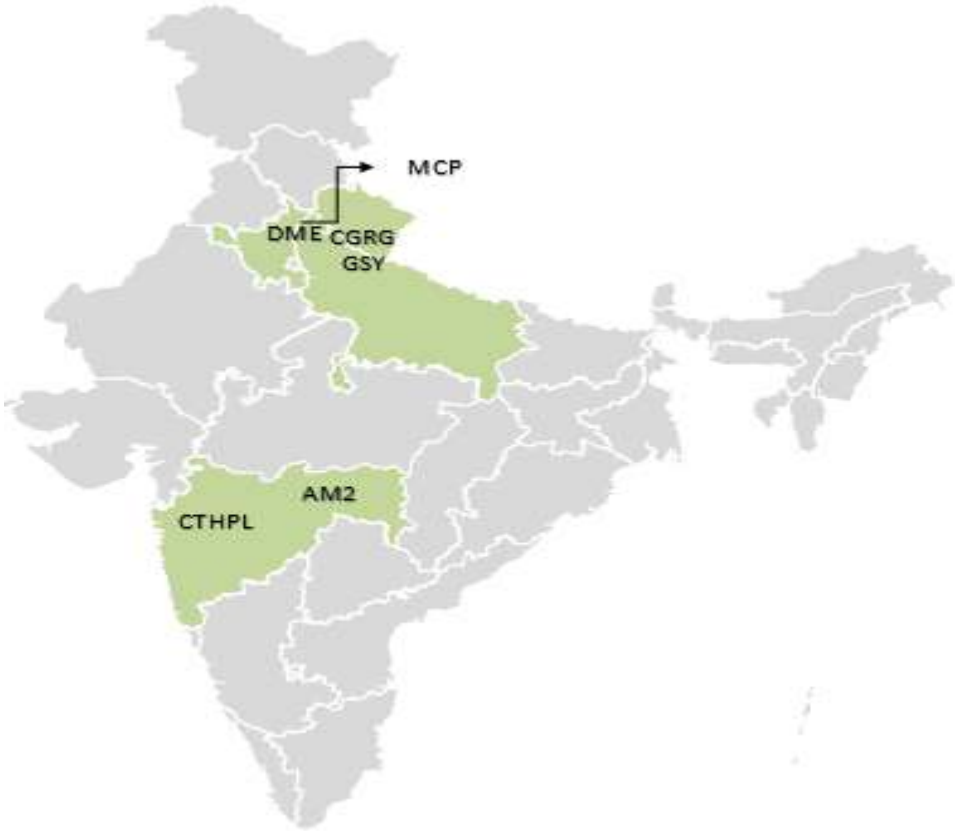
3. Overview of the InvIT and SPVs

3.1. The Trust

3.1.1. Nxt-Infra Trust ("the **Trust**") is sponsored by Actis Highway Infra Limited. The Trust is registered with the SEBI as an InvIT with effect from 8th November 2023.

3.1.2. The Trust has proposed to acquire from the Sponsor certain SPVs, viz. AM2, CGRG, CTHPL, DME, GSY, MCP.

3.1.3. Following is a map of India showing the area covered by the SPVs of the Trust



Source: Investment Manager

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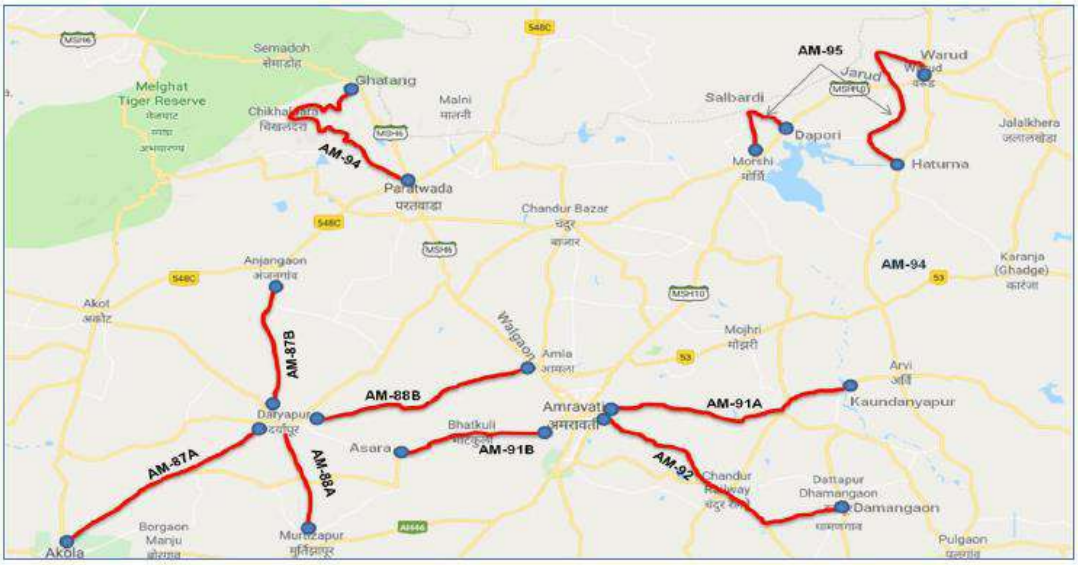
Background of the SPVs

3.2. Welspun Road Infra Private Limited ("AM2"):

3.2.1. Welspun Road Infra Private Limited (AM2) was incorporated as on 28th September 2018. The SPV entered into a concession agreement dated 10th January, 2019 with Public Works Department, Government of Maharashtra [PWD(M)] and having the appointed date as on 28th May, 2019. The project was awarded under HAM for 10 years of period from the PCOD i.e. 11th November, 2021. The project consists of improvement and maintenance of 9 distinct packages in Amravati district in the state of Maharashtra.

3.2.2. The map below illustrates the location of the Project and the corridor it covers:



Source: Investment Manager

3.2.3. Summary of project details of AM2 is as follows:

Parameters	Details
Total Length	352 Km
Nos. of Lanes	2 lanes
NH / SH	SH 280, SH-312, SH 282, SH 47, SH 300, SH 294, SH 296 & SH 297
State Covered	Maharashtra
Area (Start and End)	Amravati, Maharashtra
Bid Project Cost	INR 1,46,000 Lakhs
Project Type	HAM
Concession Granted by	PWD(M)
PCOD Date	11th November 2021
Nos. of Annuities	20 (Semi-annual)
Construction Period	730 days
Operational Period	10 years

Source: Investment Manager

3.2.4. The corridor forms a part of existing roads in the state of Maharashtra consisting of 9 distinct packages throughout the Amravati district consisting improvement of several state highway packages:

S. No	Description	Unit	Package-1		Package -2	Package -3	Package -4	Package-5		
			SH-280	SH-312				SH-280	SH-300	SH-294
1	Length of the Project Corridor	Kms	25	16	27	22	44	29	2	10
2	Major Bridges	Nos.	-	1	-	1	2	-	-	1
3	Minor Bridges	Nos.	8	1	3	4	13	11	3	2
4	Culverts (Pipe)	Nos.	23	17	19	14	23	35	10	3
5	Culvert (Slab/Box)	Nos.	11	10	6	6	21	11	1	6
6	Major Junctions	Nos.	2	1	2	3	3	5	2	1
7	Minor junctions	Nos.	25	11	20	15	33	18	4	6
8	Bus Bays with Shelter	Nos.	11	7	16	7	16	15	-	4
9	Bus Shelter	Nos.	4	2	3	4	2	-	-	-
10	RCC Cover Drain	Kms	4	1	1	1	6	2	2	2
11	Earthen Drain	Kms	44	32	50	38	82	40	1	16
12	Road Markings	Sq.m	10,485	7,420	12,098	10,064	19,800	11,959	698	4,035
13	W-Beam Safety Barriers	Kms	2	3	1	1	5	1	-	1
14	Rigid Concrete Barrier	Kms	0	0	0	0	0	0	0	0
15	Delineators	Nos.	63	63	204	259	239	-	-	-
16	Kilometer Stones	Nos.	23	17	26	22	45	26	2	11
17	Hectometer Stones	Nos.	79	48	104	70	176	73	-	32
18	Road Signs	Nos.	210	180	114	142	342	407	55	172
19	Urban Length	Kms	3	1	2	2	3	3	1	1
20	Rural Length	Kms	22	16	25	20	41	25	1	9
21	ROBs	Nos.	-	-	-	1	-	-	-	-
22	RCC Wall	Kms	-	-	-	2	-	-	-	-
23	Concrete Railing	Kms	-	-	-	0	-	0	-	0
24	Steel Railing	Kms	-	-	-	1	-	-	-	-

S. No	Description	Unit	Package - 6	Package - 7			Package - 8		Package - 9	
				SH-297	Chandur Bypass	SH-296	SH-280	SH-312	SH-280	SH-312
1	Length of the Project Corridor	Kms	28	26	5	18	32	20	31	16
2	Major Bridges	Nos.	-	-	-	-	1	-	NIL	1
3	Minor Bridges	Nos.	13	8	1	5	4	5	6	2
4	Culverts (Pipe)	Nos.	34	34	9	27	60	66	42	24
5	Culvert (Slab/Box)	Nos.	5	1	1	4	11	3	5	-
6	Major Junctions	Nos.	3	5	2	3	2	1	4	2
7	Minor junctions	Nos.	24	20	-	19	27	8	11	2
8	Bus Bays with Shelter	Nos.	21	11	-	15	-	-	-	-
9	Bus Shelter	Nos.	-	-	-	-	-	-	-	-
10	RCC Cover Drain	Kms	3	3	-	4	1	-	-	2
11	Earthen Drain	Kms	46	20	9	33	9	-	24	14
12	Road Markings	Sq.m	11,993	11,580	2,115	8,258	14,642	9,106	13,794	6,949
13	W-Beam Safety Barriers	Kms	1	1	0	19	3	Nil	4	5
14	Rigid Concrete Barrier	Kms	1	0	0	0	1	Nil	0	0
15	Delineators	Nos.	-	46	-	9	23	-	444	256
16	Kilometer Stones	Nos.	25	13	5	18	10	-	28	16
17	Hectometer Stones	Nos.	91	49	19	74	37	-	111	63
18	Road Signs	Nos.	272	440	30	250	39	Nil	413	193
19	Urban Length	Kms	3	3	-	2	4	2	6	2
20	Rural Length	Kms	26	23	5	16	28	19	25	13

3.2.5. The shareholding of AM2 as on Valuation Date is as follows:

S. No.	Particulars	No. of Shares	%
1	Actis Highway Infra Limited and its nominees	3,95,13,685	100.00%

Source: Investment Manager

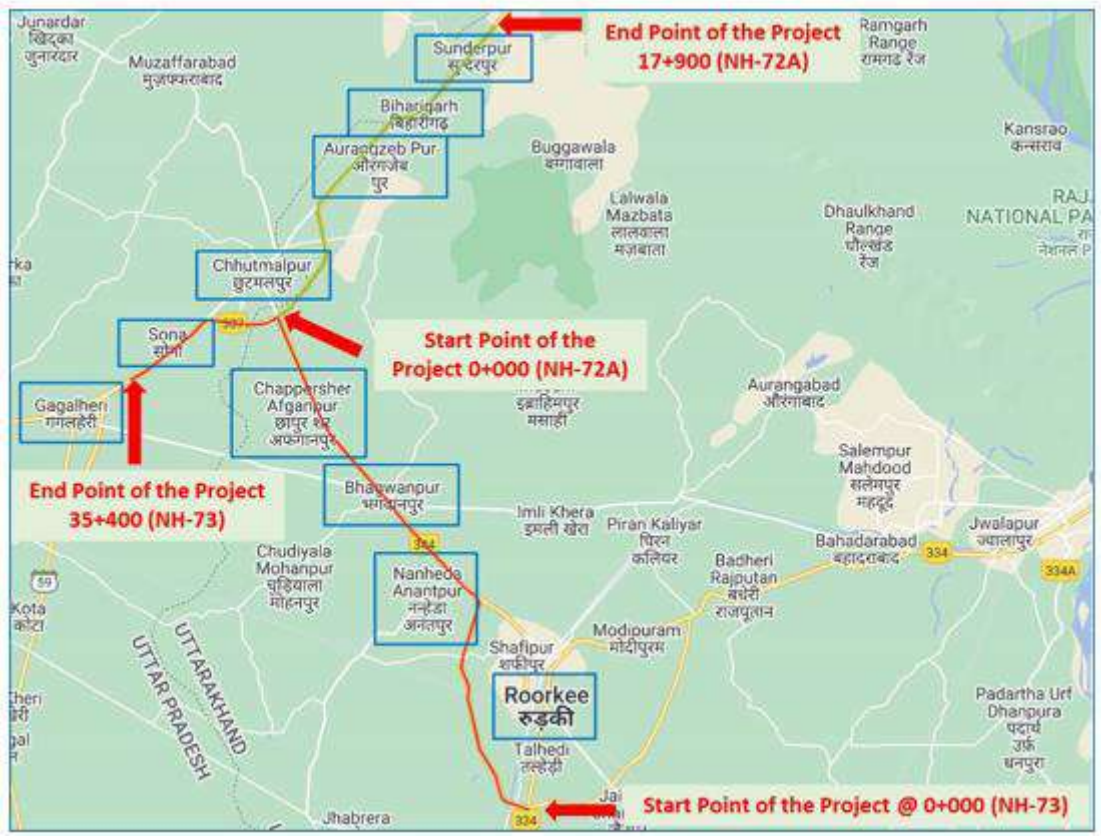
The Investment Manager has represented to me that there is no change in shareholding pattern from the Valuation Date till the date of this Report.

3.2.6. My team had conducted physical site visit for AM2 on 19th November 2023. Following are the pictures of the plant site:

3.3. Nxt-Infra CGRG Highways Limited (CGRG)

3.3.1. Nxt-Infra CGRG Highways Limited (CGRG) was incorporated as on 06th May 2016. The SPV entered into a concession agreement dated 27th May, 2017 with NHAI and having the appointed date as on 28th February, 2018. The project was awarded to M/s MBL Infrastructures Ltd by NHAI under HAM for 15 years of operation & maintenance period from the PCOD i.e. 05th August, 2020.

3.3.2. The map below illustrates the location of the Project and the corridor it covers:



Source: Investment Manager

3.3.3. Summary of project details of CGRG is as follows:

Parameters	Details
Total Length	53 Km
Nos. of Lanes	4
NH / SH	NH 72A & NH 73
State Covered	Uttar Pradesh and Uttarakhand
Area (Start and End)	Chutmalpur - Ganeshpur -Roorkee - Gagalehri
Bid Project Cost	INR 94,200 Lakhs
Project Type	HAM
Concession Granted by	NHAI
PCOD Date	5th August 2020
Nos. of Annuities	30 (semi-annual)
Construction Period	730 Days
Operational Period	15 Years

Source: Investment Manager

3.3.4. The corridor forms a part of existing road from Km 0.00 to Km 17.90 of NH-72A and from Km 0.00 to Km 33.00 of NH-73 (approx. 53.30 km):

Sr. No.	Salient Features	Units	For SPV
1	Length of the Project Corridor	Kms	53
2	Major Bridges	No.	3
3	Minor Bridges	No.	11
4	Culverts (Pipe)	No.	44
5	Culvert (Slab/Box)	No.	18
6	Major Junctions	No.	2
7	Minor junctions	No.	20
8	Bus Bays with Shelter	No.	28
9	RCC Cover Drain	Kms	12
10	Road Markings	Sqm	79,920
11	W-Beam Safety Barriers	Kms	29
12	Delineators	No.	59
13	Hectometer Stones	No.	244
14	Road Signs	No.	803
15	ROBs	No.	1
16	Concrete Railing	Kms	1

3.3.5. The shareholding of CGRG as on Valuation Date is as follows:

S. No.	Particulars	No. of Shares	%
1	Actis Highway Infra Limited and its nominees	50,000	100.00%

Source: Investment Manager

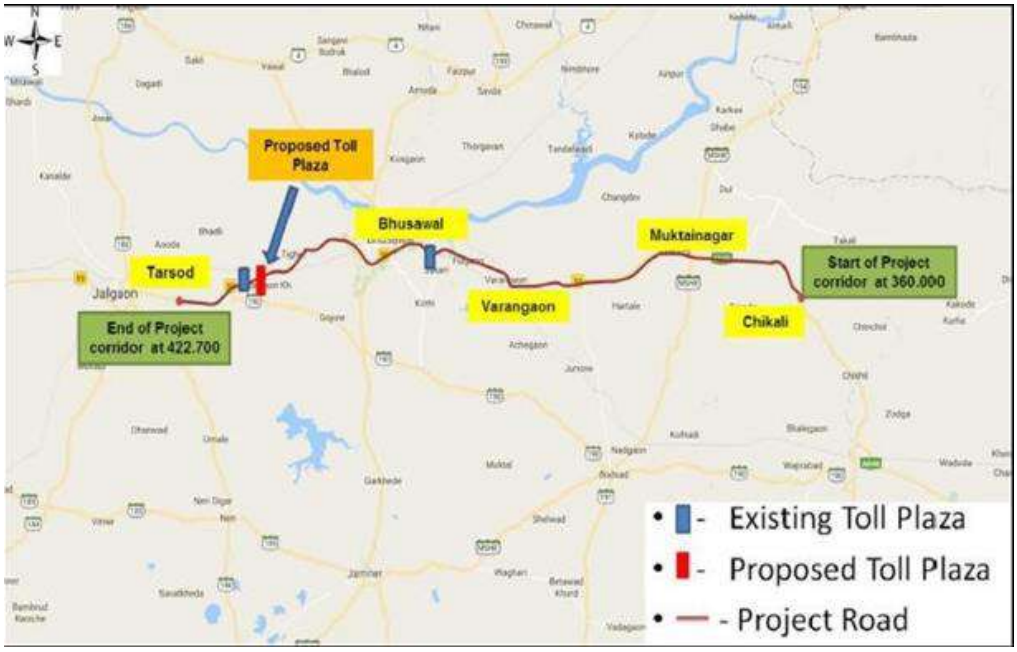
The Investment Manager has represented to me that there is no change in shareholding pattern from the Valuation Date till the date of this Report.

3.3.6. My team had conducted physical site visit for CGRG on 15th December 2023. Following are the pictures of the plant site:

3.4. Chikhali-Tarsod Highways Private Limited

3.4.1. Chikhali-Tarsod Highways Private Limited (CTHPL) was incorporated as on 06th December 2016. The SPV entered into a concession agreement dated 03rd April, 2017 with NHAI and having the appointed date as on 16th January, 2019. The project was awarded to M/s Visvaraj Environment Pvt Ltd by NHAI under HAM for 15 years of operation & maintenance period from the PCOD i.e. 25th August, 2021.

3.4.2. The map below illustrates the location of the Project and the corridor it covers:



Source: Investment Manager

3.4.3. Summary of project details of CTHPL is as follows:

Parameters	Details
Total Length	63 Km
Nos. of Lanes	4
NH / SH	NH 6
State Covered	Maharashtra
Area (Start and End)	Chikhali-Tarsod
Bid Project Cost	INR 1,04,810 Lakhs
Project Type	HAM
Concession Granted by	NHAI
PCOD Date	25th August 2021
Nos. of Annuities	30 (Semi-annual)
Construction Period	910 days
Operational Period	15 years

Source: Investment Manager

3.4.4. The corridor forms a part of existing road from 360.000 km to 422.700 km (Approx. 62.700 Kms) of NH-06.

Sr. No.	Salient Features	Units	For SPV
1	Length of the Project Corridor	Kms	63
2	Major Bridges	No.	3
3	Minor Bridges	No.	22
4	Culverts (Pipe)	No.	68
5	Culvert (Slab/Box)	No.	46
6	Major Junctions	No.	6
7	Minor junctions	No.	68
8	Bus Bays with Shelter	No.	6
9	RCC Cover Drain	Kms	61
10	Road Markings	Sqm	55,260
11	W-Beam Safety Barriers	Kms	31
12	Delineators	No.	152
13	Kilometer Stones	No.	118
14	Hectometer Stones	No.	307
15	Road Signs	No.	1,129
16	ROBs	No.	4
17	Concrete Railing	Kms	1

3.4.5. The shareholding of CTHPL as on Valuation Date is as follows:

S. No.	Particulars	No. of Shares	%
1	Actis Highway Infra Limited	9,99,994	100.00%
2	Actis Highway Holding Limited	6	0.00%
	Total	**10,00,000**	**100.00%**

Source: Investment Manager

The Investment Manager has represented to me that there is no change in shareholding pattern from the Valuation Date till the date of this Report.

3.4.6. My team had conducted physical site visit for CTHPL on 15th December 2023. Following are the pictures of the plant site:

3.5. Welspun Delhi Meerut Expressway Private Limited

3.5.1. Welspun Delhi Meerut Expressway Private Limited (DME) was incorporated as on 16th February 2016. The SPV entered into a concession agreement dated 04th March, 2016 with NHAI and having the appointed date as on 28th November, 2016. The project was awarded to M/s Welspun Enterprises ltd Ltd by NHAI under HAM for 15 years of operation & maintenance period from the PCOD i.e. 28th June, 2018.

3.5.2. The map below illustrates the location of the Project and the corridor it covers:

Source: Investment Manager

3.5.3. Summary of project details of DME is as follows:

Parameters	Details
Total Length	9 Km
Nos. of Lanes	14
NH / SH	NH 24
State Covered	Delhi and Uttar Pradesh
Area (Start and End)	Delhi-Meerut
Bid Project Cost	INR 84,150 Lakhs
Project Type	HAM
Concession Granted by	NHAI
PCOD Date	28th June 2018
Nos. of Annuities	20 (Semi-annual)
Construction Period	910 days
Operational Period	15 years

Source: Investment Manager

3.5.4. The corridor forms a part of existing road from 0.000 km to 8.360 km (Approx. 8.716 Kms) of NH-24:

Sr. No.	Salient Features	Units	For SPV
1	Length of the Project Corridor	Kms	9
2	Major Bridges	Nos.	1
3	Minor Bridges	Nos.	2
4	Major Junctions	Nos.	11
5	Minor junctions	Nos.	11
6	Bus Bays with Shelter	Nos.	-
7	Road Markings	Kms	9
8	W-Beam Safety Barriers	Kms	2
9	Delineators	Nos.	436
10	Kilometer Stones	Nos.	18
11	Hectometer Stones	Nos.	70
12	Road Signs	Nos.	329
13	Concrete Railing	Kms	16

3.5.5. The shareholding of DME as on Valuation Date is as follows:

S. No.	Particulars	No. of Shares	%
1	Actis Highway Infra Limited	49,99,994	100.00%
2	Actis Highway Holding Limited	6	0.00%
	Total	**50,00,000**	**100.00%**

Source: Investment Manager

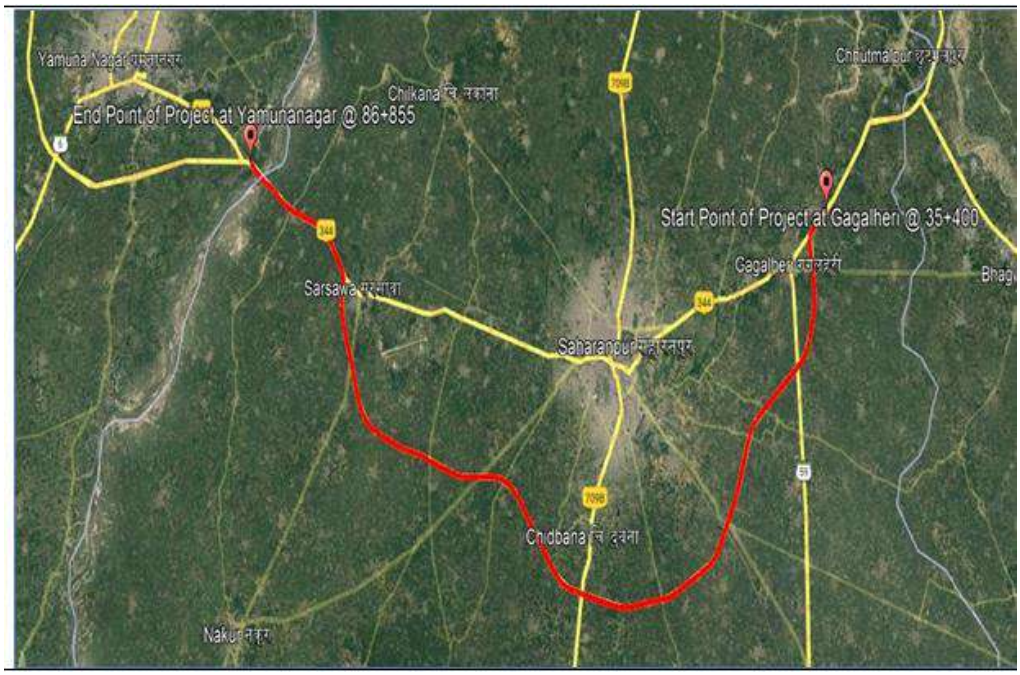
The Investment Manager has represented to me that there is no change in shareholding pattern from the Valuation Date till the date of this Report.

3.5.6. My team had conducted physical site visit for DME on 15th December 2023. Following are the pictures of the plant site:

3.6. **Nxt-Infra GSY Highways Limited**

3.6.1. Nxt-Infra GSY Highways Ltd. (GSY) was incorporated as on 11th May 2016. The SPV entered into a concession agreement dated 27th May, 2016 with NHAI and having the appointed date as on 27th January, 2018. The project was awarded to M/s MBL Infrastructures Ltd by NHAI under HAM for 15 years of operation & maintenance period from the PCOD i.e. 31st October, 2020.

3.6.2. The map below illustrates the location of the Project and the corridor it covers:



Source: Investment Manager

3.6.3. Summary of project details of GSY is as follows:

Parameters	Details
Total Length	52 Km
Nos. of Lanes	4
NH / SH	NH 73
State Covered	Uttar Pradesh Haryana Border
Area (Start and End)	Gagalheri-Saharanpur-Yamunanagar
Bid Project Cost	INR 1,18,400 Lakhs
Project Type	HAM
Concession Granted by	NHAI
PCOD Date	31st October 2020
Nos. of Annuities	30 (Semi-annual)
Construction Period	730 days
Operational Period	15 years

Source: Investment Manager

3.6.4. The corridor forms a part of existing road from 35.400 km to 85.855 (Approx. 51.455 Kms) of NH-73:

Sr. No.	Salient Features	Units	For SPV
1	Length of the Project Corridor	Kms	51
2	Major Bridges	No.	3
3	Minor Bridges	No.	9
4	Culverts (Pipe)	No.	69
5	Culvert (Slab/Box)	No.	20
6	Major Junctions	No.	2
7	Minor junctions	No.	4
8	Bus Bays with Shelter	No.	11
9	RCC Cover Drain	Kms	9
10	Road Markings	Sqm	46,640
11	W-Beam Safety Barriers	Kms	34
12	Delineators	No.	167
13	Kilometer Stones	No.	99
14	Hectometer Stones	No.	306
15	Road Signs	No.	460
16	Concrete Railing	Kms	3

3.6.5. The shareholding of GSY as on Valuation Date is as follows:

S. No.	Particulars	No. of Shares	%
1	Actis Highway Infra Limited and its nominees	50,000	100.00%

Source: Investment Manager

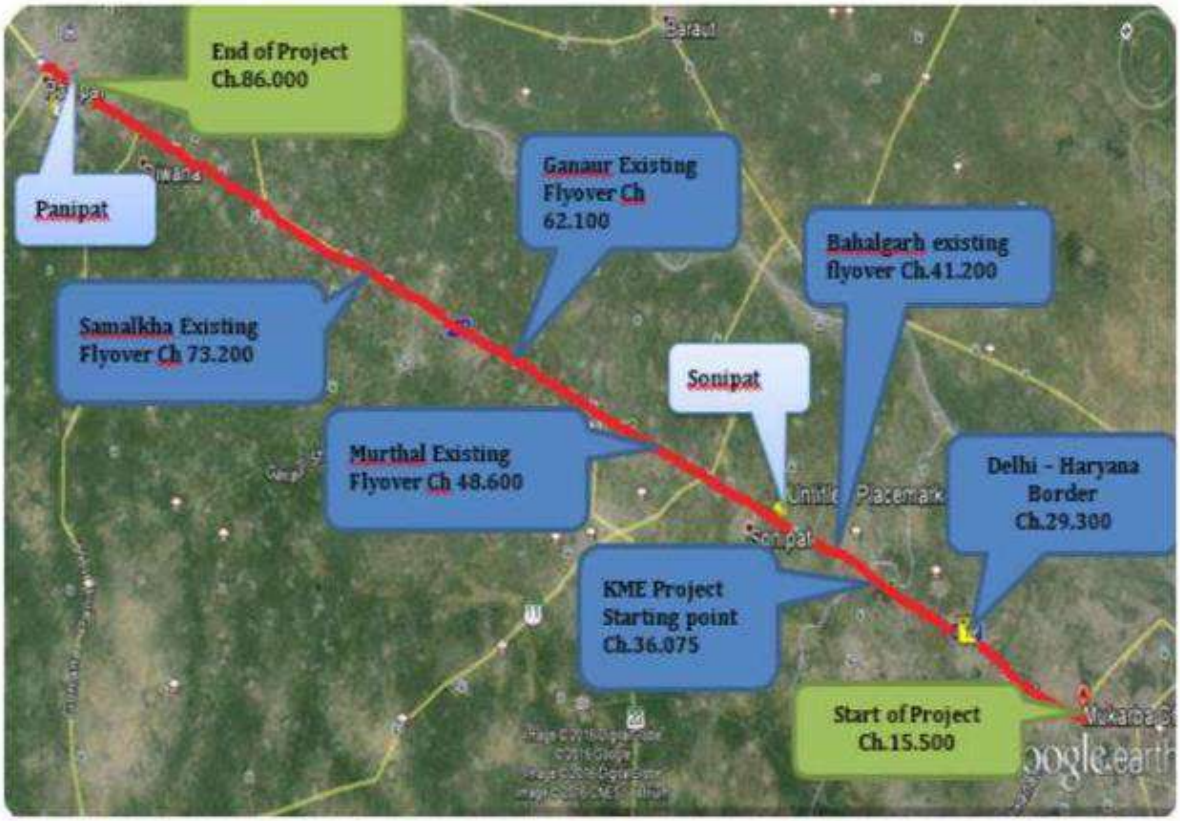
The Investment Manager has represented to me that there is no change in shareholding pattern from the Valuation Date till the date of this Report.

3.6.6. My team had conducted physical site visit for GSY on 16th December 2023. Following are the pictures of the plant site:

3.7. Welspun Infrafacility Private Limited

3.7.1. Welspun Infrafacility Private Limited (MCP) was incorporated as on 13th September 2019. The SPV entered into a Substitution agreement dated 08th June, 2020 with NHAI under a harmonious substitution as per concession agreement dated 28th August,2015 between NHAI and previous concessionaire. The project was awarded to M/s Essel Infraprojects Limited by NHAI and later substituted to the SPV for 17 years of operation & maintenance period from the Appointed Date i.e. 21th October, 2016. The Project has successfully achieved its PCOD on 31st March, 2022.

3.7.2. The map below illustrates the location of the Project and the corridor it covers:



Source: Investment Manager

3.7.3. Summary of project details of MCP is as follows:

Parameters	Details
Total Length	71.10 Km
Nos. of Lanes	8
NH / SH	NH 1 (New NH 44)
State Covered	Delhi-Haryana
Area (Start and End)	Delhi-Mubarka Chowk (Panipat)
Project Type	BOT - Toll
Concession Granted by	NHAI
PCOD Date	31st March 2022
Original Concession Period	17 years
Extension (If any)	3.4 years
Likely End of Concession Period	26th September 2037

Source: Investment Manager

3.7.4. The corridor forms a part of existing road from 15.500 km to 86.000 km (Approx. 70.500 Kms) of NH-1 (New NH-44):

Sr. No.	Salient Features	Units	Details
1	Length of the Project Corridor	Km's	71
2	Major Bridges	Nos	1
3	Minor Bridges	Nos	18
4	Culverts (Pipe)	Nos	33
5	Culvert (Slab/Box)	Nos	Slab-4 Box-42
6	Major Junctions	Nos	13
7	Minor junctions	Nos	22
8	RCC Cover Drain	Kms	119
9	Road Markings	Sqm	79
10	Rigid Concrete Barrier	Kms	30
11	Kilometer Stones	Nos	75
12	Road Signs	Nos	244
13	RCC Wall	Kms	4

3.7.5. The shareholding of MCP as on Valuation Date is as follows:

S. No.	Particulars	No. of shares	%
1	Actis Highway Infra Limited and its nominees	1,18,51,814	49.00%
2	Welspun Enterprises Limited and its nominees	1,23,35,567	51.00%
	Total	**2,41,87,381**	**100.00%**

Source: Investment Manager

The Investment Manager has represented to me that there is no change in shareholding pattern from the Valuation Date till the date of this Report.

Presently, 51% of the issued and paid-up equity share capital of MCP is held by Welspun Enterprises Limited ("WEL") and 49% is held by Actis Highway Infra Limited ("AHIL"). As represented by the Investment Manager, the InvIT can currently purchase only 49% equity stake of MCP as per the terms of the Concession Agreement. However, the Trust, will be entitled to acquire 100% of the equity share capital of MCP only after a period of one year from the COD of MCP which is as per the terms of the requirements prescribed by the NHAI and as per the Concession Agreement.

3.7.6. My team had conducted physical site visit for MCP on 14th December, 2023. Following are the pictures of the plant site:

4. Overview of the Industry

The road infrastructure is an important determinant of economic growth in India and it plays a significant role in the economy's overall development process.

India has the second-largest road network in the world, spanning over 6.3 million kms. Over 64.5% of all goods in the country are transported through roads, while 90% of the total passenger traffic uses road network to commute.

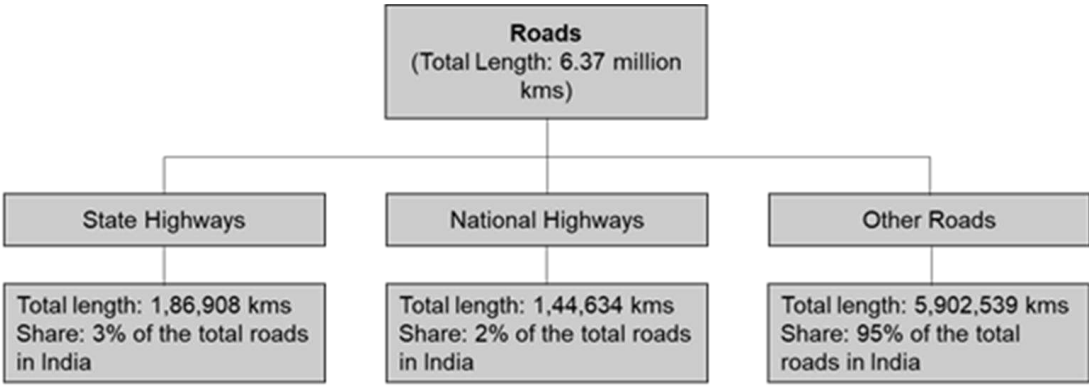
Creation and operation of quality road infrastructure continue to be major requirements for enabling overall growth and development of India in a sustained manner.

Bridging of existing infrastructure gaps and creating additional facilities to cater to the increasing population are equally important. Apart from providing connectivity in terms of enabling movement of passengers and freight, roads act as force multipliers in the economy.

Further, roads play a significant role in times of natural calamities, wars and other such events in terms of timely evacuation of the impacted population, carriage of relief material and other associated movements. Government takes cognisance of this requirement and road infrastructure remains to be a focus area.

4.1 Road Network in India

4.1.1 India has the second largest road network in the world, spanning over 6.37 million kms. Over 64.5% of all goods in the country are transported through roads, while 90% of the total passenger traffic uses road network to commute.



Source: IBEF Roads Report, February 2023

4.1.2 Out of this around 1.41 lakh km are National Highways ("NHs"). Significantly, NHs constitute around 2 per cent of the total road network in the country but carry about 40 per cent of the road traffic. The density of India's highway network at 1.89 km of roads per square kilometer of land – is similar to that of the France (1.98) and much greater than China's (0.49) or USA's (0.68).

4.2 Government Agencies for Road Development

4.2.1 The Ministry of Road Transport & Highway ("**MoRTH**") is responsible for development of Road Transport and Highways in general and construction & maintenance of National Highways.

4.2.2 The National Highways Authority of India ("**NHAI**") is an autonomous agency of the Government of India, set up in 1988 and is responsible for implementation of National Highways Development Project ("**NHDP**").

4.2.3 The NHDP in the context of NHs is nearing completion- in seven phases. Later, the other highway development programmes like Special Accelerated Road Development Programme for Development of Road Network in North Eastern States (SARDP- NE) and National Highways Interconnectivity Improvement Project (NHIIP) were also taken up by MoRTH. Further, Bharatlmala Pariyojana is ongoing. For majority of the projects under NHDP and Bharatmala Pariyojana, NHAI is the implementation agency. Other NH related programmes/works are being implemented through agencies like National Highways Infrastructure Development Corporation Limited (NHIDCL), State Public Works Departments (PWDs), State Road Development Corporations and the Border Road Organization.

4.2.4 NHAI is planning to raise Rs. 40,000 crore (US$ 5.72 billion) to monetise its highway assets through Infrastructure Investment Trust (InvIT).

4.2.5 In December 2022, NHAI raised Rs. 10,200 crore (US$ 1.23 billion) from foreign and Indian institutional investors to meet ever-growing budgetary support. Indian Government and Asian Development Bank signed US$ 500 million loan agreement to build the longest bridge across river Ganga, in Bihar. The bridge is expected to be ready by December 2021.

4.2.6 NHAI is planning to award 1,000-1,500 km of projects under the BOT model in 2023-24. In FY21, there were 125 PPP projects worth US$ 23.25 billion in India.

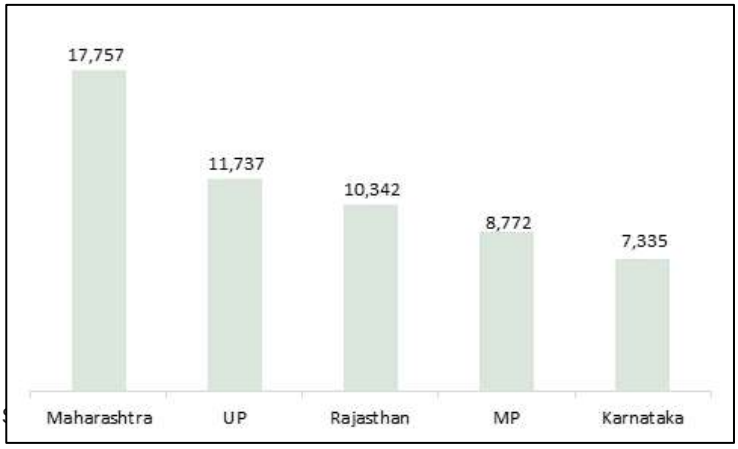
4.2.7 The government has successfully rolled out over 60 road projects in India worth over US$ 10 billion based on the Hybrid Annuity Model (HAM). HAM has balanced risk appropriately between private and public partners and boosted PPP activity in the sector.

4.2.8 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 incentivising 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.

4.2.9 Roads in the jurisdiction of state governments are under different categories like State Highways ("SHs") and Major District Roads. They are being developed/ upgraded through State PWDs and State Road Development Corporations. Pradhan Mantri Gramm Sadak Yojana is being implemented for rural roads through the Ministry of Rural Affairs with active participation by state governments. Further, roads within urban areas are maintained/ developed mostly with PWDs and Urban Local Bodies.

4.2.10 State Governments have a significant role to play in developing the SHs, Major District Roads, Other District Roads to ensure the last mile connectivity. States have varying levels of maturity in terms of road infrastructure development due to issues such as inadequate identification and prioritization of projects, funding shortfall, limited institutional capacity to implement projects, etc.

Top 5 states by length of NHs in India (in Km)



4.3 **Trend of Road and Highways Construction**

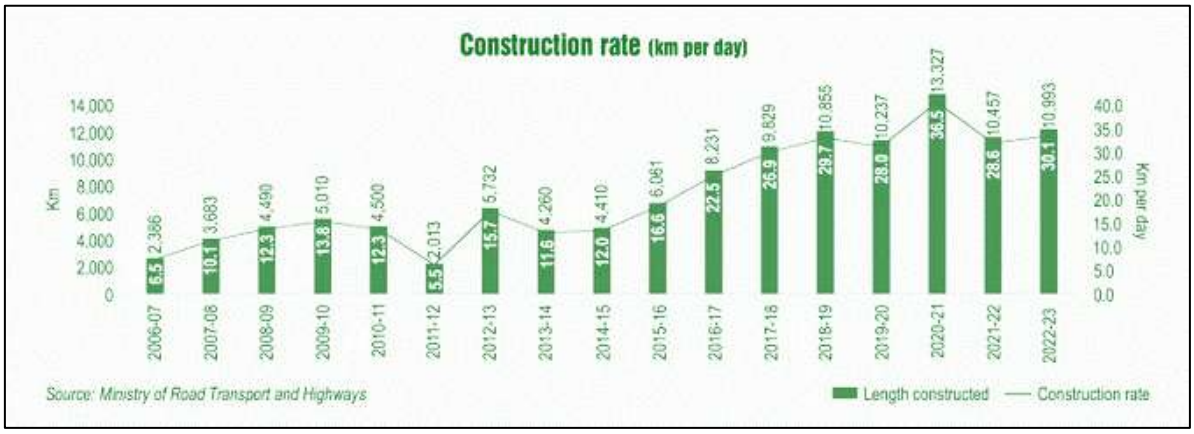
4.3.1 The length of National Highways awarded has almost doubled in the years FY15 to FY18 compared to FY11 to FY14.

4.3.2 The current rate of road construction is almost three times that in 2007-08.

4.3.3 The launch of the Bharatmala Pariyojana in 2017 provided a big fillip to construction activity, with the pace of construction doubling from 12 km per day in 2014-15 to 30 km per day in 2022-23, and peaking at 37 km per day in 2020-21.

4.3.4 The government aims to take this up to 100 km per day in the next few years.

Details of National Highway network:



4.3.5 The road transport and highways ministry (MoRTH) has received a push with the Union Budget raising the allocation by 36 percent to around Rs 2.7 lakh crore for 2023-24. This is nearly 10 percent jump over the Budgetary allocation of Rs 1.99 lakh crore made in the Budget for 2022-23.

4.3.6 The GST on construction equipment has been reduced to 18% from 28%, which is expected to give a boost to infrastructure development in the country.

4.3.7 The NHDP is a program to upgrade, rehabilitate and widen major highways in India to a higher standard. The project was started in 1998 to be implemented in 7 phases.

4.3.8 With the launch of Bharatmala project, 10,000 km of highway construction left under NHDP was merged with Phase I of the Bharatmala project.

4.3.9 The Indian government launched Gati Shakti-National Master Plan, which has consolidated a list of 81 high impact projects, out of which road infrastructure projects were the top priority. The major highway projects include the Delhi-Mumbai expressway (1,350 kilometres), Amritsar-Jamnagar expressway (1,257 kilometres) and Saharanpur-Dehradun expressway (210 kilometres).

4.3.10 The main aim of this program is a faster approval process by digitizing the process through a dedicated Gati shakti portal.

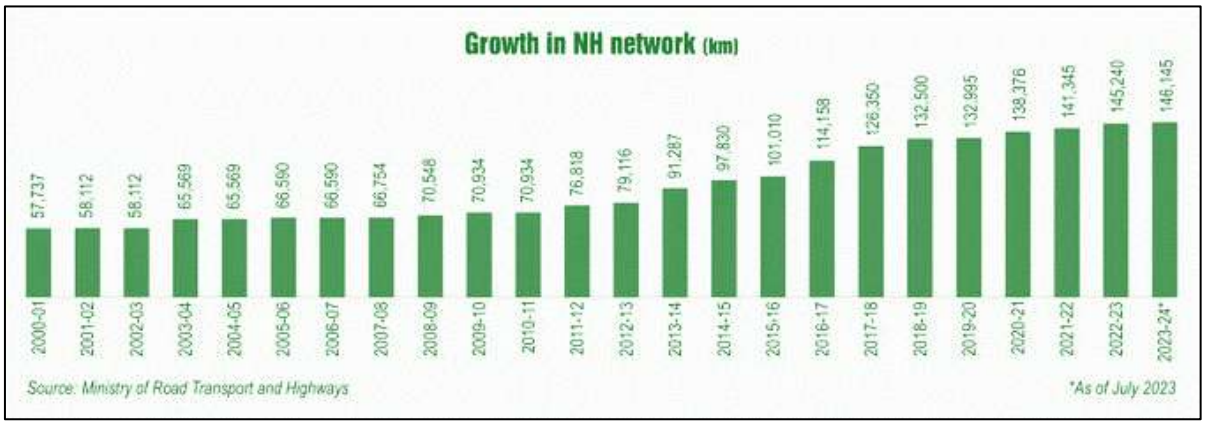
4.3.11 In December 2021, the government set a highway monetization target of Rs. 2 trillion (US$ 26.20 billion) for the next 3 years.

4.3.12 The Government of India has allocated Rs. 111 lakh crore (US$ 13.14 billion) under the National Infrastructure Pipeline for FY 2019-25. The Roads sector is expected to account for 18% capital expenditure over FY 2019-25.

4.3.13 NHAI is planning to raise Rs. 40,000 crore (US$ 5.72 billion) to monetise its highway assets through Infrastructure Investment Trust (InvIT). The InvIT of NHAI, National Highways Infra Trust, has raised more than Rs 8,000 crore from foreign and Indian institutional investors till October 2022.

4.3.14 The development of market for roads and highways is projected to exhibit a CAGR of 36.16% during 2016-2025, on account of growing government initiatives to improve transportation infrastructure in the country.

Details of National Highway network:



4.4 **Implementation of important projects and expressways:**

4.4.1 Bharatmala Pariyojna

Bharatmala Pariyojana is a new umbrella program for the highways sector that focuses on optimizing efficiency of freight and passenger movement across the country by bridging critical infrastructure gaps through effective interventions like development of Economic Corridors, Inter Corridors and Feeder Routes, National Corridor Efficiency Improvement, Border and International connectivity roads, Coastal and Port connectivity roads and Green-field expressway.

The Bharatmala Pariyojana envisages development of about 24,800 km length of Economic Corridors, which along with Golden Quadrilateral (GQ) and North-South and East-West (NS-EW) Corridors are expected to carry majority of the Freight Traffic on roads.

A total length of 34,800 km in road projects have been proposed to be constructed with an estimated outlay of Rs 5.35 trillion under Bharatmala Pariyojana Phase-I over a five year period (2017-18 to 2021-22).

4.4.2 Char Dham Vikas Mahamarg Pariyojna:

This project envisages development of easy access to the four dhams in India – Gangotri, Yamunotri, Kedarnath and Badrinath. Development of this route of 889 km route us expected at an estimated cost of INR 12,000 Crores.

4.4.3 Eastern peripheral and western peripheral expressway

These two projects will connect NH-1 and NH-2 from western and eastern side of Delhi.

4.4.4 Setu Bharatam:

This project aims to replace crossings on NHs with Road Over Bridges and Road Under Bridges. It is projected to construct 174 such structures.

4.4.5 To further augment road infrastructure, more economic corridors are also being planned by Government of India as revealed in Budget 2021-22.

a. 3,500 km of National Highway works in the state of Tamil Nadu at an investment of INR 1.03 lakh Crores. These include Madurai-Kollam corridor, Chittoor-Thatchur corridor. Construction will start next year.

b. 1,100 km of National Highway works in the State of Kerala at an investment of INR 65,000 Crores including 600 km section of Mumbai Kanyakumari corridor in Kerala.

c. 675 km of highway works in the state of West Bengal at a cost of INR 25,000 Crores including upgradation of existing road-Kolkata –Siliguri.

d. National Highway works of around INR 19,000 Crores are currently in progress in the State of Assam. Further works of more than INR 34,000 Crores covering more than 1300 kms of National Highways will be undertaken in the State in the coming three years.

e. In the Union Budget of 2022-23, the increase in Budget was a whopping 68% compared to the last year and the government plans to complete 25,000 kilometres of National highways.

4.5 **Opportunities in road development & maintenance in India**

a. India has joined the league of 15 of global alliance which will work towards the ethical use of smart city technologies

b. The Government aims to construct 65,000 kms of national highways at a cost of Rs. 5.35 lakh crore (US$ 741.51 billion).

c. The government also aims to construct 23 new national highways by 2025.

d. Road building in India is second least expensive in Asia.

e. Andhra Pradesh will spend US$ 296.05 million to build 8,970 Kms of roads.

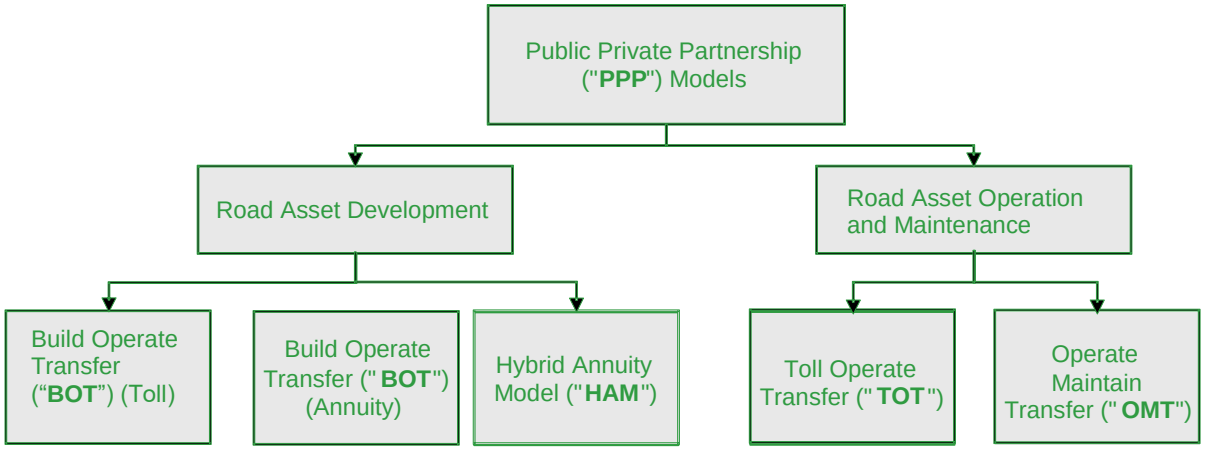
f. In February 2022, NHAI rolled out a plan to construct 5,795 kilometres of highways that will connect 117 districts. The plan was worth Rs. 1 trillion (US$ 13.09 billion).

4.6 **Public Private Partnership ("PPP") Models of road development and maintenance in India**

4.6.1 India has a well-developed framework for Public-Private-Partnerships (PPP) in the highway sector. PPP has been a major contributor to the success story of the roads and highway sector in India. With the emergence of private players over the last decade, the road construction market has become fragmented and competitive. Players bidding for projects also vary in terms of size. PPP modes have been used in India for both development and operation & maintenance of road assets.

4.6.2 In FY21, there were 125 PPP projects worth US$ 23.25 billion in India.

4.6.3 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 incentivising 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.



4.6.4 **Road Asset Development Models**

- **BOT Toll**

  In a BOT toll project, the concessionaire is responsible for designing, building, financing, operating, maintaining, tolling and transferring the project to the relevant authority at the end of the concession period. The concession period is project specific but is usually for 20-25 years. In BOT Toll model, the concessionaire earns revenue primarily in the form of toll revenue which in turns depends on the traffic on the road stretch. Toll rates are regulated by the government through rules.

- **BOT Annuity**

  Similar to a BOT Toll projects, in BOT Annuity project, the concessionaire is responsible for designing, building, financing, operating, maintaining, tolling and transferring the project to the relevant authority at the end of the concession period. However, in these projects, the right to collect toll on road stretch lies with the government. The concessionaire earns revenue in the form of pre-determined semi-annual annuity payments.

- **HAM**

  Similar to a BOT projects, in HAM project, the concessionaire is responsible for designing, building, financing, operating, maintaining, tolling and transferring the project to the relevant authority at the end of the concession period. However, in these projects, the right to collect toll on road stretch lies with the government. The construction period for HAM projects is project specific and a fixed operation period of 15 years.

4.7 **Government Investment in the Sector**

4.7.1 Under Union Budget 2023-24, the Government of India has allocated Rs. 270,435 Crore to the Ministry of Road Transport and Highways.

4.7.2 The Government aims to increase the toll revenue to INR 1.3 Trillion by 2030. In 2014, the waiting time at the toll plazas was 734 seconds, whereas in the 2023 this has reduced to 47 seconds. We are hopeful that we will bring it down to 30 second soon

4.7.3 NHAI is in the process to raise Rs. 40,000 crore (US$ 5.72 billion) to monetize its highway assets through Infrastructure Investment Trust (InvIT).

4.8 **Recent Initiatives by Government**

Bhoomi Rashi – Land Acquisition Portal

The ministry has corroborated with the National Informatics Centre, to create Bhoomirashi, a web portal which digitises the cumbersome land acquisition process, and also helps in processing notifications relating to land acquisition online. Processing time, which was earlier two to three months has come down to one to two weeks now.

FASTag – Electronic Toll Collection

National Electronic Toll Collection (NETC) system, has been implemented on pan India basis in order to remove bottlenecks and ensure seamless movement of traffic and collection of user fee as per the notified rates, using passive Radio Frequency Identification (RFID) technology.

Revival of languishing projects

Projects which were languishing for a number of years have been attempted to be revived, with the help of a number of policy measures taken by the government. Some of the policy measures like Premium deferment in stressed projects, extension of concession period for languishing projects to the extent of delay not attributable to concessionaires, One Time Capital Support for physical completion of languishing projects that have achieved at least 50 per cent physical progress, through one time fund infusion by NHAI, subject to adequate due diligence on a case to case basis.

Rural development

Under the Union Budget 2023-24, the Government of India allocated Rs. 19,000 (US$ 2.37 billion) for Pradhan Mantri Gram Sadak Yojana (PMGSY).

Portfolios in roads & highways sector

In October 2020, the National Investment and Infrastructure Fund (NIIF) is making progress towards integrating its road and highway portfolio. The NIIF has acquired Essel Devanahalli Tollway and Essel Dichpally Tollway through the NIIF master fund. These road infra-projects will be supported by Athaang Infrastructure, NIIF's proprietary road network, assisted by a team of established professionals with diverse domain expertise in the transport field.

International Tie-ups

In December 2020, the Ministry of Road Transport and Highways signed an MoU with the Federal Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology of the Republic of Austria on technology cooperation in the road infrastructure sector.

Encourage private funding to reduce finance constraints

- Cumulative FDI inflows in construction development stood at US$ 26.21 billion between April 2000-March 2022. Maif 2 Investments India Pvt. Ltd. became the first-largest foreign investment in Indian roads sector under toll-operate-transfer (TOT) mode worth Rs. 9,681.5 crore (US$ 1.50 billion).
- In October 2020, the Asian Development Bank (ADB) and the Government of India signed a US$ 177 million loan to upgrade 450 kms of state highways and major district roads in Maharashtra.
- In January 2021, the Government of India and New Development Bank (NDB) signed two loan agreements for US$ 646 million for upgrading the state highway and district road networks in Andhra Pradesh.
- 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 incentivising 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.

4.9 Outlook

India's infrastructure sector is rapidly evolving and the key trends demonstrate positivity and optimism. The market for roads and highways in India is projected to exhibit a CAGR of 36.16% during 2016-2025, on account of growing Government initiatives to improve transportation infrastructure in the country. For the period of 2016-17 to 2021-22, the CAGR stands at 20%.

Development and maintenance of road infrastructure is a key Government priority, the sector has received strong budgetary support over the years. During the past years, the standardized processes for Public Private Partnership & public funded projects and a clear policy framework relating to bidding and tolling have also been developed.

The major initiatives undertaken by the Government such as National Infrastructure Pipeline (NIP) and the PM Gati Shakti National Master Plan will raise productivity, and accelerate economic growth and sustainable development.

The highways sector in India has been at the forefront of performance and innovation. The government is committed towards expanding the National Highway network to 2 lakh kilometres by 2025 emphasizing the construction of the World Class Road infrastructure in time bound & target oriented way. India has a well-developed framework for Public-Private-Partnerships (PPP) in the highway sector.

The Asian Development Bank ranked India at the first spot in PPP operational maturity and also designated India as a developed market for PPPs. The Hybrid Annuity Model (HAM) has balanced risk appropriated between private and public partners and boosted PPP activity in the sector.

Sources: IBEF Roads Report, November 2022; KPMG Report - Roads and Highway Sector; ICRA reports, website of Ministry of Road Transport and Highways, Government of India.

5. Valuation Methodology and Approach

5.1 The present valuation exercise is being undertaken in order to derive the fair EV of the SPVs.

5.2. The valuation exercise involves selecting a method suitable for the purpose of valuation, by exercise of judgment by the valuers, based on the facts and circumstances as applicable to the business of the company to be valued.

5.3. There are three generally accepted approaches to valuation:

(a) "Cost" approach
(b) "Market" approach
(c) "Income" approach

5.4. **Cost Approach**

The cost approach values the underlying assets of the business to determine the business value. This valuation method carries more weight with respect to holding companies than operating companies. Also, cost value approaches are more relevant to the extent that a significant portion of the assets are of a nature that could be liquidated readily if so desired.

Net Asset Value ("NAV") Method

The NAV Method under Cost Approach considers the assets and liabilities, including intangible assets and contingent liabilities. The Net Assets, after reducing the dues to the preference shareholders, if any, represent the value of a company.

The NAV Method is appropriate in a case where the main strength of the business is its asset backing rather than its capacity or potential to earn profits. This valuation approach is also used in cases where the firm is to be liquidated, i.e. it does not meet the "Going Concern" criteria.

As an indicator of the total value of the entity, the NAV method has the disadvantage of only considering the status of the business at one point in time.

Additionally, NAV does not properly take into account the earning capacity of the business or any intangible assets that have no historical cost. In many aspects, NAV represents the minimum benchmark value of an operating business.

5.5. **Market Approach**

Under the Market approach, the valuation is based on the market value of the company in case of listed companies, and comparable companies' trading or transaction multiples for unlisted companies. The Market approach generally reflects the investors' perception about the true worth of the company.

Comparable Companies Multiples ("CCM") Method

The value is determined on the basis of multiples derived from valuations of comparable companies, as manifest in the stock market valuations of listed companies. This valuation is based on the principle that market valuations, taking place between informed buyers and informed sellers, incorporate all factors relevant to valuation. Relevant multiples need to be chosen carefully and adjusted for differences between the circumstances.

Comparable Transactions Multiples ("CTM") Method

Under the CTM Method, the value is determined on the basis of multiples derived from valuations of similar transactions in the industry. Relevant multiples need to be chosen carefully and adjusted for differences between the circumstances. Few of such multiples are EV/Earnings before Interest, Taxes, Depreciation & Amortization ("**EBITDA**") multiple and EV/Revenue multiple.

Market Price Method

Under this method, the market price of an equity share of the company as quoted on a recognized stock exchange is normally considered as the fair value of the equity shares of that company where such quotations are arising from the shares being regularly and freely traded. The market value generally reflects the investors' perception about the true worth of the company.

5.6. Income Approach

The income approach is widely used for valuation under "Going Concern" basis. It focuses on the income generated by the company in the past as well as its future earning capability. The Discounted Cash Flow Method under the income approach seeks to arrive at a valuation based on the strength of future cash flows.

DCF Method

Under DCF Method value of a company can be assessed using the FCFF or Free Cash Flow to Equity Method ("**FCFE**"). Under the DCF method, the business is valued by discounting its free cash flows for the explicit forecast period and the perpetuity value thereafter. The free cash flows represent the cash available for distribution to both, the owners and creditors of the business. The free cash flows in the explicit period and those in perpetuity are discounted by the WACC. The WACC, based on an optimal vis-à-vis actual capital structure, is an appropriate rate of discount to calculate the present value of future cash flows as it considers equity-debt risk by incorporating debt-equity ratio of the firm.

The perpetuity (terminal) value is calculated based on the business' potential for further growth beyond the explicit forecast period. The "Constant Growth Model" is applied, which implies an expected constant level of growth for perpetuity in the cash flows over the last year of the forecast period.

The discounting factor (rate of discounting the future cash flows) reflects not only the time value of money, but also the risk associated with the business' future operations. The EV (aggregate of the present value of explicit period and terminal period cash flows) so derived, is further reduced by the value of debt, if any, (net of cash and cash equivalents) to arrive at value to the owners of the business.

5.7. Conclusion on Valuation Approach

It is pertinent to note that the valuation of any company or its assets is inherently imprecise and is subject to certain uncertainties and contingencies, all of which are difficult to predict and are beyond my control. In performing my analysis, I have made numerous assumptions with respect to industry performance and general business and economic conditions, many of which are beyond the control of the SPVs. In addition, this valuation will fluctuate with changes in prevailing market conditions, and prospects, financial and otherwise, of the SPVs, and other factors which generally influence the valuation of companies and their assets.

The goal in selection of valuation approaches and methods for any business is to find out the most appropriate method under particular circumstances on the basis of available information. No one method is suitable in every possible situation. Before selecting the appropriate valuation approach and method, I have considered various factors, inter-alia, the basis and premise of current valuation exercise, purpose of valuation exercise, respective strengths and weaknesses of the possible valuation approach and methods, availability of adequate inputs or information and its reliability and valuation approach and methods considered by the market participants.

5.7.1 Cost Approach

The existing book value of EV of the SPVs comprising of the value of its Net fixed assets, Financial assets, Other non-current assets and working capital based on the provisional financial statements as at 30th September 2023 prepared as per Indian Accounting Standards (Ind AS) are as under :

SPVs	30th September 2023	
	Book EV (INR Lakhs)	Adjusted Book EV (INR Lakhs)
AM 2	52,648	59,411
CGRG	57,719	61,253
CTHPL	56,490	69,981
DME	33,844	38,004
GSY	77,374	82,326
MCP	2,00,725	2,20,282
Total	**4,78,800**	**5,31,256**

** Enterprise Value ("**EV**") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or cash equivalents to meet those liabilities.*

*** Adjusted Enterprise Value of the SPVs is derived as the EV as defined above plus non-operating cash and cash like items (includes cash or cash equivalents and current investments) of the SPVs as at the Valuation Date.*

In the present case, the SPVs operate and maintain the project facilities in accordance with the terms and conditions under the relevant concession agreement(s). During the concession period, the HAM SPVs operate and maintain their respective road assets and earn revenues through annuity payment that are pre-determined as per the respective concession agreement. And in case of the Toll SPVs operates and maintains the road asset and earns revenue through Charges and collection of user fee in the form of Toll revenue. The charges, fees or tolls that may be collected are notified by relevant government authority, which are usually revised annually as specified in the relevant concessions and toll notifications. In such scenario, the true worth of the business is reflected in its future earning capacity rather than the cost of the project. Accordingly, I have not considered the cost approach for the current valuation exercise.

5.7.2 Market Approach

The present valuation exercise is to undertake fair EV of the SPVs engaged in the road infrastructure projects for a predetermined tenure. Further, the tariff revenue and expenses are very specific to the SPVs depending on the nature of their geographical location, stage of project, terms of profitability. In the absence of any exactly comparable listed companies with characteristics and parameters similar to that of the SPVs, I have not considered CCM method in the present case. In the absence of adequate details about the Independent Comparable Transactions, I was unable to apply the CTM method as a measure of valuation. Currently, the equity shares of the SPVs are not listed on any recognized stock exchange of India. Hence, I was unable to apply market price method.

5.7.3 Income Approach

Each of the SPVs operates under a DBOT based concession agreement with the relevant Authority.

- **For HAM Assets**,

  Currently HAM SPVs are completed and are revenue generating. The revenue of the SPVs is based on tenure, annuity payments, operations and other factors that are unique to each of the SPVs.

  The revenue of the HAM SPVs is mainly derived from the annuity payments (annuity fees), interest income on balance annuity payments (which is linked to bank rate) and O&M payments (adjusted for inflation), that is defined under respective Concession Agreement for operation period for the HAM assets.

  The annuity fees are typically pre-determined with the relevant government authority (NHAI in this case) and cannot be modified to reflect prevailing circumstances. Interest on balance annuity payments are linked to bank rate, which is changed by RBI based on prevailing market conditions. The rights in relation to the underlying assets of all the HAM SPVs shall be transferred after the expiry of the Concession Period. Accordingly, since all the HAM SPVs are generating income based on pre-determined agreements / mechanism and since the Investment Manager has provided me with the financial projections of the SPVs for the balance tenor of the concession agreements, DCF Method under the income approach has been considered as the appropriate method for the present valuation exercise.

- **For Toll Asset,**

  Currently, the Toll SPV is completed and revenue generating. The revenue of the Toll SPV is based on tenure, traffic volumes, operations, macro-economic factors like GDP growth, WPI, and other factors that are unique to the SPV. The Toll SPV derive almost all of the revenue from its toll-road operations (toll collections) over the operation period. Traffic plying through the toll road is primarily dependent on sustained economic development in the regions that they operate in and government policies relating to infrastructure development. The Toll SPV are substantially dependent on the accuracy of their respective traffic volume forecasts. The rights in relation to the underlying assets of the Toll SPV shall be transferred after the expiry of the Concession Period. Accordingly, since the Toll SPV is generating income based on pre-determined agreement mechanism and since the Investment Manager has provided me with the financial projections of the Toll SPV for the balance tenor of the concession agreements, DCF Method under the income approach has been considered as the appropriate method for the present valuation exercise.

6. Valuation of the SPVs

6.1. I have estimated the Fair EV and Adjusted EV of the SPVs using the DCF Method. While carrying out this engagement, I have relied extensively on the information made available to me by the Investment Manager. I have considered projected financial statement of the SPVs as provided by the Investment Manager.

Valuation

6.2. The key assumptions of the projections provided to me by the Investment Manager are:

Key Assumptions:

6.2.1. **Revenue cash flows**

- **For HAM SPVs,**

The Cash flow for the SPVs can be divided into two segments:

Payment NHAI during the Construction Period:

HAM SPVs other than AM2 having their Concession Agreement with the NHAI were eligible to receive 40% of the Bid Project Cost and AM2 having its Concession Agreement with the PWD(M) was eligible to receive 60% of the Bid Project Cost, adjusted for the price index multiple, in 5 equal installments during the construction period. I have been represented by the Investment Manager that all the SPVs have received the agreed portion of the inflation adjusted bid project cost (of 40% or 60% as applicable) as per their respective concession agreement. Hence, no further cash flow receipts are attributable towards this segment of cash flows.

Payment by NHAI during the Operation Period: Accordingly, the revenue of the SPVs would mainly consists of the following receipts:

a. **Annuity payments**: The Bid Project Cost remaining, adjusted for the price index multiple, to be paid in pursuance of the respective concession agreements (i.e. the Balance Completion Cost) is eligible to be received by the respective SPVs by way of specified biannual installments as mentioned in their respective concession agreement for the balance period of operations.

b. **Interest**: As per the concession agreements, the SPVs are entitled to receive interest on reducing Balance Completion Cost equal to applicable Bank Rate (as decided by the Monetary Policy Committee and published by the Reserve Bank of India) + 3.00% spread. Such interest is due and payable along with each of the biannual installments as mentioned above; and

c. **Operation and Maintenance Revenue**: In lieu of O&M expenses to be incurred by SPV, SPVs are eligible for certain O&M income (as defined in the respective concession agreement) at each biannual installment date, duly adjusted for an appropriate inflation rate.

Following table summarizes the payment received by the respective SPVs from NHAI till the Valuation Date, and balance number of biannual annuity installments expected to be received**:**

INR lakhs

INR in Lakhs	AM2	CGRG	CTHPL	DME	GSY
First NHAI Payment Amount	6,289	4,527	4,285	3,863	6,516
Second NHAI Payment Amount	6,856	3,246	5,380	3,791	5,696
Third NHAI Payment Amount	-	3,437	5,845	3,564	5,243
Fourth NHAI Payment Amount	-	4,238	-	3,403	5,059
Fifth NHAI Payment Amount	-	4,550	-	3,567	5,094
Sixth NHAI Payment Amount	-	-	-	3,276	-
Seventh NHAI Payment Amount	-	-	-	3,474	-
Eighth NHAI Payment Amount	-	-	-	3,519	-
Total Annuity received	13,145	19,997	15,509	28,455	27,609
No. of Annuities Received till 30-sep-23	**2**	**5**	**3**	**8**	**5**
No. of Annuities yet to be Received	**18**	**25**	**27**	**22**	**25**

- **For Toll SPV,**

Revenue cash flows for the SPV:

The SPV is responsible for designing, building, financing, operating, maintaining and transferring the project to the authority at the end of the concession period. The right and responsibility for tolling is with the SPV. The SPV earns revenue primarily in the form of toll revenue.

Toll Revenue: As per the concession agreement of the SPV, the Concessionaire is allowed to levy, demand, collect and appropriate the fees (called as toll fees) from vehicles and persons liable to payment of fees for using their road stretch or any part thereof and refuse entry of any vehicle to the road asset if the due fee is not paid. Toll revenues depend on toll receipts, which in turn depend on traffic volumes and toll fees on the toll roads.

Concession Period

The Concession Period refers to the period where the Concessionaire has the responsibility to construct the road asset and post-construction is granted with the exclusive rights, license and authority to demand, collect and appropriate fee, operate, manage and maintain the project highway subject to the terms and conditions mention in their respective concession agreement. The cash flow projections are prepared by the Investment Manager for the balance concession period remaining from the Valuation Date. The Concession Period for MCP will end on 26th September, 2037.

Traffic Volumes

Traffic volumes are directly or indirectly affected by a number of factors, many of which are outside of the control of the SPV, including: fuel prices in India; the frequency of traveler use; the quality, convenience and travel efficiency of alternative routes outside the SPV's network of toll roads; the convenience and extent of a toll road's connections with other parts of the local, state and national highway networks; the availability and cost of alternative means of transportation, including rail networks and air transport; the level of commercial, industrial and residential development in areas served by the SPV's projects; adverse weather conditions; and seasonal holidays.

Toll Rates

During the concession period, the SPV operate and maintain the road asset and earn revenues through charges, fees or tolls generated from the asset. The amount of charges, fees or tolls that they may collect are notified by the relevant government authorities, which are usually revised annually as specified in the relevant concession agreement considering National Highways Fee (Determination of Rates and Collection) Rules, 2008, published by NHAI in toll notification for SPV on annual basis.

The toll rates for the projected period have been derived in the manner stipulated in the concession agreement of the SPV.

In the present case, the Investment Manager has appointed M/s Steer Davies Gleave India Private Limited an independent third-party research agency to forecast the traffic volumes and toll revenues for the SPV. As confirmed by the Investment Manager, the traffic volumes and toll revenues for SPV have been estimated by the traffic consultant after considering overall structure and condition of the projects including analysis of demand and supply and strategic geographical locations of the individual road projects. This was one of the most important input in projecting the toll revenues.

6.2.2. **Expenditure:**

Since all the SPVs are operational on the Valuation Date, following are the major costs incurred by the SPV:

6.2.3. **Operation and Maintenance Costs (Routine) ("O&M Costs")**

These are routine costs incurred every year. These costs are related to the normal wear and tear of the road and hence involve repairing the patches damaged mainly due to heavy traffic movement. O&M Costs also includes staff salaries, project management fees, professional fees, insurance, security expenses, electricity, etc. The primary purpose of these expenses is to maintain the road as per the specifications mentioned in the respective concession agreement. SPV is generally responsible for carrying out operation and maintenance activities at its road during its concession period**.** Within the scope of such operation and maintenance obligations, the SPV may be required to undertake routine maintenance of project roads, maintain and comply with safety standards to ensure smooth and safe traffic movement, deploy adequate human resources for

incident management, maintain proper medical and sanitary arrangements for personnel deployed at the site, prevent any unauthorized entry to and exit from the project as may be required.

The Investment Manager has provided the estimated O&M costs for the projected period and I have corroborated the said expenses with the Technical Due Diligence report of the respective SPV prepared by the external professional agency (Samarth InfraEngg Technocrats Private Limited) for estimating major maintenance expenses and O&M Costs for the projected period.

Major Maintenance and Repairs Costs ("MMR Costs")

Estimating the MMR Costs

Period maintenance expenses will be incurred on periodic basis say every 3 years or more. These are the costs incurred to bring the road assets back to its earlier condition or keep the road assets in its present condition. These expenses are primarily related to the construction or re-laying of the top layer of the road. Accordingly such costs includes considerable amounts of materials and labour.

The Investment Manager has provided the estimated MMR cost for the projected period and I have corroborated the said expenses with the Technical Due Diligence report of the respective SPV prepared by the external professional agency (Samarth InfraEngg Technocrats Private Limited) for estimating major maintenance expenses and O&M Costs for the projected period.

6.2.4. **Capital Expenditure ("Capex"):**

As represented by the Investment Manager, regarding the maintenance Capex, the same has already been considered in the Operation & Maintenance expenditure and Major Maintenance and Repairs expenditure for the projected period.

6.2.5. **Direct Taxes**:

As per the discussions with the Investment Manager, taxes payable by DME and MCP for the projected period shall be MAT rates or normal tax rates, whichever is beneficial. While projecting the tax numbers, 80-IA benefits under the Income Tax Act, 1961 has been considered wherever applicable to arrive at tax payable by the SPVs.

Further the Investment Manager has provided that rest of the SPVs have opted to pay tax under new regime for corporates under section 115BAA.

As per the discussions with the Investment Manager, for DME the company wishes to continue with old tax regime till FY 32 and avail the benefits of additional depreciation, section 115JB and section 80IA and thereafter shift to the new tax regime (the base tax rate of 22%). I have relied on the representation of the Investment Manager for the projected tax outflow for the projected period.

6.2.6. **Working Capital:**

The Investment Manager has provided projected Working Capital information for the SPVs. I have relied on the same.

6.2.7. **GST Claim:**

i. **On Annuity and O&M Payments:** As per the clarification notification of Ministry of Road Transport & Highways as on 27th August 2021 vis-à-vis Ministry of Finance circular dated 17th June 2021, SPVs are eligible to claim reimbursement of GST on annuity and O&M payments, considering change in law, after adjusting GST input credit lying with the SPVs. Accordingly, following GST Claim % has been considered throughout the projected period in each SPVs as represented by Investment Manager:

Sr no	SPV	Claim % on Annuity	Claim % on O&M Payment
1	AM2	0.00%*	NA
2	CGRG	8.67%	8.67%
3	CTHPL	8.09%	8.09%
4	DME	0.00%*	10.38%
5	GSY	8.51%	8.51%

**However, as represented by Management, AM2 and DME have paid output GST on entire Bid Project Cost at the time of construction. Accordingly, Both the SPVs are not liable to pay GST on annuity receipt throughout the projected period and are not eligible to claim any reimbursement of GST on annuity.*

ii. **On Interest on Annuity:** As per the Ministry of Finance circular dated 17th June 2021, GST will be applicable on annuity (deferred payments) paid for construction of roads i.e. annuity plus interest, additionally Ministry of Road Transport & Highways issued clarification dated 17th June 2021 that the SPVs will be eligible to claim reimbursement of GST on interest.

iii. **Change in GST rates:** Ministry of Finance vide notification no. 03/2022 dated 13th July 2022, increased the GST rates applicable on road construction services from 12% to 18%. As per the clarification of Ministry of Road Transport & Highways dated 20th September 2022, the above increase in GST rates are eligible for reimbursement from NHAI as it is considered as change in law (i.e. change of rate).

6.3. Impact of Ongoing Material Litigation on Valuation

As on 30th September 2023, there are ongoing litigations as shown in Appendix 4. Further, Investment Manager has informed us that majority of the cases are low to medium risk and accordingly no material outflow is expected against the litigations, hence no impact has been factored on the valuation of the SPV.

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Calculation of Weighted Average Cost of Capital

6.4.1. **Cost of Equity:**

Cost of Equity (CoE) is a discounting factor to calculate the returns expected by the equity holders depending on the perceived level of risk associated with the business and the industry in which the business operates.

For this purpose, I have used the Capital Asset Pricing Model (CAPM), which is a commonly used model to determine the appropriate cost of equity for the SPVs.

K(e) = Rf + [ERP* Beta] + CSRP

Wherein:
K(e) = cost of equity
Rf = risk free rate
ERP = Equity Risk Premium
Beta = a measure of the sensitivity of assets to returns of the overall market
CSRP = Company Specific Risk Premium (In general, an additional company-specific risk premium will be added to the cost of equity calculated pursuant to CAPM).
For valuation exercise, I have arrived at adjusted cost of equity of the SPVs based on the above calculation (Refer Appendix 2).

6.4.2. **Risk Free Rate:**

I have applied a risk free rate of return of 7.16% on the basis of the zero coupon yield curve as on 30th September 2023 for government securities having a maturity period of 10 years, as quoted on the website of Clearing Corporation of India Limited.

6.4.3. **Equity Risk Premium ("ERP"):**

Equity Risk Premium is a measure of premium that investors require for investing in equity markets rather than bond or debt markets. The equity risk premium is estimated based on consideration of historical realised returns on equity investments over a risk-free rate as represented by 10 year government bonds. Based on the aforementioned, a 7% equity risk premium for India is considered appropriate.

6.4.4. **Beta:**

Beta is a measure of the sensitivity of a company's stock price to the movements of the overall market index. In the present case, I find it appropriate to consider the beta of companies in similar business/ industry to that of the SPVs for an appropriate period.

For the valuation of the HAM SPVs, I find it appropriate to consider the beta of MEP Infrastructure Developers Limited, Bharat Road Network Limited and IRB InvIT fund for an appropriate period. The beta so arrived, is further adjusted based on the factors of mentioned SPVs like completion of projects, revenue certainty, past collection trend, lack of execution uncertainty, etc. to arrive at the adjusted unlevered beta appropriate to the SPVs.

For the valuation of the Toll SPV, I find it appropriate to consider the beta of Ashoka Buildcon Limited and IRB Infrastructure Developers Limited for an appropriate period.

I have further unlevered the beta of such companies based on market debt-equity of the respective company using the following formula:
Unlevered Beta = Levered Beta / [1 + (Debt / Equity) *(1-T)]

Further I have re-levered it based on debt-equity at 70:30 based on the industry Debt: Equity ratio of HAM based projects and debt-equity at 50:50 based on the industry Debt: Equity ratio of Toll based projects using the following formula:
Re-levered Beta = Unlevered Beta * [1 + (Debt / Equity) *(1-T)]

Accordingly, as per above, I have arrived at re-levered betas of the SPVs. (Refer Appendix 2)

6.4.5. **Company Specific Risk Premium ("CSRP"):**

As the risk inherent in achieving the future cash flows. In the present case, considering the counter-party risk for Discount Rate is the return expected by a market participant from a particular investment and shall reflect not only the time value of money but also the risk inherent in the asset being valued as well certain SPVs, considering the length of the explicit period for the SPVs, and basis my discussion with Investment Manager, I found it appropriate to 0% CSRP for the five HAM SPVs and 1% CSRP for the Toll SPV.

6.4.6. **Cost of Debt:**

The calculation of Cost of Debt post-tax can be defined as follows:
K(d) = K(d) pre-tax * (1 - T)

Wherein:
K(d) = Cost of debt
T = tax rate as applicable

For valuation exercise, pre-tax cost of debt has been considered as 8.25% for all the Assets, as represented by the Investment Manager.

6.4.7. **Weighted Average Cost of Capital (WACC):**

The discount rate, or the WACC, is the weighted average of the expected return on equity and the cost of debt. The weight of each factor is determined based on the company's optimal capital structure.

Formula for calculation of WACC:
WACC = [K(d) * Debt /(Debt + Equity)] + [K(e) * (1 - Debt /(Debt + Equity))]

Accordingly, as per above, I have arrived the WACC for the explicit period of the SPVs.
(Refer Appendix 2 for detailed workings).

6.4.8. **Cash Accrual Factor (CAF) and Discounting Factor**

Discounted cash flow requires to forecast cash flows in future and discount them to the present in order to arrive at present value of the asset as on Valuation Date. To discount back the projections we take in use cash accrual factor. The Cash Accrual Factor refers to the duration between the Valuation date and the point at which each cash flow is expected to accrue.

Since the cash inflows in case of HAM Assets are receivable on the predetermined dates as per the concession agreement it could be inaccurate to assume that the cash proceeds are all received at the end of each year. As a compromise, cash accrual factor is integrated into DCF models to assume that FCFs are received on the predetermined dates as per concession agreement. Accordingly, the cash flows of HAM assets during each year of the projected period are discounted back from the predetermined dates as per concession agreement to Valuation Date.

In case of the Toll assets, the cash inflows and outflows occur continuously year-round, it could be inaccurate to assume that the cash proceeds are all received at the end of each year. As a compromise, mid-year discounting is integrated into DCF models to assume that FCFs are received in the middle of the annual period. Accordingly, the cash flows for Toll assets during each year of the projected period are discounted back from the mid-year to Valuation Date.

Discounted cash flow is equal to sum of the cash flow in each period divided by discounting factor, where the discounting factor is determined by raising one plus discount rate (WACC) to the power of the CAF.

$DCF = [CF_1 / (1+r)^{CAF1}] + [CF_2 / (1+r)^{CAF2}] + ... + [CF_n /(1+r)^{CAFn}]$

Where,

CF = Cash Flows,

CAF = Cash accrual factor for particular period

R = Discount Rate (i.e. WACC)

6.5. At the end of the agreed concession period, the rights in relation to the underlying assets, its operations and the obligation to maintain the road reverts to the government authority that granted the concession. Hence, SPVs are not expected to generate cash flow after the expiry of their respective concession agreements. Accordingly, I found it appropriate not to consider terminal period value, which represents the present value at the end of explicit forecast period of all subsequent cash flows to the end of the life of the asset or into perpetuity if the asset has an indefinite life, in this valuation exercise.

7. Valuation Conclusion

7.1. The current valuation has been carried out based on the discussed valuation methodology explained herein earlier. Further, various qualitative factors, the business dynamics and growth potential of the business, having regard to information base, management perceptions, key underlying assumptions and limitations were given due consideration.

7.2. I have been represented by the Investment Manager that there is no potential devolvement on account of the contingent liability as of valuation date; hence no impact has been factored in to arrive at fair EV of the SPVs.

7.3. Based on the above analysis, the fair EV and Adjusted Enterprise Value as on the Valuation Date of the SPVs is as mentioned below:

INR Lakhs

Sr. No.	SPVs	Last Date	Approximate Balance Period	Enterprise Value	Adjusted Enterprise Value
1	AM 2	11-Nov-31	~8 Years 1 Months	69,993	76,756
2	CGRG	05-Aug-35	~11 Years 10 Months	59,209	62,743
3	CTHPL	25-Aug-36	~12 Years 11 Months	56,915	70,406
4	DME	25-Jul-33	~9 Years 10 Months	34,405	38,565
5	GSY	30-Oct-35	~12 Years 1 Months	77,697	82,648
6	MCP*	26-Sep-37	~14 Years 0 Months	3,78,462	3,98,001
	Total			**6,76,680**	**7,29,119**

(Refer Appendix 1 for detailed workings)

** Presently, 51% of the issued and paid-up equity share capital of MCP is held by Welspun Enterprises Limited ("WEL") and 49% is held by Actis Highway Infra Limited ("AHIL"). As represented by the Investment Manager, the InvIT can currently purchase only 49% equity stake of MCP as per the terms of the Concession Agreement. However, the Trust, will be entitled to acquire 100% of the equity share capital of MCP only after a period of one year from the COD of MCP which is as per the terms of the requirements prescribed by the NHAI and as per the Concession Agreement.*

The above mentioned EV and Adjusted EV represents the value EV calculated at 100% equity stake level for MCP and since InvIT is currently proposing to acquire only 49% equity stake in MCP, the above mentioned values should be adjusted in this context for 49% equity stake level. In this regard, I have calculated EV and Adjusted EV at 100% equity stake level and 49% equity stake level in the below table for MCP:

INR Lakhs

SPVs	Enterprise Value		Adjusted Enterprise Value	
	at 100% equity stake level	at 49% equity stake level	at 100% equity stake level	at 49% equity stake level
MCP	3,78,462	1,85,446	3,98,001	1,95,020

7.4. EV is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or cash equivalents to meet those liabilities.

7.5. Adjusted Enterprise Value is derived as EV as defined plus non-operating cash and cash like items (cash or cash equivalents and current investments) of the SPVs as at 30th September 2023.

7.6. The fair EV of the SPVs is estimated using DCF method. The valuation requires Investment Manager to make certain assumptions about the model inputs including forecast cash flows, discount rate, and credit risk.

7.7. Valuation is based on estimates of future financial performance or opinions, which represent reasonable expectations at a particular point of time, but such information, estimates or opinions are not offered as predictions or as assurances that a particular level of income or profit will be achieved, a particular event will occur or that a particular price will be offered or accepted. Actual results achieved during the period covered by the prospective financial analysis will vary from these estimates and the variations may be material.

7.8. Accordingly, I have conducted a quantitative sensitivity analysis on certain model inputs, the results of which are as indicated below:

a. WACC by increasing / decreasing it by 0.5%
b. WACC by increasing / decreasing it by 1.0%
c. Total Expenses by increasing / decreasing it by 20%
d. Total Revenue by increasing / decreasing it by 10% for Toll Asset,

1. Fair Enterprise Valuation Range based on

a. Fair Enterprise Valuation Range based on WACC parameter (0.5%)

INR Lakhs

Sr. No.	SPVs	WACC +0.50%	EV	Base WACC	EV	WACC -0.50%	EV
1	AM2	8.18%	68,664	7.68%	69,993	7.18%	71,363
2	CGRG	8.38%	57,992	7.88%	59,209	7.38%	60,474
3	CTHPL	8.49%	55,813	7.99%	56,915	7.49%	58,059
4	DME	8.47%	33,775	7.97%	34,405	7.47%	35,055
5	GSY	8.08%	76,025	7.58%	77,697	7.08%	79,436
6	MCP*	10.61%	3,67,012	10.11%	3,78,462	9.61%	3,90,450
	Total		**6,59,281**		**6,76,680**		**6,94,836**

b. Fair Enterprise Valuation Range based on WACC parameter (1.0%)

INR lakhs

Sr. No.	SPVs	WACC +1.00%	EV	Base WACC	EV	WACC -1.00%	EV
1	AM2	8.68%	67,376	7.68%	69,993	6.68%	72,777
2	CGRG	8.88%	56,821	7.88%	59,209	6.88%	61,788
3	CTHPL	8.99%	54,750	7.99%	56,915	6.99%	59,245
4	DME	8.97%	33,164	7.97%	34,405	6.97%	35,726
5	GSY	8.58%	74,417	7.58%	77,697	6.58%	81,245
6	MCP*	11.11%	3,56,072	10.11%	3,78,462	9.11%	4,03,007
	Total		**6,42,600**		**6,76,680**		**7,13,789**

c. Fair Enterprise Valuation Range based on Expenses parameter (20%)

INR Lakhs

Sr. No.	SPVs	EV at Expenses -20%	EV at Base Expenses	EV at Expenses +20%
1	AM2	71,275	69,993	68,805
2	CGRG	61,505	59,209	57,263
3	CTHPL	59,729	56,915	54,696
4	DME	35,612	34,405	33,116
5	GSY	79,285	77,697	76,023
6	MCP*	3,86,395	3,78,462	3,73,676
	Total	**6,93,801**	**6,76,680**	**6,63,578**

d. Fair Enterprise Valuation Range based on Revenue parameter (10%)

INR Lakhs

Sr. No.	SPVs	EV at Revenue -10%	EV at Base Revenue	EV at Revenue +10%
1	MCP*	3,35,901	3,78,462	4,24,075

**Presently, 51% of the issued and paid-up equity share capital of MCP is held by Welspun Enterprises Limited ("WEL") and 49% is held by Actis Highway Infra Limited ("AHIL"). As represented by the Investment Manager, the InvIT can currently purchase only 49% equity stake of MCP as per the terms of the Concession Agreement. However, the Trust, will be entitled to acquire 100% of the equity share capital of MCP only after a period of one year from the COD of MCP which is as per the terms of the requirements prescribed by the NHAI and as per the Concession Agreement.*

The above mentioned EV and Adjusted EV represents the value EV calculated at 100% equity stake level for MCP and since InvIT is currently proposing to acquire only 49% equity stake in MCP, the above mentioned values should be adjusted in this context for 49% equity stake level.

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8. Additional Procedures to be complied with in accordance with InvIT regulations

Scope of Work

8.1 The Schedule V of the SEBI InvIT Regulations prescribes the minimum set of mandatory disclosures to be made in the valuation report. In this reference, the minimum disclosures in valuation report may include following information as well, so as to provide the investors with the adequate information about the valuation and other aspects of the underlying assets of the InvIT.

The additional set of disclosures, as prescribed under Schedule V of InvIT Regulations, to be made in the valuation report of the SPVs are as follows:

- List of one-time sanctions/approvals which are obtained or pending;
- List of up to date/overdue periodic clearances;
- Statement of assets;
- Estimates of already carried as well as proposed major repairs and improvements along with estimated time of completion;
- Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any;
- On-going material litigations including tax disputes in relation to the assets, if any;
- Vulnerability to natural or induced hazards that may not have been covered in town planning/ building control.

Limitations

8.2 This Report is based on the information provided by the representatives of the Investment Manager. The exercise has been restricted and kept limited to and based entirely on the documents, records, files, registers and information provided to me. I have not verified the information independently with any other external source.

8.3 I have assumed the genuineness of all signatures, the authenticity of all documents submitted to me as original, and the conformity of the copies or extracts submitted to me with that of the original documents.

8.4 I have assumed that the documents submitted to me by the representatives of Investment Manager in connection with any particular issue are the only documents related to such issue.

8.5 I have reviewed the documents and records from the limited perspective of examining issues noted in the scope of work and I do not express any opinion as to the legal or technical implications of the same.

Analysis of Additional Set of Disclosures for the SPVs

A. <u>List of one-time sanctions/approvals which are obtained or pending:</u>

As informed by the Investment Manager, there are no pending applications for government sanctions/ approvals by the SPVs (related to the road stretches of the SPVs) which are pending as on 30th September 2023. The list of sanctions/ approvals obtained by the SPVs till 30th September 2023 is provided in Appendix 3.1 to Appendix 3.7.

B. <u>List of up to date/ overdue periodic clearances:</u>

The Investment Manager has confirmed that the SPVs are not required to take any periodic clearances and hence there are no up to date/ overdue periodic clearances as on 30th September 2023.

C. Statement of assets included:

The details of assets of the SPVs as per the provisional financial statements at 30th September 2023 are as mentioned below:

INR Lakhs

Sr. No.	SPVs	Net Fixed Assets	Net Intangible Asset	Non-Current Assets	Current Assets
1	AM 2	1	-	44,381	19,688
2	CGRG	-	-	38,748	22,706
3	CTHPL	-	-	65,414	22,436
4	DME	5	-	26,345	12,061
5	GSY	-	-	60,396	22,038
6	MCP	13	1,99,265	2,11,951	18,041
	Total	**19**	**1,99,265**	**4,47,235**	**1,16,970**

Source: Investment Manager

D. Estimates of already carried and proposed major repairs and improvements along with estimated time of completion:

I have been informed that maintenance is regularly carried out by SPVs in order to maintain the working condition of the assets.

Forecasted major repairs

INR Lakhs

SPVs	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30	FY 31
AM2	-	4,776	-	-	-	14,820	-	-
CGRG	75	57	-	4,186	-	-	201	-
CTHPL	-	142	16	4,964	4,845	-	-	96
DME	104	-	3,709	190	18	-	81	-
GSY	66	95	-	3,173	-	-	176	-
MCP	224	508	-	13,873	14,436	-	301	-

SPVs	FY 32	FY 33	FY 34	FY 35	FY 36	FY 37	FY 38
AM2	71	-	-	-	-	-	-
CGRG	738	466	6,161	-	-	-	-
CTHPL	396	46	-	5,647	7,237	-	-
DME	-	6,777	-	-	-	-	-
GSY	366	407	5,393	-	-	-	-
MCP	973	7,041	1,281	8,520	-	20,267	19,531

Source: Investment Manager

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any:

Investment Manager has informed me that there are no material dues including local authority taxes (such as Municipal Tax, Property Tax, etc.) pending to be payable to the government authorities with respect to the SPVs (InvIT assets).

F. On-going material litigations including tax disputes in relation to the assets, if any:

As informed by the Investment Manager, as on 30th September 2023, there are no ongoing material litigations, except indirect tax litigations as shown in Appendix 4. Further, Investment Manager has informed us that majority of the tax litigations are low to medium risk and accordingly no material outflow is expected against the litigations, hence no impact has been factored on the valuation of the SPVs. F

G. Vulnerability to natural or induced hazards that may not have been covered in town planning/ building control:

Investment Manager has confirmed to me that there are no such natural or induced hazards which have not been considered in town planning/ building

9. Sources of Information

For the purpose of undertaking this valuation exercise, I have relied on the following sources of information provided by the Investment Manager:

- Audited Financial Statements of the SPVs for Financial Year ("FY") ended 31st March 2020, 31st March 2021, 31st March 2022 and 31st March 2023;
- Provisional Financial Statements of the SPVs for the period ended 30th September 2023;
- Projected financial information for the remaining project life for each of the SPVs;
- Pass orders and milestone payment order issued by NHAI & respective authority for all the Annuity aSPVs
- Details of projected Major Maintenance & Repairs (MMR) Expenditure and Capital Expenditure (Capex);
- Technical Due Diligence Study Report dated October 2023 for all the SPVs, prepared by M/s Samarth InfraEngg Technocrats Private Limited for projected MMR and O&M Costs;
- Traffic Study Report dated September 2023 for the Toll SPV, prepared by M/s Steer Davies Gleave India Private Limited for projected Traffic Volumes.
- Concession Agreement of each of the SPVs with the respective authority;
- List of licenses / approvals, details of tax litigations, civil proceeding and arbitrations of the SPVs;
- Shareholding pattern as on Valuation Date of the SPVs and other entities mentioned in this Report;
- Management Representation Letter by the Investment Manager dated 27th December 2023;
- Relevant data and information about the SPVs provided by the Investment Manager either in written or oral form or in the form of soft copy;
- Information provided by leading database sources, market research reports and other published data.

The information provided to me by the Investment Manager in relation to the SPVs included but not limited to historical financial statements, forecasts/projections, other statements and assumptions about future matters like forward-looking financial information prepared by the Investment Manager. The forecasts and projections as supplied to me are based upon assumptions about events and circumstances which are yet to occur.

I have not tested individual assumptions or attempted to substantiate the veracity or integrity of such assumptions in relation to the forward-looking financial information, however, I have made sufficient enquiries to satisfy myself that such information has been prepared on a reasonable basis.

Notwithstanding anything above, I cannot provide any assurance that the forward looking financial information will be representative of the results which will actually be achieved during the cash flow forecast period.

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10. Exclusions and Limitations

10.1. My Report is subject to the limitations detailed hereinafter. This Report is to be read in totality, and not in parts, in conjunction with the relevant documents referred to herein.

10.2. Valuation analysis and results are specific to the purpose of valuation and is not intended to represent value at any time other than the valuation date of 30th September 2023 ("Valuation Date") mentioned in the Report and as per agreed terms of my engagement. It may not be valid for any other purpose or as at any other date. Also, it may not be valid if done on behalf of any other entity.

10.3. This Report, its contents and the results are specific to (i) the purpose of valuation agreed as per the terms of my engagements; (ii) the Valuation Date and (iii) are based on the financial information of the SPVs till 30th September 2023. The Investment Manager has represented that the business activities of the SPVs have been carried out in normal and ordinary course between 30th September 2023 and the Report Date and that no material changes have occurred in the operations and financial position between 30th September 2023 and the Report date, except for any events disclosed by the Investment Manager during the valuation exercise.

10.4. The scope of my assignment did not involve me performing audit tests for the purpose of expressing an opinion on the fairness or accuracy of any financial or analytical information that was provided and used by me during the course of my work. The assignment did not involve me to conduct the financial or technical feasibility study. I have not done any independent technical valuation or appraisal or due diligence of the assets or liabilities of the SPVs or any of other entity mentioned in this Report and have considered them at the value as disclosed by the SPVs in their regulatory filings or in submissions, oral or written, made to me.

10.5. In addition, I do not take any responsibility for any changes in the information used by me to arrive at my conclusion as set out here in which may occur subsequent to the date of my Report or by virtue of fact that the details provided to me are incorrect or inaccurate.

10.6. I have assumed and relied upon the truth, accuracy and completeness of the information, data and financial terms provided to me or used by me; I have assumed that the same are not misleading and do not assume or accept any liability or responsibility for any independent verification of such information or any independent technical valuation or appraisal of any of the assets, operations or liabilities of the SPVs or any other entity mentioned in the Report. Nothing has come to my knowledge to indicate that the material provided to me was misstated or incorrect or would not afford reasonable grounds upon which to base my Report.

10.7. This Report is intended for the sole use in connection with the purpose as set out above. It can however be relied upon and disclosed in connection with any statutory and regulatory filing in connection with the provision of SEBI InvIT Regulations. However, I will not accept any responsibility to any other party to whom this Report may be shown or who may acquire a copy of the Report, without my written consent.

10.8. It is clarified that this Report is not a fairness opinion under any of the stock exchange/ listing regulations. In case of any third party having access to this Report, please note this Report is not a substitute for the third party's own due diligence/ appraisal/ enquiries/ independent advice that the third party should undertake for his purpose.

10.9. Further, this Report is necessarily based on financial, economic, monetary, market and other conditions as in effect on, and the information made available to me or used by me up to, the date hereof. Subsequent developments in the aforementioned conditions may affect this Report and the assumptions made in preparing this Report and I shall not be obliged to update, revise or reaffirm this Report if information provided to me changes.

10.10. This Report is based on the information received from the sources as mentioned in Section 9 of this Report and discussions with the Investment Manager. I have assumed that no information has been withheld that could have influenced the purpose of my Report.

10.11. Valuation is not a precise science and the conclusions arrived at in many cases may be subjective and dependent on the exercise of individual judgment. There is, therefore, no indisputable single value. I have arrived at an indicative EV based on my analysis. While I have provided an assessment of the value based on an analysis of information available to me and within the scope of my engagement, others may place a different value on this business.

10.12. Any discrepancies in any table / appendix between the total and the sums of the amounts listed are due to rounding-off.

10.13. Valuation is based on estimates of future financial performance or opinions, which represent reasonable expectations at a particular point of time, but such information, estimates or opinions are not offered as predictions or as assurances that a particular level of income or profit will be achieved, a particular event will occur or that a particular price will be offered or accepted. Actual results achieved during the period covered by the prospective financial analysis will vary from these estimates and the variations may be material.

10.14. I do not carry out any validation procedures or due diligence with respect to the information provided/extracted or carry out any verification of the assets or comment on the achievability and reasonableness of the assumptions underlying the financial forecasts, save for satisfying ourselves to the extent possible that they are consistent with other information provided to me in the course of this engagement.

10.15. My conclusion assumes that the assets and liabilities of the SPVs, reflected in their respective latest balance sheets remain intact as of the Report date.

10.16. Whilst all reasonable care has been taken to ensure that the factual statements in the Report are accurate, neither myself, nor any of my associates, officers or employees shall in any way be liable or responsible either directly or indirectly for the contents stated herein. Accordingly, I make no representation or warranty, express or implied, in respect of the completeness, authenticity or accuracy of such factual statements. I expressly disclaim any and all liabilities, which may arise based upon the information used in this Report. I am not liable to any third party in relation to the issue of this Report.

10.17. The scope of my work has been limited both in terms of the areas of the business & operations which I have reviewed and the extent to which I have reviewed them. There may be matters, other than those noted in this Report, which might be relevant in the context of the transaction and which a wider scope might uncover.

10.18. For the present valuation exercise, I have also relied on information available in public domain; however the accuracy and timelines of the same has not been independently verified by me.

10.19. In the particular circumstances of this case, my liability (in contract or under any statute or otherwise) for any economic loss or damage arising out of or in connection with this engagement, however the loss or damage caused, shall be limited to the amount of fees actually received by me from the Investment Manager, as laid out in the engagement letter for such valuation work.

10.20. In rendering this Report, I have not provided any legal, regulatory, tax, accounting or actuarial advice or opinion and accordingly I do not assume any responsibility or liability in respect thereof.

10.21. This Report does not address the relative merits of investing in InvIT as compared with any other alternative business transaction, or other alternatives, or whether or not such alternatives could be achieved or are available.

10.22. I am not an advisor with respect to legal, tax and regulatory matters for the proposed transaction. No investigation of the SPVs' claim to title of assets has been made for the purpose of this Report and the SPVs' claim to such rights have been assumed to be valid. No consideration has been given to liens or encumbrances against the assets, beyond the loans disclosed in the accounts. Therefore, no responsibility is assumed for matters of a legal nature.

10.23. I have no present or planned future interest in the Trustee, Investment Manager or the SPVs and the fee for this Report is not contingent upon the values reported herein. My valuation analysis should not be construed as investment advice; specifically, I do not express any opinion on the suitability or otherwise of entering into any financial or other transaction with the Investment Manager or SPVs.

10.24. I have submitted the draft valuation report to the Trust and Investment Manager for confirmation of accuracy of the factual data used in my analysis and to prevent any error or inaccuracy in this Report.

10.25. **Limitation of Liabilities**

i. It is agreed that, having regard to the RV's interest in limiting the personal liability and exposure to litigation of its personnel, the Sponsor, the Transferor, the Investment Manager and the Trust will not bring any claim in respect of any damage against any of RV personally.

ii. In no circumstances RV shall be responsible for any consequential, special, direct, indirect, punitive or incidental loss, damages or expenses (including loss of profits, data, business, opportunity cost, goodwill or indemnification) in connection with the performance of the services whether such damages are based on breach of contract, tort, strict liability, breach of warranty, negligence, or otherwise, even if the Investment Manager had contemplated and communicated to RV the likelihood of such damages. Any decision to act upon the deliverables (including this Report) is to be made by the Investment Manager and no communication by RV should be treated as an invitation or inducement to engage the Investment Manager to act upon the deliverable(s).

iii. It is clarified that the Investment Manager will be solely responsible for any delays, additional costs, or other liabilities caused by or associated with any deficiencies in their responsibilities, misrepresentations, incorrect and incomplete information including information provided to determine the assumptions.

iv. RV will not be liable if any loss arises due to the provision of false, misleading or incomplete information or documentation by the Investment Manager.

10.26. Further, this Report is necessarily based on financial, economic, monetary, market and other conditions as in effect on, and the information made available to me or used by me up to, the date hereof. Subsequent developments in the aforementioned conditions may affect this Report and the assumptions made in preparing this Report and I shall not be obliged to update, revise or reaffirm this Report if information provided to me changes**.**

Yours faithfully,

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S. Sundararaman
Registered Valuer
IBBI Registration No.: IBBI/RV/06/2018/10238
Place: Chennai
UDIN: 23028423BGYWJG5597

Appendix 1 – Valuation of SPVs as on 30th September 2023

Abbreviations	Meaning
EBITDA	Operating Earnings Before Interest, Taxes, Depreciation and Amortization
Capex	Capital Expenditure
WC	Working Capital
FCFF	Free Cash Flow to the Firm
CAF	Cash Accrual Factor
DF	Discounting Factor
PV	Present value

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Appendix 1.1 – Valuation of AM2 as on 30th September 2023

INR Lakhs

Year	Financial Income	Construction Revenue	O&M Income	Changes in Financial Asset	Total Inflow	Expenses	MM Expense	Changes in Working Capital	Tax Outflow	Free Cash Flow to Firm	Cash Accrual Factor	WACC	Discounting Factor	PV of FCFF
	A	B	C	D	E = A+B+C+D	F	G	H	I	J = E+F+G+H+I	K	L	M	N = J*M
Dec-23	4,658	1,130	513	275	6,575	(480)	-	110	(943)	5,262	0.19	7.68%	0.99	5,187
Jun-24	4,694	-	3,314	(1,455)	6,552	(862)	(2,388)	-	(238)	3,064	0.69	7.68%	0.95	2,910
Dec-24	4,828	-	3,314	(1,660)	6,482	(862)	(2,388)	-	(214)	3,018	1.20	7.68%	0.92	2,762
Jun-25	4,825	-	582	3,172	8,579	(572)	-	-	(1,393)	6,615	1.69	7.68%	0.88	5,836
Dec-25	4,545	-	582	3,327	8,454	(572)	-	-	(1,351)	6,531	2.20	7.68%	0.85	5,551
Jun-26	4,249	-	611	3,499	8,359	(621)	-	-	(1,325)	6,413	2.69	7.68%	0.82	5,254
Dec-26	3,939	-	611	3,678	8,228	(621)	-	-	(1,283)	6,325	3.20	7.68%	0.79	4,992
Jun-27	3,611	-	642	3,892	8,145	(647)	-	-	(1,259)	6,238	3.69	7.68%	0.76	4,747
Dec-27	3,266	-	642	4,101	8,008	(647)	-	-	(1,215)	6,146	4.20	7.68%	0.73	4,505
Jun-28	3,063	-	8,084	(3,200)	7,946	(671)	(7,410)	(544)	-	(679)	4.70	7.68%	0.71	(479)
Dec-28	3,358	-	8,084	(3,647)	7,795	(671)	(7,410)	(576)	-	(863)	5.20	7.68%	0.68	(587)
Jun-29	3,424	-	708	5,943	10,074	(696)	-	952	(285)	10,045	5.70	7.68%	0.66	6,590
Dec-29	2,897	-	708	6,254	9,858	(696)	-	168	(1,611)	7,719	6.20	7.68%	0.63	4,879
Jun-30	2,336	-	743	6,713	9,792	(727)	-	-	(1,587)	7,478	6.70	7.68%	0.61	4,556
Dec-30	1,740	-	743	7,085	9,568	(727)	-	-	(1,521)	7,320	7.20	7.68%	0.59	4,297
Jun-31	1,104	-	827	7,588	9,519	(758)	(47)	-	(1,489)	7,224	7.70	7.68%	0.57	4,088
Dec-31	-	-	197	9,094	9,291	(187)	(24)	1,487	(1,564)	9,002	8.20	7.68%	0.55	4,907
Enterprise Value														**69,993**
(+) Closing cash or cash equivalents as at the Valuation Date														6,763
Adjusted Enterprise Value														**76,756**

**Upto 11 November 2031*

Appendix 1.2 – Valuation of CGRG as on 30th September 2023

INR lakhs

Year	Financial Income	Changes in Financial Asset	O&M Income	Total Inflow	Expenses	MM Expense	Changes in Working Capital	Tax Outflow	Free Cash Flow to Firm	Cash Accrual Factor	WACC	Discounting Factor	PV of FCFF
	A	B	C	D = A+B+C	E	F	G	H	I = D+E+F+G+H	J	K	L	M = I*L
Feb-24	2,747	786	2,220	5,754	(1,279)	(75)	5,621	(560)	9,461	0.42	7.88%	0.97	9,163
Aug-24	2,673	1,627	662	4,963	(634)	(28)	799	(541)	4,558	0.92	7.88%	0.93	4,250
Feb-25	2,570	1,724	662	4,957	(634)	(28)	798	(534)	4,558	1.42	7.88%	0.90	4,091
Aug-25	2,461	1,788	665	4,915	(665)	-	791	(531)	4,509	1.92	7.88%	0.86	3,897
Feb-26	2,348	1,902	665	4,915	(665)	-	705	(523)	4,433	2.42	7.88%	0.83	3,688
Aug-26	2,261	(174)	2,792	4,879	(699)	(2,093)	-	-	2,088	2.92	7.88%	0.80	1,673
Feb-27	2,272	(187)	2,792	4,877	(699)	(2,093)	-	-	2,086	3.42	7.88%	0.77	1,609
Aug-27	2,252	1,855	734	4,840	(734)	-	-	(461)	3,646	3.92	7.88%	0.74	2,708
Feb-28	2,135	1,962	734	4,830	(734)	-	-	(484)	3,612	4.42	7.88%	0.71	2,582
Aug-28	2,011	2,028	770	4,809	(770)	-	-	(475)	3,563	4.92	7.88%	0.69	2,453
Feb-29	1,883	2,131	770	4,784	(770)	-	-	(463)	3,551	5.43	7.88%	0.66	2,353
Aug-29	1,751	2,093	909	4,752	(809)	(101)	-	(429)	3,414	5.92	7.88%	0.64	2,178
Feb-30	1,618	2,207	909	4,734	(809)	(101)	-	(416)	3,409	6.43	7.88%	0.61	2,094
Aug-30	1,478	2,381	849	4,708	(849)	-	-	(433)	3,425	6.92	7.88%	0.59	2,026
Feb-31	1,327	2,502	849	4,679	(849)	-	-	(417)	3,413	7.43	7.88%	0.57	1,943
Aug-31	1,175	2,215	1,261	4,651	(893)	(369)	-	(315)	3,074	7.92	7.88%	0.55	1,685
Feb-32	1,035	2,322	1,261	4,618	(893)	(369)	-	(298)	3,057	8.43	7.88%	0.53	1,613
Aug-32	887	2,545	1,169	4,601	(943)	(233)	-	(323)	3,102	8.93	7.88%	0.51	1,576
Feb-33	726	2,624	1,169	4,520	(943)	(233)	-	(296)	3,048	9.43	7.88%	0.49	1,491
Aug-33	605	(243)	4,063	4,426	(994)	(3,080)	-	-	351	9.93	7.88%	0.47	165
Feb-34	621	(268)	4,063	4,416	(994)	(3,080)	-	-	341	10.43	7.88%	0.45	155
Aug-34	590	2,863	1,032	4,486	(1,042)	-	-	-	3,444	10.93	7.88%	0.44	1,504
Feb-35	409	2,925	1,032	4,366	(1,042)	-	-	-	3,324	11.43	7.88%	0.42	1,397
Aug-35	225	3,295	748	4,268	(768)	-	3,763	(64)	7,199	11.93	7.88%	0.40	2,914
Enterprise Value													**59,209**
(+) Closing cash or cash equivalents as at the Valuation Date													3,534
Adjusted Enterprise Value													**62,743**

**Upto 05 August 2035*

Appendix 1.3 – Valuation of CTHPL as on 30th September 2023

INR lakhs

Year	Financial Income	O&M Income	Changes in Financial Asset	Construction Revenue	Total Inflow	Expenses	MM Expense	Changes in Working Capital	Tax Outflow	Free Cash Flow to Firm	Cash Accrual Factor	WACC	Discounting Factor	PV of FCFF
	A	B	C	D	E = A+B+C+D	F	G	H	I	J = E+F+G+H+I	K	L	M	N = J*M
Feb-24	3,002	6,925	1,720	630	12,277	(1,083)	-	1,112	(2,303)	10,002	0.48	7.99%	0.96	9,643
Aug-24	2,685	1,887	726	-	5,297	(655)	(71)	857	(642)	4,787	0.98	7.99%	0.93	4,441
Feb-25	2,555	2,010	726	-	5,291	(655)	(71)	856	(635)	4,787	1.48	7.99%	0.89	4,272
Aug-25	2,417	2,103	696	-	5,215	(687)	(8)	850	(632)	4,738	1.98	7.99%	0.86	4,070
Feb-26	2,272	2,257	696	-	5,225	(687)	(8)	851	(626)	4,755	2.48	7.99%	0.83	3,930
Aug-26	2,159	(216)	3,204	-	5,147	(722)	(2,482)	388	-	2,331	2.98	7.99%	0.80	1,855
Feb-27	2,174	(230)	3,204	-	5,147	(722)	(2,482)	388	-	2,332	3.48	7.99%	0.77	1,785
Aug-27	2,189	(295)	3,180	-	5,075	(758)	(2,422)	116	-	2,010	3.98	7.99%	0.74	1,481
Feb-28	2,210	(317)	3,180	-	5,072	(758)	(2,422)	-	-	1,892	4.48	7.99%	0.71	1,341
Aug-28	2,191	2,024	796	-	5,011	(796)	-	-	(443)	3,772	4.98	7.99%	0.68	2,573
Feb-29	2,052	2,137	796	-	4,985	(796)	-	-	(540)	3,649	5.48	7.99%	0.66	2,394
Aug-29	1,906	2,174	836	-	4,915	(836)	-	-	(521)	3,559	5.98	7.99%	0.63	2,248
Feb-30	1,756	2,306	836	-	4,898	(836)	-	-	(508)	3,554	6.48	7.99%	0.61	2,160
Aug-30	1,599	2,301	925	-	4,826	(877)	(48)	-	(476)	3,425	6.98	7.99%	0.58	2,003
Feb-31	1,441	2,438	925	-	4,804	(877)	(48)	-	(462)	3,417	7.48	7.99%	0.56	1,922
Aug-31	1,276	2,340	1,119	-	4,736	(921)	(198)	-	(404)	3,212	7.98	7.99%	0.54	1,740
Feb-32	1,115	2,467	1,119	-	4,702	(921)	(198)	-	(387)	3,195	8.48	7.99%	0.52	1,665
Aug-32	944	2,706	990	-	4,639	(972)	(23)	-	(410)	3,235	8.98	7.99%	0.50	1,622
Feb-33	757	2,844	990	-	4,591	(972)	(23)	-	(392)	3,205	9.48	7.99%	0.48	1,546
Aug-33	562	2,947	1,016	-	4,525	(1,025)	-	-	(377)	3,123	9.98	7.99%	0.46	1,450
Feb-34	360	3,061	1,016	-	4,436	(1,025)	-	-	(347)	3,065	10.48	7.99%	0.45	1,369
Aug-34	198	197	3,890	-	4,285	(1,072)	(2,823)	-	-	389	10.98	7.99%	0.43	167
Feb-35	184	198	3,890	-	4,272	(1,072)	(2,823)	-	-	377	11.48	7.99%	0.41	156
Aug-35	185	(614)	4,738	-	4,309	(1,122)	(3,619)	(18)	-	(451)	11.98	7.99%	0.40	(179)
Feb-36	227	(797)	4,738	-	4,169	(1,122)	(3,619)	(44)	-	(616)	12.48	7.99%	0.38	(236)
Aug-36	99	2,932	978	-	4,008	(984)	-	1,044	-	4,068	12.98	7.99%	0.37	1,500
Enterprise Value														**56,915**
(+) Closing cash or cash equivalents as at the Valuation Date														13,491
Adjusted Enterprise Value														**70,406**

**Upto 25 August 2036*

Appendix 1.4 – Valuation of DME as on 30th September 2023

INR lakhs

Year	Financial Income	O&M Income	Changes in Financial Asset	Total Inflow	Expenses	MM Expense	Changes in Working Capital	Tax Outflow	Free Cash Flow to Firm	Cash Accrual Factor	WACC	Discounting Factor	PV of FCFF
	A	B	C	D = A+B+C	E	F	G	H	I = D+E+F+G+H	J	K	L	M = I*L
Jan-24	1,715	2,159	545	4,418	(413)	(104)	63	(304)	3,660	0.32	7.97%	0.98	3,572
Jul-24	1,658	1,727	423	3,808	(426)	-	-	(289)	3,093	0.82	7.97%	0.94	2,905
Jan-25	1,559	1,797	423	3,779	(426)	-	-	(272)	3,082	1.32	7.97%	0.90	2,785
Jul-25	1,482	(28)	2,299	3,753	(449)	(1,855)	(28)	(258)	1,163	1.82	7.97%	0.87	1,012
Jan-26	1,484	(54)	2,299	3,729	(449)	(1,855)	(41)	(259)	1,126	2.32	7.97%	0.84	943
Jul-26	1,463	1,680	561	3,705	(473)	(95)	69	(255)	2,952	2.82	7.97%	0.81	2,378
Jan-27	1,367	1,752	561	3,681	(473)	(95)	-	(238)	2,875	3.32	7.97%	0.78	2,229
Jul-27	1,265	1,889	499	3,653	(496)	(9)	-	(220)	2,928	3.82	7.97%	0.75	2,185
Jan-28	1,157	1,972	499	3,628	(496)	(9)	-	(201)	2,922	4.32	7.97%	0.72	2,098
Jul-28	1,043	2,051	514	3,609	(520)	-	-	(181)	2,908	4.82	7.97%	0.69	2,009
Jan-29	926	2,130	514	3,570	(520)	-	-	(161)	2,889	5.32	7.97%	0.66	1,921
Jul-29	804	2,156	581	3,540	(545)	(40)	-	(140)	2,815	5.82	7.97%	0.64	1,802
Jan-30	681	2,246	581	3,507	(545)	(40)	-	(118)	2,803	6.32	7.97%	0.62	1,726
Jul-30	551	2,360	567	3,479	(571)	-	-	(96)	2,812	6.82	7.97%	0.59	1,667
Jan-31	417	2,427	567	3,410	(571)	-	-	(72)	2,768	7.32	7.97%	0.57	1,579
Jul-31	279	2,439	596	3,314	(599)	-	-	(48)	2,667	7.82	7.97%	0.55	1,464
Jan-32	138	2,574	596	3,308	(599)	-	-	(24)	2,685	8.32	7.97%	0.53	1,419
Jul-32	37	(693)	4,014	3,357	(629)	(3,388)	(558)	(6)	(1,224)	8.82	7.97%	0.51	(622)
Jan-33	80	(839)	4,014	3,254	(629)	(3,388)	(581)	(13)	(1,357)	9.33	7.97%	0.49	(664)
Jul-33	-	2,833	317	3,151	(322)	-	1,415	-	4,243	9.82	7.97%	0.47	1,998
Enterprise Value													**34,405**
(+) Closing cash or cash equivalents as at the Valuation Date													4,160
Adjusted Enterprise Value													**38,565**

**Upto 25 July 2033*

Appendix 1.5 – Valuation of GSY as on 30th September 2023

INR lakhs

Year	Financial Income	O&M Income	Changes in Financial Asset	Total Inflow	Expenses	MM Expense	Changes in Working Capital	Tax Outflow	Free Cash Flow to Firm	Cash Accrual Factor	WACC	Discounting Factor	PV of FCFF
	A	B	C	D = A+B+C	E	F	G	H	I=D+E+F+G+H	J	K	L	M = I*L
Oct-23	3,638	3,427	1,113	8,178	(663)	(66)	1,398	(1,238)	7,610	0.16	7.58%	0.99	7,521
Apr-24	3,496	1,954	744	6,193	(697)	(48)	1,030	(736)	5,743	0.66	7.58%	0.95	5,471
Oct-24	3,388	2,020	744	6,152	(697)	(48)	1,022	(725)	5,704	1.16	7.58%	0.92	5,239
Apr-25	3,273	2,322	531	6,126	(534)	-	1,017	(776)	5,834	1.66	7.58%	0.89	5,167
Oct-25	3,144	2,421	531	6,096	(534)	-	733	(765)	5,531	2.16	7.58%	0.85	4,722
Apr-26	3,032	891	2,144	6,067	(563)	(1,587)	-	(355)	3,562	2.66	7.58%	0.82	2,933
Oct-26	2,983	910	2,144	6,037	(563)	(1,587)	-	(344)	3,543	3.16	7.58%	0.79	2,812
Apr-27	2,911	2,514	585	6,011	(593)	-	-	(733)	4,685	3.66	7.58%	0.77	3,585
Oct-27	2,772	2,615	585	5,973	(593)	-	-	(720)	4,660	4.16	7.58%	0.74	3,438
Apr-28	2,627	2,716	614	5,957	(624)	-	-	(709)	4,625	4.67	7.58%	0.71	3,290
Oct-28	2,477	2,812	614	5,903	(624)	-	-	(695)	4,585	5.17	7.58%	0.69	3,144
Apr-29	2,322	2,822	733	5,877	(655)	(88)	-	(662)	4,472	5.67	7.58%	0.66	2,957
Oct-29	2,166	2,929	733	5,828	(655)	(88)	-	(646)	4,439	6.17	7.58%	0.64	2,830
Apr-30	2,002	3,126	677	5,805	(686)	-	-	(658)	4,461	6.67	7.58%	0.61	2,742
Oct-30	1,829	3,248	677	5,754	(686)	-	-	(642)	4,426	7.17	7.58%	0.59	2,622
Apr-31	1,651	3,180	894	5,726	(723)	(183)	-	(584)	4,236	7.67	7.58%	0.57	2,420
Oct-31	1,475	3,294	894	5,664	(723)	(183)	-	(564)	4,193	8.17	7.58%	0.55	2,310
Apr-32	1,293	3,404	951	5,647	(760)	(204)	-	(546)	4,137	8.67	7.58%	0.53	2,197
Oct-32	1,105	3,518	951	5,573	(760)	(204)	-	(528)	4,082	9.17	7.58%	0.51	2,089
Apr-33	945	1,079	3,481	5,505	(799)	(2,697)	-	-	2,009	9.67	7.58%	0.49	992
Oct-33	889	967	3,481	5,337	(799)	(2,697)	-	-	1,842	10.17	7.58%	0.48	876
Apr-34	798	3,741	823	5,363	(837)	-	-	(218)	4,308	10.67	7.58%	0.46	1,977
Oct-34	588	3,981	823	5,393	(837)	-	-	(514)	4,042	11.17	7.58%	0.44	1,788
Apr-35	369	4,055	865	5,289	(877)	-	-	(481)	3,931	11.67	7.58%	0.43	1,677
Oct-35	-	4,954	141	5,095	(148)	-	2,715	(611)	7,050	12.17	7.58%	0.41	2,899
Enterprise Value													**77,697**
(+) Closing cash or cash equivalents as at the Valuation Date													4,952
Adjusted Enterprise Value													**82,648**

**Upto 31 October 2035*

Appendix 1.6 – Valuation of MCP as on 30th September 2023

INR lakhs

Year	Revenue	EBITDA	Major Maintenace Expense	Capital Expenditure	Changes in Working Capital	Taxation	FCFF	CAF	WACC	Discounting Factor	PV of FCFF
	A	B	C	D	E	F	G=B+C+D+E+F	H	I	J	K= G*J
FY 24	19,593	18,042	(224)	-	-	(1,437)	16,380	0.25	10.11%	0.98	15,990
FY 25	41,558	37,767	(508)	(1,064)	-	(4,399)	31,797	1.00	10.11%	0.91	28,878
FY 26	46,761	42,731	-	-	-	(5,096)	37,635	2.00	10.11%	0.82	31,043
FY 27	52,239	47,928	(13,873)	-	-	(5,826)	28,228	3.00	10.11%	0.75	21,147
FY 28	55,644	51,022	(14,436)	-	-	(6,255)	30,330	4.00	10.11%	0.68	20,635
FY 29	61,138	56,198	-	-	-	(6,702)	49,496	5.00	10.11%	0.62	30,584
FY 30	67,328	62,075	(301)	-	-	(7,527)	54,247	6.00	10.11%	0.56	30,443
FY 31	74,015	68,430	-	-	-	(8,420)	60,011	7.00	10.11%	0.51	30,586
FY 32	80,565	74,565	(973)	-	-	(9,278)	64,314	8.00	10.11%	0.46	29,770
FY 33	86,530	80,084	(7,041)	-	-	(10,048)	62,994	9.00	10.11%	0.42	26,483
FY 34	93,398	86,500	(1,281)	-	-	(10,945)	74,274	10.00	10.11%	0.38	28,359
FY 35	1,00,374	93,070	(8,520)	-	-	(11,866)	72,685	11.00	10.11%	0.35	25,204
FY 36	1,09,111	1,01,396	-	-	-	(13,036)	88,360	12.00	10.11%	0.31	27,828
FY 37	1,17,783	1,09,629	(20,267)	-	-	(14,192)	75,170	13.00	10.11%	0.29	21,500
FY 38	62,773	58,541	(19,531)	-	-	(8,183)	30,827	13.75	10.11%	0.27	8,199
NPV of Explicit Period											**3,76,649**
PV of Working Capital Received											1,812
Enterprise Value											**3,78,462**
(+) Closing cash or cash equivalents as at the Valuation Date											19,540
Adjusted Enterprise Value											**3,98,001**

**Upto 26 September 2037*

***Presently, 51% of the issued and paid-up equity share capital of MCP is held by Welspun Enterprises Limited ("WEL") and 49% is held by Actis Highway Infra Limited ("AHIL"). As represented by the Investment Manager, the InvIT can currently purchase only 49% equity stake of MCP as per the terms of the Concession Agreement. However, the Trust, will be entitled to acquire 100% of the equity share capital of MCP only after a period of one year from the COD of MCP which is as per the terms of the requirements prescribed by the NHAI and as per the Concession Agreement.*

The above mentioned EV and Adjusted EV represents the value EV calculated at 100% equity stake level for MCP and since InvIT is currently proposing to acquire only 49% equity stake in MCP, the above mentioned values should be adjusted in this context for 49% equity stake level. In this regard, I have calculated EV and Adjusted EV at 100% equity stake level and 49% equity stake level in the below table for MCP:

SPVs	Enterprise Value		Adjusted Enterprise Value	
	at 100% equity stake level	at 49% equity stake level	at 100% equity stake level	at 49% equity stake level
MCP	3,78,462	1,85,446	3,98,001	1,95,020

Appendix 2.1 – Weighted Average Cost of Capital of the HAM SPVs as on 30th September 2023

Particulars	AM2	CGRG	CTHPL	DME	GSY	Remarks
Risk free return (Rf)	7.16%	7.16%	7.16%	7.16%	7.16%	Risk Free Rate has been considered based on zero coupon yield curve as at 30th September 2023 of Government Securities having maturity period of 10 years, as quoted on CCIL's website
Market Risk Premium (ERP)	7.00%	7.00%	7.00%	7.00%	7.00%	Based on historical realized returns on equity investments over a risk free rate represented by 10 years government bonds, a 7% equity risk premium is considered appropriate for India
Beta (Relevered)	0.46	0.47	0.48	0.48	0.46	Beta has been considered based on the beta of companies operating in the similar kind of business in India
Cost of Equity (Ke)	**10.39%**	**10.47%**	**10.51%**	**10.51%**	**10.35%**	**Base Ke = Rf + (β x ERP)**
Company Specific Risk Premium (CSRP)	0.00%	0.00%	0.00%	0.00%	0.00%	Based on SPV specific risk(s)
Revised Cost of Equity (Ke)	**10.39%**	**10.47%**	**10.51%**	**10.51%**	**10.35%**	**Adjusted Ke = Rf + (β x ERP) + CSRP**
Pre-tax Cost of Debt (Kd)	8.25%	8.25%	8.25%	8.25%	8.25%	As per the Existing Cost of Debt of the SPVs, as represented by the Investment Manager
Tax rate of SPV	20.98%	17.95%	16.26%	16.60%	22.58%	Tax Rate Applicable to SPVs is considered
Post-tax Cost of Debt (Kd)	**6.52%**	**6.77%**	**6.91%**	**6.88%**	**6.39%**	**Effective cost of debt. Kd = Pre tax Kd * (1-Effective Tax Rate)**
Debt/(Debt+Equity)	70.00%	70.00%	70.00%	70.00%	70.00%	Debt : Equity ratio computed as [D/(D+E)]
WACC	**7.68%**	**7.88%**	**7.99%**	**7.97%**	**7.58%**	**WACC = [Ke * (1 - D/(D+E))] + [Kd * (1-t) * D/(D+E)]**

Appendix 2.2 – Weighted Average Cost of Capital for the Toll Asset as on 30th September 2023

Particulars	MCP	Remarks
Risk free return (Rf)	7.16%	Risk Free Rate has been considered based on zero coupon yield curve as at 30th September 2023 of Government Securities having maturity period of 10 years, as quoted on CCIL's website
Market Risk Premium (ERP)	7.00%	Based on historical realized returns on equity investments over a risk free rate represented by 10 years government bonds, a 7% equity risk premium is considered appropriate for India
Beta (Relevered)	0.75	Beta has been considered based on the beta of companies operating in the similar kind of business in India
Cost of Equity (Ke)	**12.41%**	**Base Ke = Rf + (β x ERP)**
Company Specific Risk Premium (CSRP)	1.00%	Based on SPV specific risk(s)
Revised Cost of Equity (Ke)	**13.41%**	**Adjusted Ke = Rf + (β x ERP) + CSRP**
Pre-tax Cost of Debt (Kd)	8.25%	As represented by the Investment Manager
Tax rate of SPV	17.47%	Tax Rate Applicable to SPVs is considered
Post-tax Cost of Debt (Kd)	**6.81%**	**Effective cost of debt. Kd = Pre tax Kd * (1-Effective Tax Rate)**
Debt/(Debt+Equity)	50.00%	Debt : Equity ratio computed as [D/(D+E)]
WACC	**10.11%**	**WACC = [Ke * (1 - D/(D+E))] + [Kd * (1-t) * D/(D+E)]**

Appendix 3.1 – AM2: Summary of approvals and licences

Sr. No.	Description of the permits	Issuing Authority	Date of Issue	Validity
1	Labour License No. 1952700110028171	Govt. of Maharasthra, Licensing dept.	23-02-2021	28-02-2022
2	BOCW Certificate No. 1952702310006606	Govt of Maharashtra	01-03-2019	28-02-2020
3	Labour License No. 1952700110028171	Govt. of Maharasthra, Licensing dept.	03-06-2019	29-02-2020
4	Forest Department clearence Paratwada - Ghatang	Govt of Maharashtra, Forest Dept	05-03-2021	Lifetime
5	Forest Department clearence Paratwada - Ghatang	Govt of Maharashtra, Forest Dept	05-03-2021	Lifetime
6	Forest Department clearence Paratwada - Ghatang	Govt of Maharashtra, Forest Dept	19-10-2020	Lifetime
7	Forest Department clearence Paratwada - Ghatang	Govt of Maharashtra, Forest Dept	19-10-2020	Lifetime
8	Forest Department clearence Paratwada - Ghatang	Govt of Maharashtra, Forest Dept	19-10-2020	Lifetime
9	Letter of Appointment	Public Wroks department	28-05-2019	
10	Provisional certificates	G-Eng Advisory Services, JV Global Infra Solutions, AICONS Engineering Pvt Ltd, JV Real Strength Infrastructure, M.S.Consultant JV Krishna Techno Consult	11-11-2021	Lifetime
11	Completion certificate	G-Eng Advisory Services, JV Global Infra Solutions, AICONS Engineering Pvt Ltd, JV Real Strength Infrastructure, M.S.Consultant JV Krishna Techno Consult	29-07-2022	Lifetime

Source: Investment Manager

Appendix 3.2 – CGRG: Summary of approvals and licences

Sr. No.	Description of the permits	Issuing Authority	Date of issue	Validity/ Current status
1	Forest Department clearence HRB023/2015-CHA	Ministry of Environment, Forest and Climate Change	28-05-2015	Lifetime
2	Letter of Appointment NHAI/PIU-DDN/MBL(CGRG)/14629	NHAI	06-03-2018	Lifetime
3	Forest Department clearence 8B/USP/06/288/2015/1090	Ministry of Environment, Forest and Climate Change		26-09-2023
4	Certificate of registration of labour license	Ministry of Labour and Employment	15-03-2018	14-03-2019
5	Renewal of certificate of registration dated Feb 19, 2019	Ministry of Labour and Employment		14-03-2020

Source: Investment Manager

Appendix 3.3 – CTHPL: Summary of approvals and licences

Sr. No.	Description of the permits	Issuing Authority	Date of Issue	Validity
1	Registration Certificate No. BOCW/ALCNAGPUR/2019/R-10	Ministry of Labour	11-02-2020	18-02-2021
2	Water Clearance	Government of Maharashtra	21-02-2019	Lifetime
3	Forest Clearance	Forest Officer, Jalgaon	28-08-2018	Lifetime
4	Provisional Certificate	Independent Engineer	01-09-2021	Lifetime
5	Completion Certificate	Independent Engineer	22-12-2022	Lifetime

Source: Investment Manager

Appendix 3.4 – DME: Summary of approvals and licences

Sr. No.	Description of the permits	Issuing Authority	Date of Issue	Validity
1	Part permission for felling/transplant of 1000 trees	DEPARTMENT OF FOREST AND WILD LIFE	24-11-2016	Lifetime
2	Part permission for felling/transplant of 1000 trees	DEPARTMENT OF FOREST AND WILD LIFE	29-11-2016	Lifetime
3	Certification of registration	Labour and Employment Department	10-02-2017	Lifetime
4	Completion Certificate	Independent Engineer	29-10-2018	Lifetime
5	Labour License AU-1/46/2/2017-R	Office of the Licensing Officer	30-08-2023	29-08-2024
6	IWAI/PR/NW-1/Nav.Clearance/2014-15 Vol II	Inland Waterways Authorit of India	24-11-2016	Lifetime
7	CLRA/ALCNEWDLEHI1/2019/101	Labour and Employment Department	03-08-2022	29-07-2023
8	LEI Code	Legal Entity Identifier of India		17-08-2024
9	NHAI/PIU/GZB/DME -1/12027/GEN/2017	National Highways Authority of India	06-03-2017	Lifetime
10	NHAI/PIU/GZB/DME -1/12021/CONC/2017	National Highways Authority of India	08-01-2018	Lifetime
11	Provisional Completion Certificate	Independent Engineer	28-06-2018	Lifetime

Source: Investment Manager

Appendix 3.5 – GSY: Summary of approvals and licences

Sr. No.	Description of the permits	Issuing Authority	Date of Issue	Validity
1	Forest Clearance HRBO23/2015- CHA	Ministry of Environment, Forest and Climate Change	28-05-2015	Lifetime
2	Water Clearance 57772/UPPCB/Saharanpur(UPPCBRO)/CTO/wat	U.P. Pollution Control Board	21-05-2019	Lifetime
3	Registration Certificate F.No. D-57 (17)/2018/ALC	Ministry of Labour and Employment	28-02-2018	Lifetime
4	LEI Code	Legal Entity Identifier of India		15-05-2024
5	Confirmation of transfer of 100% shareholding	National Highways Authority of India	31-10-2022	Lifetime
6	Glg/crusher/Y.nagar/L-15	Deparment of Mines and Geology	22-11-2017	Lifetime
7	Permission for storage of diesel at camp	Collector and District Magistrate	27-04-2018	Lifetime
8	Forest Clearance	Ministry of Enviroment, Forest and Clearance	06-04-2018	Lifetime
9	Water Clearance 57772/UPPCB/Saharanpur(UPPCBRO)/CTO/wat	U.P. Pollution Control Board	11-05-2019	31-07-2020
10	Completion Certificate	Idependent Engineer	10-02-2020	Lifetime

Source: Investment Manager

Appendix 3.6 – MCP: Summary of approvals and licences

Sr. No.	Description of the permits	Issuing Authority	Date of Issue	Validity
1	Provisional Certificate - I	Independent Engineer	31-03-2022	Lifetime
2	Provisional Certificate - II	Independent Engineer	25-04-2023	Lifetime
3	Labour License - Haryana Section	Office of the Licensing Officer	21-09-2023	20-09-2024
4	Labour License - Delhi Section	Office of the Licensing Officer	21-09-2023	20-09-2024
5	Principal Employers License	National Highways Authority of India	18-06-2020	Lifetime
6	DG Certificate - I	Executive Engineer	20-05-2021	Lifetime
7	DG Certificate - II	Executive Engineer	06-08-2021	Lifetime
8	Forest Clearance	Office of the Deputy Conservator of Forest	23-10-2017	Lifetime

Source: Investment Manager

Appendix 4.1 – MCP-Summary of Ongoing Litigations

Sr. No	Matter	No. of Suits	Pending Before	Particulars	Amount Involved (INR Million)
1	Arbitration		Delhi High Court, New Delhi	**Background of the case**: Vidya Projects Pvt Ltd ('Vidya') was a sub-contractor to PIPL. As per Vidya, the outstanding amount of Rs 6,10,00,000/- is from PIPL. Upon instruction from Essel Group, the part payment of Rs. 1,96,00,000/- was made to Vidya. Vidya demanded unpaid dues of Rs. 4,10,00,000/- of PIPL/MCPTRL from WIFPL. Vidya invoked arbitration on 25.11.2021 as per the Substitution and Amendment Agreement dated 25.06.2020 executed between Essel, PIPL, MCPTRL and Vidya. Vidya has filed Section.11 petition for appointment of arbitrator before Hon'ble Delhi High Court. **Current status** : WIFPL filed the reply on 22.03.2022. Vidya filed the Rejoinder on 10.05.2022. On 26.05.2023, WIFPL submitted additional affidavit, stating that the agreement is not stamped. Next date is 18.12.2023.	41
2	Civil		P & H High Court	**Background of the case:** Petitioners claim that being Indian Air Force Officers they are exempted from paying toll tax as per the notification dated 03.12.2010. **Current status**: Next date is 7.12.2023	0
3	Civil		Before the District Consumer Disputes Redressal Commission, Panipat	**Background of the case** : The Complainant filed the complaint under Consumer Protection Act, 2019, alleging deficiency and negligent service against the Toll plaza due to wrongfully took an amount of Rs. 1900/- and issued a receipt of Rs. 190 only. He has also prayed for compensation. **Current status** : Next date is awaited.	0
4	Civil		Before the District Consumer Disputes Redressal Commission, Panipat	**Background of the case**: The Complainant filed the complaint under Consumer Protection Act, 2019, alleging deficiency and negligent service against the Toll plaza due to wrongfully took an excess amount. He has also prayed for compensation as well as return excess amount **Current status** : Next date is awaited.	0

Source: Investment Manager

ANNEXURE IV - TECHNICAL REPORT

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SIT/PJRP/2312188/060
22nd December 2023

To
M/S Actis Highway Infra Ltd
The Sponsor

Sub: Submission of Technical Reports for Walter Projects

K/A Mr. Rakshit Jain,

We are pleased to submit hereby the "Technical Report" in hard/soft copies for the following assets.

S. No	Project Title
1	Technical Diligence of Delhi-Meerut Expressway (Section from km 0.000 to UP Border) including 8 laning of NH-24 in the state of Delhi. (Design Length-8.716)
2	Technical Diligence for 4-Laning of Chutmalpur - Ganeshpur of NH-72A from Ch. 0.000 to Ch. 17.900 & Roorkee – Chutmalpur - Gagalehri of NH-73 from Ch. 0.000 to Ch. 35.400 in the state of Uttar Pradesh & Uttarakhand on Hybrid Annuity Basis (Pkg-1)
3	Technical Diligence for 4-Laning of Gagalheri–Saharapur–Yamunanagar (UP/Haryana Border) section of NH-73 from Km 35.400 to Km 86.855 in the State of Uttar Pradesh under NHDP-IV on Hybrid Annuity Mode (PKG-II)
4	Technical Diligence for Four Laning Chikhali – Tarsod (Package-IIA) Section of NH-6 from Km 360.000 to Km 422.700 in the State of Maharashtra to be executed on Hybrid Annuity pattern under NHDP Phase IV (CTHPL)
✓ 5	Technical Diligence of Two Lanning with paved shoulders Road on Package HAM-AM-2 in the State of Maharashtra under MRIP on Hybrid Annuity Mode
6	Technical Diligence for the 8 Laning of NH-1 from Mukarba Chowk at km 15.500 to km 86.000 in the State of Haryana on DBFOT Basis

Thanking you and assuring you best services all the time.

Yours faithfully,

For Samarth Infraengg Technocrats Pvt Ltd.,

SAMARTH INFRAENGG TECHNOCRATS PVT. LTD.

Authorized Signatory
Name: [Mr. Kalva Kiran Kumar]
Designation: [Director]

TECHNICAL REPORT

Technical Diligence for Two Lane with paved shoulders Road on Package HAM-AM-2 in the State of Maharashtra under MRIP on Hybrid Annuity Mode

SAMARTH INFRAENGG Technocrats Private Limited

DECEMBER 2023

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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	-California Bearing Ratio
CCB	-Concrete Crash Barrier
CCR	-Cement Concrete Railing
COD	-Commercial Operation Date
COS	-Change of scope
CPI	-Consumer Price Index
CUP	-Cattle Under pass
CVC	-Classified Volume Count
CVPD	-Commercial Vehicles per Day
DBM	-Dense Bituminous Concrete
DPR	-Detailed Project Report
ECB	-Emergency Call Box
EPC	-Engineering, Procurement and Construction
ESI	- Employees' State Insurance
FDD	-Filed Dry Density
FOB	-Foot Over Bridge
FRL	-Finished Road Level
FSI	-Free Swell Index
FWD	-Falling Weight Deflectometer
FY	-Financial Year
GOI	- Government of India
GR	-Growth Rates
GS	-Grade Separated
GSB	-Granular Sub Base
GST	-Goods and Services Tax
HCPT	-Half-cell Potential Test
HPC	-Hume Pipe Culvert
HR	- Human Resources
HTMS	-Highway Traffic Management Systems
IE	-Independent Engineer
IRC	- Indian Roads Congress
IRC SP	- Indian Roads Congress Special Publications
IRI	-International Roughness Index
Km	-kilometer
LHS	-Left Hand Side
LL	-Liquid Limit
LS	-Lumpsum
m	-Meter
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
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
PWD	Public Works Department
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

The Public Works Department, Government of Maharashtra (the "**Authority**") is engaged in the development, maintenance and management of State Highways and Major District Roads in Maharashtra and upgrading to Two Lane with paved shoulders as part of this endeavor, the Authority has decided to undertake following roads:

1. Improvement to Roads joining District place in Akola District (Akola Mhaisang Daryapur) (SH 280, SH 312 length 41.59km),
2. Improvement to Roads joining Taluka place in Akola and Amravati District (Anjangaon Daryapur) (SH 282 length 26.80 km)
3. Improvement to Roads joining Taluka place in Akola and Amravati District (Daryapur Murtizapur) (SH 282 Length 22.42 km)
4. Improvement to Roads joining District place in Amaravati District (Daryapur Walgaon) (SH 47, length 44.15km)
5. Improvement to Amravati Mardi Kurha Kaundynapur up to District Border Road in Amaravati District Joining Kaundinyapur Holy place to Amaravati Dist. HQ (SH 280, SH 300 & SH 294)
6. Improvement to Amravati-Bhatkuli-Asara Road joining Bhatkuli Taluka HQ to Amaravati District HQ of (SH280)
7. Improvement to Amravati Chandur Railway Dhamangaon Road in Amravati Dist. Joining Chandur railway & Dhamangaon Taluka HQ to Amravati Dist. HQ (SH 297 &296)
8. Improvement to Roads for Chikaldara Hill Station in Amravati District (Paratwada Chikhaldara Ghatang Road) and
9. Improvement to Roads joining District place in Amravati District (Warud Gavankund Bahada Jarud Mangruli Kachurna Haturna and Morshi Pala Salbardi Dongaryavali Dapori)

The "**Project**" herewith referred as AM-2 in the State of Maharashtra on Design, Build, Operate and Transfer ("**DBOT**") "Hybrid Annuity" basis for a total length of 352.15km. The Authority had accordingly invited the bid proposals and upon the evaluation of received bids, the Authority has awarded the Project to **M/s Welspun Enterprises Limited.**

Consequent to this, **M/s Welspun Enterprises Limited,** formed a Special Purpose Vehicle (SPV) in the name of **Welspun Road Infra Private Limited (Concessionaire)** for implementation/execution of the project.

The Concessionaire has achieved PCOD for a length of 296.77 km on 11th Nov 2021 against the total Length of 352.15 km.

The PCOD for the balance length of 55.38 km is yet to be achieved. Major contributor in this length is Package-8, which falls in Hilly terrain and passes through forest lands. Work commenced in only

9 km length of this package and hence no PCOD has achieved for full length of 52.57 km. Package-3 and Package-4, PCOD is achieved for entire length and for other packages minor lengths are pending for achieving PCOD/Completion.

Table 1-1: Package-wise Length and Achieved PCOD Length

Pkg	SH/MDR Nos	Length of Project As per CA			PCOD achieved length, Dt 11.11.2021			Pending Length for PCOD
		From Km	To Km	Length Km	From Km	To Km	Length Km	
Pkg-1	SH-280	0	25.1	41.59	0.58	25.11	41.012	0.58
	SH-312	0	16.49		0	16.482		
Pkg-2	SH-282	1	27.885	26.89	1	27.65	26.65	0.24
Pkg-3	SH-282	27.885	50.22	22.34	27.885	50.22	22.34	-
Pkg-4	SH-47	180	224.15	44.15	180	224.15	44.15	-
Pkg-5	SH-280	95	123.675	41.08	95	123.675	41.035	0.04
	SH-300	56.3	58.45		56.3	58.41		
	SH-294	41.8	52.05		41.8	52.05		
Pkg-6	SH-280	65.25	93.65	28.40	65.25	92.55	27.3	1.10
Pkg-7	SH-297	3	28.85	48.85	3.24	28.85	48.61	0.24
	ChundurBYP	0	4.7		0	4.7		
	SH-296	26.5	44.8		26.5	44.8		
Pkg-8	SH-305	24	56.338	52.57	0	0	0	52.57
	MDR-08	0	20.236		0	0		
Pkg-9	MDR-66	0	15.652	46.31	0.00 5.37 06.860	5.15 6.45 15.652	45.675	0.63
	MDR-45	0	15.443		0	15.443		
	MDR-45	15.443	30.653		15.443	30.653		
Total length of Packages				**352.15**	**Achieved PCOD Length**		**296.77**	**55.38**

Further received Completion Certificate on 29th July 2022 for full length excluding balance cost for 13.827 Cr to be completed by Oct 22 and 7.76 Cr after clearance of existing hindrances.

This project road is acquired by M/s Actis GP LLP and is presently under Operation and Maintenance phase.

Actis GP LLP Ltd has engaged M/s Samarth Infra-engg Technocrats to undertake due-diligence study for self-assessment and/or for its Concessioning Authority and/ or for InvIT purpose and/ or for its present/ future investors/ lenders whom this Report will be presented as Vendors Technical Due Diligence Report.

This report highlights about the project at a glance and to evaluate the asset condition and work out O&M Cost, Major Maintenance cost and additional facilities cost/improvement works of the project during the Concession period.

1.1 PROJECT AT GLANCE

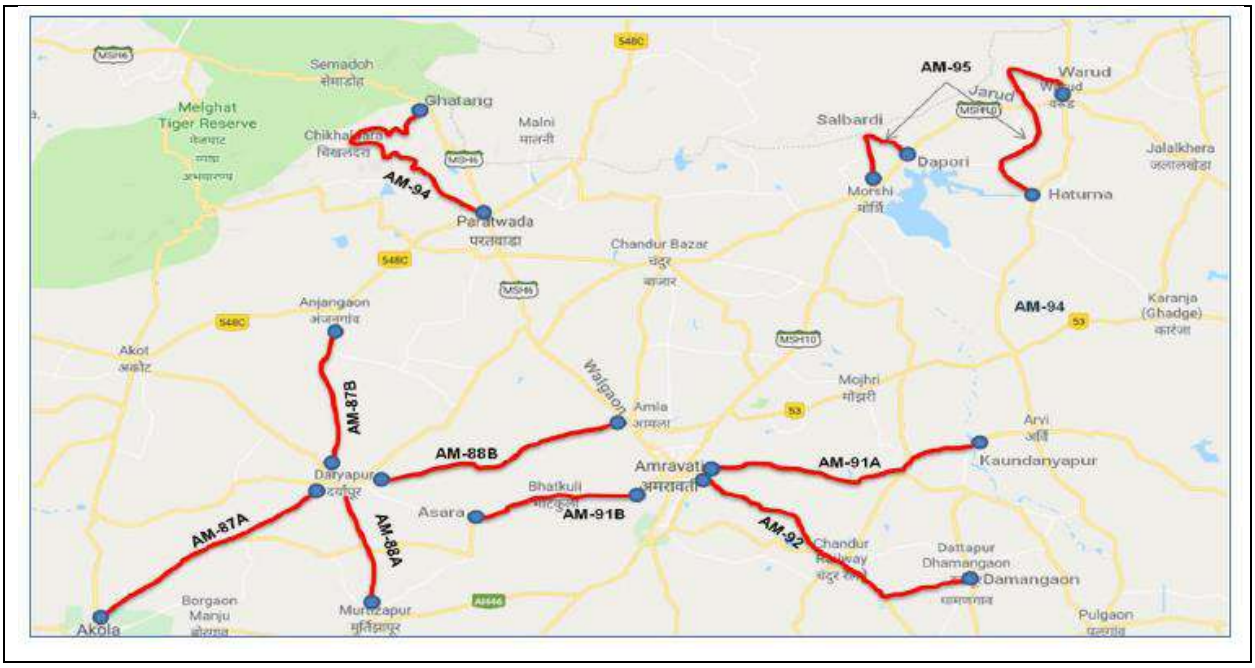
The project, AM-2, consists of nine (9) package and covers seventeen (17) road sections in Amaravati Dist. and Akola Dist. These roads are part of few State Highways (SH) and Major District Roads (MDR). Most length of packages runs through plain and rolling terrain, except Package-8, Chikhaldara which is on hilly station passes through forest lands. Intermittent lengths of Package-5,6 &7 also consists of forest lands.

Table 1-2: List of Project Corridor Details

Pkg	Description	Length (Km)
Pkg-1	AM- 87A: Improvement to Roads joining District place in Akola District (Akola Mhaisang Daryapur) (SH 280 SH-312 Length 41.59 Km)	41.59
Pkg-2	AM- 87B: Improvement to Roads joining Taluka place in Akola and Amravati District (Anjangaon Daryapur) (SH 282 Length 26.80 Km)	26.8
Pkg-3	AM- 88A: Improvement to Roads joining Taluka place in Akola and Amravati District (Daryapur Murtizapur) (SH 282 Length 22.42 Km)	22.42
Pkg-4	AM- 88A: Improvement to Roads joining District place in Amravati District (Daryapur Walgaon) (SH47 Length 44.15 Km)	44.15
Pkg-5	AM- 91A: Improvement to Amravati Mardi Kurha Kaundynapur up to District Border Road in Amravati District Joining Kaundynapur Holy place to Amravati Dist. HQ (SH 280, SH 300 & SH 294). Length- 39.70 Km.	39.7
Pkg-6	AM- 91B: Improvement to Amravati-Bhatkuli-Asara Road joining Bhatkuli Taluka HQ to Amravati District HQ of (SH-280). Length- 28.92 Km.	28.92
Pkg-7	AM- 92: Improvement to Amravati Chandur Railway Dhamangaon Road in Amravati Dist. Joining Chandur Railway & Dhamangaon Taluka HQ to Amravati Dist. HQ (SH 297& 296). Length - 49.7 Km.	49.7
Pkg-8	AM- 94: Improvement to Roads for Chikhaldara Hill Station in Amravati District. (Paratwada -Chikhaldara - Ghatang Road) (SH-305, MDR-8). Length - 52.574 Km.	52.574
Pkg-9	AM- 95: Improvement to Roads joining District place in Amravati District. (Warud - Gavankund -Bahada - Jarud - Mangruli - Kachurna - Haturna and Morshi - Pala - Salbardi - Dongaryavali - Dapori) (MDR-66, MDR-45). Length - 46.305 Km.	46.305
TOTAL (Km)		**352.15**

Table 1-3: Independent Engineer details for Packages

Consultants	Package 1 to 4 & 9	Package 5 to 7	Package 8
Independent Engineer	G-Eng. Advisory Services Pvt Ltd JV Global Infra Solutions	AICON Engineering Pvt Ltd JV Real Strength Infrastructure	MS Consultant JV Krishna Techno Consultants



Photographs showing the various corridors of the project road are presented below:

A view of Project Road with 7.0m wide at Km: 4.000_SH-312, Package-1

A view of Project Road Km: 1.000 -Package 2

A view of Project Road Km: 27.885, Package-3

A view of Project Road Km: 181.100, Package 4

A view of Project Road Km: 69.145, Package 6

A view at Km: 29.600 -SH-296-Package 7

Following Table highlights the total project at a glance:

Sl No.	Description	Date
1.	Date of Signing the Concession Agreement	10th Jan 2019
2.	Appointment Date	28th May 2019
3.	Scheduled Project completion	27th May 2021
4.	Scheduled End of Concession	12 years from Appointed date
5.	Date of issue of Provisional Completion Certificate	11th Nov 2021
6.	Date of Commencement of Commercial Operation	-
7.	Date of Issue of Final Completion Certificate	29th July 2022

1.2 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 due diligence for said project.

The scope of services as defined in the "terms of reference" for consultants is as below:

1. Review of Contractual documents

- ✓ Review of CA/ Schedules pertaining to scope of work
- ✓ Collection of relevant records and documents and review of same
- ✓ Review correspondences with NHAI/IE on technical issues
- ✓ Review of EPC contracts/Maintenance Contracts
- ✓ Review of As-built drawings & Detailed Project Reports and Designs
- ✓ Review of COS works if any
- ✓ Review the technical approvals from IE or another agency required under the CA

2. Field Investigations

- ✓ Review and Update of Field investigations survey data done during Technical Due Diligence time.

3. Major Maintenance

- ✓ Review of current maintenance system.
- ✓ Updating of Maintenance costs to be incurred over the period of the concession keeping in mind the maintenance requirements of the Concession Agreement.

4. Operations cost

- ✓ Updating of O&M cost for the concession period.

5. BOQ and Cost Estimates

- ✓ Updating of BOQ & Cost for Immediate works (1st year Capex)
- ✓ Updating of BOQ and Costs for Major Maintenance
- ✓ Updating of BOQ and cost for Routine maintenance, Route Patrolling
- ✓ Updating of BOQ and Cost for Operations
- ✓ Updating of year-by-year O&M cost
- ✓ The costs would be updated till the end of the concession period including any expected extension of Concession periods as informed to us.

6. Reports & Presentation

- ✓ Draft O&M cost
- ✓ Final Reports along with Final BoQ

1.3 Review of concession agreement

1) Concession Parties and date of execution of Agreement: PWD and WRIPL entered into the Concession Agreement on 10th Jan, 2019.
2) Appointed Date, Commercial Operation Date (Article 4, Article 15): The Concession Agreement was signed on 10th Jan, 2019. The Appointed Date as per the definition in the

Concession Agreement would be required to be achieved by 09th June 2019. The same has been declared as 28th May 2019 with the approval of the competent authority vide letter no 2345/TC date 28th May 2019. Financial Closure occurred on 01st May 2019. The Concession Period is 12 years from the Appointed Date. Based on the aforesaid, it appears that there has been no delay in achieving the Appointed Date.

3) Concession Period (Clause 3): This includes Construction Period of 730 days and Operation Period of 10 years commencing from COD.As the Appointed Date is declared on 28.05.2019 and accordingly the expiry date of the Concession Period would be 27.05.2031. Due to COVID-19 outbreak under Force Majeure head in accordance with the clause 28.6.2 of the Concession Agreement, the Concession period would be extended beyond the Scheduled end of Concession Period by 184 days, ie.,10.11.2031.

4) Obligations of Concessionaire & Authority (Article 5 & 6): The Concessionaire and Authority have fulfilled most of the obligations. **Superintending Engineer, PWD, Amaravati,** in his letter no 2170/HAM dt 22.04.2021 to CE**, Public Works Region, Amaravati** has recommended an EOT of 184 days as per Maharashtra Govt. GR dated 29.7.2020 for the projects on the request of the Contractor under construction and no penalty would be imposed as consequence of such action.

   Further 2nd EOT for 153 days has been requested by SPV considering Covid 2nd wave. Approval from authority for the same is not known. No further documentation is available regarding EOT. It is required to get the proper documents to understand EOT clearly from concessionaire.

5) Change in Ownership (Clause 5.3 read with Clause 7.1(k)): The Concessionaire shall not undertake or permit any Change in Ownership except with the prior approval of the Authority.

6) Performance Security (Article 9): The performance security is Rs 73.00Cr. The Concessionaire has fulfilled this condition. The YES bank of India has furnished the Bank Guarantee by way of Performance Security on 16.01.2019.

7) Right of Way (Article 10): If the Authority is unable to provide the remaining site within 180 days from the Appointed Date, the remaining Site of the Project Highway shall be removed from the scope of the work under the provision of Change of Scope. Right of Way is granted within 180 (one hundred and eighty) days of the Appointed Date shall be completed on or before the Scheduled Completion Date.

8) Scheduled Completion Date (Schedule-G, Article12): Construction period 730 days from the appointed date i.e., schedule date of completion is on 27th May 2021. As 184 days EOT granted by Maharashtra Govt due to COVID outbreak, the revised schedule date of completion is on 27th Nov'2021.

   Mile Stone-I: Achieved on 04.11.2019 (As per CA Sch-G, Scheduled Completion Date is 24.11.2019 i.e., 180th day from Appointed Date)

   Mile Stone-II: Achieved on 30.01.2020 (As per CA Sch-G, Scheduled Completion Date is 01.07.2020 i.e., 400th day from Appointed Date)

   Mile Stone-III: Achieved on 30.11.2020 (As per CA Sch-G, Scheduled Completion Date is 17.01.2021 i.e., 600th day from Appointed Date)

9) Provisional Certificates, Completion Certificate and Punch List Items (Article 14 & Article 15): The Concessionaire has achieved PCOD for a length of 296.77 km on 11th Nov 2021 for Package 1 to 4 & 9 respective vide IE letter Nos is 365/Geng JV Global/ IE/Amravati/2021 dated 11th Nov 2021 and for Package 5,6 & 7 is RSI/TL/ WRIPL/HAM/ AM91(A&B),92/483

dated 11th Nov 2021. For Package-8 there is no PCOD achieved. The total length of the Project is 352.15 km out of which PCOD achieved for a length of 296.77km (The Punch List appended to the PCODs consists of (i) List A- items that were required to be completed within ninety (90) days (ii) List B-Items to be completed within a reasonable time period as assessed by IE.

10) Change of Scope (Article 16): Chief Engineer, P.W region has power of approval of change of scope subject to that no increase in scope by 5% of Bid project cost. If concessionaire fail to complete works on account of Force Majeure or for reasons attributable to Authority, the process of calculation of total cost of reduced scope shall be as per clause 16.6.1. If change of scope leads to a reduction or increase in the length of Project Highway, the O&M Payments as provided in Clause 23.7 shall be reduced or increased in proportion to reduction or increase in the length of Project Highway.

    Package 5 and 7, additional works of 83.11 Crore as change of scope issued by Executive Engineer vide ref:3084/aud/20-21 dated 15.07.2020.

11) O&M Obligations of the Concessionaire (Article 17): Concessionaire has to fulfil the all the obligations during O&M operations. Maintenance Program to comply with the Maintenance Requirements, Maintenance Manual and Safety Requirements shall be provided On or before COD and no later than 45 days prior to the beginning of each Accounting Year during the Operation Period. Irrespective of condition of the road, there shall be special maintenance in year 3 and year 7 from date of COD.

    3rd year: Treatment of entire length by using Micro Seal Surfacing.
    7th year: renewal of entire length by using 40mm thick bituminous concrete

    Concessionaire fails to repair or rectify any defect or deficiency set forth in the Maintenance Requirements within the period specified period, Authority shall be entitled to recover Damages, to be calculated and paid for each day of delay until the breach is cured, at the higher of (a) 2% of the Performance Security, and (b) 0.1% of the cost of such repair or rectification as estimated by the Independent Engineer.

12) Remuneration of IE (Article 21): One half of the IE Fee shall be borne by Concessionaire.

13) Financial Close (Article 22): Given that the Concession Agreement was executed on 10th Jan 2019, the Financial Close was required to be achieved on or before 09th June 2019 considered 150 days period. The financial closure had occurred 01st May 2019. As, the appointed date was declared well within the time frames, there was no damages levied to both the parties by either party (Authority issued letter regarding Financial Close is not available in the correspondences)

14) Payment of Bid Project Cost (Article 23): 60% of Bid Project Cost, adjusted for Price Index multiple, shall be payable to Concessionaire in 5 equal installments of 12% each during construction period. The remaining 40% of Bid Project Cost, adjusted for Price Index multiple, shall be payable in 20 biannual installments commencing from 180th day of COD.

    Expenses in excess of O&M payments shall be borne by Concessionaire. O&M payments due payable to the Concessionaire shall be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.

15) Insurance (Article 26): The Concessionaire has been fulfilling this obligation.

16) Force Majeure (Article 28): As per Clause 28.6.2, at any time after the Appointed Date, if any Force Majeure Event occurs) before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the

duration for which such Force Majeure Event subsists; or (b) after COD, the Concessionaire shall be entitled to receive Annuity payments plus interest due and payable under this Agreement.

Due to COVID-19 outbreak under Force Majeure event in accordance with the clause 28.6.2 of the Concession Agreement, Concession period has been extended beyond the Scheduled end of Concession Period by 184 days.

17) Change in Law (Article 35): Change in law occurred due to eruption of COVID-19 and its impact by way of change in legislations by both the Central Government and respective State Governments.

18) Dispute resolution (Article 38): Any dispute not resolved amicably by conciliation, arbitration shall be held in accordance with Arbitration and Conciliation Act,1996. Place of such arbitration shall be the Mumbai and the language of arbitration proceedings shall be English. There are no disputes referred so far under the article 38.

1.4 Review of correspondences

There are several correspondences which are reviewed. Following are the some of the major correspondences that are reviewed for ready reference:

1) Concession Agreement with PWD, Govt. of Maharashtra, dated 10.01.2019,
2) EPC Agreement with Welspun Enterprises Limited, dated 15.01.2019
3) Provisional Certificate for a length of 296.77 Km vide IE letter Nos for Package 1 to 4 & 9 is 365/Geng JV Global/ IE/Amravati/2021 dated 11th Nov 2021 and for Package 5,6 & 7 is RSI/TL/ WRIPL/HAM/ AM91(A&B),92/483 dated 11th Nov 2021. Completion certificate received for full length with effect from 29th July 2022.
4) IE has approved PP drawing vide Ltr No 298 & 299/Geng JV Global/ IE/Amravati/2021 dated 08th Jan 2021 for Pkg 1to Pkg 4. For remaining Packages, drawing available in technical correspondence No.TDD-52
5) The Concessionaire has submitted As-Built drawings to IE for Box Culverts, Pipe culverts, MNB, vide Ltr No WRIPL/AM-2/CLO/2021/2022 dt:29.04.2021 for Pkg-1, …./ 2038 dt:03.05.2021 for Pkg-2, …/2233 dt:01.07.2021 for Pkg-3, …/ 2239 dt:03.05.2021 for Pkg-4.
6) The Concessionaire has submitted various letters related to Pavement Design and Geotechnical Investigations
7) The Concessionaire has notified the Authority about the outbreak of Corona pandemic under Force Majeure event pursuant to Article 28 of CA vide Ltr No WRIPL/AM-2/CLO/2020/1539 dt:26.10.2020, and further extension also requested considering 2nd wave of COVID, vide Ltr No WRIPL/AM-2/CLO/2021/2700 dt:24.11.2021.

   The PWD granted 184 days EOT on account of COVID-19 vide letter ref:1374/Tech-2/2021 dt:18.03. 2021.Considering the Corona 2nd wave, Concessionaire's request for another 153 days EOT has no approval from Authority yet.
8) The Authority has issued COS works for additional length of roads amounting to 83.11 Cr vide their letter ref:3084/aud/20-21 dt:15.07.2020
9) Forest land permissions available for Pkg-8
10) Concessionaire submitted tests on completion as per Schedule-I.

11) Monthly Inspection Reports of the Independent Engineer (MPR)

12) Monthly Inspection Reports of the Concessionaire (MPR)

1.5 Review of EPC/ MAINTENANCE contracts

(A) <u>EPC CONTRACT:</u>

1) Concession Parties and date of execution of Agreement: WRIPL, Welspun Road Infra Pvt Ltd (Concessionaire) and Welspun Enterprises Ltd (Contractor) entered into the EPC Agreement on 15th Jan 2019.
2) Appointment of Contractor, Effective Date and Term (Clause 2): The Concessionaire appointed Welspun Enterprises Limited as the Contractor to execute the EPC Works. The effective date of the Project is 15.01.2019. The EPC contract will be valid and subsisting from the effective date until the termination date.
3) Scope of Contractor's works (Clause 3): The Contractor shall construct the Project Highway on the Site set forth in Schedule A, B, C & D of the Concession Agreement and shall include the scope of work as set out in Annexure A of EPC Agreement.
4) Obligations and Undertakings (Clause 4): The Contractor and concessionaire shall at their own cost and expense observe, undertake, comply with and perform his obligations as set out in EPC Contract.
5) Contract Price and Terms of Payment (Clause 5): The Contract Price payable by the Concessionaire to the Contractor shall be 1321 Cr and the terms of payment shall be as specified in Annexure -B Part II.
6) Change in Law (Clause 6): Under this clause, if the Authority make any payment to the Concessionaire, the concessionaire is liable to make over such amounts (less Statutory deductions) to the Contractor.

   Notice to change of law regarding the Royalty was issued by EPC to the Concessionaire.
7) Guarantees, Liabilities, Liens and Indemnities (Clause 8): The Contractor acknowledges that the failure to meet the completion of each of Milestone set out in Annexure-D of EPC and to complete the EPC works on or prior to the Schedule Completion date shall constitute a Material Breach of Contractor. If the contractor fails to achieve the completion Milestones and Scheduled Construction Completion date as in Annexure-D, he shall pay the damages to Concessionaire at a rate of 0.005% and 0.011% of Contract Price per day respectively until such Milestone/Completion date is achieved subject to a maximum of 10% of Contract Price. During, DLP period, if any defect, damage of any EPC works thereof being non-operational by reason of such shall be borne by Contractor.
8) Change of Scope (Clause 9): All payments for execution of COS shall be made within 15 days from the date of receipt of the same from the Authority in accordance with clause 16.3 of Concession Agreement. In case of reduction in scope of works, the Contract Price shall stand decreased to the of such reduction. If Article-38(Dispute Resolution) is evoked, all risk, cost, expenses incurred by Concessionaire towards such procedure shall be borne by Contractor
9) Force Majeure (Clause 11): Upon review of the EPC Contract, the "Force Majeure" has the same meaning given to such term in the Concession Agreement
10) Suspension and Termination (Clause 12): The Concessionaire may, without prejudice to any of its other rights under the Contract, issue "Preliminary Notice" to the Contractor stating the

nature of default. If the Contractor fails to remedy or to take effective steps, to remedy the same to the satisfaction of the Concessionaire within 15 days of receipt of the Preliminary Notice, then the Concessionaire shall be entitled to terminate the Contract forthwith, by issuing a Termination Notice to the Contractor. However, no such clause has been invoked on the Contractor

1.6 RIVEW OF SCHEDULES

The following table depicts the project scope as given in schedules at a glance:

- Package 1 to 4

Table 1-4: Salient Features of Project Corridor, Pkg.1 to Pkg 4

S. No	Description	Unit	As per CA				
			Package-1		Package-2	Package-3	Package-4
			SH-280	SH-312	SH-282	SH-282	SH-47
1	Start Chainage (km)	km.	0.000	0.000	1.000	27.885	180.000
2	End chainage (km)	km.	25.100	16.490	27.885	50.220	224.150
3	Length of the Project Corridor	km.	25.100	16.490	26.885	22.335	44.150
4	ROBs	Nos.	-	-	-	1	-
5	ROBs-Retained	Nos.	-	-	-	1	-
6	**Major Bridges**	**Nos.**	**0**	**1**	**0**	**1**	**2**
7	Major Bridges-Retained	Nos.		1		1	2
8	**Minor Bridges**	**Nos.**	**8**	**1**	**3**	**4**	**14**
9	Minor Bridges-Reconstruction	Nos.	5	1	2		1
10	Minor Bridges-Widening	Nos.	2			1	4
11	Minor Bridges-New	Nos.					1
12	Minor Bridges-Retained	Nos.	1		1	3	8
13	**Culverts (Pipe)**	**Nos.**	**24**	**19**	**19**	**14**	**29**
14	Culverts-Reconstruction	Nos.	24	19	19	14	28
15	Culverts-Retained	Nos.					1
16	**Culvert (Slab/Box)**	**Nos.**	**10**	**8**	**6**	**6**	**15**
17	Culverts-Reconstruction	Nos.	6	8	6	1	7
18	Culverts-Retained	Nos.	4			5	8
19	Covered Drain Cum Foot path	Km	4.650	1.300	3.710	1.115	3.300
20	Major Junctions	Nos.	2	1	2	3	3
21	Minor junctions	Nos.	25	10	19	15	33
22	Kilometre / Hectometre / Boundary Stones	Nos.	26 / 100	17 / 66	108 / 28	23/90	45/176
23	No of Truck Lay bye	Nos.	-	-	-	1	-
24	No of Bus Bays with Shelter	Nos.	9	6	16		-
25	Only Bus bays	Nos.	9	6	16	10	14
26	Only Bus Shelter	Nos.	4	1	2	4	2

S. No	Description	Unit	As per CA				
			Package-1		Package-2	Package-3	Package-4
			SH-280	SH-312	SH-282	SH-282	SH-47
27	Earthen Drain	km	44.400	31.300	50.000	41.6	81.7
28	Medical Aid Post	No's	1		1	1	1
29	Traffic Aid Post	No's	1		1	1	1

- Package 5 to 7

Table 1-5: Salient Features of Project Corridor, Pkg 5 to Pkg 7

S. No	Description	Unit	As per CA						
			Package-5			Package-6	Package-7		
			SH-280	SH-300	SH-294	SH-280	SH-297	Chandur Rly. Bypass	SH-296
1	Start Chainage (km)	km.	95	56.3	41.8	65.25	3.000	0	26.5
2	End chainage (km)	km.	123.675	58.450	52.050	93.650	28.850	4.700	44.800
3	Length of the Project Corridor	km.	28.675	2.150	10.250	28.400	25.850	4.700	18.300
4	**Major Bridges**	**Nos.**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5	**Minor Bridges**	**Nos.**	**11**	**3**	**2**	**13**	**8**	**1**	**5**
6	Minor Bridges-Reconstruction	Nos.	4	1	1	1	4	1	2
7	Minor Bridges-Widening	Nos.	3	1	1	6	2	-	2
8	Minor Bridges-New	Nos.	4	1	-	6	2	-	1
9	**Culverts (Pipe)**	**Nos.**	**35**	**10**	**3**	**34**	**34**	**9**	**27**
10	Culverts-Reconstruction	Nos.	30	10	1	34	17	8	27
11	Culverts-Widening	Nos.	3	-	-		-	-	-
12	Culverts-New	Nos.	2	-	2		14	-	-
13	Culverts-Retained	Nos.					3	1	-
14	**Culvert (Slab/Box)**	**Nos.**	**8**	**1**	**6**	**5**	**1**	**1**	**4**
15	Culverts-Reconstruction	Nos.	-	-	-	1	1	-	-
16	Culverts-Rehabilitation	Nos.	1	1	-		-	-	-
17	Culverts-Widening	Nos.	4	-	6	4	-	-	-
18	Culverts-New	Nos.	3	-	-		-	1	3
19	Culverts-Retained	Nos.					-	-	1
20	Covered Drain Cum Foot path	Km	3.3	1.15	1.05	5.2	5.5	-	5.6
21	Major Junctions	Nos.	5	2	1	3	5	2	3
22	Minor junctions	Nos.	18	4	6	24	20	0	19
23	Kilometre / Hectometre / Boundary Stones	Nos.	29/115	2/9	11/41	28/114	27/104	5/19	18/74
24	No of Truck Lay bye	Nos.	1	-	-	1	1	-	-
25	No of Bus Bays with Shelter	Nos.	16	-	4	24	16	-	10

S. No	Description	Unit	As per CA						
			Package-5			Package-6	Package-7		
			SH-280	SH-300	SH-294	SH-280	SH-297	Chandur Rly. Bypass	SH-296
26	Earthen Drain	km	50.75	2	18.4	51.52	45.8	9.4	24
27	Medical Aid Post	No's	1			1	1		
28	Traffic Aid Post	No's	1			1	1		

- Package 8 to 9

Table 1-6: Salient Features of Project Corridor, Pkg 8 to Pkg 9

S. No	Description	Unit	As per CA			
			Package-8		Package-9	
			SH-305	MDR-8	MDR-45	MDR-66
1	Start Chainage (km)	km.	24.000	0	0	0
2	End chainage (km)	km.	56.338	20.236	30.653	15.652
3	Length of the Project Corridor	km.	32.338	20.236	30.653	15.652
4	**Major Bridges**	**Nos.**	**1**	**0**	**0**	**0**
5	Major Bridges-New	Nos.	1	-		
6	**Minor Bridges**	**Nos.**	**4**	**5**	**6**	**2**
7	Minor Bridges-Reconstruction	Nos.			1	
8	Minor Bridges-New	Nos.				1
9	Minor Bridges-Retained	Nos.	4	5	5	1
10	**Culverts (Pipe)**	**Nos.**	**60**	**66**	**42**	**20**
11	Culverts-Reconstruction	Nos.	46	36	28	14
12	Culverts-Widening	Nos.			8	1
13	Culverts-New	Nos.	5	30	5	5
14	Culverts-Retained	Nos.	9		1	
15	**Culvert (Slab/Box)**	**Nos.**	**11**	**3**	**5**	**4**
16	Culverts-Reconstruction	Nos.				4
17	Culverts-Widening	Nos.	1		5	
18	Culverts-Retained	Nos.	10	3		
19	Covered Drain Cum Foot path	Km	9.640	2.900	6.502	2.4
20	Major Junctions	Nos.	2	2	4	2
21	Minor junctions	Nos.	20	13	11	2
22	Kilometre / Hectometre / Boundary Stones	Nos.	33/129	21/81	31/123	16/63
23	Earthen Drain	km	1.6	0.600	26.054	43.416
24	Medical Aid Post	No's	1		1	
25	Traffic Aid Post	No's	1		1	

1.7 REVIEW OF PAVEMENT DESIGN

1.7.1 Manual of Specification and Standards

The Schedule-D states that "**Two/Four-laning of the Project Highway shall conform to the Manual for Specifications and Standards for Hybrid Annuity Projects & IRC SP:73-2015 manual for Two laning State Highways published by the authority/MOSRTH*.**

1.7.2 Review of CA stipulations for Pavement Design

- Annexure-I of Schedule-B Clause 4.9 states that "Pavement design shall be in accordance with section 5 sub para 5.2.3" - Package-1 to Package-9. However, there is no such Clause no 5.2.3 in the Manual.
- For Design Traffic, Clause 5.4.1 of IRC SP 73-2015 states "Flexible pavement shall be designed for a minimum design period of 15 years, subject to the condition that Design Traffic shall not be less than 20 MSA".

1.7.3 Concessionaire's Pavement Design

The Project involved construction of flexible & rigid pavements. Design of New construction was carried out in accordance with IRC 37. The pavement layer for new construction has been designed for 15-year design traffic both for the Bituminous layers and base and sub base layers.

The details such as applicable manual, minimum mSA as per manual, minimum crust for new carriageway & overlay on existing carriageway as per CA, Concessionaire's Design CBR, design loading in mSA and crust considered in the project – package wise are furnished in the Tables below.

❖ Package 1 to 4

Sl.No	Description	Package-1	Package-2	Package-3	Package-4
1	**As per CA**				
(a)	Applicable Manual	Manual - IRC SP 73-2015.			
	Applicable Clause	Annexure-I of Schedule-B Clause 4.9 states that pavement design shall be in accordance with section 5 sub para 5.2.3. **However, there is no clause as 5.2.3 in the Manual.**			
(b)	MSA as per Manual	MSA shall not be less than 20 MSA as per clause 5.4.1			
(c)	**Minimum Crust in Pavement Design clause in CA**				
(i)	Flexible Pavement	Not given	Not given	Not given	Not given
(ii)	Overlay thickness	Not given	Not given	Not given	Not given
(iii)	Rigid Pavement	Not given	Not given	Not given	Not given
(d)	**Crust shown in TCS drawings**				
(i)	Flexible Pavement	40+50+250+200	40+65+250+200	40+65+250+200	40+65+250+200
(ii)	Overlay thickness	NA	40+65	40+65	40+65
(iii)	Rigid Pavement	250+100+200	250+100+200	250+100+200	250+100+200
(iv)	CBR in %	10	10	10	10
2	**As per Pavement Design Report**				
(a)	Design Period	15	15	15	15
(b)	Actual MSA	**2.6**	**5.52**	**7.18**	**5.55**
	Design MSA considered	**10**	**10**	**10**	**10**
(c)	CBR in %	10	10	10	10
(d)	Flexible Pavement Design BC+DBM+WMM+GSB	40+50+250+200	40+50+250+200	40+50+250+200	40+50+250+200
(e)	Overlay Design	NA	Not Available	Not Available	Not Available
(f)	Rigid Pavement Design PQC+S Layer+DLC+GSB	250+125+100+200	250+125+100+200	250+125+100+200	250+125+100+200
(g)	Remarks	Pavement Design as per IRC 37-2012, for 20 MSA with 10% CBR is as **40+65+250+200.** ***Adopted crust 40+50+250+200 thickness will satisfy 15 MSA***			

❖ Package 5, 6 & 7

Sl.No	Description	Package-5	Package-6	Package-7
1	As per CA			
(a)	Applicable Manual	Manual - IRC SP 73-2015.		
	Applicable Clause	Annexure-I of Schedule-B Clause 4.9 states that pavement design shall be in accordance with section 5 sub para 5.2.3. However, there is no clause as 5.2.3 in the Manual.		
(b)	MSA as per Manual	MSA shall not be less than 20 MSA as per clause 5.4.1		
(c)	**Minimum Crust in Pavement Design clause in CA**			
(i)	Flexible Pavement	**40+80+250+260**	**40+65+250+260**	**40+80+250+260**
(ii)	Overlay thickness	40+80	-	40+80
(iii)	Rigid Pavement	280+100+200	280+100+200	280+100+200
(d)	**Crust shown in TCS drawings**			
(i)	Flexible Pavement	**40+80+250+260**	**40+65+250+260**	**40+80+250+260**
(ii)	Overlay thickness	40+80	40+65	40+80
(iii)	Rigid Pavement	280+100+200	280+100+200	280+100+200
(iv)	CBR in %	8	8	8
2	**As per Pavement Design Report**			
(a)	Design Period	15	15	15
(b)	Actual MSA	25.98/14.06	2.24	2.76
	Design MSA considered	**30/20**	20	20
(c)	CBR in %	9/8	**9**	8
(d)	Flexible Pavement Design BC+DBM+WMM+GSB	**40+80+250+260**	**40+65+250+260**	**40+80+250+260**
(e)	Overlay Design	40+80	40+65	40+80
(f)	Rigid Pavement Design PQC+S Layer+DLC+GSB	280+100+200	280+100+200	280+100+200 and 250+100+200
(g)	Remarks	Pavement Design as per IRC 37-2012, for 30mSA/20mSA with 9% & 8% CBR is 40+80+250+260 (mentioned as minimum thickness).	The adopted crust i.e., 40+65+250+260 satisfies 20 MSA with **9% CBR** as per IRC 37-2012.	

❖ Package 8 & 9

Sl.No	Description	Package-8	Package-9
1	As per CA		
(a)	Applicable Manual	Manual - IRC SP 73-2015.	
	Applicable Clause	Annexure-I of Schedule-B Clause 4.9 states that pavement design shall be in accordance with section 5 sub para 5.2.3. However, there is no clause as 5.2.3 in the Manual.	
(b)	MSA as per Manual	MSA shall not be less than 20 MSA as per clause 5.4.1	
(c)	**Minimum Crust in Pavement Design clause**		
(i)	Flexible Pavement	Not given	Not given
(ii)	Overlay thickness	Not given	Not given
(iii)	Rigid Pavement	Not given	Not given
(d)	**Crust shown in TCS drawings**		
(i)	Flexible Pavement	**25+50+250+150**	**25+50+250+150**
(ii)	Overlay thickness	25+50	25+50
(iii)	Rigid Pavement	300+100+200	300+100+200
(iv)	CBR in %	-	-
2	As per Pavement Design Report		
(a)	Design Period	15	Not Available
(b)	Actual MSA	8.13	Not Available
	Design MSA considered	10	Not Available
(c)	CBR in %	10	9
(d)	Flexible Pavement Design BC+DBM+WMM+GSB	**40+50+250+150**	**30+50+250+200**
(e)	Overlay Design	40+50	30+50
(f)	Rigid Pavement Design PQC+S Layer+DLC+GSB	250+100+200	270+100+200 (submitted but kept hold)
(g)	Remarks	Pavement Design as per IRC 37-2012, for 20 MSA with 10% CBR is as **40+70+250+150** However, 40+50+250+150 crust is adopted which satisfy 13 MSA with 10% CBR	Pavement Design as per IRC 37-2012, for 20 MSA with 9% CBR is as **30+80+250+200** However, 30+50+250+200 crust is adopted which satisfy 10 MSA

1.8 Review of COS works

Authority has instructed, the Concessionaire has to execute the additional works under the Change of Scope (COS). For the Package-5 & 7, the COS received from Authority on 15/07/2020, which amounts to 83.11 Cr are as mentioned below.

Sr No	Particulars	length as per DPR	Additional Length/Scope	Additional KM	Additional Grant (including GST &Royalty)Rs.Cr
1	Improvement of road connecting Amravati District (Amravati Chandur railway Dhamangaon road SH297 KM 0/00 to 30/00,SH-296 KM26/500 to 46/500 under HAM AM-2	49.70	1.60 km Road Connecting SH-296 & SH-297(Mini by Pass) Four lanning of existing road with Paved Shoulder including drain, CD works & bridges by rigid pavement	0/00 to 1/600 length under Nagar Parishad	22.75
2	Improvement of road from Amravati to Kaudanyapur (Amravati Mardi kurha Kaudanyapur to District Border) SH280 KM 94/00 to 123/600, SH-300 KM55/00 to 57/800 ,SH294 KM 41/400 to 52/00 under HAM AM-2 Package	40.52	9 km Reconstruction of road from kaudanyapur in Amravati District to Arvi (.Two lanning with paved shoulder of existing 5.50 meter width road)(.10 meter width flexible pavement with drain & Bridge	SH-294 52/00 to 61/00	60.36

1.9 HEAD OF TERMS

Key terms of Concession Agreement

Particulars	Description
Date of Agreement **Appointed Date**	10-Jan-2019 28-May-2019
Employer	Public Works Department, Government of Maharashtra
Concessionaire	WRIPL (Welspun Road Infra Private Limited)
Concession Period	12 Years (28-May-2019 to 27-May-2031)
Length of the Project, Total project Cost	352.15 Km Rs.1460 Cr
Achievement of Project Mile Stones	Mile Stone-I: Achieved on 04.11.2019 (As per CA Sch-G, Scheduled Completion Date is 24.11.2019 i.e., 180th day from Appointed Date) Mile Stone-II: Achieved on 30.01.2020 (As per CA Sch-G, Scheduled Completion Date is 01.07.2020 i.e., 400th day from Appointed Date) Mile Stone-III: Achieved on 30.11.2020 (As per CA Sch-G, Scheduled Completion

	Date is 17.01.2021 i.e., 600th day from Appointed Date)
Construction Period/ Scheduled completion date	730 days from the Appointed Date/ 27.05.2021
Annuity	First Year O&M Cost-RS 31.50 Crore, paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.
Extension of Time **COD** **PCOD** **FCOD**	Authority granted 1st interim EOT recommendations for 184 days on 10th June 2020 in view of COVID-19 pandemic. Accordingly, scheduled completion date 27th May 2021 has been revised to 27th Nov 2021. On 24th Nov 2021, Concessionaire further requested 2nd interim EOT for 153 days on account of COVID-19 second wave. There is no further correspondence available in the records. Final completion certificate is yet to be received.
Respective rights and obligations of the Parties	Article 4, 9, 10, 24, 34, 42
Change in Ownership	The Concessionaire shall take prior approval of the Authority for any change in ownership in accordance with the article 5.3 of CA
Dispute Resolution	1.At first instance by mediation by the Independent Engineer 2.Amicable settlement by conciliation by the Chairman of the Authority & Chairman of the board of directors of the Concessionaire 3. Finally by Arbitration in accordance with Arbitration and Conciliation Act 1996
Governing Law and Jurisdiction	Courts in Maharashtra shall have exclusive jurisdiction over matters arising out of or relating to this Agreement

Key terms of EPC Agreement

Particulars	Description
Date of Agreement **Appointed Date**	15-Jan-2019 28-May-2019
Concessionaire	WRIPL (Welspun Road Infra Private Limited)
Contractor	Welspun Enterprises Limited
Commencement Date **Construction Period**	28-May-2019 Beginning from the commencement Date and ending on the completion of EPC Works
Length of the Project, Contract Price	352.150 Km Base price Rs 1321 Cr + GST as per clause 5 of EPC agreement, + Price Index Multiple as per CA, Article 23
Achievement of Project Mile Stones	Milestone-I: Achieved on 04.11.2019 (As per EPC Agreement Scheduled Completion Date is 24.11.2019 i.e., 180th day from Commencement Date) Milestone-II: Achieved on 30.01.2020 (As per EPC Agreement, Scheduled Completion Date is 01.07.2020 i.e., 400th day from Commencement Date)

	Milestone-III: Achieved on 30.11.2020 (As per EPC Agreement, Scheduled Completion Date is 17.01.2021 i.e., 600th day from Commencement Date) Milestone-IV: Not Achieved (As per EPC Agreement, Scheduled Completion Date is 27.11.2021 i.e., 730th day from Appointment Date)
Extension of Time **COD** **PCOD** **FCOD** **DLP**	Authority granted 1st interim EOT recommendations for 184 days on 10th June 2020 in view of COVID-19 pandemic. Accordingly, scheduled completion date 27th May 2021 has been revised to 27th Nov 2021. On 24th Nov 2021, Concessionaire further requested 2nd interim EOT for 153 days on account of COVID-19 second wave. There is no further correspondence available in the records. Final completion certificate is yet to be received. The period commencing from the date of issue of Provisional Completion Certificate (if applicable) or Completion Certificate by the Concessionaire and ending on expiry of 24months from Completion Certificate
Liquidated Damages for Delay	If the Contractor fails to achieve any completions Project Milestones, the following delay damages, on demand, be paid to the Concessionaire not exceeding 10% of Contract Price 1) Milestone-I, II & III: 0.005% of the Contract Price per day until completion of such milestone 3) Milestone-IV: 0.011% of the Contract Price per day for each package until EPC works are completed
Monthly Progress Report	The Contractor shall prepare a monthly report on the progress of the works and submit to the Concessionaire
Retention Money	-
Dispute Resolution	1. Amicable Resolution, 2. Three Member Arbitration in accordance with Arbitration & Conciliation Act 1996

1.10 MAINTENANCE REQUIREMENTS:

As per Schedule-K

S. No	Description	Length (Km)	Lanes	Applicable Schedule for O&M	Maximum Roughness Allowed
1	AM-2	352.15	2L/ 2LPS	Schedule-K	2750 mm/Km

As per Manual, IRC SP:73-2015:

S. No	Description	Length (Km)	Lanes	New pavement roughness in each lane	Maximum allowable deflection	Frequency of Roughness Test	Frequency of FWD Test
1	AM-2	352.15	2L/ 2LPS	2000 mm/Km	1.2mm	Twice a Year	In every 5 Years

1.11 SITE OBSERVATIONS:

1. Project road is in compliance to CA provisions.
2. The overall pavement condition of Project Road is good, except, minor cracking and raveling observed at few locations

CHAPTER 2.SURVEY AND INVESTIGATION

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 in the month of November/December 2021 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

2.1 PACKAGE 1: SH-312, DARYAPUR-MHAISANG AND SH-280, AKOLA-MHAISANG

2.1.1 ROAD INVENTORY

Package-1, comprises two state highways SH-312(Daryapur-Mhaisang, km0 to km16.49) and SH-280 (Akola-Mhaisang, km0- km25.1) of length 16.49 km and 25.1km respectively, with the total length of 41.59km. The PCOD obtained on 11 Nov 2021 for a length of 41.012km.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 10m Rigid pavement.

Table 2-1: Package-1, Project Road configuration

Pavement Configuration	Carriageway width, m	Flexible/Rigid	SH-280, Length (km)	SH-312 Length (km)
2-Lane	7	Flexible	22.200	15.69
2-Lane with PS	10	Rigid	2.900	0.800
			25.1	**16.49**
Total			**41.59**	

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like Akola, Ghusar, Aapatapa, Ambikapur, Ramthirth etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations

Typical view of project road is shown below:

A view of Project Road with 7.0m wide at Km: 1.000_SH-312	**A view of Project Road with 7.0m wide at Km: 4.000_SH-312**
A view of the Project Road with 7.0m wide With at Km: 17.000_SH-280	**A view of the Project Road with 7.0m wide With at Km: 13.000_SH-280**

The Project Road has 2 Major junctions and 25 minor junctions in SH-280 and 1 Major junction and 11 minor junctions in SH-312 along the project road.

Photographs showing Junctions are presented below:

Minor Junction at km 15.750 RHS_Sh-312	Minor Junction at km 49.400 LHS_SH-312
Minor Junction at km 6.550 LHS_Sh-312	Minor Junction at km 24.640 LHS_Sh-280
Minor Junction at km 20.640 LHS_SH-280	Minor Junction at km 14.840 RHS_SH-280

Minor Junction at km 1.200 RHS_SH-280

Major Junction at km 0.000 LHS_SH-280

All together the Project Road has about 15 no's Bus bays with shelters in SH-280 and 09 no's Bus bays with shelters in SH-312 along the project corridor. Few photos taken at the bus shelters and bus bays are presented below:

Bus shelter @ Km 9.600 -LHS_SH-312

Bus shelter @ Km 6.200-LHS_SH-312

Bus Bay with Bus shelter @ Km 20.700-RHS_SH-280

Bus Bay with Bus shelter @ Km 19.000-RHS_SH-280

The collected Road Inventory Data is presented in **Appendix 1** of this Report.

2.1.2 PAVEMENT CONDITION SURVEY

The visual Pavement condition data has been collected in the month of November/December 2021 for each km length has been presented in **Appendix 2** of this Report. The pavement condition appears to be fair and the riding quality is satisfactory.

Few photos taken during visual pavement condition Surveys are presented below:

Fair Condition at Km 0.000 @ SH-312

Fair Condition at Km 12.500 @ SH-312

Fair Condition at Km 16.500 @ SH-312

Fair Condition at Km 10.000 @ SH-312

Fair Condition at Km 9.600 @ SH-312

Fair Condition at Km 21.000 @ SH-280

Fair Condition at Km 18.150 @ SH-280

Fair Condition at Km 14.500 @ SH-280

Fair Condition at Km 12.000 @ SH-280

Fair Condition at Km 2.000 @ SH-280

2.1.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road. 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

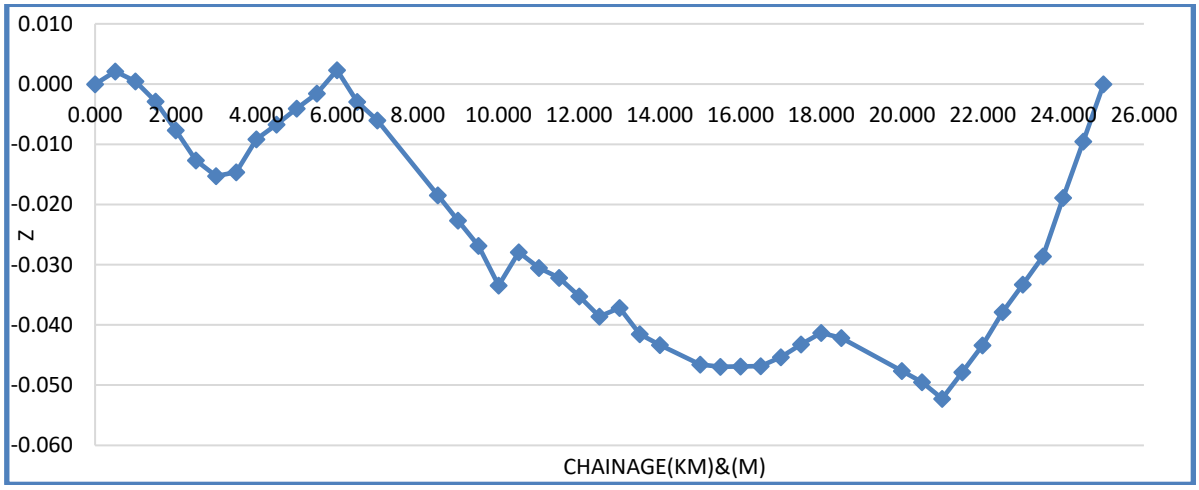
The homogenous sections in each direction of traffic (i.e., BHS) for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

Table 2-2: Package-1, Summary of Homogenous Section - BHS

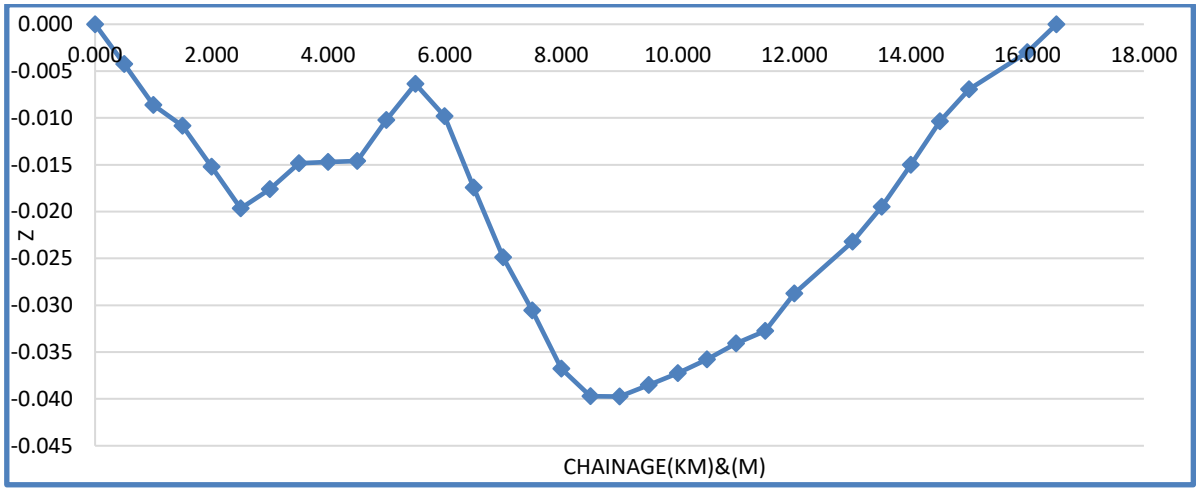
S. No	From	To	SH.No	Length (m)
1	0.00	6.00	SH-280	6.0
2	6.00	13.00	SH-280	7.0
3	13.00	25.00	SH-280	12.0
Total Length				**25.0**

S.No	From	To	SH.No	Length (m)
1	0.00	8.50	SH-312	8.5
2	8.50	16.50	SH-312	8.0
Total Length				**16.5**

Package-1, Delineation of Homogeneous Section – BHS @ SH-280



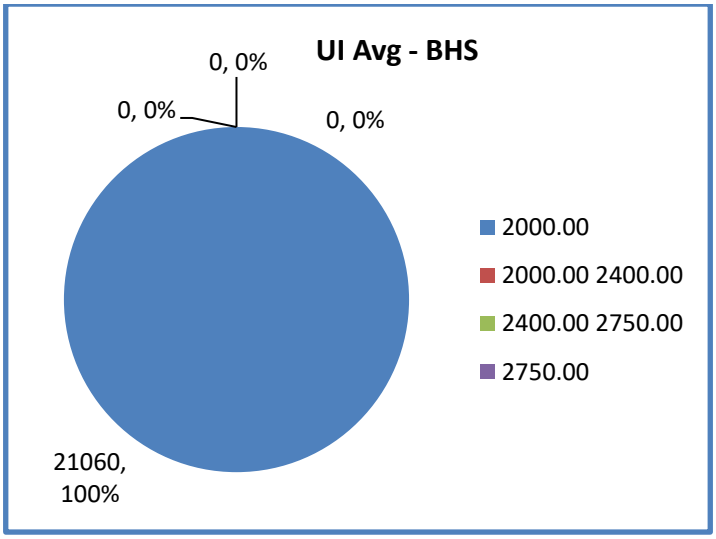
Package-1, Delineation of Homogeneous Section – BHS @ SH-312



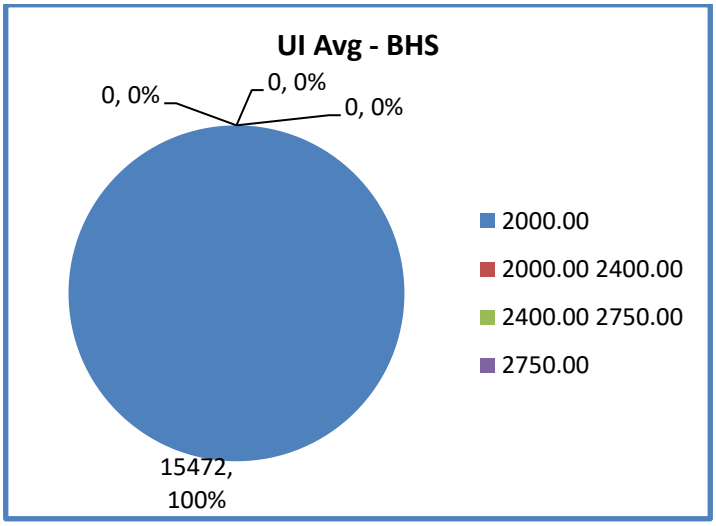
2.1.4 ROUGNESS SURVEYS

The Roughness data has been collected in the month of November/December 2021 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 CA, Schedule-K, roughness value should not exceed 2750mm/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:



SH-280



SH-312

It can be seen from the above pie charts, that about 100% of the length of the Project Road has good riding quality (UI<2000 mm/km).

2.1.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys in the month of November/December 2021. Test pits have been undertaken at an interval of 10.0 km in carriageway along the project road. Thus, a total of 3 pits have been dug along the corridor and the data on composition of pavement has been noted. All 3 Pits done on Main Carriageway edge. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few sample photos taken are presented below:

AM-TP-24	AM-TP-25

AM-TP-26

Results of the test pit survey showing thickness of various pavement layers are presented in the Table below.

Table 2-3: Package-1, Details of Pavement Composition along the Project Road

S. No	Test Pit Number	Existing Chainage	Direction	BT	WMM	GSB	Total
1	AM-TP-24	0+150	LHS	100	200	120	420
2	AM-TP-25	10+000	RHS	100	200	160	460
3	AM-TP-26	20+450	LHS	100	200	250	450

Total average crust thickness of the MCW pavement is 440mm. The average thickness of bituminous layer is 100mm. Pavement composition is mainly with the BT layer, WMM & GSB base over subgrade.

2.1.6 SUBGRADE INVESTIGATION & LABORATORY TESTING

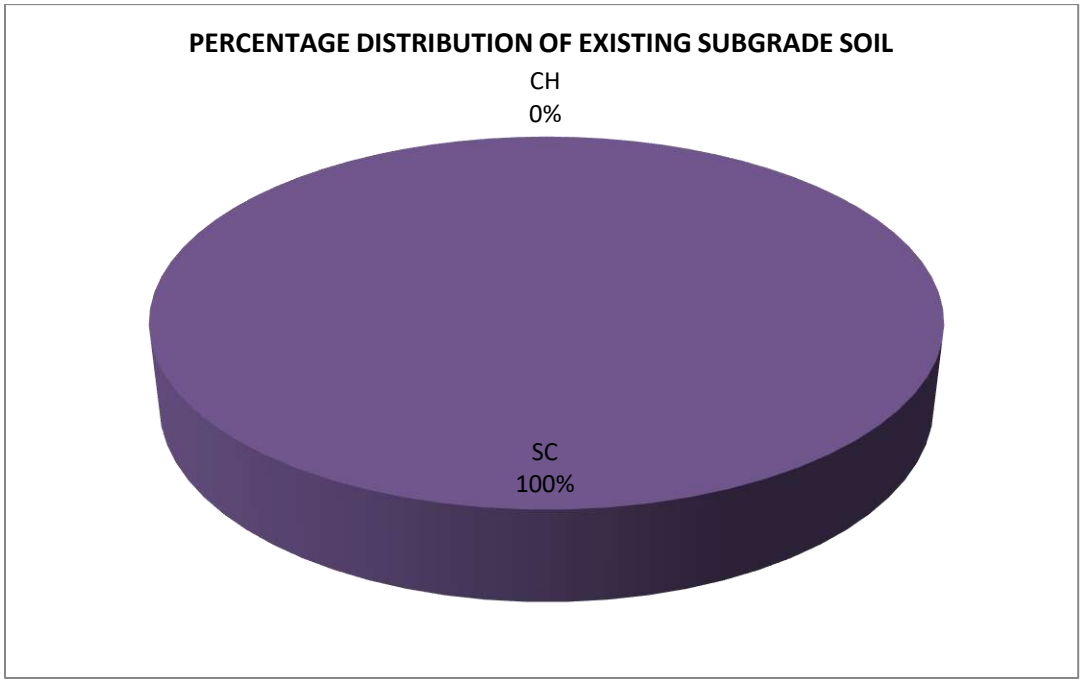
Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. 3 number of Test pits have been carefully dug from the pavement surface up to sub-grade level. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. All the 3 soil samples belong to SC type. The details of the analysis were presented in the Chapter 4, Quality Audit report.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.1.7 AXLE LOAD SURVEYS

Traffic loading has a significant impact on pavement performance and design. The damage that vehicles create to a road depends on the axle loads of the vehicles..

Axle load study has been conducted using portable axle load pads. Surveys have been conducted on the Project Road at km 5+000 (SH-280) on 4th December 2021 on either direction. 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 2-4: Details of Standard Axels Used

Axle Configuration	Standard Axle load (Tonnes)*	Remarks
Single Wheel, Single Axle	6.60	As per IRC 37-2018
Dual Wheel, Single Axle	8.16	As per IRC 37-2018

Dual Wheel, Tandem Axle group	15.10	As per IRC 37-2018
Dual Wheel, Tridem Axle group	22.90	As per IRC 37-2018

Few photographs illustrating the survey locations and axle load measurements are presented below.

As the pavement crust proposed for Package-1 to Package-4 remains the same and few Commercial vehicles are plying on these packages, therefore Package-1 to 4, considered as ONE-SET. In the month, Dec21, DD-Consultants have conducted axle load tests in Package-1,3 & 4 and verified VDFs with pavement design reports (Package 1 to 4). Finally, adopted the maximum values out of these 7 VDFs, for each mode-wise data as presented below.

Table 2-5: VDF Values Estimated at the Package1 to 4

Sl.No	Description	Package-1		Package-2		Package-3		Package-4		Max. VDF Considered For Pkg-1 to Pkg-4
		Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	
1	**Vehicle Damage Factor (VDF)**									
(a)	Bus	0.44	0.93	1.06	-	0.38	0.00	0.65	2.21	2.21
(b)	LCV	0.01	0.10	0.36	-	0.55	0.47	0.26	0.11	0.55
(c)	2-Axle	1.28	2.40	7.66	-	3.26	3.64	6.50	2.96	7.66
(d)	3-Axle	0.65	4.20	2.54	-	5.14	5.01	2.86	3.35	5.14
(e)	MAV	22.27	16.30	8.08	-	5.91	6.09	10.94	9.18	22.27

2.2 PACKAGE 2: SH-282, ANJANGAON TO DARYAPUR SECTION

2.2.1 ROAD INVENTORY

Package-2, is a part of state highway SH-282(Anjangaon to Daryapur section, km1 to km27.89) with the total length of 26.89km. The PCOD obtained on 11 Nov 2021 for a length of 26.65km.

The most length of project corridor has flexible pavement with 7.0m wide plus 1.5m-2.5m earthen shoulder on each side, whereas, in Built-up sections, it has 15m Rigid/Flexible pavement.

Table 2-6: Package-2, Project Road configuration

Pavement Configuration	Carriageway width, m	Flexible/Rigid	Length (km)
2-Lane	7	Flexible	25.000
4-lane (Rigid)	15	Rigid	1
4-lane (Flexi)	15	Flexible	0.885
Total			**26.885**

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like hantoda, Vihigaon, Parlhadpur, Saidapur, Wadal, Antargaon and Babhali etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations.

Typical view of project road is shown below:

A view of Project Road Km: 1.000

A view of Project Road Km: 6.000

A view of Project Road Km: 12.000

A view of Project Road Km: 18.000

The Project Road has 2 major junctions and 20 minor junctions along the project road.

Photographs showing Junctions are presented below:

Minor Junction at km 1+800 - LHS	Minor Junction at km km 4+000 - RHS
Minor Junction at km 5+920 - RHS	Minor Junction at km 6+040 - LHS
Minor Junction at km 8+680 - LHS	Minor Junction at km 10+460 - RHS

Minor Junction at km 11+820 - LHS

Minor Junction at km 14+060 - LHS

All together the Project Road has about 16 nos Bus bays, 3 nos with only Bus shelters along the project corridor.

Few photos taken at the bus shelters and bus bays are presented below:

Bus bay @ Km 14.000

Bus bay @ Km 17.500

Bus Bay with Bus Shelter @ Km 19.350 (Bus Shulter Under Construction)

Bus Bay with Bus shelter @ Km 23.200

The collected Road Inventory Data is presented in **Appendix 1** of this Report.

2.2.2 PAVEMENT CONDITION SURVEY

The visual Pavement condition data has been collected for each km length has been presented in **Appendix 2** of this Report. The pavement condition appears to be fair and the riding quality is satisfactory.

Few photos taken during visual pavement condition Surveys are presented below:

Fair Condition @ 3.000

Fair Condition @ 4.000

Fair Condition at Km 6.000

Fair Condition at Km 8.000

Fair Condition at Km 10.000

Fair Condition @ km 12.000

Fair condition @ km 15.000

Fair Condition @KM 17.000

Fair Condition @KM 19.000

Fair Condition @KM 24.000

2.2.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

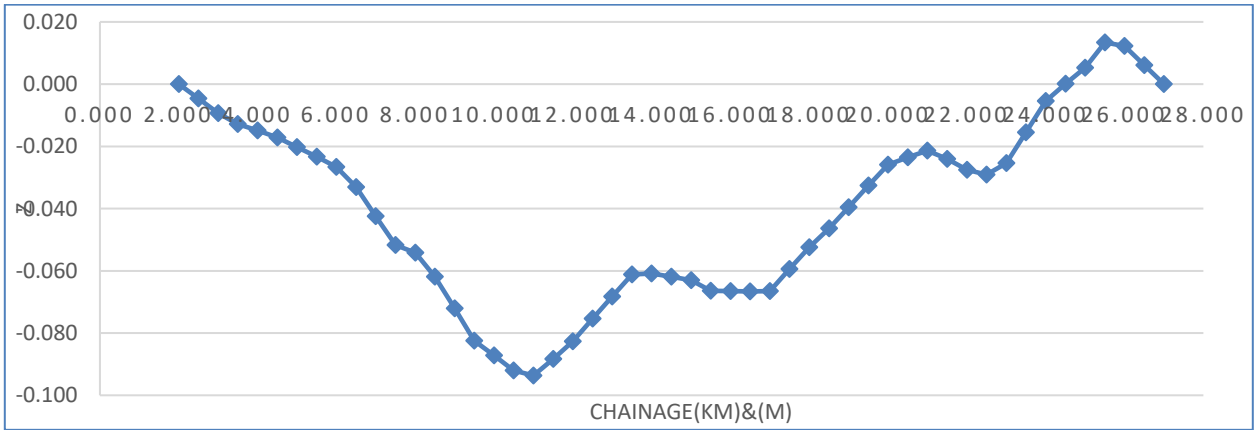
In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

The homogenous sections for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

Table 2-7: Package-2, Summary of Homogenous Section - BHS

S. No	Side	Chainage(km)		Length (Km)	Remarks
		From	To		
1	BHS	1.00	2.00	1.0	Rigid Pavement
2	BHS	2.00	11.00	9.0	
3	BHS	11.00	17.00	6.0	
4	BHS	17.00	23.00	6.0	
5	BHS	23.00	27.89	4.9	

Delineation of Homogeneous Section – BHS

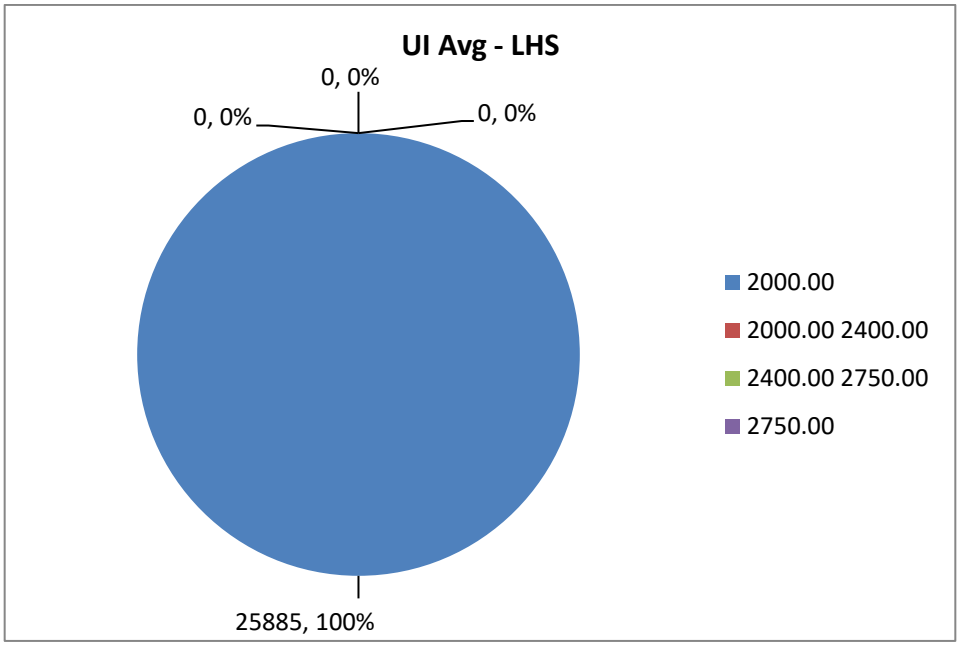


2.2.4 ROUGNESS SURVEYS

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 IRC-SP:16-2004, Bituminous Concrete pavement surface is considered to be good when its UI value is less than 2000 mm/km and the same is considered to be average for UI values between 2000 and 3000 mm/km whilst the surface is treated as Poor for UI values greater than 3000 mm/km.

As per CA, Schedule-K, roughness value should not exceed 2750mm/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 100% of the length of the Project Road has good riding quality (UI<2000 mm/km) in BHS carriageway respectively.

2.2.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys. Test pits have been undertaken at an interval of 10.0 km in each carriageway along the project road. Thus, a total of 3 pits have been dug along the corridor and the data on composition of pavement has been noted. All 3 pits done on Main Carriageway edge. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few sample photos taken are presented below:

AM-TP-21

Am-TP-22

AM-TP-23

Results of the test pit survey showing thickness of various pavement layers are presented in the Table below.

Table 2-8: Package-2, **Details of Pavement Composition along the Project Road**

S. No	Test Pit Number	Existing Chainage	Direction	BT (mm)	WMM (mm)	GSB (mm)	Total (mm)
1	AM-TP-21	24+000	LHS	100	190	170	460
2	AM-TP-22	14+900	RHS	100	210	200	510
3	AM-TP-23	1+200	LHS	120	200	150	450

Total average crust thickness of the MCW pavement is 470mm. The average thickness of bituminous layer is 100mm. Pavement composition is mainly with the BT layer, WMM & GSB base over subgrade.

2.2.6 SUBGRADE INVESTIGATION & LABORATORY TESTING

Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 3 Test pits have been carefully dug from the pavement surface up to sub-grade level. Field density tests have been conducted for subgrade samples and a

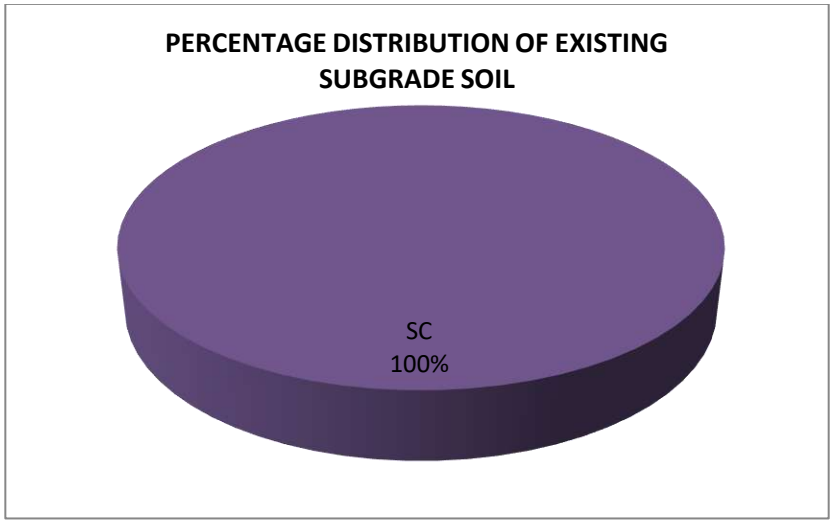
small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. About 3 Numbers belongs to SC type. The details of the analysis were presented in the Chapter 4, Quality Audit report.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.2.7 AXLE LOAD SURVEYS

As the pavement crust proposed for Package-1 to Package-4 remains same, as few Commercial vehicles are plying on the project corridor, it has been considered Package-1 to 4, as ONE-SET. There is no axle load survey conducted in the package-2.

In Dec21, DD-Consultants have conducted axle load tests in Package-1,3 & 4 and verified VDFs with pavement design reports (Package 1 to 4). Finally, adopted the maximum values out of these 7 VDFs, for each mode-wise data as presented below.

Table 2-9: VDF Values Estimated at the Package1 to 4

Sl.No	Description	Package-1		Package-2		Package-3		Package-4		Max. VDF Considered For Pkg-1 to Pkg-4
		Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	
1	Vehicle Damage Factor (VDF)									
(a)	Bus	0.44	0.93	1.06	-	0.38	0.00	0.65	2.21	2.21
(b)	LCV	0.01	0.10	0.36	-	0.55	0.47	0.26	0.11	0.55
(c)	2-Axle	1.28	2.40	7.66	-	3.26	3.64	6.50	2.96	7.66
(d)	3-Axle	0.65	4.20	2.54	-	5.14	5.01	2.86	3.35	5.14
(e)	MAV	22.27	16.30	8.08	-	5.91	6.09	10.94	9.18	22.27

2.3 PACKAGE 3: SH-282, DARYAPUR-MURTIZAPUR

2.3.1 ROAD INVENTORY

Package-3, is a part of state highway SH-282 (Daryapur-Murtizapur, km27.885 to km50.22) with the total length of 22.34km. The PCOD obtained for this full length on 11 Nov 2021. The following represent the project location on the map.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Daryapur village Built-up section, it has 15m Rigid pavement.

Table 2-10: Package-3,Project Road configuration

Pavement Configuration	Carriageway width, m	Flexible/Rigid	Length (km)
2-Lane	7	Flexible	21.22
2-lane with PS (Rigid)	10	Rigid	0.40
4-lane (Rigid)	15	Flexible	0.715
Total			**22.335**

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like Panora Fata,Takli, Durgwada,Rasulpur Fata etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations. Maximum embankment height is observed near ROB locations.

Typical view of project road is shown below:

A view of Project Road Km: 27.885

A view of Project Road Km: 28.000

A view of Project Road Km: 34.000

A view of Project Road Km: 42.000

The Project Road has 3 major junctions and 15 minor junctions along the project road.

Photographs showing Junctions are presented below:

Major Junction at km 27+885 -BHS

Major Junction at km 49+400 -LHS

Minor Junction at km 29.860

Minor Junction at km 34.220-RHS

Minor Junction at km km 38.040 -LHS

Minor Junction at km km 41.400-RHS

Minor Junction at km 45.740-RHS

Minor Junction at km 50.220-RHS

All together the Project Road has about 7 no's Bus bays with shelters, 04 no's only Bus Shelters.

Few photos taken at the bus shelters and bus bays are presented below:

Bus bay with Bus shelter @ Km 30.000-LHS	Bus bay @ Km 36.100-RHS
Bus bay with Bus shelter @ Km 41.350-LHS	Bus Bay with Bus shelter @ Km 38.800-LHS

The collected Road Inventory Data is presented in **Appendix 1** of this Report.

2.3.2 PAVEMENT CONDITION SURVEY

The visual Pavement condition data has been collected for each km length has been presented in **Appendix 2** of this Report. The pavement condition appears to be fair and the riding quality is satisfactory.

Few photos taken during visual pavement condition Surveys are presented below:

Fair Condition Rigid Pavement at Km 27.885

Fair Condition @ 30.000

Fair Condition @ km 35.000

Fair condition Rigid Pavement @ km 36.000

Fair Condition @ 38.000

Fair Condition at Km 42.000

Fair Condition at Km 44.000

Fair Condition at Km 46.000

Fair Condition at Km 49.400

Fair Condition at Km 49.700

2.3.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

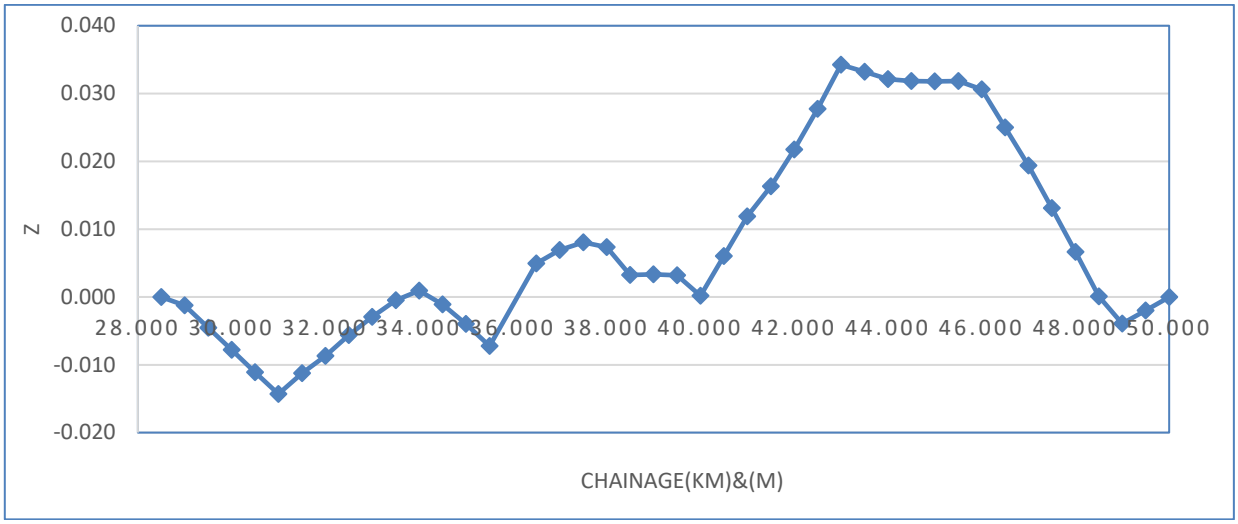
In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

The homogenous sections in each direction of traffic (i.e. LHS & RHS) for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

Table 2-11: Package-3, Summary of Homogenous Section – BHS

S. No	Side	Chainage(km)		Length (Km)	Remarks
		From	To		
1	BHS	27.885	28.500	0.615	Rigid Pavement
2	BHS	28.500	34.000	5.500	
3	BHS	34.000	40.500	6.500	
4	BHS	40.500	50.220	9.720	

Delineation of Homogeneous Section – BHS

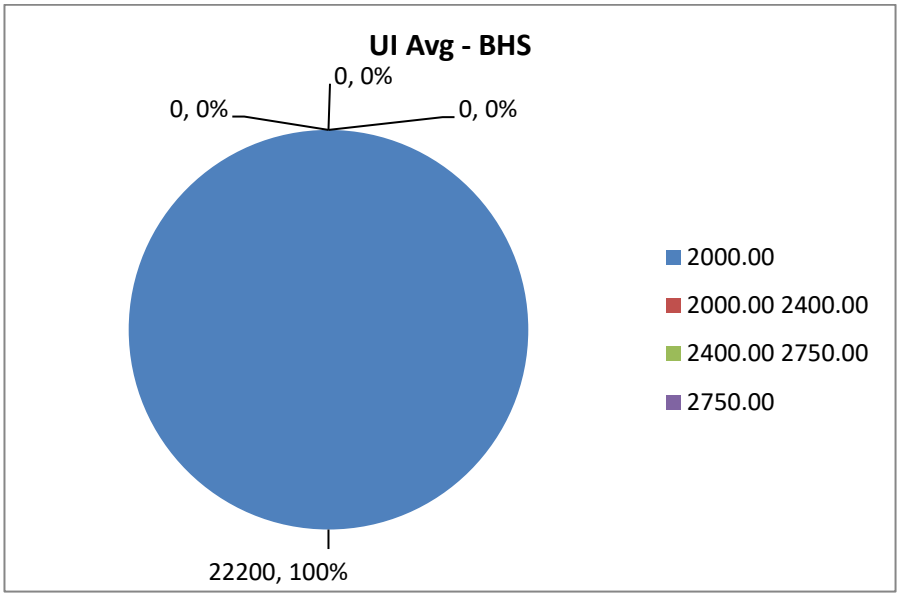


2.3.4 ROUGNESS SURVEYS

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 IRC-SP:16-2004, Bituminous Concrete pavement surface is considered to be good when its UI value is less than 2000 mm/km and the same is considered to be average for UI values between 2000 and 3000 mm/km whilst the surface is treated as Poor for UI values greater than 3000 mm/km.

As per CA, Schedule-K, roughness value should not exceed 2750mm/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 100% of the length of the Project Road has good riding quality (UI<2000 mm/km) in BHS carriageway respectively.

2.3.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys. Test pits have been undertaken at an interval of 10.0 km in each carriageway along the project road. Thus, a total of 2 pits have been dug along the corridor on the carriageway edges and recorded the pavement composition. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few sample photos taken are presented below:

AM-TP-19	AM-TP-20

Results of the test pit survey showing thickness of various pavement layers are presented in the Table below.

Table 2-12: Details of Pavement Composition along the Project Road

S. No	Test Pit Number	Existing Chainage	Direction	BT	WMM	GSB	Total
1	AM-TP-19	28+900	LHS	100	280	300	680
2	AM-TP-20	45+000	RHS	90	210	220	520

Total average crust thickness of the MCW pavement is 600mm. The average thickness of bituminous layer is 95mm. Pavement composition is mainly with the BT layer, WMM & GSB base over subgrade.

2.3.6 SUBGRADE INVESTIGATION & LABORATORY TESTING

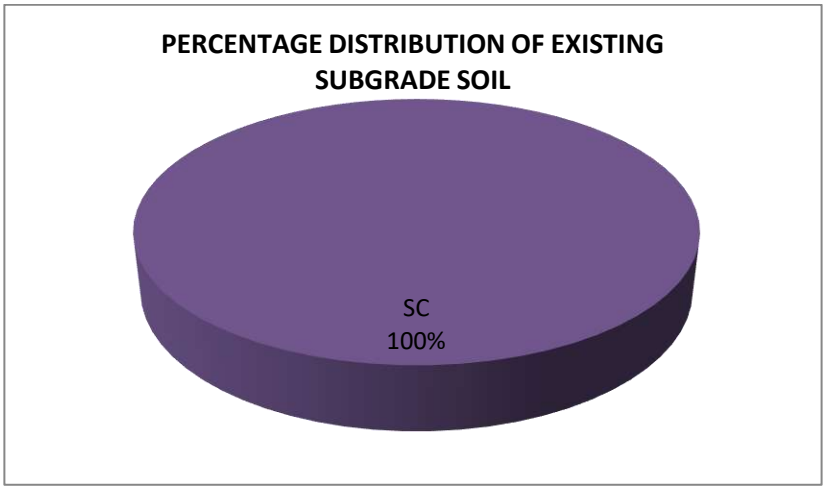
Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 2 Test pits have been carefully dug from the pavement surface up to sub-grade level. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil and these belongs to SC type. The details of the analysis were presented in the Chapter 4, Quality Audit report.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.3.7 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. 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. The sources identified as potential borrow sources and certain useful information such as distance from the project road, location, village name, are presented in the table below.

Table 2-13: Details of Borrow Area Sources along the Project Road

Sl.No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Area	Rate	Co-ordinate
1	AM-BP-4	50+000 (Pkg-3)	LHS	7.0 KM	Village: Anbhora Name; Gajanan Thokal Contact;9423466418	Plenty	RS- 1200/- 100 CFT With Royalty	20.694401 77.319481

AM-BP-4, Borrow Area

2.3.8 AGGREGATE AND SAND SAMPLES

The materials such as aggregates and sand to be used for sub-base, base, surface courses and concrete works have been collected from the crushers/quarry 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 presented in following table.

Table 2-14: Aggregate Sources along the Project Road

sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM-AQ-7	50+000 (Pkg-3)	LHS	Anbhora	Yogi Raja stone crusher Owner-Gajanan Thkal Contract no-9423466418	7.0 km	Plenty	40mm-Rs 1800/- 100 Cft 20mm-Rs 1900/-100 Cft 10mm-Rs 2300/-100 Cft 6mm-Rs 3000/-100 Cft Dust -RS 3000/-100 Cft Crush Sand-RS 3500/-100 Cft Murrum-RS 1200/-100 Cft	With Royality &with of GST 5% Extra	20.694401 77.319481
AM-AQ-8	55+900 (Pkg-3)	RHS	Anbhora	Yogi Raja stone crusher Owner-Gajanan Thkal Contract no-9423466418	113.0 km	Plenty	40mm-Rs 1800/- 100 Cft 20mm-Rs 1900/-100 Cft 10mm-Rs 2300/-100 Cft 6mm-Rs 3000/-100 Cft Dust -RS 3000/-100 Cft Crush Sand-RS 3500/-100 Cft Murrum-RS 1200/-100 Cft	With Royality &with of GST 5% Extra	20.694401 77.319481

AM-AQ-7	AM-AQ-8

2.3.9 AXLE LOAD SURVEYS

Traffic loading has a significant impact on pavement performance and design. This is because the damage that vehicles create to a road depends very strongly on the axle loads of the vehicles. The exact relationship is influenced by the type of road structure and the way the road deteriorates but a "fourth power" damage law gives a good approximation.

Axle load study has been conducted using portable axle load pads. Surveys have been conducted on the Project Road near km 35+900 on 03th of Decmber'2021. 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

Table2-15:: Details of Standard Axels Used

Axle Configuration	Standard Axle load (Tonnes)*	Remarks
Single Wheel, Single Axle	6.60	As per IRC 37-2018
Dual Wheel, Single Axle	8.16	As per IRC 37-2018
Dual Wheel, Tandem Axle group	15.10	As per IRC 37-2018
Dual Wheel, Tridem Axle group	22.90	As per IRC 37-2018

Few photographs illustrating the survey locations and axle load measurements are presented below.

As the pavement crust proposed for Package-1 to Package-4 remains the same, as few Commercial vehicles are plying on the project corridor, it has been considered Package-1 to 4, as ONE-SET. In the month, Dec21, DD-Consultants have conducted axle load tests in Package-1,3 & 4 and verified VDFs with pavement design reports (Package 1 to 4). Finally, adopted the maximum values out of these 7 VDFs, for each mode-wise data as presented below.

Table 2-16:: VDF Values Estimated at the Package1 to 4

Sl.No	Description	Package-1		Package-2		Package-3		Package-4		Max. VDF Considered For Pkg-1 to Pkg-4
		Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	
1	Vehicle Damage Factor (VDF)									
(a)	Bus	0.44	0.93	1.06	-	0.38	0.00	0.65	2.21	2.21
(b)	LCV	0.01	0.10	0.36	-	0.55	0.47	0.26	0.11	0.55
(c)	2-Axle	1.28	2.40	7.66	-	3.26	3.64	6.50	2.96	7.66
(d)	3-Axle	0.65	4.20	2.54	-	5.14	5.01	2.86	3.35	5.14
(e)	MAV	22.27	16.30	8.08	-	5.91	6.09	10.94	9.18	22.27

2.4 PACKAGE 4: SH-47, DARYAPUR-WAIGAON

2.4.1 Road Inventory

Package-4, comprises state highway SH-47 (Daryapur-Waigaon, km180 to km224.15) with the total length of 44.15km. The PCOD obtained for full length on 11 Nov 2021. The following represent the locations on the map.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 4lane m Rigid pavement.

Table 2-17:: Package-4, Project Road configuration

Pavement Configuration	Carriageway width, m	Flexible/Rigid	Length (km)
2-Lane	7	Flexible	40.850
4-lane (Rigid)	14	Rigid	2.00
4-lane (Flexi)	14	Flexible	1.300
Total			**44.150**

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like Daryapur, kapshi, Shahpur, Ahmadpur, Arala, Zanji and Wandi etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations.

Typical view of project road is shown below:

A view of Project Road Km: 224.000

A view of Project Road Km: 218.000

A view of Project Road Km: 181.100

A view of Project Road Km: 182.800

The Project Road has 3 major junctions and 33 minor junctions along the project road.

Photographs showing Junctions are presented below:

Major Junction at km 182+400 -BHS

Major Junction at km 224+150 -BHS

Minor Junction at km 223.630

Minor Junction at km 217.00 -RHS

Minor Junction at km km 213.180 -LHS

Minor Junction at km km 203.300-LHS

Minor Junction at km 196.00-LHS	**Minor Junction at km 188.640-RHS**

All together the Project Road has about 16 no's Bus bays with shelters and 02 no's Bus Shelters.

Few photos taken at the bus shelters and bus bays are presented below:

Bus bay with Bus shelter @ Km 193.720-LHS	**Bus bay @ Km 195.200-LHS**
Bus bay with Bus shelter @ Km 201.050-RHS	**Bus Bay with Bus shelter @ Km 217.250-RHS**

The collected Road Inventory Data is presented in **Appendix 1** of this Report.

2.4.2 PAVEMENT CONDITION SURVEY

The visual Pavement condition data has been collected for each km length has been presented in **Appendix 2** of this Report. The pavement condition appears to be fair and the riding quality is satisfactory.

Few photos taken during visual pavement condition Surveys are presented below:

Fair Condition Rigid Pavement @ 182.700

Fair Condition at Km 193.000

Fair Ccondition at Km 200.000

Fair Condition at Km 205.000

Fair Condition at Km 222.000

Fair condition @ km 223.000

Fair Condition at Km 223.630

Fair Condition @ km 224.000

2.4.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

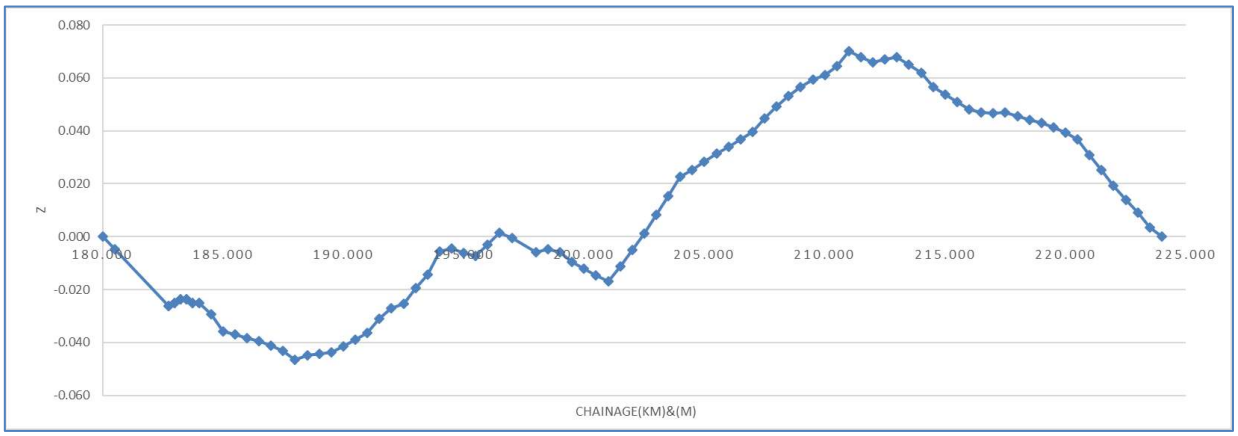
The homogenous sections considering either direction traffic (i.e.BHS) for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

Table2-18:: Package-4, Summary of Homogenous Section – BHS

S. No	Side	Chainage(km)		Length (Km)
		From	To	
1	BHS	180.00	180.50	0.5
2	BHS	180.50	182.75	2.3
3	BHS	182.75	184.00	1.3
4	BHS	184.00	190.00	6.0
5	BHS	190.00	196.50	6.5

S. No	Side	Chainage(km)		Length (Km)
		From	To	
6	BHS	196.50	204.00	7.5
7	BHS	204.00	211.00	7.0
8	BHS	211.00	218.00	7.0
9	BHS	218.00	224.15	6.15

Delineation of Homogeneous Section – BHS

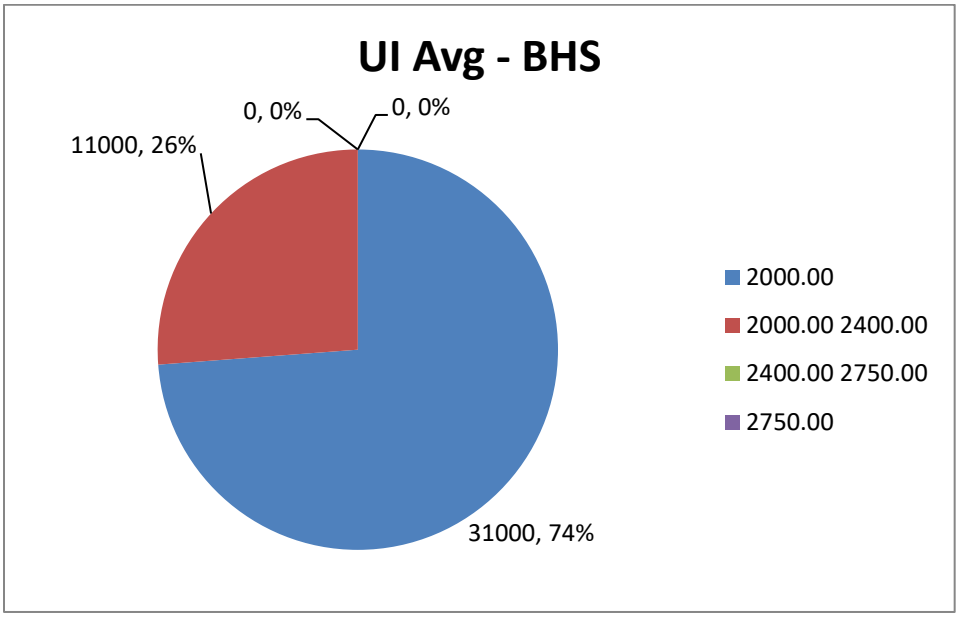


2.4.4 ROUGNESS SURVEYS

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 IRC-SP:16-2004, Bituminous Concrete pavement surface is considered to be good when its UI value is less than 2000 mm/km and the same is considered to be average for UI values between 2000 and 3000 mm/km whilst the surface is treated as Poor for UI values greater than 3000 mm/km.

As per CA, Schedule-K, roughness value should not exceed 2750mm/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 74% of the length of the Project Road has good riding quality (UI<2000 mm/km) and 26% of the length of the Project Road has Fair riding quality (UI>2000 <2400mm/km) in BHS carriageway respectively.

2.4.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys. Test pits have been undertaken at an interval of 10.0 km in each carriageway along the project road. Thus, a total of 5 pits have been dug along the corridor and the data on composition of pavement has been noted. All 5 pits done on Main Carriageway edge. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few sample photos taken are presented below:

AM-TP-14	AM-TP-15

AM-TP-16

AM-TP-17

AM-TP-18

Results of the test pit survey showing thickness of various pavement layers are presented in the Table below.

Table 2-19:: Package-4, **Details of Pavement Composition along the Project Road**

S. No	Test Pit Number	Existing Chainage	Direction	BT	WMM	GSB	Total
1	AM-TP-14	184+000	LHS	80	260	280	620
2	AM-TP-15	204+100	RHS	100	200	230	530
3	AM-TP-16	214+000	LHS	90	250	180	520
4	AM-TP-17	224+050	RHS	100	200	110	410
5	AM-TP-18	194+000	LHS	120	200	210	530

Total average crust thickness of the MCW pavement is 520mm. The average thickness of bituminous layer is 100mm. Pavement composition is mainly with the BT layer, WMM & GSB base over subgrade.

2.4.6 SUBGRADE INVESTIGATION & LABORATORY TESTING

Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 5 Test pits have been carefully dug from the pavement

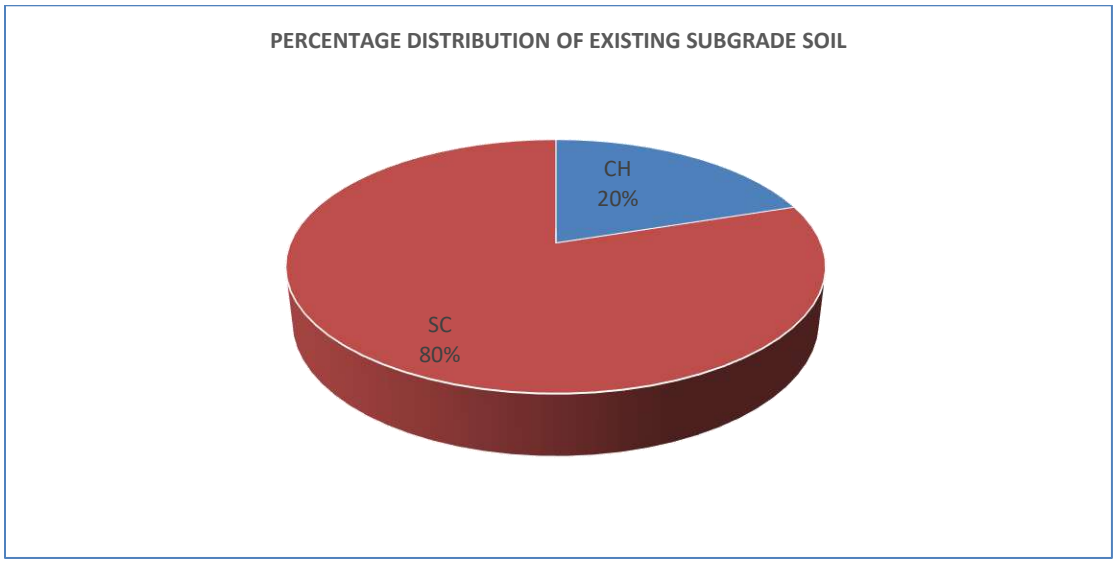
surface up to sub-grade level. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. About 4 Numbers belongs to SC type, 1 sample belong to CH. The details of the analysis were presented in the Chapter 4, Quality Audit report.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.4.7 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. 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. The sources identified as potential borrow sources and certain useful information such as distance from the project road, location, village name, are presented in the table below.

Table2-20:: Package-4, **Details of Borrow Area Sources along the Project Road**

Sl.No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Area	Rate	Remarks	Co-ordinate
5	AM-BP-5	224+050 (Pkg-4)	LHS	28 KM	Village: Prasoda Name;Baijavesh Contact;8830444819		RS-2500/-100 CFT		20.957835 77.853139

2.4.8 AGGREGATE AND SAND SAMPLES

The materials such as aggregates and sand to be used for sub-base, base, surface courses and concrete works have been collected from the crushers/quarry 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 presented in following table.

Table 2-21: Package-4, Aggregate Sources along the Project Road

sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM-AQ-10	224+050 (Pkg-4)	LHS	Parsoda	Shiva Ganesh stone crusherOwner-BaijaveshContract no-8830444819 Identify	28.0 km	Plenty	40mm-Rs 2000/- 100 Cft 20mm-Rs1800/-100 Cft10mm-Rs 1800/-100 Cft80mm-Rs 2000/-100 Cft Murrum -RS 2500/-100 Cft GSB-RS 1700/-100 Cft	With Royality &with of GST 5% Extra	20.957835 77.853139

2.4.9 AXLE LOAD SURVEYS

Traffic loading has a significant impact on pavement performance and design. This is because the damage that vehicles create to a road depends very strongly on the axle loads of the vehicles. The exact relationship is influenced by the type of road structure and the way the road deteriorates but a “fourth power” damage law gives a good approximation.

Axle load study has been conducted using portable axle load pads. Surveys have been conducted on the Project Road at two locations first near km 210+000 on 30th of November’2021. 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 2-22: Details of Standard Axels Used

Axle Configuration	Standard Axle load (Tonnes)*	Remarks
Single Wheel, Single Axle	6.60	As per IRC 37-2018
Dual Wheel, Single Axle	8.16	As per IRC 37-2018
Dual Wheel, Tandem Axle group	15.10	As per IRC 37-2018
Dual Wheel, Tridem Axle group	22.90	As per IRC 37-2018

Few photographs illustrating the survey locations and axle load measurements are presented below.

As the pavement crust proposed for Package-1 to Package-4 remains the same, as few Commercial vehicles are plying on the project corridor, it has been considered Package-1 to 4, as ONE-SET. In the month, Dec21, DD-Consultants have conducted axle load tests in Package-1,3 & 4 and verified VDFs with pavement design reports (Package 1 to 4). Finally, adopted the maximum values out of these 7 VDFs, for each mode-wise data as presented below.

Table 2-23:: VDF Values Estimated at the Package1 to 4

Sl.No	Description	Package-1		Package-2		Package-3		Package-4		Max. VDF Considered For Pkg-1 to Pkg-4
		Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	
1	**Vehicle Damage Factor (VDF)**									
(a)	Bus	0.44	0.93	1.06	-	0.38	0.00	0.65	2.21	2.21
(b)	LCV	0.01	0.10	0.36	-	0.55	0.47	0.26	0.11	0.55
(c)	2-Axle	1.28	2.40	7.66	-	3.26	3.64	6.50	2.96	7.66
(d)	3-Axle	0.65	4.20	2.54	-	5.14	5.01	2.86	3.35	5.14
(e)	MAV	22.27	16.30	8.08	-	5.91	6.09	10.94	9.18	22.27

2.5 PACKAGE 5: AMARAVATI- KURHA- KAUNDYNAPUR

2.5.1 ROAD INVENTORY

Package-5, comprises three state highways, SH-280 (Amaravati- Kurha, km95 to km123.675), SH-300 (Kurha town, km56.3- km58.45) and SH-294 (Kurha - Kaundynapur, km41.8- km52.05) of length 28.68 km, 2.15 km and 10.25 km respectively with the total length of 41.08 km. The PCOD obtained on 11 Nov 2021 for 41.035 km length. The following represent the locations on the map.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 4lane m Rigid pavement.

Table 2-24:: Package-5, Project Road configuration

Pavement Configuration	Carriageway width, m	Flexible/Rigid	SH-280 Length, km	SH-300 Length, km	SH-294 Length, km
2-Lane	7	Flexible	22.575	0.350	8.700
2-Lane with PS	10	Flexible	5.350	0.650	0.500
2-Lane with PS	10	Rigid			1.050
4-lane (Rigid)	15	Rigid	0.750		
4-lane (Flexi)	15	Flexible	-		
4-lane with PS (Flexi)	19	Flexible	-	1.150	
			28.675	**2.150**	**10.250**
Total			**41.075**		

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like Amravati, Parsoda, Diwankhed, Pimplekuta, Mardi, Virgavhan, Kondnyapur and Kurha etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations.

Typical view of project road is shown below:

A view of Project Road at Km: 43.000_SH - 294

A view of Project Road at Km: 50.000_SH - 294

A view of the Project Road at Km: 57.700_SH - 300	A view of the Project Road at Km: 58.000_SH - 300
A view of the Project Road at Km: 97.000_SH - 280	A view of the Project Road at Km: 107.000_SH - 280

The Project Road has 8 major junctions and 28 minor junctions along the project road.

Photographs showing Junctions are presented below:

Major Junction at km 46.400 – RHS_SH - 294	Minor Junction at km 51.185 – LHS_SH - 294

Minor Junction at km 57.985 - LHS_SH - 300	**Minor Junction at km 58.134 - LHS_SH - 300**
Minor Junction at km 95.450 - RHS_SH - 280	**Minor Junction at km 106.900 - LHS_SH - 280**

All together the Project Road has about 19 nos Bus bays with shelters.

Few photos taken at the bus shelters and bus bays are presented below:

Bus Bay & Bus shelter @ Km 51.450 - LHS_SH - 294	**Bus Bay & Bus shelter @ Km 51.450 - LHS_SH - 294**

Bus Bay with Bus shelter @ Km 99.925 – LHS_SH - 280	Bus Bay with Bus shelter @ Km 107.000 – RHS_SH - 280

There are two (2) nos. of Truck laybys along the Project Road on both side of the carriageway in Mardi village. The Truck layby consists of Flexible Pavement and the condition appears to be fair.

Few photographs depicting the truck lay bye locations are presented below:

Truck Lay bye on RHS km 110.580_SH - 280	Truck Lay bye on LHS km 110.580_SH - 280

The collected Road Inventory Data is presented in **Appendix 1** of this Report.

2.5.2 PAVEMENT CONDITION SURVEY

The visual Pavement condition data has been collected for each km length has been presented in **Appendix 2** of this Report. The pavement condition appears to be fair and the riding quality is satisfactory.

Few photos taken during visual pavement condition Surveys are presented below:

Fair Condition @ 41.000_SH – 294	Fair Condition @ 43.000_SH – 294
Fair Condition @ 45.000_SH – 294	Fair Condition @ 49.000_SH – 294
Fair Condition @ 50.000_SH – 294	Fair Condition @ 51.000_SH – 294

Rutting @ 57.000_SH - 300	Fair Condition @ 58.000 - LHS_SH - 300
Fair Condition @ 116.000_SH - 280	Fair Condition @ 11.000_SH - 280
Fair Condition @ 97.000_SH - 280	Fair Condition @ 100.000_SH - 280

Fair Condition @ 104.000_SH - 280	Fair Condition @ 107.000_SH - 280

2.5.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

The homogenous sections considering either direction traffic (i.e.BHS) for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

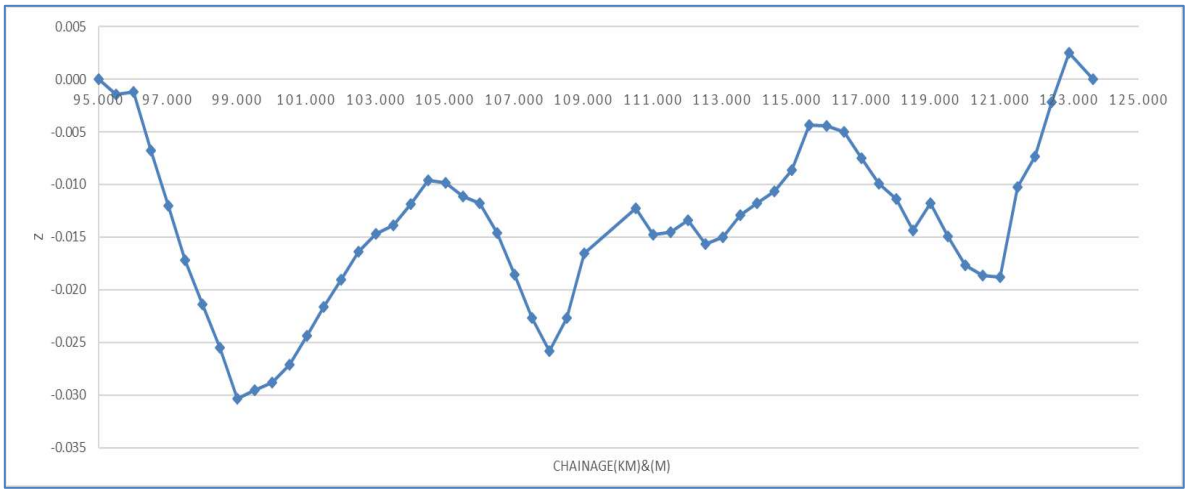
Table 2-25:: Package-5, Summary of Homogenous Section – BHS @ SH-280

S. No	Side	Chainage(km)		Length (Km)	Remarks
		From	To		
1	BHS	95.00	100.50	5.5	
2	BHS	100.50	108.00	7.5	
3	BHS	108.00	115.50	7.5	
4	BHS	115.50	123.68	8.2	

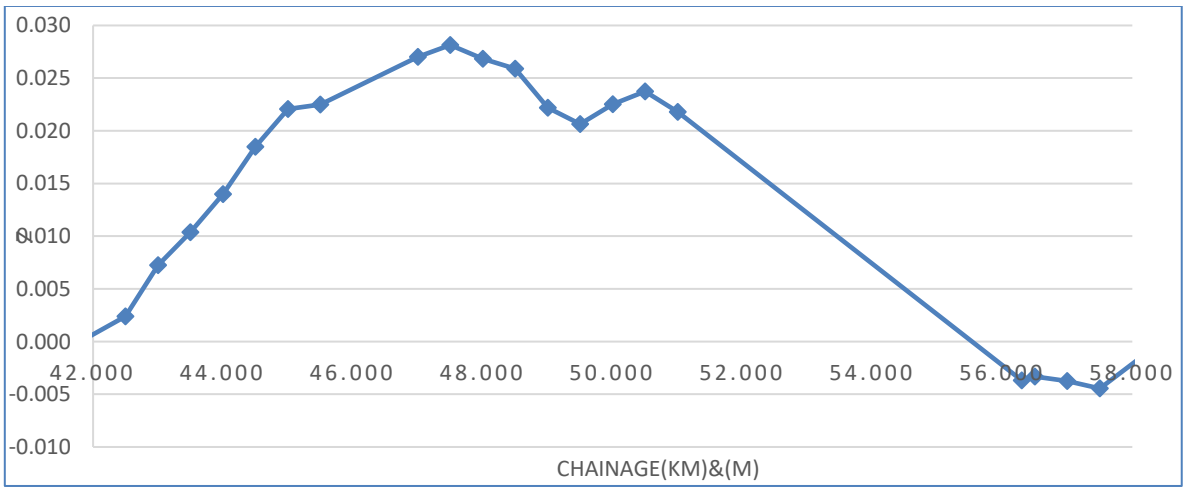
Table 2-26: Package-5, Summary of Homogenous Section – BHS @ SH-300 & 294

S. No	Side	Chainage(km)		Length (Km)	Remarks
		From	To		
1	BHS	41.80	45.50	3.7	
2	BHS	45.50	47.00	1.5	Rigid
3	BHS	47.00	51.00	4.0	
4	BHS	51.00	52.02	1.0	Rigid
5	BHS	56.30	58.45	2.2	

Delineation of Homogeneous Section – SH - 280



Delineation of Homogeneous Section – SH–294 & SH-300



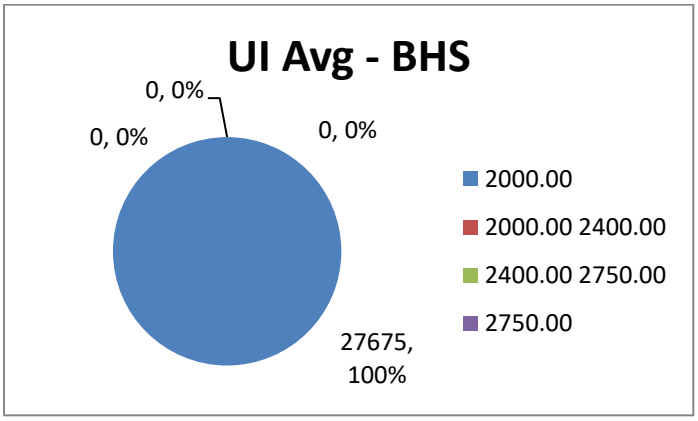
2.5.4 ROUGNESS SURVEYS

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.

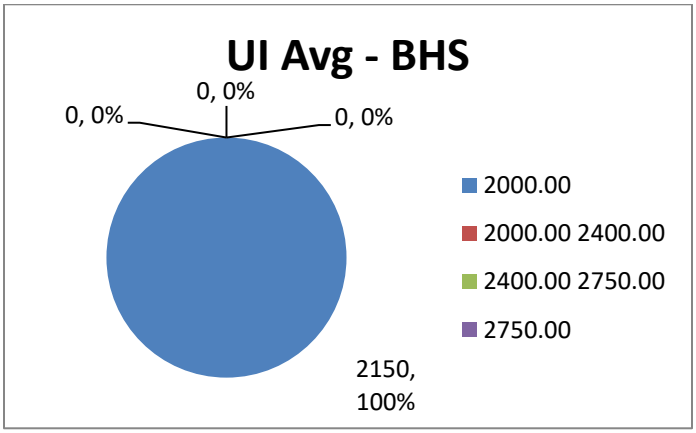
As per IRC-SP:16-2004, Bituminous Concrete pavement surface is considered to be good when its UI value is less than 2000 mm/km and the same is considered to be average for UI values between 2000 and 3000 mm/km whilst the surface is treated as Poor for UI values greater than 3000 mm/km.

As per CA, Schedule-K, roughness value should not exceed 2750mm/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:

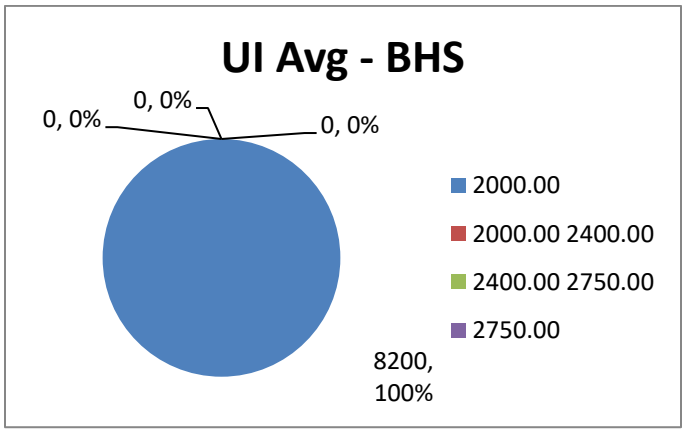
UI Average – BHS (SH – 280)



UI Average – BHS (SH – 294)



UI Average – BHS (SH –300)



It can be seen from the above pie charts, that about 100% of the length of the Project Road has good riding quality (UI<2000 mm/km) in BHS carriageway respectively.

2.5.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been ascertained from test pit surveys. Test pits have been undertaken at an interval of 10.0 km in each carriageway along the project road. Thus, a total of 4 pits have been dug along the corridor on Main Carriageway edges and the recorded the pavement composition. Photographs have been taken at all test pit locations depicting the crust thickness and nature of pavement material. Few sample photos taken are presented below:

AM-TP-7

AM-TP-8

AM-TP-9

AM-TP-10

Results of the test pit survey showing thickness of various pavement layers are presented in the Table below.

Table 2-27:: Package-5, Details of Pavement Composition along the Project Road

S. No	Test Pit Number	Existing Chainage	Direction	BT	WMM	GSB	Total
1	AM-TP-7	51+400	RHS	120	200	220	540
2	AM-TP-8	123+200	LHS	120	250	220	590
3	AM-TP-9	103+050	RHS	130	260	240	630
4	AM-TP-10	113+050	RHS	130	230	230	590

Total average crust thickness of the MCW pavement is 590mm. The average thickness of bituminous layer is 125mm. Pavement composition is mainly with the BT layer, WMM & GSB base over subgrade.

2.5.6 SUBGRADE INVESTIGATION & LABORATORY TESTING

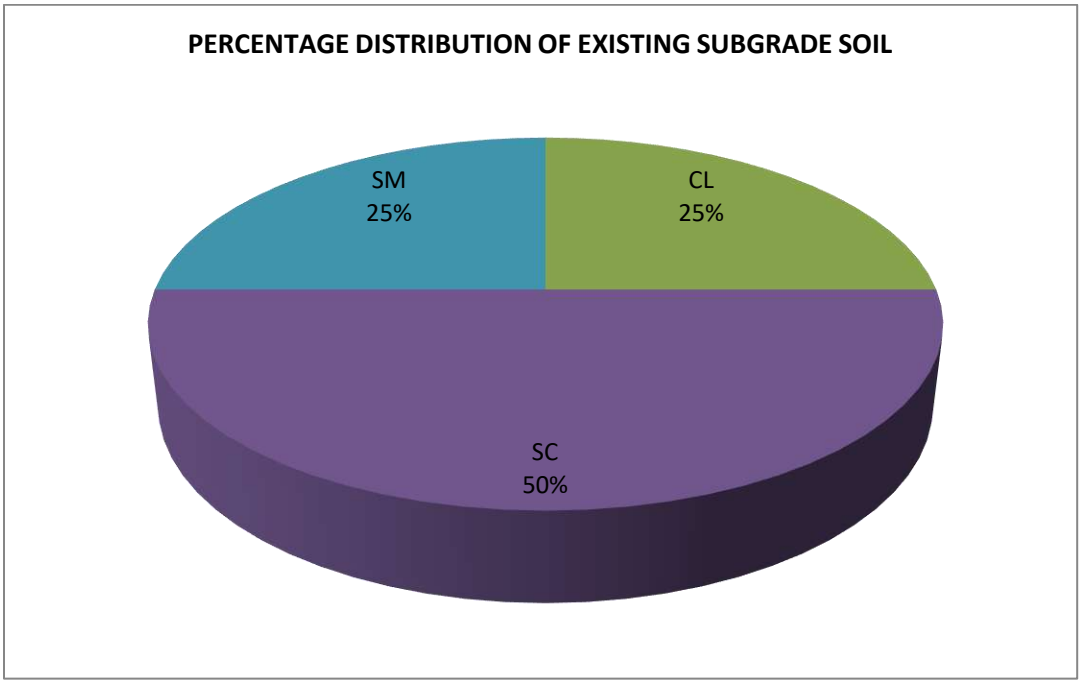
Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 4 Test pits have been carefully dug from the pavement surface up to sub-grade level. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. About 2 Numbers belongs to SC type, 1 sample belong to CI, 1 sample belongs to SM. The details of the analysis were presented in the Chapter 4, Quality Audit report.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.5.7 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. 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. The sources identified as potential borrow sources and certain useful information such as distance from the project road, location, village name, are presented in the table below.

Table 2-28:: Package-5, Details of Borrow Area Sources along the Project Road

Sl.No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Area	Rate	Remarks	Co-ordinate
1	AM-BP-3	43+100	LHS	Road side	Village: Kursha Name;Abdul Rafique Contact;9422190840		Rs-RS-1100/-100 FT		20.958235 78.069218

2.5.8 AGGREGATE AND SAND SAMPLES

The materials such as aggregates and sand to be used for sub-base, base, surface courses and concrete works have been collected from the crushers/quarry 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 presented in following table.

Table 2-29:: Aggregate Sources along the Project Road

Sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM-AQ-4	43+100 (Pkg-5)	LHS	Kursha	Dinesh stone crusher Owner-Abdul Rafique Contract no-9422190840	0.5 KM	Plenty	40mm-Rs 2200/- 100 Cft 20mm-Rs 2400/-100 Cft 10mm-Rs 2200/-100 Cft 6mm-Rs 2200/-100 Cft Dust-Rs 2200/-100 Cft Murrum-Rs 1100/-100 Cft	With Royality & GST 5% Extra	20.958235 78.069218
AM-AQ-5	105+300 (Pkg-5)	LHS	Sulthanpur	Kamala stone crusher Owner-Dipak Sahoo Contract no-8485011114	400 M	Plenty	40mm-Rs 2200/- 100 Cft 20mm-Rs 2200/-100 Cft 10mm-Rs 2000/-100 Cft 6mm-Rs 2200-100 Cft 65mm-Rs 2200/-100 Cft 80mm-Rs 1100/-100 Cft Dust -RS 2200/-100 Cft Crush sand-RS 3100/-100 Cft	With Royality & GST 5% Extra	20.947676 77.885228
AM-AQ-6	101+600 (Pkg-5)	RHS	Parsoda	Sri stone crusher Owner-Pratul Ramdas Bende Contract no-9823101349	1.6 km	Plenty	40mm-Rs 2000/- 100 Cft 20mm-Rs 2000/-100 Cft 10mm-Rs 2000/-100 Cft 6mm-Rs 2000-100 Cft 65mm-Rs 2000/-100 Cft 80mm-Rs 1800/-100 Cft Dust -RS 2200/-100 Cft GSB-RS 1800/-100 Cft	With Royality &with of GST 5% Extra	20.957961 77.853401

Table 2-30:: Package-5, Sand Sources along the Project Road

sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM--M sand-5	105+300 (Pkg-5)	LHS	Sulthanpur	Kamala stone crusher Owner-Dipak Sahoo Contract no-8485011114	400 M	Plenty	Crush sand-RS 3100/-100 Cft	With Royalty & GST 5% Extra	20.947676 77.885228

2.5.9 AXLE LOAD SURVEYS

No Axle load study has been done in Package-5. However, Axle load Surveys performed in Package-7 is applicable to this project considering the loading pattern and pavement composition. The surveys have been conducted in both the directions in Pkg-7, SH-297, Km15 Chandur Rly. Station on 1st Dec, 2021. The measurements have been made on random sampling basis. The collected axle load data and analysis is presented in **Appendix 5** of this Report.

Considering the loading pattern and proposed uniform pavement composition as suggested in Pavement Design reports of the project roads it has been considered Package-5 to 7, as ONE-SET. In the month, Dec21, DD-Consultants have conducted axle load tests in Package-7 and verified

VDFs with pavement design reports (Package 5 to 7). Finally, adopted the maximum values out of these 4 VDFs, for each mode-wise data as presented below.

Table 2-31: VDF Values Estimated at the Package 5 to 7

Sl.No	Description	Package-5		Package-6		Package-7		Maximum Considered
		Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	
1	Vehicle Damage Factor (VDF)							
(a)	Bus	0.67	-	0.78	-	0.80	0.46	0.80
(b)	LCV	0.60	-	0.34	-	0.97	0.09	0.97
(c)	2-Axle	11.45	-	6.38	-	2.96	2.44	11.45
(d)	3-Axle	11.12	-	0.00	-	6.52	4.28	11.12
(e)	MAV	15.90	-	13.14	-	11.61	6.41	15.90

2.6 PACKAGE 6: ASARA -BHATKULI- AMARAVATI

2.6.1 ROAD INVENTORY

Package-6, is a part of state highway SH-280(Asara -Bhatkuli- Amaravati section, km65.25 to km93.65) with the total length of 28.40km. The PCOD obtained on 11 Nov 2021 for a length of 27.3km.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 2Lane/4lane with paved shoulder Rigid pavement.

Table 2-32: Package-6, Project Road configuration

Pavement Configuration	Carriageway width, m	Flexible/Rigid	SH-280 Length, km
2-Lane	7	Flexible	19.650
2-Lane with PS	10	Flexible	6.150
2-Lane with PS	10	Rigid	1.600
4-lane (Rigid)	15	Rigid	
4-lane (Flexi)	15	Flexible	-
4-lane with PS (Flexi)	19	Flexible	1.000
Total			**28.400**

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like Asara Phata, Jasapur Phata,Sayat Village, Bhatkuli Mandi, Nimba Phata, Gaurkhed,Pandhari and Lontek etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structures locations.

Typical view of project road is shown below:

A view of Project Road Km: 66.567

A view of Project Road Km: 69.145

A view of Project Road Km: 72.000

A view of Project Road Km: 75.000

A view of Project Road Km: 77.800

A view of Project Road Km: 79.000

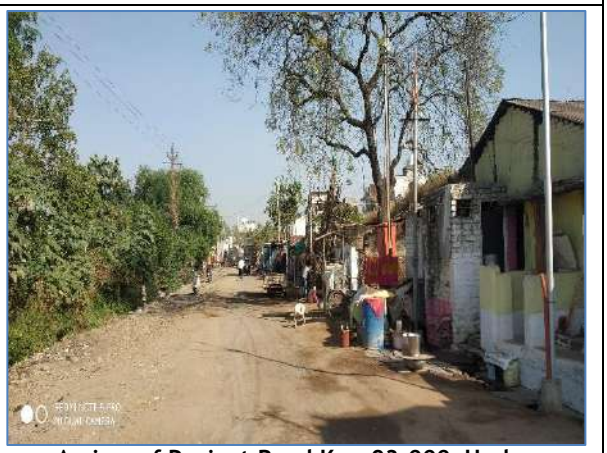
A view of Project Road Km: 81.000

A view of Project Road Km: 86.000

A view of Project Road Km: 86.800

A view of Project Road Km: 88.150

A view of Project Road Km: 91.000



A view of Project Road Km: 93.000_Under Construction

The Project Road has 3 major junctions and 24 minor junctions along the project road.

Photographs showing Junctions are presented below:

Major Junction at km 65.250 -RHS

Minor Junction at km 66.567-LHS

Minor Junction at km 69.145-LHS

Minor Junction at km 71.392-RHS

Minor Junction at km km 78.970 -RHS

Minor Junction at km 86.710-RHS

All together the Project Road has about 21 no's Bus bays with shelters.

Few photos taken at the bus shelters and bus bays are presented below:

Bus Bay with Bus shelter @ Km 65.605-RHS

Bus bay with Bus shelter @ Km 71.650-BHS

Bus bay with shelter @ Km 71.750-BHS

Bus Bay with Bus shelter @ Km 85.620-LHS

Bus Bay with Bus shelter @ Km 86.500-BHS

The Project Road has two (2) nos. of Truck lay byes along the Project Road. All the truck lay byes have been provided with Flexible Pavement and the condition appears to be fair. Separator is provided between main carriageway and Truck lay bye portion

Few photographs depicting the truck lay bye locations are presented below:

Truck Lay bye on LHS km 85.000	**Truck Lay bye on RHS km 85.000**

The collected Road Inventory Data is presented in **Appendix 1** of this Report.

2.6.2 PAVEMENT CONDITION SURVEY

The visual Pavement condition data has been collected for each km length has been presented in **Appendix 2** of this Report. The pavement condition appears to be fair and the riding quality is satisfactory.

Few photos taken during visual pavement condition Surveys are presented below:

Fair Condition @ KM 66.567	**Fair Condition @ KM 67.000**

Fair Condition @KM 68.000

Fair Condition @ 69.145

Fair condition @ km 71.670

Fair Condition @ Km 75.000

Fair Condition @ Km 77.800

Fair Condition @ Km 81.000

Fair Condition @ Km 86.000

Fair Condition @ km 88.150

Fair Condition @ KM 91.000

Fair Condition @ Km 92.000

2.6.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

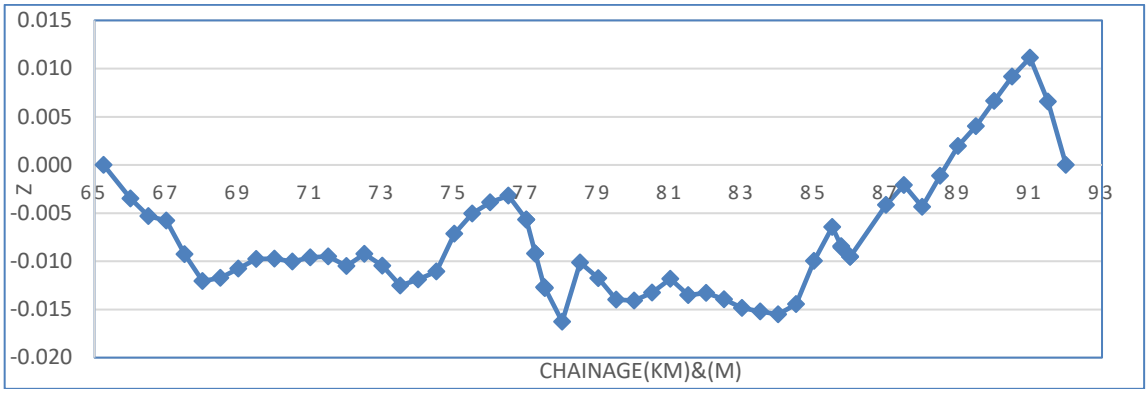
In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

The homogenous sections in each direction of traffic for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

Table 2-33: Package-6, Summary of Homogenous Section – BHS

S. No	Side	Chainage(km)		Length (Km)
		From	To	
1	BHS	65.250	73.500	8.3
2	BHS	73.500	78.500	5.0
3	BHS	78.500	85.500	7.0
4	BHS	85.500	92.000	6.5
5	BHS	92.000	93.650	1.7

Delineation of Homogeneous Section – BHS

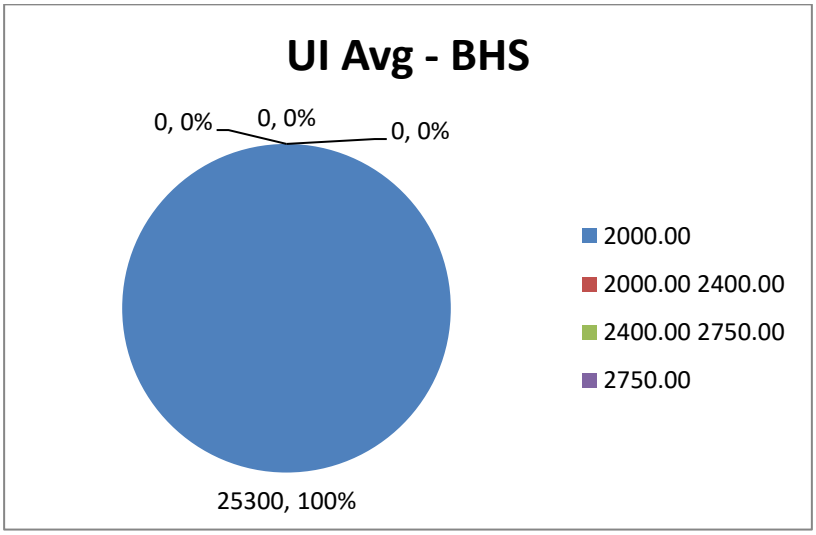


2.6.4 ROUGNESS SURVEYS

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 IRC-SP:16-2004, Bituminous Concrete pavement surface is considered to be good when its UI value is less than 2000 mm/km and the same is considered to be average for UI values between 2000 and 3000 mm/km whilst the surface is treated as Poor for UI values greater than 3000 mm/km.

As per CA, Schedule-K, roughness value should not exceed 2750mm/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 100 % of the length of the Project Road has good riding quality (UI<2000 mm/km) in BHS carriageway.

2.6.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys. Test pits have been undertaken at an interval of 10.0 km in each carriageway along the project road. Thus, a total of 4 pits have been dug along the corridor and the data on composition of pavement has been noted. All 4 pits done on Main Carriageway edge. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement.

Few sample photos taken are presented below:

AM-TP-11

AM-TP-12

AM-TP-13

AM-TP-39

Results of the test pit survey showing thickness of various pavement layers are presented in the Table below.

Table 2-34: Package-6, Details of Pavement Composition along the Project Road

S. No	Test Pit Number	Existing Chainage	Direction	BT	PQC	DLC	WMM	GSB	Total
1	AM-TP-11	86+00	LHS	150			340	260	750
2	AM-TP-12	65+450	LHS	110			220	220	550
3	AM-TP-13	76+000	RHS	100			330	240	670
4	AM-TP-39	88+200	LHS		300	100		200	600

Total average crust thickness of the MCW pavement is 640mm. The average thickness of bituminous layer is 120mm, PQC is 300mm and DLC 100mm. Pavement composition is mainly with the BT layer, WMM & GSB base over subgrade.

2.6.6 SUBGRADE INVESTIGATION & LABORATORY TESTING

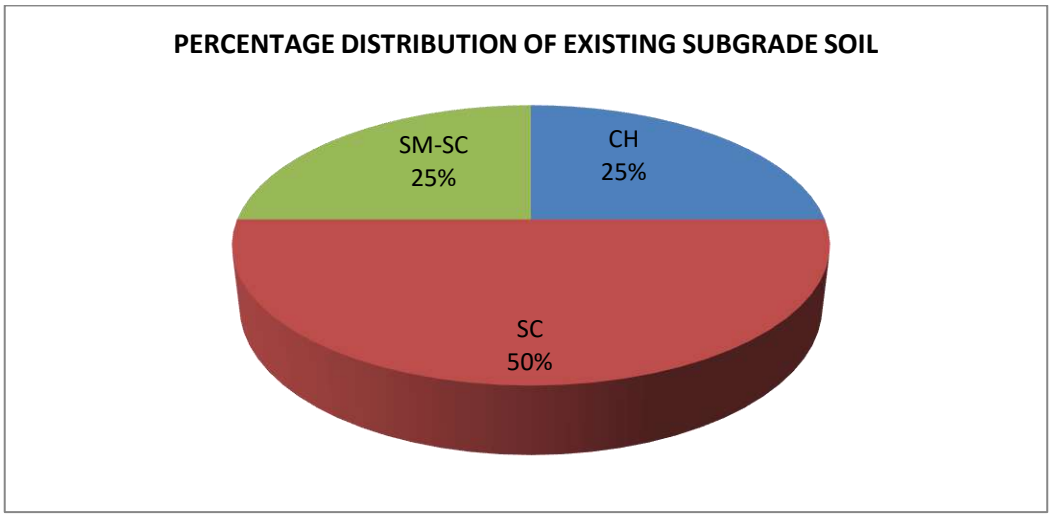
Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 4 Test pits have been carefully dug from the pavement surface up to sub-grade level. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. About 2 Numbers belongs to SC type, 1 sample belong to CH & 1 sample belong to SM-SC. The details of the analysis were presented in the Chapter 4, Quality Audit report.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.6.7 AXLE LOAD SURVEYS

No Axle load study has been done in Package-6. However, Axle load Surveys performed in Package-7 is applicable to this project considering the loading pattern and pavement composition. The surveys have been conducted in both the directions in Pkg-7, SH-297, Km15 Chandur Rly. Station on 1st Dec, 2021. 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

Considering the loading pattern and proposed uniform pavement composition as suggested in Pavement Design reports of the project roads it has been considered Package-5 to 7, as ONE-SET. In the month, Dec21, DD-Consultants have conducted axle load tests in Package-7 and verified VDFs with pavement design reports (Package 5 to 7). Finally, adopted the maximum values out of these 4 VDFs, for each mode-wise data as presented below.

Table 2-35: VDF Values Estimated at the Package 5 to 7

Sl.No	Description	Package-5		Package-6		Package-7		Maximum Considered
		Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	
1	Vehicle Damage Factor (VDF)							
(a)	Bus	0.67	-	0.78	-	0.80	0.46	0.80
(b)	LCV	0.60	-	0.34	-	0.97	0.09	0.97
(c)	2-Axle	11.45	-	6.38	-	2.96	2.44	11.45
(d)	3-Axle	11.12	-	0.00	-	6.52	4.28	11.12
(e)	MAV	15.90	-	13.14	-	11.61	6.41	15.90

2.7 PACKAGE 7: AMARAVATI- CHANDUR BYPASS- DHAMANGAON

2.7.1 ROAD INVENTORY

Package-7, comprises three road sectional lengths SH-297(Amaravati-Chandur Rly. Station, km3 to km28.85), Chandur bypass (km0 to km4.7) and SH-296 (Chandur bypass- Dhamangaon, km26.5-km44.8) of length 25.85 km,4.7km and 18.3km respectively, with the total length of 48.85km. The PCOD obtained on 11 Nov 2021 for a length of 48.61km. Due to non-availability of RoW, the balance length of 240m is descoped from project.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 10m/15m Rigid pavement.

Table 2-36: Package-7, Project Road configuration

Pavement Configuration	Carriageway width, m	Flexible/Rigid	SH-297, (km)	Chandur BYP, (km)	SH-312 L (km)
2-Lane	7	Flexible	18.55		17.00
2-Lane with PS	10	Rigid	1.50		
2-Lane with PS	9m/10m	Flexible	5.80	4.70	
4-Lane with PS	15	Rigid			1.30
			25.85	**4.7**	**18.3**
Total			**41.59**		

The project corridor generally runs in plain terrain for most of length except in few locations where it has rolling. The land use along the project road is mostly agricultural and forest. It passes through small village settlements like Amaravati, Phora, Chirodi, Basalapur, Chandur bypass, Chandur Rly station, Sirajgaon, Virul ronghe, Dhamangaon etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structures locations. Maximum embankment height is observed near ROB locations.

Typical view of project road is shown below:

A view of Project Road Km: 1.675 Chandur Bypass

A view of Project Road Km: 23.400 -SH-297

A view of Project Road Km: 26.500 -SH-296

A view of Project Road Km: 29.600 -SH-296

The Project Road has 10 major junction and 39 minor junctions along the project road.

Photographs showing Junctions are presented below:

Major Junction at km 25.480-SH-297-RHS

Minor Junction at km km 3.145-SH-297-RHS

Minor Junction at km 44.720-SH-296

Minor Junction at km 32.940 -SH-296

Minor Junction at km 31.290-SH-296

Minor Junction at km 3.720 -SH-297

Minor Junction at km 4.605 -SH-297

Minor Junction at km 11.790 -SH-297

All together the Project Road has about 26 no's Bus bays with shelters, along the project corridor.

Few photos taken at the bus shelters and bus bays are presented below:

Bus bay with Bus shelter @ Km 19.650-SH-297

Bus bay with shelter @ Km 28.875 -SH-296

Bus Bay with Bus shelter @ Km 23.850 -SH-297	Bus Bay with Bus shelter @ Km 30.760-SH-296

The Project Road has two (2) nos. of Truck lay byes in SH-297 on either side, near to Bohra village. All the truck lay byes have been provided with Flexible Pavement and the condition appears to be fair. Separator is provided between main carriageway and Truck lay bye portion

Few photographs depicting the truck lay bye locations are presented below:

Truck lay bye@ Km 14.400 -SH-297-RHS	Truck lay bye@ Km 14.400 -SH-297-LHS

The collected Road Inventory Data is presented in **Appendix 1** of this Report.

2.7.2 PAVEMENT CONDITION SURVEY

The visual Pavement condition data has been collected for each km length has been presented in **Appendix 2** of this Report. The pavement condition appears to be fair and the riding quality is satisfactory.

Few photos taken during visual pavement condition Surveys are presented below:

Fair Condition @ 4.500-SH-297

Fair Condition @ 36.000 -SH-296

Fair Condition at Km 43.000 -SH-296

Fair Condition at Km 2.000-Chandur Bypass

Fair Condition at Km 28.890 -SH-297

Fair Condition @ km 24.000-SH-297

Fair condition @ km 19.000 -SH-297

Fair Condition @KM 29.600 -SH-296

Fair Condition @KM 31.200 -SH-296

Fair Condition @KM 34.000 -SH-296

2.7.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

The homogenous sections in each direction of traffic (i.e.BHS) for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

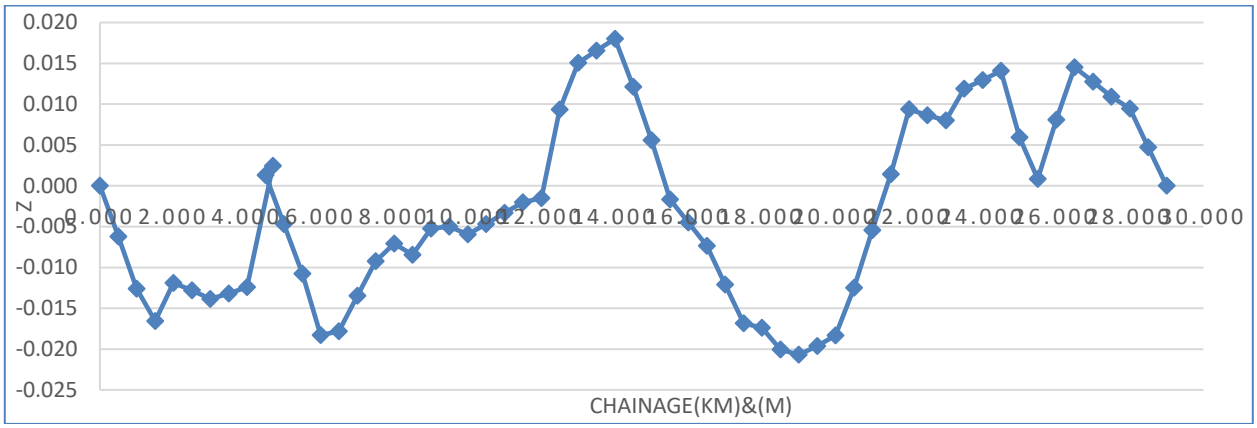
Table 2-37: Package-7, Summary of Homogenous Section – SH-297 & Chandur Bypass BHS

S.No	From	To	Length (m)	Remarks
1	0.000	4.700	4.700	Chandur Bypass
2	3.000	4.501	1.501	Rigid
3	4.501	14.000	9.499	
4	14.000	20.500	6.500	
5	20.500	28.850	8.350	
	Total Length		**30.550**	

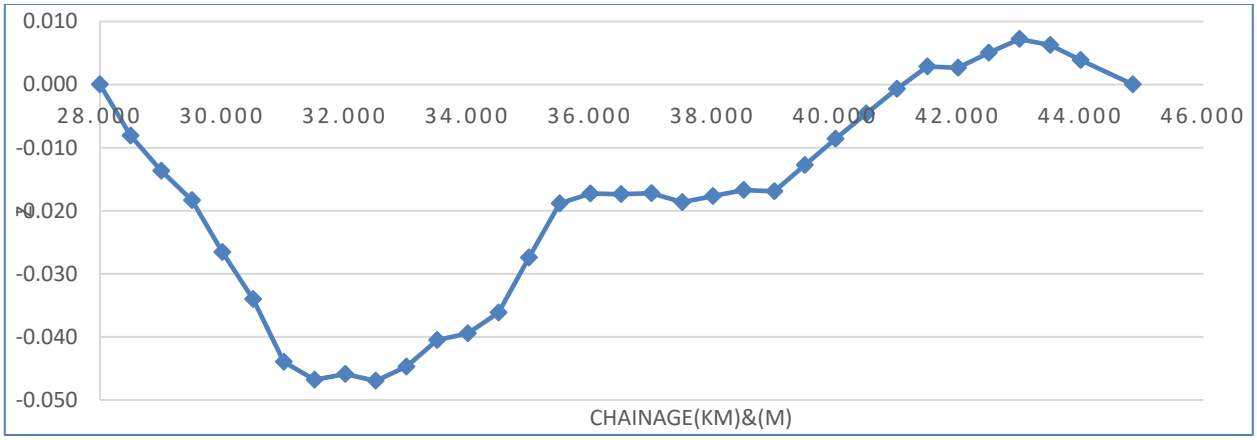
Table 2-38: Package-7, Summary of Homogenous Section - SH-296 BHS

S.No	From	To	Length (m)	Remarks
1	26.500	28.000	1.500	
2	28.000	35.500	7.500	
3	35.500	44.800	9.300	
	Total Length		18.300	

Delineation of Homogeneous Section – BHS_SH-297 & Chandur Bypass



Delineation of Homogeneous Section – BHS_SH-296

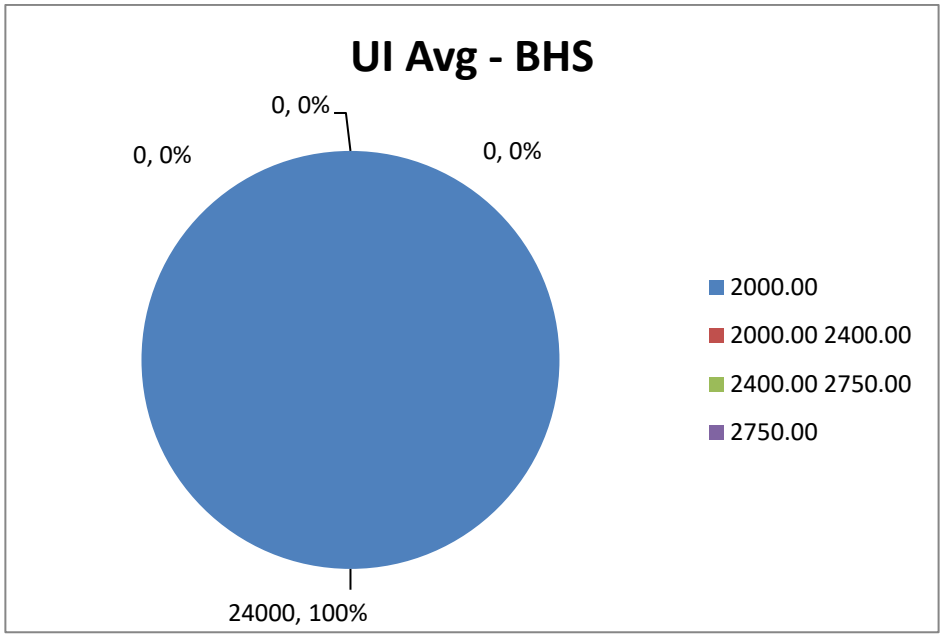


2.7.4 ROUGNESS SURVEYS

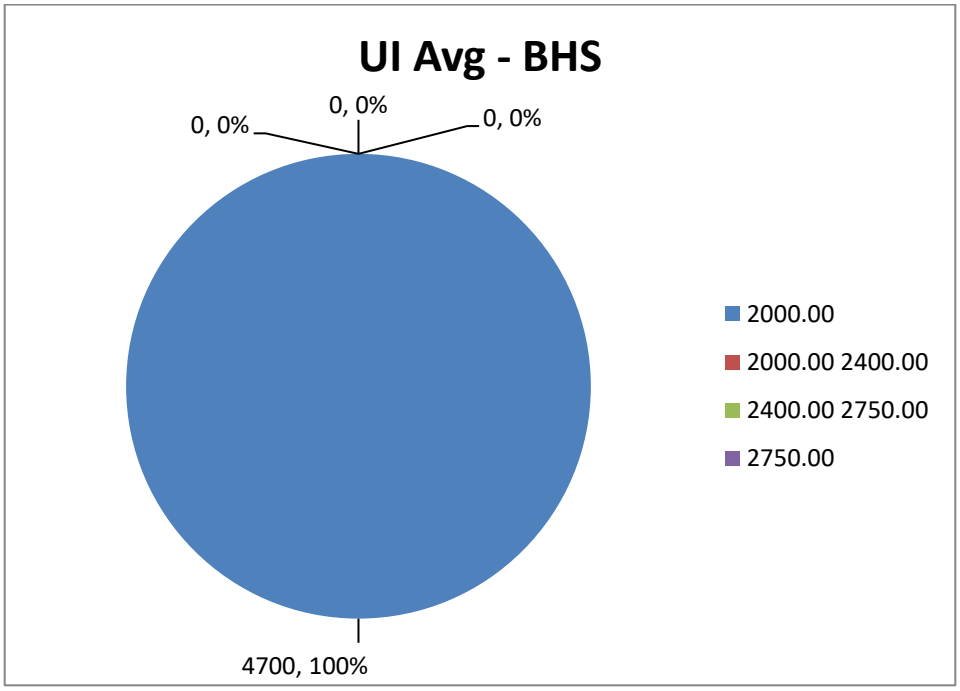
The Roughness data has been collected using **Network Survey Vehicle** and analyzed in terms of International Roughness Index (IRI), separately for each lane, for both direction of travel. Pavement Roughness report covering the data collection and methodology, computation of IRI for each km length in each direction is presented in **Appendix 4** of this Report.

As per IRC-SP:16-2004, Bituminous Concrete pavement surface is considered to be good when its UI value is less than 2000 mm/km and the same is considered to be average for UI values between 2000 and 3000 mm/km whilst the surface is treated as Poor for UI values greater than 3000 mm/km.

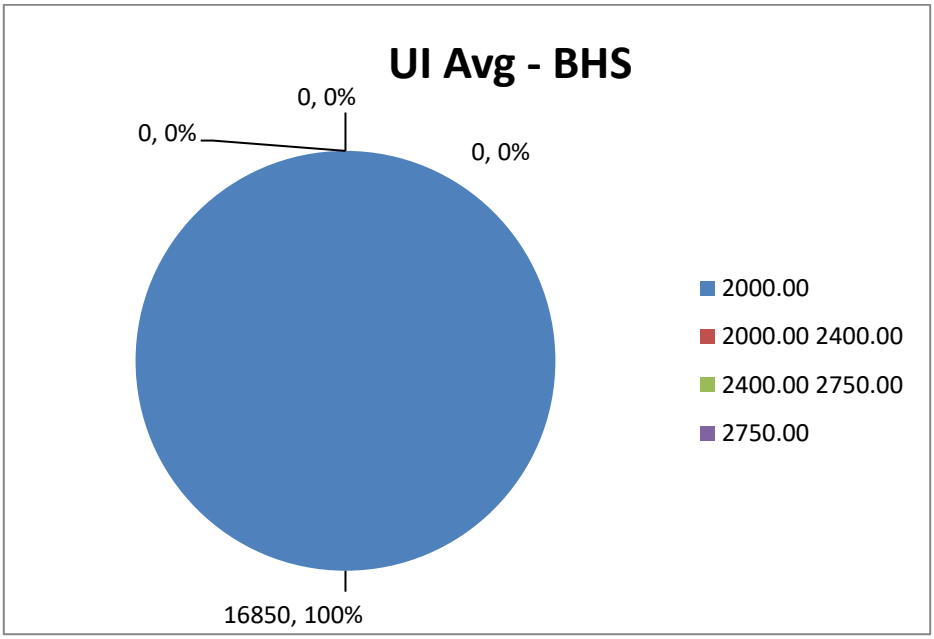
As per CA, Schedule-K, roughness value should not exceed 2750mm/km. Average UI values along the corridor were grouped in to four categories, Pie chart showing the range of UI values in each carriageway of the project road have been presented below:



SH-297



Chandur Bypass



SH-296

It can be seen from the above pie charts, that about 100% of the length of the Project Road has good riding quality (UI<2000 mm/km) in BHS carriageway respectively.

2.7.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys. Test pits have been undertaken at an interval of 10 km of carriageway along the project road. Thus, a total of 6 pits have been dug along the corridor and the data on composition of pavement has been noted. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few sample photos taken are presented below:

AM-TP-1	AM-TP-2

AM-TP-3

AM-TP-4

AM-TP-5

AM-TP-6

Results of the test pit survey showing thickness of various pavement layers are presented in the Table below.

Table 2-39: Package-7, Details of Pavement Composition along the Project Road

S. No	Test Pit Number	Existing Chainage	Direction	BT	PQC	DLC	WMM	GSB	Total
1	AM-TP-1	3+000	LHS	-	300	100	-	200	600
2	AM-TP-2	13+800	RHS	140	-	-	260	210	610
3	AM-TP-3	24+050	LHS	110	-	-	260	260	630
4	AM-TP-4	28+000	RHS	120	-	-	250	330	700
5	AM-TP-5	38+000	LHS	100	-	-	250	280	630
6	AM-TP-6	44+800	LHS	100	-	-	200	300	600

Total average crust thickness of the MCW pavement is 630mm. The average thickness of bituminous layer is 115mm. Pavement composition is mainly with the BT layer, WMM & GSB base over subgrade.

2.7.6 SUBGRADE INVESTIGATION & LABORATORY TESTING

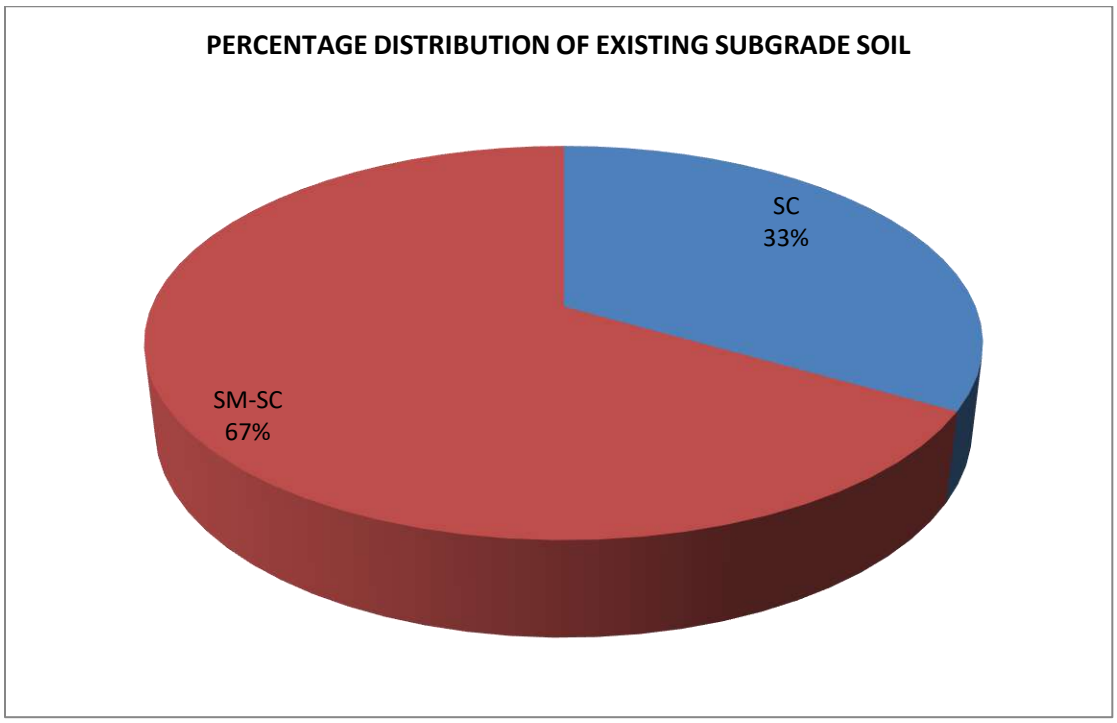
Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 6 Test pits have been carefully dug from the pavement surface up to sub-grade level. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.Laboratory test results indicate that all the Subgrade soil samples collected belongs to Sand silt & Sandy Clay Soils. About 2 Numbers belongs to SC type, and 4 samples belongs to SM-SC. The details of the analysis were presented in the Chapter 4, Quality Audit report.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.7.7 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. 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. The sources identified as potential borrow sources and certain useful information such as distance from the project road, location, village name, are presented in the table below.

Table 2-40: Package-7, Details of Borrow Area Sources along the Project Road

Sl.No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Rate	Co-ordinate
1	AM-BP-1	24+677 (Pkg-7)	LHS	1.4km	Village: Baslpur Name: Nithin Rathi Contact no: 966535555 9049323333	Rs- 1600/- 100 CFT	20.845264 77.942613
2	AM-BP-2	38+000 (Pkg-7)	LHS	6km	Village: Shahapur Name: Vikram Budhalmi Contact no: 9404545577	Rs-1200 /- 100 CFT With Royalty	20.834266 78.125749

2.7.8 AGGREGATE AND SAND SAMPLES

The materials such as aggregates and sand to be used for sub-base, base, surface courses and concrete works have been collected from the crushers/quarry 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 presented in following table.

Table 2-41: Package-7, Aggregate Sources along the Project Road

Sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM-AQ-1	24+677 (Pkg-7)	LHS	Baslapur	Renuka stone crusher Owner- Nithin Rathi Contract no- 9665345555 Contract no- 9049323333	1.4 km	Plenty	20mm-Rs 2200/- 100 Cft 10mm-Rs 1700/- 100 Cft 6mm-Rs 1500/- 100 Cft Dust-Rs 1500/- 100 Cft murrum-RS 1600/-100 Cft	Including Royality & GST 5% Extra	20.845264 77.942613

Sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM-AQ-2	42+430 (Pkg-7)	RHS	Gangajoli	Sri Ram Stone Crusher Owner- Nitin Chavan Contract no- 9665954444 Pranay Bhende Contract no- 7517405500	1.9 km	Plenty	40mm-Rs 20/- Per Cft 10mm-Rs 20/- Per Cft 6mm-Rs 22/- Per Cft 5mm-RS 35/- Per Cft 20mm-RS 22/- Per Cft 70mm- RS 20/- Per Cft 80 mm-RS 20/- Perr Cft Dust-RS 20/- Per Cft Crush Sand-RS 35/- Per Cft	With Royality & GST 5% Extra	20.816821 78.096709
AM-AQ-3	38+000 (Pkg-7)	LHS	Shahapur	Balaji Stone Crusher Owner- Vikram Budhalmi Contract no- 9860415160 9404545577	6.0 km	Plenty	40mm-Rs 2400/- 100 Cft 20mm-Rs 2500/- 100 Cft 10mm-Rs 2300/- 100 Cft 6mm-Rs 2300/- 100 Cft 75mm-Rs 2400/- 100 Cft Crush sand-Rs 3500/- 100 Cft GSB-Rs 2400/- 100 Cft Murrum-RS 1200/-100 Cft	With Royality & GST 5% Extra	20.834266 78.125749

Table 2-42: Sand Sources along the Project Road

Sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM-M sand-2	42+430 (Pkg-7)	RHS	Gangajoli	Sri Ram Stone Crusher Owner- Nitin Chavan Contract no- 9665954444 Pranay Bhende Contract no- 7517405500	1.9 km	Plenty	Crush Sand-RS 35/- Per Cft	With Royality & GST 5% Extra	20.816821 78.096709
AM--M sand-3	38+000 (Pkg-7)	LHS	Shahapur	Balaji Stone Crusher Owner-Vikram Budhalmi Contract no- 9860415160 9404545577	6.0 km	Plenty	Crush sand-Rs 3500/- 100 Cft	With Royality & GST 5% Extra	20.834266 78.125749

2.7.9 AXLE LOAD SURVEYS

Axle load study has been conducted using portable axle load pads. Surveys have been conducted on the Project Road at One locations first near km 15+000 (SH-297) on 01th of December'2021. 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.

Few photographs illustrating the survey locations and axle load measurements are presented below.

Considering the loading pattern and proposed uniform pavement composition as suggested in Pavement Design reports of the project roads it has been considered Package-5 to 7, as ONE-SET. In the month, Dec21, DD-Consultants have conducted axle load tests in Package-7 and verified VDFs with pavement design reports (Package 5 to 7). Finally, adopted the maximum values out of these 4 VDFs, for each mode-wise data as presented below.

Table 2-43: VDF Values Estimated at the Package 5 to 7

Sl.No	Description	Package-5		Package-6		Package-7		Maximum Considered
		Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	
1	Vehicle Damage Factor (VDF)							
(a)	Bus	0.67	-	0.78	-	0.80	0.46	0.80
(b)	LCV	0.60	-	0.34	-	0.97	0.09	0.97
(c)	2-Axle	11.45	-	6.38	-	2.96	2.44	11.45
(d)	3-Axle	11.12	-	0.00	-	6.52	4.28	11.12
(e)	MAV	15.90	-	13.14	-	11.61	6.41	15.90

2.8 PACKAGE 8: CHIKALDHARA-PARATWADA, CHIKALDHARA -GHATANG

2.8.1 ROAD INVENTORY

Package-8, comprises one State Highway and one Major District Road i.e., SH-305 (Chikaldhara-Paratwada, km24 to km56.338) and MDR-08 (Chikaldhara -Ghatang, km0- km20.236) of length 32.34 km and 20.24km respectively, with the total length of 52.57km. No PCOD has issued to this Package as only first 9km works are completed and balance length of works are pending as forest department permission have obtained very recently.

The most length of project corridor has flexible pavement of 5.5m/7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 11m Rigid pavement.

Table 2-44: Package-8, Project Road configuration

Pavement Configuration	Carriageway width, m	Flexible/Rigid	SH-305, (km)	MDR-08 (km)
Intermediate	5.5	Flexible	17.75	11.23
2-Lane	7	Flexible	13.368	8.756
2-Lane with PS	11	Rigid	1.220	0.250
			25.85	**20.24**
Total Length			**52.57**	

The project corridor generally runs in plain terrain for the initial few kilometers and balance length passes though hilly and rolling terrain. The land use along the project road is forest lands and passes through Hill-stations Chikaldara at the end point. It passes through some agricultural lands and small village settlements like Chikhaldhara, Aladoh, Motha, Madki, Dhamangaon, Eklaspur, Shahapur,Tetu and Salona etc.

In general, road embankments are in the range of 0.5m-1.5m for few kilometers and most lengths passes through hill-cut sections of varying embankment heights.

Typical view of project road is shown below:

A view of Project Road (SH-305) Km: 56.000

A view of Project Road (SH-305) Km:53.100

A view of Project Road (SH-305) Km: 50.000	A view of Project Road (SH-305) Km: 47.200
A view of Project Road (MDR-8) Km: 0.050	A view of Project Road MDR-8) Km: 1.000
A view of Project Road (MDR-8) Km: 2.000	A view of Project Road (MDR-8) Km: 11.000

The Project Road has 3 major junctions and 35 minor junctions along the project road.

Photographs showing Junctions are presented below:

Major Junction at (SH-305) km 56+338 -LHS	Major Junction at (SH-305) km 24+000 -BHS
Minor Junction at (SH-305) km 24.900	Minor Junction at (SH-305) km 47.150 -RHS
Minor Junction at (MDR-8) km 8.200 -LHS	Minor Junction at (MDR-8) km 8.050-LHS

Minor Junction at (SH-305) km 35.900-RHS

Minor Junction at (SH-305) km 25.980 -RHS

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.8.2 PAVEMENT CONDITION SURVEY

The visual Pavement condition data has been collected for each km length has been presented in **Appendix 2** of this Report. The pavement condition appears to be fair and the riding quality is satisfactory where the new pavement works are taken up and balance length no work taken up due to pending forest permissions

Few photos taken during visual pavement condition Surveys are presented below:

Fair Condition Rigid Pavement @ Km 53.200 SH-305

Fair Condition @ 55.000 (SH-305)

Fair Condition @ km 52.200 (SH-305)

Fair condition Rigid Pavement @ km 25.500 SH-305

Fair Condition Rigid Pavement @ 0.100 MDR-8

Fair Condition at Km 0.600 MDR-8

Fair Condition at Km 0.900

Fair Condition at Km 4.000 MDR-8

2.8.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

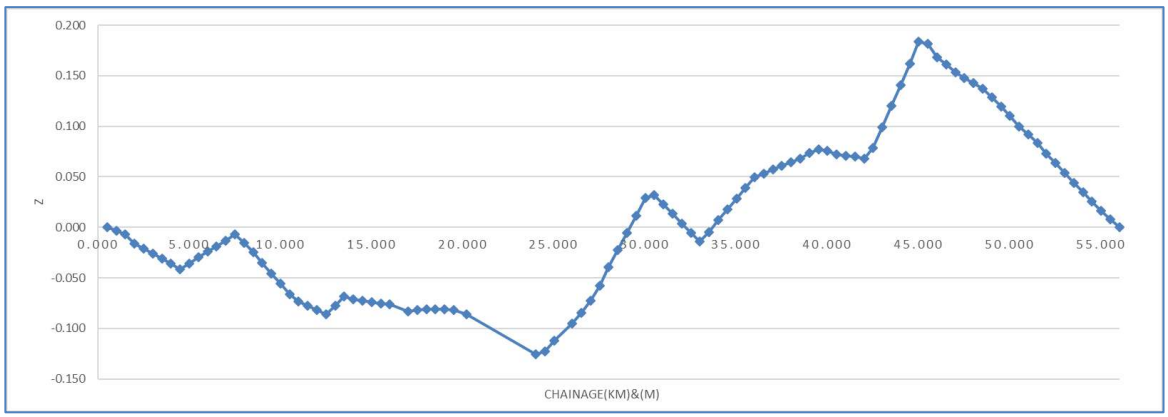
In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

The homogenous sections in each direction of traffic (i.e.BHS) for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

Table 2-45: Package-8, Summary of Homogenous Section - BHS

S. No	Side	Chainage(km)		Length (Km)
		From	To	
1	BHS	0.500	6.500	6.000
2	BHS	6.500	12.500	6.000
3	BHS	12.500	20.200	7.700
4	BHS	24.000	30.000	6.000
5	BHS	30.000	39.000	9.000
6	BHS	39.000	45.000	6.000
7	BHS	45.000	56.000	11.000

Delineation of Homogeneous Section – BHS @ SH-305 & MDR-8

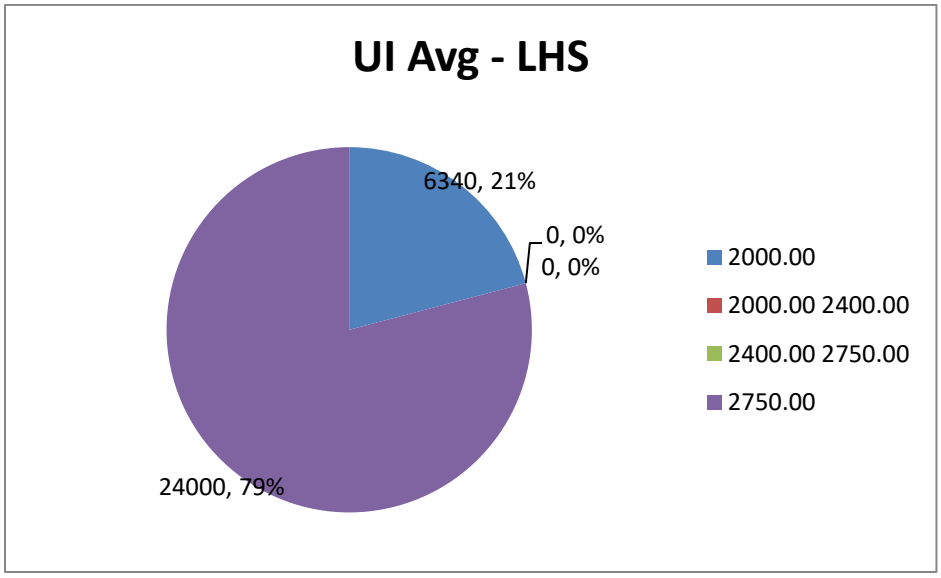


2.8.4 ROUGNESS SURVEYS

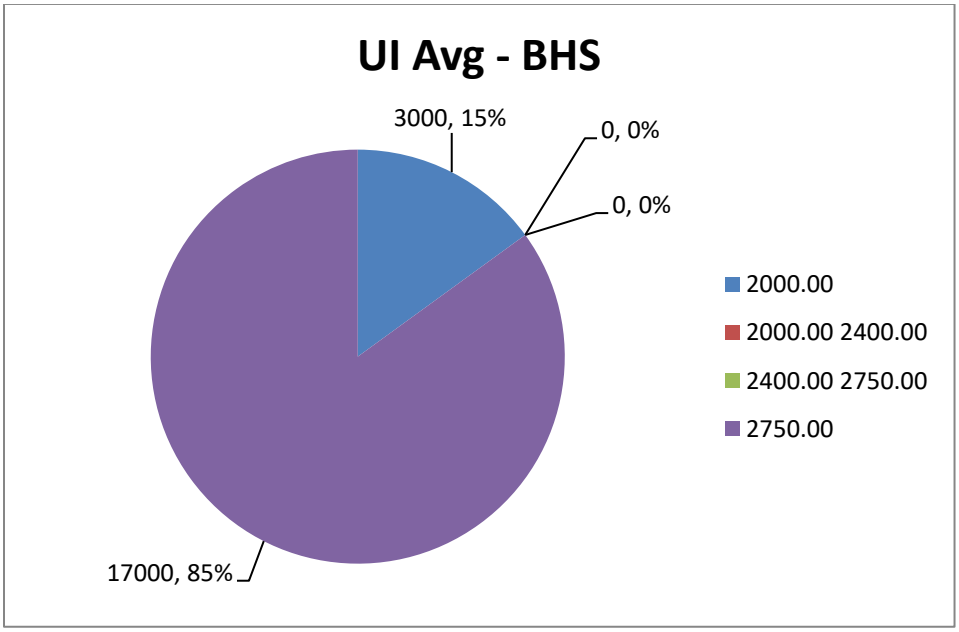
The Roughness data has been collected using **Network Survey Vehicle** and analyzed in terms of International Roughness Index (IRI), separately for each lane, for both direction of travel. Pavement Roughness report covering the data collection and methodology, computation of IRI for each km length in each direction is presented in **Appendix 4** of this Report.

As per IRC-SP:16-2004, Bituminous Concrete pavement surface is considered to be good when its UI value is less than 2000 mm/km and the same is considered to be average for UI values between 2000 and 3000 mm/km whilst the surface is treated as Poor for UI values greater than 3000 mm/km.

As per CA, Schedule-K, roughness value should not exceed 2750mm/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:



SH-305



MDR-8

It can be seen from the above pie charts that roughness values are "<2000", in SH-35, for about 6.4 km only length only and for balance stretch, roughness values are higher than threshold limit, as no construction activity has been taken up due to pending of forest permissions. In MDR-08,

only 3km length, has good riding quality (UI<2000 mm/km) and roughness values are higher than threshold limit, as no construction activity has been taken up.

2.8.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys. Test pits have been undertaken at an interval of 10.0 km of carriageway along the project road. Thus, a total of 6 pits have been dug along the corridor and the data on composition of pavement has been noted. All 6 pits done on Main Carriageway edge. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few sample photos taken are presented below:

AM-TP-28

AM-TP-29

AM-TP-30

AM-TP-31

AM-TP-32

AM-TP-33

Results of the test pit survey showing thickness of various pavement layers are presented in the Table below.

Table 2-46: Package-8, Details of Pavement Composition along the Project Road

S. No	Test Pit Number	Existing Chainage	Direction	BT	PQC	DCL	WMM	GSB	Total
1	AM-TP-28	55+900	RHS	100			250	220	570
2	AM-TP-29	46+910	LHS	100					300
3	AM-TP-30	36+830	RHS	80					180
4	AM-TP-31	26+450	LHS	120					400
5	AM-TP-32	0+140	RHS		260	100		200	560
6	AM-TP-33	10+200	LHS	130					270

Total average crust thickness of the MCW pavement is 380mm. The average thickness of bituminous layer is 105mm, PQC is 260mm & DCL is 100mm. Pavement composition is mainly with the BT layer, WMM & GSB base over subgrade.

2.8.6 SUBGRADE INVESTIGATION & LABORATORY TESTING

Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 6 Test pits have been carefully dug from the pavement surface up to sub-grade level. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

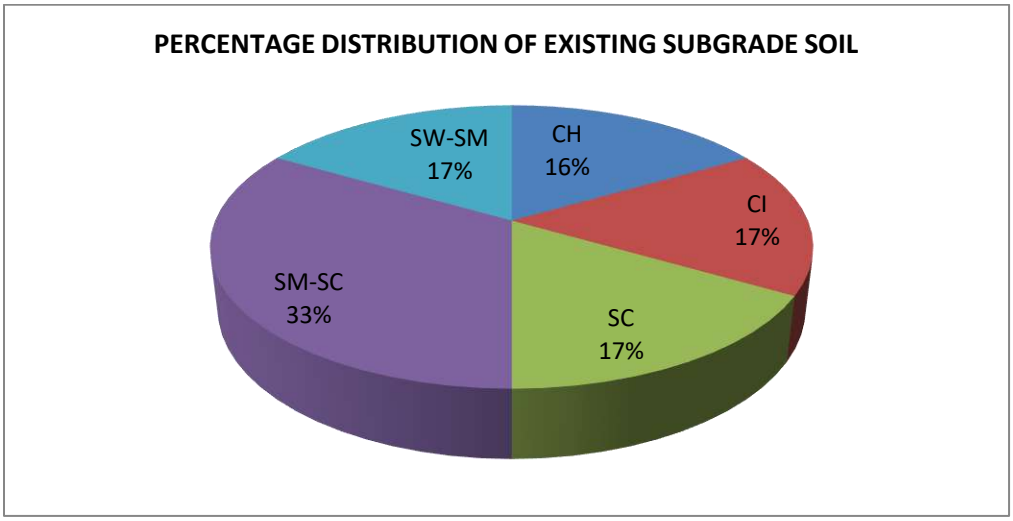
The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)

- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. About 1 Numbers belongs to SC type, 1 samples belong to CH, 1 sample belong to CI, 2 samples belong to SM-SC and 1 sample belongs to SW-SM.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.8.7 AGGREGATE AND SAND SAMPLES

The materials such as aggregates and sand to be used for sub-base, base, surface courses and concrete works have been collected from the crushers/quarry 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 presented in following table.

Table 2-47: Package-8, Aggregate Sources along the Project Road

Sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM-AQ-8	55+900 (Pkg-8)	RHS	Anbhora	Yogi Raja stone crusher Owner-Gajanan Thkal Contract no-9423466418	113.0 km	Plenty	40mm-Rs 1800/- 100 Cft 20mm-Rs 1900/-100 Cft 10mm-Rs 2300/-100 Cft 6mm-Rs 3000/-100 Cft Dust -RS 3000/-100 Cft Crush Sand-RS 3500/-100 Cft Murrum-RS 1200/-100 Cft	With Royality &with of GST 5% Extra	20.694401 77.319481

Table 2-48: Sand Sources along the Project Road

Sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM--M sand-8	55+900 (Pkg-8)	RHS	Anbhora	Yogi Raja stone crusher Owner- Gajanan Thkal Contract no- 9423466418	113.0 km	Plenty	Crush Sand-RS 3500/- 100 Cft	With Royality &with of GST 5% Extra	20.694401 77.319481

2.8.8 AXLE LOAD SURVEYS

In Package-8 & Package-9, no axle load surveys are performed by DD- consultants.

Considering the loading pattern and proposed uniform pavement composition as suggested in Pavement Design reports of the individual packages, it has been considered Package-8 & 9, as ONE-SET. Client supplied pavement design reports have given VDFs for Package 8 & 9. Finally, adopted the maximum values out of these two packages and mode-wise data as presented below:

Sl.No	Description	Package-8		Package-9		Maximum Considered For Pkg-8 & Pkh-9
		Welspun	Samarth	Welspun	Samarth	
1	Vehicle Damage Factor (VDF)					
(a)	Bus	1.47	-	0.61	-	1.47
(b)	LCV	1.61	-	0.54	-	1.61
(c)	2-Axle	2.16	-	3.37	-	3.37
(d)	3-Axle	2.05	-	5.27	-	5.27
(e)	MAV	2.52	-	6.32	-	6.32

2.9 PACKAGE 9: MORSHI- DAPORI & WARUD -JARUD- HATURNA

2.9.1 ROAD INVENTORY

Package-9, comprises two Major District Roads, MDR-66 (Morshi- Dapori, km0 to km15.652), MDR-45, Warud -Jarud (km0- km15.443), Jarud – Haturna(km15.443- km30.653) of length 15.65 km and 30.653 km respectively with the total length of 46.31 km. The PCOD obtained on 11 Nov 2021 for 45.675 km length.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 5.5m/7.5m lane Rigid pavement.

Table 2-49: Package-9, Project Road configuration

Pavement Configuration	Carriageway width m	Flexible/ Rigid	MDR-66 km	MDR-45 Warud-Jarud km	MDR-45, Jarud-Haturna km
Intermediate Lane	5.5	Rigid		2.91	6.195
2-Lane	7	Flexible	13.352	9.7	5.355
2-Lane (Rigid)	7.5	Rigid	2.3	2.833	3.66
			15.652	**15.443**	**15.21**
Total			**46.31**		

The project corridor generally runs through rolling terrain for most of length except in few locations where it is plain terrain. The land use along the project road is mostly agricultural and forest lands. It passes through small village settlements like Warud, Temburkheda, Gavhnkund, Pala, Salbardi, Jarud and hatura etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structures locations.

Typical view of project road is shown below:

A view of Project Road Km: 16.000_MDR - 45

A view of Project Road Km: 20.000_MDR - 45

A view of Project Road Km: 25.000_MDR - 45

A view of Project Road Km: 30.000_MDR - 45

A view of Project Road Km: 1.000_MDR - 66

A view of Project Road Km: 5.000_MDR - 66

A view of Project Road Km: 10.000_MDR - 66

A view of Project Road Km: 15.000_MDR - 66

The Project Road has 6 major junctions and 13 minor junctions along the project road.

Photographs showing Junctions are presented below:

Minor Junction at km 21+400 - LHS_MDR - 45

Minor Junction at km km 24+450 - RHS_MDR - 45

Minor Junction at km 26+710 - RHS_MDR - 45

Major Junction at km 30+653 - _MDR - 45

Minor Junction at km 8+200 - LHS_MDR - 66

Minor Junction at km 12+625 - RHS_MDR - 66

Minor Junction at km 14+900 - LHS_MDR - 66

Minor Junction at km 15+250 - LHS_MDR - 66

The collected Road Inventory Data is presented in **Appendix 1** of this Report.

2.9.2 PAVEMENT CONDITION SURVEY

The visual Pavement condition data has been collected for each km length has been presented in **Appendix 2** of this Report. The pavement condition appears to be fair to good and the riding quality is satisfactory. Few photos taken during visual pavement condition Surveys are presented below:

Fair Condition @ 1.000_MDR - 45

Fair Condition @ 16.000-Rigid_MDR - 45

Fair Condition at Km 20.000_MDR - 45

Fair Condition at Km 26.000_MDR - 45

Fair Condition at Km 30.375-Rigid_MDR - 45

Fair Condition @ km 30.500_MDR - 45

Fair condition @ km 1.000 _MDR - 66

Fair Condition @KM 3.000_MDR - 66

Fair Condition @KM 8.000_MDR - 66

Fair Condition @KM 9.000_MDR - 66

Fair Condition @KM 12.000_MDR - 66

Fair Condition @KM 15.250_MDR - 66

2.9.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

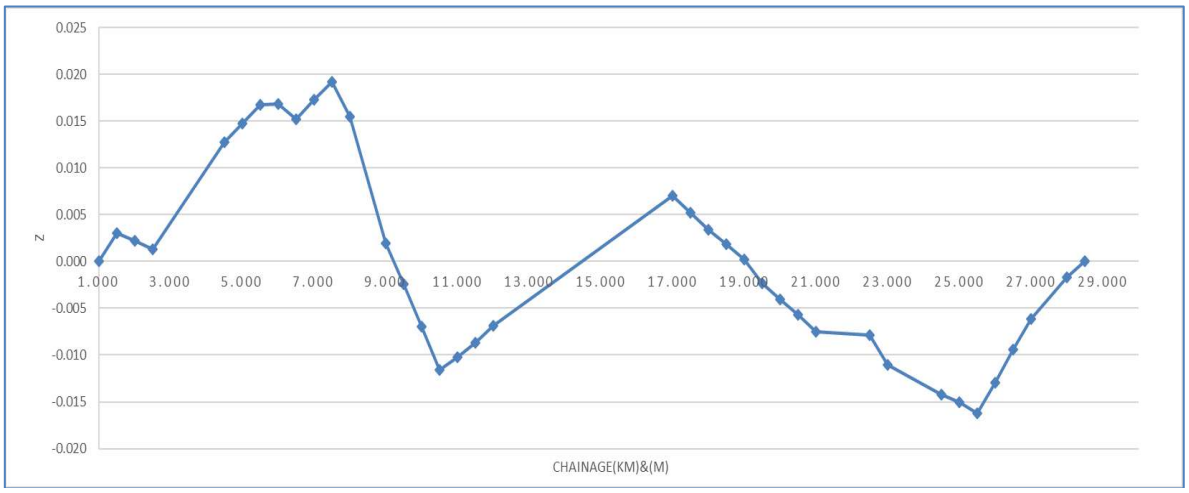
In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

The homogenous sections in each direction of traffic (i.e. LHS & RHS) for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

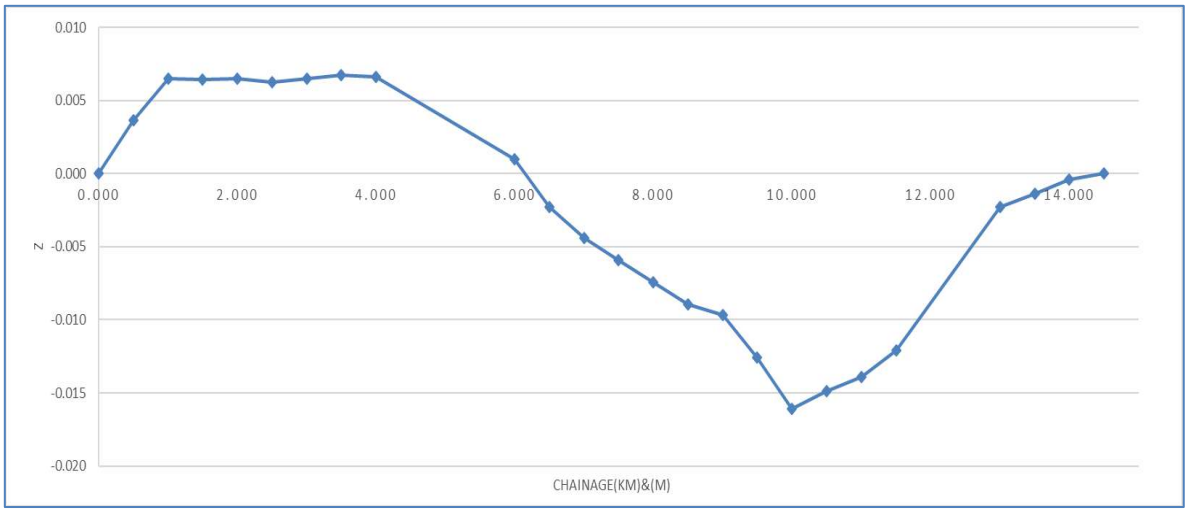
Table 2-50: Package-9, Summary of Homogenous Section - BHS

S. No	Side	Chainage(km)		Length (Km)	Remarks
		From	To		
MDR-45					
1	BHS	0.00	1.00	1.0	Rigid
2	BHS	1.00	2.50	1.5	
3	BHS	2.50	4.50	2.0	Rigid
4	BHS	4.50	12.00	7.5	
5	BHS	12.00	17.00	5.0	Rigid
6	BHS	17.00	23.00	6.0	
7	BHS	23.00	24.50	1.5	Rigid
8	BHS	24.50	28.50	4.0	
9	BHS	28.50	30.65	2.2	Rigid
MDR-66					
1	BHS	0.00	4.00	4.0	
2	BHS	4.00	6.00	2.0	Rigid
3	BHS	6.00	14.50	8.5	
4	BHS	14.50	15.65	1.2	Rigid

Delineation of Homogeneous Section –BHS (MDR – 45)



Delineation of Homogeneous Section – BHS (MDR – 66)

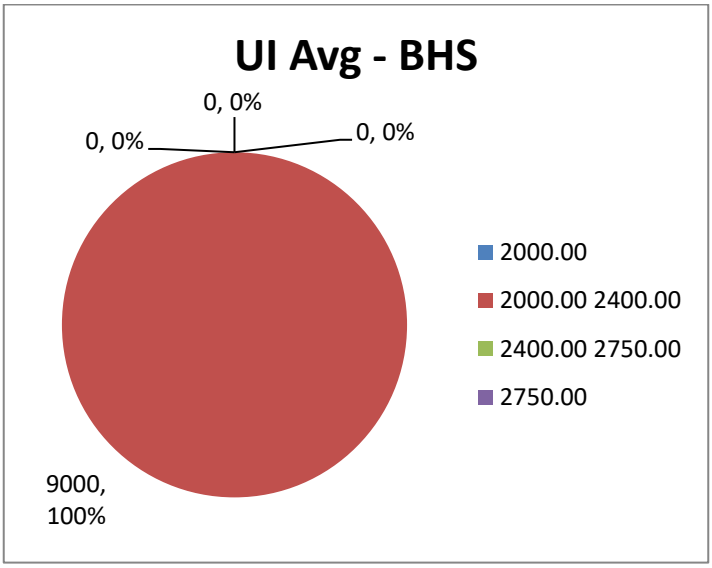


2.9.4 ROUGNESS SURVEYS

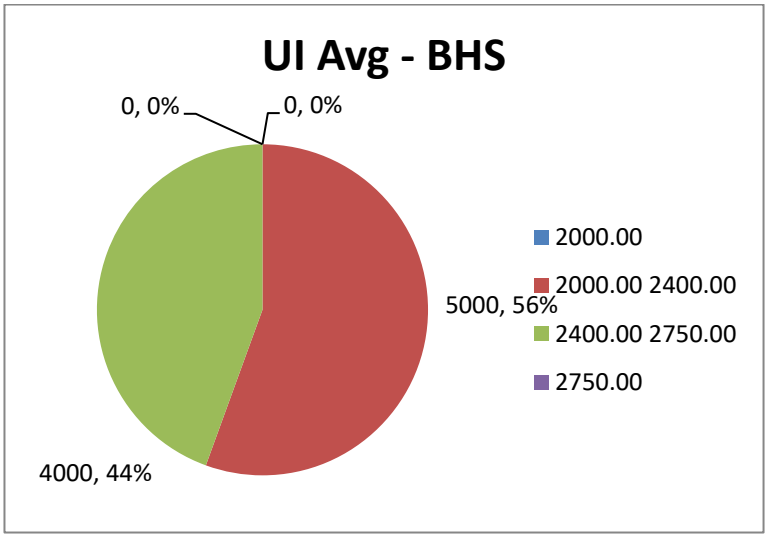
The Roughness data has been collected using **Network Survey Vehicle** and analyzed in terms of International Roughness Index (IRI), separately for each lane, for both direction of travel. Pavement Roughness report covering the data collection and methodology, computation of IRI for each km length in each direction is presented in **Appendix 4** of this Report.

As per CA, Schedule-K, roughness value should not exceed 2750mm/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:

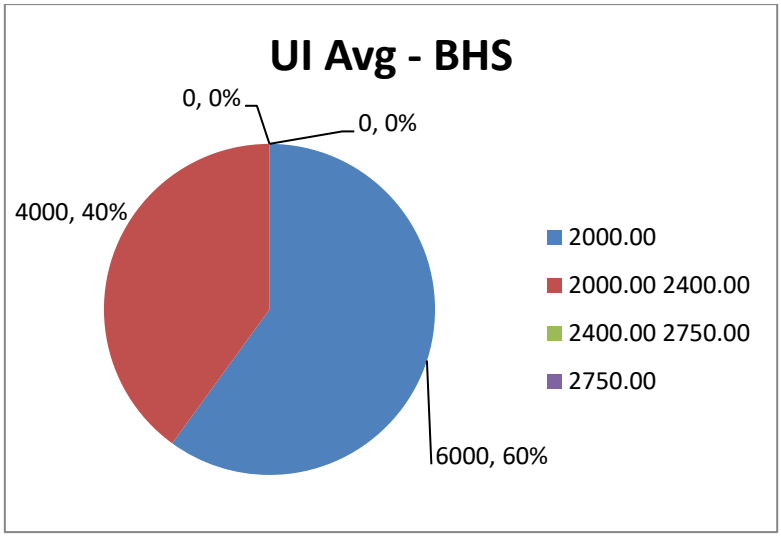
Warud - Jarud (MDR - 45)



Jarud - Hathurna (MDR - 45)



Morsi - Dapori (MDR- 66)



It can be seen from the above pie charts, for entire MDR-45 and 40% length of MDR-66 has roughness values raging between 2000-2750, whereas, that of MDR-66 balance 60% length of the Project Road has good riding quality (UI<2000 mm/km) on either side carriageways respectively.

2.9.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys. Test pits have been undertaken at an interval of 10 km in each carriageway along the project road. Thus, a total of 5 pits have been dug along the corridor and the data on composition of pavement has been noted. All 5 pits done on Main Carriageway edge. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few sample photos taken are presented below:

AM-TP-34

AM-TP-35

AM-TP-36

AM-TP-37

AM-TP-38

Results of the test pit survey showing thickness of various pavement layers are presented in the Table below.

Table 2-51: Package-9, Details of Pavement Composition along the Project Road

S. No	Test Pit Number	Existing Chainage	Direction	BT	PQC	DLC	WMM	GSB	Total
1	AM-TP-34	0+200	RHS	90			200	220	510
2	AM-TP-35	9+100	LHS		280	100		120	500
3	AM-TP-36	5+000	LHS	80			250	200	530
4	AM-TP-37	14+650	RHS		280	120		200	600
5	AM-TP-38	24+950	LHS	80			200	250	530

Total average crust thickness of the MCW pavement is 535mm. The average thickness of bituminous layer is 85mm, PQC is 280mm & DLC is 110. Pavement composition is mainly with the BT layer, WMM & GSB base over subgrade.

2.9.6 SUBGRADE INVESTIGATION & LABORATORY TESTING

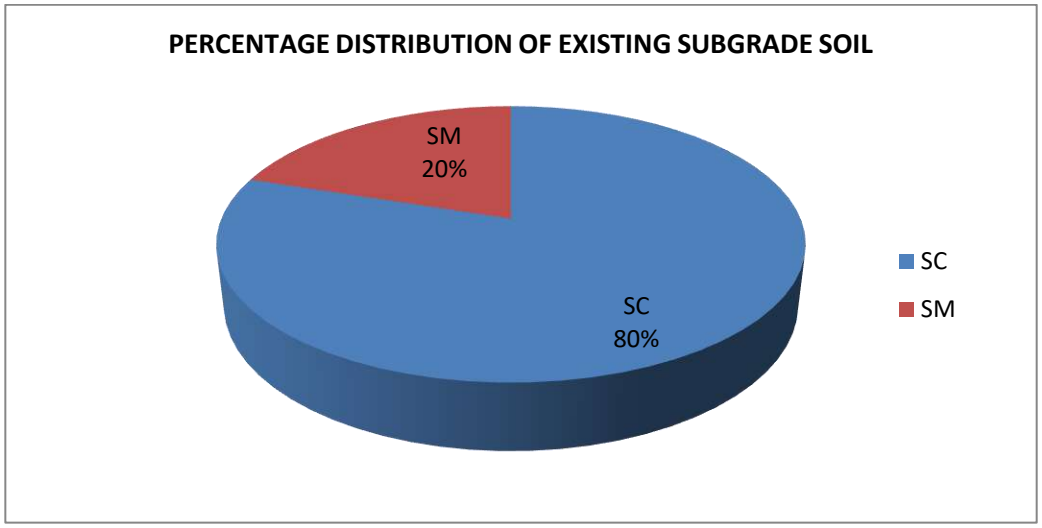
Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 5 Test pits have been carefully dug from the pavement surface up to sub-grade level. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. About 4 Numbers belongs to SC type and 1 no. belongs to SM type. The details of the analysis were presented in the Chapter 4, Quality Audit report.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.9.7 AGGREGATE AND SAND SAMPLES

The materials such as aggregates and sand to be used for sub-base, base, surface courses and concrete works have been collected from the crushers/quarry 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 presented in following table.

Table 2-52: Aggregate Sources along the Project Road

Sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM-AQ-9	0+000 (Morsi) (MDR-66), 0+000 (MDR-45,Warud) (Pkg-9)	RHS	Talni	Mantri stone crusher Owner-Rajesh Contract no-7620214195 Identify	7 Km for Morsi MDR 66 40 km from Warud MDR 45	Plenty	40mm-Rs 445/- Per ton 20mm-Rs495 /- Per ton 10mm-Rs 495/- Per ton Crush Sand-Rs 725/- Per ton Dust -RS 527/- Per ton GSB-RS 445/- Per ton WMM -RS 495/- Per ton	With Royality &with of GST 5% Extra	21.285222 77.977710

Table 2-53: Sand Sources along the Project Road

Sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source / Crusher	Lead from Nearest Ex.Chainage (Km.)	Approx. Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AM--M sand-9	0+000 (Morsi) (MDR-66), 0+000 (MDR-45,Warud) (Pkg-9)	RHS	Talni	Mantri stone crusher Owner-Rajesh Contract no-7620214195 Identify	7 Km for Morsi MDR 66 40 km from Warud MDR 45	Plenty	Crush Sand-Rs 725/- Per ton	With Royalty & with of GST 5% Extra	21.325420 78.004992

2.9.8 AXLE LOAD SURVEYS

For Package-8 & Package-9, no axle load surveys are performed by DD- consultants.

Considering the loading pattern and proposed uniform pavement composition as suggested in Pavement Design reports of the individual packages, it has been considered Package-8 & 9, as ONE-SET. Client supplied pavement design reports have given VDFs for Package 8 & 9. Finally, adopted the maximum values out of these two packages and mode-wise data as presented below:

Sl.No	Description	Package-8		Package-9		Maximum Considered For Pkg-8 & Pkh-9
		Welspun	Samarth	Welspun	Samarth	
1	Vehicle Damage Factor (VDF)					
(a)	Bus	1.47	-	0.61	-	1.47
(b)	LCV	1.61	-	0.54	-	1.61
(c)	2-Axle	2.16	-	3.37	-	3.37
(d)	3-Axle	2.05	-	5.27	-	5.27
(e)	MAV	2.52	-	6.32	-	6.32

CHAPTER 3. VALIDATION OF EXECUTED WORKS

3.1 PACKAGE 1: SH-312, DARYAPUR-MHAISANG AND SH-280, AKOLA-MHAISANG

3.1.1 ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights the executed works on ground.

Table 3-1: Package-1, Details of Executed Works

S.No	Description	Unit	As per Site	SH-280	SH-312
1	Start Chainage (Km)	Km.		0	0
2	End chainage (Km)	Km.		25.1	16.49
3	Length of the Project Corridor	Km's	41.59	25.1	16.49
4	Major Bridges	Nos.	1	0	1
5	Minor Bridges	Nos.	9	8	1
6	Culverts (Pipe)	Nos.	40	23	17
7	Culvert (Slab/Box)	Nos.	21	11	10
8	Major Junctions	Nos.	3	2	1
9	Minor junctions	Nos.	36	25	11
10	Bus Bays with Shelter	Nos.	18	11	7
11	Bus Shelter	Nos.	6	4	2
12	RCC Cover Drain	Km's	5.65	4.35	1.3
13	Earthen Drain	Km's	75.28	43.6	31.68
14	Road Markings	Sq.m	17905	10485	7420
15	W-Beam Safety Barriers	Km's	5.319	2.228	3.091
16	Rigid Concrete Barrier	Km's	0.397	0.224	0.173
17	Delineators	Nos.	126	63	63
18	Kilometre Stones	Nos.	40	23	17
19	Hectometre Stones	Nos.	127	79	48
20	Road Signs	No's	390	210	180
21	Urban Length	Kms	3.7	2.9	0.8
22	Rural Length	Kms	37.89	22.2	15.69

Lined Covered drains exists mostly at built-up locations for a length of 5.65Kms. Details of the Lined Covered Drains are presented in Appendix 6 of this report

Table 3-2: Package-1, Details of Lined Covered Drains along the Project Road

S.No	Chainage		SH.No	Side	Total Length	Remarks
	From	To				
1	0.000	1.200	SH-280	LHS	0.000	Covered Drain
2	7.500	8.000	SH-280	LHS	1.000	Covered Drain
3	7.300	7.650	SH-280	RHS	0.700	Covered Drain
4	7.650	8.000	SH-280	RHS	0.700	Covered Drain
5	14.300	14.400	SH-280	BHS	0.200	Covered Drain
6	14.550	14.900	SH-280	BHS	0.700	Covered Drain
7	18.700	19.100	SH-280	BHS	0.800	Covered Drain
8	24.700	24.950	SH-280	LHS	0.250	Covered Drain
9	12.150	12.800	SH-312	BHS	1.300	Covered Drain
Total					**5.65**	

Table 3-3: Package-1, Details of Earthen Drains along the Project Road

Sr. No	Design Chainage (Km)		Length	SH. No	Remarks
	From	To			
1	1.200	7.300	6.100	SH-280	Earthen Drain
2	8.000	14.300	6.300	SH-280	Earthen Drain
3	14.900	18.700	3.800	SH-280	Earthen Drain
4	19.100	24.700	5.600	SH-280	Earthen Drain
5	0.000	12.150	12.150	SH-312	Earthen Drain
6	12.800	16.490	3.690	SH-312	Earthen Drain
	Total		**37.640**		

Metal Beam Crash Barrier are observed for a length of 5.139 Kms along the project corridor. Details of Metal Beam Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Crash Barrier are observed for a length of 0.397 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Table 3-4: Package-1, Summary of Safety Barriers along Project Road

Safety Barrier	Length (km)
Metal Beam Crash Barrier	5.319
Concrete Crash Barrier	0.397
Pedestrians Guard Rail	0.00
Concrete Railing	0.00

List of major and minor junctions developed are presented in the **Appendix 6** of this Report.

Road furniture in the form of Signs/Markings, Delineators and Crash Barriers have been provided along the project road.

Road signs of 390no.s are observed along the project corridor and are presented in the **Appendix 6** of this report.

Table 3-5: Package-1, Road Signs along the Project Road

Description	LHS (Nos)	RHS (Nos)	Total (Nos)
Octagonal	7	1	8
Circular	1	3	4
Triangular	41	41	82
Rectangular	24	22	46
Facility informatory	0	0	0
Chevron	113	82	195
Hazard	24	31	55
Route Marker	0	0	0
Safety Boards	0	0	0
Toll Boards	0	0	0
Cantilever Gantry	0	0	0
Over Head Gantry	0	0	0
Variable Message Sign	0	0	0
Project Descriptive	0	0	0
Total	**210**	**180**	**390**

Total 126no.s of delineators are observed along the project corridor on both sides. Details of Delineators are presented in the **Appendix 6** of this report.

Table 3-6: Package-1, Locations of Bus-bay and Bus Shelters

S. No.	Chainage	SH No.	Side	As per Site
1	3.050	SH-280	LHS	Only Bus Shelter
2	5.800	SH-280	LHS	Bus bay with shelter
3	6.000	SH-280	RHS	Bus bay with shelter
4	7.400	SH-280	LHS	Only Bus Shelter
5	7.600	SH-280	RHS	Only Bus Shelter
6	11.150	SH-280	RHS	Bus bay with shelter
7	11.450	SH-280	LHS	Bus bay with shelter
8	15.700	SH-280	LHS	Bus bay with shelter
9	15.680	SH-280	RHS	Bus bay with shelter
10	18.150	SH-280	LHS	Bus bay with shelter
11	18.100	SH-280	RHS	Bus bay with shelter
12	19.000	SH-280	RHS	Bus bay with shelter
13	20.500	SH-280	RHS	Bus bay with shelter
14	20.700	SH-280	RHS	Bus bay with shelter
15	24.800	SH-280	LHS	Only Bus Shelter
16	4.535	SH-312	RHS	Bus bay with shelter
17	4.735	SH-312	RHS	Bus bay with shelter
18	6.050	SH-312	RHS	Bus bay with shelter
19	6.200	SH-312	LHS	Bus bay with shelter

S. No.	Chainage	SH No.	Side	As per Site
20	6.600	SH-312	RHS	Bus bay with shelter
21	6.600	SH-312	LHS	Bus bay with shelter
22	9.550	SH-312	LHS	Only Bus Shelter
23	9.550	SH-312	RHS	Bus bay with shelter
24	12.800	SH-312	LHS	Only Bus Shelter

3.1.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 3-7: Package-1, Details of CD & Other Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)	Remarks
1	15+350	15+450	MJB	Retained/ Rehabilitation	Retained/ Rehabilitation	Old	21 x 7.4 + 1 x 4.9	7.9	
2	2+600	2+665	MNB	Reconstruction	Reconstructed	New	4 x 5	12	
3	5+000	5+054	MNB	Retained	Retained	Old	4 x 4	10.8	
4	7+900	7+880	MNB	Reconstruction	Reconstructed	New	6 x 5	12	
5	7+950	8+073	MNB	Reconstruction	Reconstructed	New	2 x 5	12	
6	9+950	9+995	MNB	Reconstruction	Reconstructed	New	2 x 5	12	
7	13+050	13+183	MNB	Reconstruction	Reconstructed	New	4 x 5	12	
8	13+990	14+108	MNB	Widening	Widened	Old	3 x 6	12	
9	19+400	19+533	MNB	Reconstruction	Reconstructed	New	6 x 5	12	
10	23+780	23+859	MNB	Widening	Widened	Old	1 x 7.5	12	

3.2 PACKAGE 2: SH-282, ANJANGAON TO DARYAPUR SECTION

3.2.1 ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights the scope comparison of the executed works on ground.

Table 3-8: Package-2, Details of Executed Works

S.No	Description	Unit	As per Site
1	Start Chainage (Km)	Km.	1.000
2	End chainage (Km)	Km.	27.885
3	Length of the Project Corridor	Km's	26.885
4	Minor Bridges	Nos.	3

S.No	Description	Unit	As per Site
5	Culverts (Pipe)	Nos.	19
6	Culvert (Slab/Box)	Nos.	6
7	Major Junctions	Nos.	2
8	Minor junctions	Nos.	20
9	Bus Bays with Shelter	Nos.	16
10	Bus bays	Nos.	-
11	Bus Shelter	Nos.	3
12	RCC Cover Drain	Km's	1.000
13	Earthen Drain	Km's	50.000
14	Median Opening	Nos.	0.200
15	Road Markings	Sq.m	12098
16	W-Beam Safety Barriers	Km's	0.600
17	Rigid Concrete Barrier	Km's	0.269
18	Delineators	Nos.	204
19	Kilometre Stones	Nos.	26
20	Hectometre Stones	Nos.	104
21	Road Signs	No's	114
22	Urban Length	Kms	1.885
23	Rural Length	Kms	25.000

Lined Covered drains exist mostly at built-up areas along the project road. Length of Lined Covered is about 0.590 Kms and Length of Earthen Drains 50.000 Km Details of the Lined Covered Drains and Earthen Drains are presented in **Appendix 6** of this report

Table 3-9: Package-2, Details of Lined Covered Drains along the Project Road

Sl. No.	Design Chainage (Km)		Length (m)	Side		Drain Width (m)	Total Length (Km)
	From	To		LHS	RHS		
1	1.400	1.990	0.590	1.000		1.500	1.000
Total Length			**0.590**				

Table 3-10: Package-2, Earthen Drain along the Project Road

Sl. No.	Design Chainage (Km)		Length	SH No	Side	Remarks
	From	To				
1	2.000	27.000	25.000	SH-282	BHS	
Total Length			**50.000**			

Safety barriers have been provided along the project road at high embankments, structure approaches and at sharp curve locations. Details of safety barriers provided along the corridor include the following.

Metal Beam Crash Barrier are observed for a length of 0.600 Kms along the project corridor. Details of Metal Beam Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Crash Barrier are observed for a length of 0.269 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Table 3-11: Package-2, Summary of Safety Barriers along Project Road

Safety Barrier	Length (km)	Damage (km)
Metal Beam Crash Barrier	0.600	0
Concrete Crash Barrier	0.269	0
Pedestrians Guard Rail	0	0
Concrete Railing	0	0

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, Delineators and Crash Barriers, have been provided along the project road.

114 nos of Road signs are observed along the project corridor. Details of Road Signs are presented in the **Appendix 6** of this report.

Table 3-12: Package-2, Road Signs along the Project Road

Description	Total
Octagonal	0
Circular	8
Triangular	41
Rectangular	25
Facility informatory	0
Chevron	26
Hazard	14
Route Marker	0
Safety Boards	0
Toll Boards	0
Cantilever Gantry	0
Over Head Gantry	0
Variable Message Sign	0
Project Descriptive	0
Total	**114**

Total 204 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.

Table 3-13: Package-2, Locations of Bus-bay and Bus Shelters

Sl. No.	Chainage	Side		Location	Remark
		LHS	RHS		
ANJANGAON ~ DARYAPUR					
1	3+900	1		Hatonda	Bus-bay with Shelter
2	4+100		1		Bus-bay with Shelter
3	5+850	1		Kapustalni	Bus-bay with Shelter
4	6+050		1		Bus-bay with Shelter
5	8+580	1		Muhadevi	Bus-bay with Shelter
6	8+750		1		Bus-bay with Shelter
7	10+370	1		Rahimpur	Bus-bay with Shelter
8	10+550		1		Bus-bay with Shelter
9	11+700	1		Kapustalni	Bus-bay with Shelter
10	11+900		1		Bus-bay with Shelter
11	14+000	1		Nimbhari	Bus-bay with Shelter
12	14+150		1		Bus-bay with Shelter
13	16+350	1		Kokarda	Bus-bay with Shelter
14	16+500		1		Bus-bay with Shelter
15	18+100	1	1	Khurmabad	Bus Shelter
16	19+350	1	1	Nachona	Bus shelters const. in progress
17	23+000	1		Lehgaon	Bus-bay with Shelter
18	23+200		1		Bus Shelter

3.2.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 3-14: Package-2, Details of CD & Other Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)	Remarks
1	13+500	13+580	MNB	Reconstruction	Reconstructed	New	6 x 5.0	12.0	
2	17+500	-	MNB	Repair & retained	Retained	Old	2 x 4.00	10.60	
3	27+600	27+745	MNB	Reconstruction	RHS-Completed	-	6 x 5.0	24.0	LHS-Under construction

3.3 PACKAGE 3: SH-282, DARYAPUR-MURTIZAPUR

3.3.1 ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table 3-15: Package-3, Details of Executed Works

S.No	Description	Unit	As per Site
1	Start Chainage (Km)	Km.	27.885
2	End chainage (Km)	Km.	50.22
3	Length of the Project Corridor	Km's	22.335
4	ROBs	Nos.	1
5	Major Bridges	Nos.	1
6	Minor Bridges	Nos.	4
7	Culverts (Pipe)	Nos.	14
8	Culvert (Slab/Box)	Nos.	6
9	Major Junctions	Nos.	3
10	Minor junctions	Nos.	15
11	RCC Wall	Km's	1.54
12	Bus Bays with Shelter	Nos.	7
13	Bus Shelter	Nos.	4
14	RCC Cover Drain	Km's	0.8
15	Earthen Drain	Km's	38
16	Road Markings	Sq.m	10064
17	W-Beam Safety Barriers	Km's	0.75
18	Rigid Concrete Barrier	Km's	0.12
19	Concrete Railing	Kms	0.440
20	Steel Railing	Kms	1.250
21	Delineators	Nos.	259
22	Kilometre Stones	Nos.	22
23	Hectometre Stones	Nos.	70
24	Road Signs	No's	142
25	Urban Length	Kms	1.935
26	Rural Length	Kms	20.4

Lined Covered drains exist mostly at built-up areas along the project road. Length of Lined Covered is about 0.800 Kms. Details of the Lined Covered Drains are presented in **Appendix 6** of this report

Table 3-16: Package-3, Details of Lined Covered Drains along the Project Road

S. No	Chainage		Side	Length (Km)	Type
	From	To			
1	36.000	36.400	BHS	0.800	RCC Covered Drain
Total Length				0.800	

Table 3-17: Package-3, Earthen Drain along the Project Road

S. No.	Chainage		Side	Length (Km)	Type
	From	To			
1	30.000	36.000	BHS	12.000	Earthen Drain
2	36.400	49.400	BHS	26.000	Earthen Drain
Total Length				38.000	

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 table below.

Table 3-18: Package-3, Summary of Type of Slope Details

Type of slope Protection	Length km
Embankment	0
Stone Pitching	0
RCC Wall	1.540
RE Wall	0
Grouting	0
Total	**0**

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.

Metal Beam Crash Barrier are observed for a length of 0.750 Kms along the project corridor. Details of Metal Beam Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Crash Barrier are observed for a length of 0.120 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Railing are observed for a length of 0.440 Kms along the project corridor. Details of Concrete Railing are provided in the **Appendix 6** of this report.

Steel Railing are observed for a length of 1.250 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Table 3-19: Package-3, Summary of Safety Barriers along Project Road

Safety Barrier	Length (km)
Metal Beam Crash Barrier	0.750
Concrete Crash Barrier	0.120
Concrete Railing	0.440
Steel Railing	1.25

List of major and minor junctions developed are presented in the **Appendix 6** of this Report.

Road furniture in the form of Signs/Markings, Delineators and Safety barrier have been provided along the project road.

142 no's of Road signs are observed along the project corridor. Details of Road Signs are presented in the **Appendix 6** of this report.

Table 3-20: Package-3, Road Signs along the Project Road

Description	Total
Octagonal	**4**
Circular	**20**
Triangular	**42**
Rectangular	**14**
Facility informatory	**0**
Chevron	**36**
Hazard	**26**
Route Marker	**0**
Safety Boards	**0**
Toll Boards	**0**
Cantilever Gantry	**0**
Over Head Gantry	**0**
Variable Message Sign	**0**
Project Descriptive	**0**
Total	**142**

Total 259 no's of delineators are observed along the project corridor on both sides. Details of Delineators are presented in the **Appendix 6** of this report.

Road user facilities such as Bus Stops have been provided along the corridor. The project Road has total 11 numbers of Bus bay/bus shelters along the project Road. The details of the bus bay/bus shelter are presented in the **Appendix 6** of this report are presented in the table below.

Table 3-21: Package-3, Locations of Bus bay and Bus Shelters

S.No	Chainage (Km)	SH. No	Side	As per Site
1	30.000	SH-282	LHS	Bus bay with shelter
2	30.100	SH-282	RHS	Bus Shelter
3	34.320	SH-282	RHS	Bus bay with shelter
4	35.950	SH-282	LHS	Bus bay with shelter
5	36.100	SH-282	RHS	Bus Shelter
6	37.850	SH-282	LHS	Bus Shelter
7	37.850	SH-282	RHS	Bus Shelter
8	38.800	SH-282	LHS	Bus bay with shelter
9	39.000	SH-282	RHS	Bus bay with shelter
10	41.350	SH-282	LHS	Bus bay with shelter
11	41.500	SH-282	RHS	Bus bay with shelter

3.3.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 3-22: Package-3, Details of CD & Other Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)	Remarks
1	36+500	36+647	MJB	Retained	Retained	Old	20 x 8.50	8	
2	34+850	34+885	MNB	Repair & Retained	Retained	Old	8 x 7.00	9.9	
3	40+220	40+170	MNB	Repair & Retained	Retained	Old	5 x 5.00	10.5	
4	40+840	40+815	MNB	Widening	Widened	Old	3 x 5.30	12	
5	45+130	45+135	MNB	Retained	Retained	Old	6 x 5.00	10.5	
6	49+400	49+900	ROB	No Proposal	Retained	Old	1 x 14 + 2 x 20	11	

3.4 PACKAGE 4: SH-47, DARYAPUR-WAIGAON

3.4.1 ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights the details of the executed works on ground.

Table 3-23: Package-4, details of Executed Works

S. No	Description	Unit	As per Site
1	Start Chainage (Km)	Km.	180.000
2	End chainage (Km)	Km.	224.150
3	Length of the Project Corridor	Km's	44.150
4	Major Bridges	Nos.	2
5	Minor Bridges	Nos.	13
6	Culverts (Pipe)	Nos.	23
7	Culvert (Slab/Box)	Nos.	21
8	Major Junctions	Nos.	3
9	Minor junctions	Nos.	33
10	Bus Bays with Shelter	Nos.	16
11	Bus bays	Nos.	-
12	Bus Shelter	Nos.	2
13	RCC Cover Drain	Km's	6.300
14	RCC Open Lined Drain	Km's	Nil

S. No	Description	Unit	As per Site
15	Earthen Drain	Km's	81.7
16	Median Opening	Nos.	0.192
17	Road Markings	Sq.m	19800
18	W-Beam Safety Barriers	Km's	5.132
19	Rigid Concrete Barrier	Km's	0.464
20	Delineators	Nos.	239
21	Kilometer Stones	Nos.	45
22	Hectometer Stones	Nos.	176
23	Road Signs	No's	342
24	Urban Length	Kms	3.300
25	Rural Length	Kms	40.850

Lined Covered drains exists in built-up areas along the project road. Length of Lined Covered is about 6.300 Kms. Details of the Lined Covered Drains are presented in **Appendix 6** of this report

Table 3-24: Package-4, Details of Lined Covered Drains along the Project Road

S. No	Chainage		Side	Length (Km)	Type
	From	To			
1	180.700	182.600	BHS	3.800	RCC Covered Drain
2	182.750	184.000	BHS	2.500	RCC Covered Drain
Total Length				6.300	

Table 3-25: Package-4, Earthen Drain along the Project Road

S. No.	Chainage		Length (Km)	Type
	From	To		
1	180.000	180.700	0.700	Earthen Drain
2	184.001	224.150	40.150	Earthen Drain
Total Length			40.850x2	**=81.700km**

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.

Metal Beam Crash Barrier are observed for a length of 5.132 Kms along the project corridor. Details of Metal Beam Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Crash Barrier are observed for a length of 0.464 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Table 3-26: Package-4, Summary of Safety Barriers along Project Road

Safety Barrier	Length (km)
Metal Beam Crash Barrier	5.132
Concrete Crash Barrier	0.464
Concrete Railing	0
Steel Railing	0

List of major and minor junctions developed are presented in the **Appendix 6** of this Report.

Road furniture in the form of Signs/Markings, Delineators and Safety Barriers, have been provided along the project road.

342 no's of Road signs are observed along the project corridor. Details of Road Signs are presented in the **Appendix 6** of this report.

Table 3-27: Package-4, Road Signs along the Project Road

Description	Total
Octagonal	**10**
Circular	**3**
Triangular	**17**
Rectangular	**97**
Facility informatory	**0**
Chevron	**118**
Hazard	**97**
Route Marker	**0**
SafetyBoards	**0**
Toll Boards	**0**
Cantilever Gantry	**0**
Over Head Gantry	**0**
Variable Message Sign	**0**
Project Descriptive	**0**
Total	**342**

Total 239 no's 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.

The details of the bus bay/bus shelter are presented in the **Appendix 6** of this report.

Table 3-28: Package-4, Locations of Bus bay and Bus Shelters

S.No	Chainage (Km)	SH.No	Side	As per Site
1	188+500	SH-47	LHS	Bus bay with shelter
2	188+500	SH-47	RHS	Bus bay with shelter
3	193+720	SH-47	LHS	Bus bay with shelter
4	194+000	SH-47	RHS	Bus bay with shelter
5	195+200	SH-47	LHS	Bus bay with shelter
6	195+400	SH-47	RHS	Bus bay with shelter

S.No	Chainage (Km)	SH.No	Side	As per Site
7	201+050	SH-47	LHS	Bus bay with shelter
8	201+050	SH-47	RHS	Bus bay with shelter
9	203+250	SH-47	LHS	Bus Shelter only
10	203+250	SH-47	LHS	Bus Shelter only
11	208+150	SH-47	LHS	Bus bay with shelter
12	208+350	SH-47	RHS	Bus bay with shelter
13	210+300	SH-47	LHS	Bus bay with shelter
14	210+300	SH-47	RHS	Bus bay with shelter
15	212+300	SH-47	LHS	Bus bay with shelter
16	121+450	SH-47	RHS	Bus bay with shelter
17	216+900	SH-47	RHS	Bus bay with shelter
18	217+250	SH-47	LHS	Bus bay with shelter

3.4.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 3-29: Package-4, Details of CD & Other Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m) As per CA	Width (m)	Remarks
1	180+450	180+460	MJB	Retain/ Rehabilitation	Retained	Old	12 x 9	8.4	
2	186+530	186+600	MNB	Widening	Widened	Old	3 x 4.0	12.0	
3	187+800	187+880	MNB	Widening	Widened	Old	3 x 4.4	12.0	
4	188+960	189+030	MNB	Widening	Widened	Old	3 x 3	12.0	
5	193+450	193+690	MNB	Widening	Widened	Old	3 x 4	12.0	
6	195+570	195+840	MNB	Retained	Retained	Old	3 x 5	10.8	
7	197+440	197+540	MNB	Reconstruction	Reconstructed	New	3 x 10	12.0	
8	201+650	201+800	MJB	Retain/ Rehabilitation	Retained	Old	10 x 6.5	8.0	
9	205+600	205+630	MNB	Retained	Retained	Old	4 x 5	12.0	
10	207+820	207+910	MNB	Retained	Retained	Old	3 x 4.5	12.1	
11	210+350	210+460	MNB	Retained	Retained	Old	11 x 4.5	8.3	Same location New Structure Proposed with span of 11 x 5.0m
12	215+980	215+860	MNB	Retained	Retained	Old	2 x 9	12.1	
13	217+100	217+020	MNB	Retained	Retained	Old	4 x 4.5	15.0	
14	220+300	220+340	MNB	Retained	Retained	Old	2 x 6	12.1	
15	220+600	220+625	MNB	Retained	Retained	Old	2 x 6	12.1	

3.5 PACKAGE-5: AMARAVATI- KURHA- KAUNDYNAPUR

3.5.1 ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table 3-30: Package-5, Detail of Executed Works

S.No	Description	Unit	As per Site	SH-280	SH-300	SH-294
1	Start Chainage (Km)	Km.		95	56.300	41.800
2	End chainage (Km)	Km.		123.675	58.450	52.050
3	Length of the Project Corridor	Km's	41.075	28.675	2.150	10.250
4	Major Bridges	Nos.	0	0	0	1
5	Minor Bridges	Nos.	16	11	3	2
6	Culverts (Pipe)	Nos.	48	35	10	3
7	Culvert (Slab/Box)	Nos.	18	11	1	6
8	Major Junctions	Nos.	8	5	2	1
9	Minor junctions	Nos.	28	18	4	6
10	Bus Bays with Shelter	Nos.	19	15	0	4
11	Truck Lay bye	Nos.	2	2	0	0
12	RCC Cover Drain	Km's	6.300	2.200	2.300	1.800
13	Earthen Drain	Km's	57.100	40.2	1.3	15.6
14	Road Markings	Sq.m	16691	11958.75	697.50	4035.00
15	W-Beam Safety Barriers	Km's	2.460	1.17	0	1.29
16	Rigid Concrete Barrier	Km's	0.440	0.22	0.16	0.06
17	Concrete Railing	Kms	0.410	0.08	0	0.33
18	Kilometre Stones	Nos.	39	26	2	11
19	Hectometre Stones	Nos.	105	73	0	32
20	Road Signs	No's	634	407	55	172
21	Urban Length	Kms	5.5	3.3	1.15	1.05
22	Rural Length	Kms	35.575	25.375	1	9.2

Lined Covered drains exist in built-up areas along the project road. Length of Lined Covered is about 6.300 Kms. Details of the Lined Covered Drains are presented in **Appendix 6** of this report.

Table 3-31: Package-5, Details of Lined Covered Drains along the Project Road

S. No.	Chainage		SH.No	Side	Length (Km)	Type
	From	To				
1	102.500	102.850	SH-280	BHS	0.700	RCC Covered Drain
2	109.250	110.000	SH-280	BHS	1.500	RCC Covered Drain
3	56.950	58.100	SH-300	BHS	2.300	RCC Covered Drain
4	46.000	46.500	SH-294	BHS	1.000	RCC Covered Drain
5	51.400	51.600	SH-294	BHS	0.400	RCC Covered Drain
6	51.800	52.000	SH-294	BHS	0.400	RCC Covered Drain
Total Length					**6.300**	

Table 3-32: Package-5, Earthen Drains along the Project Road

Sr. No.	Design Chainage (Km)		Length	Side	SH. No	Remarks
	From	To				
1	97.200	99.900	5.400	BHS	SH-280	Earthen Drain
2	102.000	102.500	1.000	BHS	SH-280	Earthen Drain
3	102.850	109.250	12.800	BHS	SH-280	Earthen Drain
4	110.000	113.600	7.200	BHS	SH-280	Earthen Drain
5	116.100	123.000	13.800	BHS	SH-280	Earthen Drain
6	56.300	56.950	1.300	BHS	SH-300	Earthen Drain
7	41.800	43.800	4.000	BHS	SH-294	Earthen Drain
8	45.200	46.000	1.600	BHS	SH-294	Earthen Drain
9	46.500	49.500	6.000	BHS	SH-294	Earthen Drain
10	49.500	51.000	3.000	BHS	SH-294	Earthen Drain
11	51.000	51.500	1.000	BHS	SH-294	Earthen Drain
	Total		**57.100**			

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.

Metal Beam Crash Barrier are observed for a length of 2.46 Kms along the project corridor. Details of Metal Beam Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Crash Barrier are observed for a length of 0.44 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Railing are observed for a length of 0.41 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Table 3-33: Package-5, Summary of Safety Barriers along Project Road

Safety Barrier	Length (km)
Metal Beam Crash Barrier	2.46
Concrete Crash Barrier	0.44
Pedestrians Guard Rail	0.00
Concrete Railing	0.41

List of major and minor junctions developed are presented in the **Appendix 6** of this Report.

Road furniture in the form of Signs, Markings, Crash barriers, have been provided along the project road.

558 no's of Road signs are observed along the project corridor. Details of Road Signs are presented in the **Appendix 6** of this report.

Table 3-34: Package-5, Road Signs along the Project Road

Description	Total
Octagonal	4
Circular	28
Triangular	106
Rectangular	72
Facility informatory	0
Chevron	207
Hazard	130
Route Marker	11
Safety Boards	0
Toll Boards	0
Cantilever Gantry	0
Over Head Gantry	0
Variable Message Sign	0
Project Descriptive	0
Total	**558**

Road user facilities such as Bus-bays and Truck Laybys have been provided along the corridor. The project Road has total 19 numbers of Bus bay with bus shelters and 02 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.

Table 3-35: Package-5, Locations of Busbay and Bus Shelters

S. No.	Chainage (km)	SH.No	Side	As per Site
1	95.050	SH-280	RHS	Bus bay with shelter
2	95.500	SH-280	LHS	Bus bay with shelter
3	95.475	SH-280	RHS	Bus bay with shelter
4	98.050	SH-280	LHS	Bus bay with shelter
5	98.120	SH-280	RHS	Bus bay with shelter
6	99.700	SH-280	LHS	Bus bay with shelter
7	99.700	SH-280	RHS	Bus bay with shelter
8	102.800	SH-280	LHS	Bus bay with shelter
9	102.810	SH-280	RHS	Bus bay with shelter
10	105.700	SH-280	LHS	Bus bay with shelter
11	105.720	SH-280	RHS	Bus bay with shelter
12	107.000	SH-280	RHS	Bus bay with shelter
13	106.950	SH-280	LHS	Bus bay with shelter

S. No.	Chainage (km)	SH.No	Side	As per Site
14	109.900	SH-280	LHS	Bus bay with shelter
15	109.900	SH-280	RHS	Bus bay with shelter
16	47.575	SH-294	LHS	Bus bay with shelter
17	47.575	SH-294	RHS	Bus bay with shelter
18	51.650	SH-294	LHS	Bus bay with shelter
19	51.650	SH-294	RHS	Bus bay with shelter

Table 3-36: Package-5, Locations of Truck lay byes

S. No	Chainage		Length (km)	SH.No	Side	Type of Pavement	Width (m)	Tappering Entry	Tappering Exit
	From	To							
1	110.580	110.820	0.240	SH-280	LHS	BT	7	66	72
2	110.580	110.820	0.240	SH-280	RHS	BT	7	70	65
	Total Length/No		0.480						

3.5.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 3-37: Package-5, Details of CD & Other Structures

Sl. No	SH.No	Existing Chainage	Design Chainage	Type of Structure	Proposed type as per schedule B	Structure statusAs per site	Age of Structure	Existing Span arrangement (m)	Proposed Span arrangement (m)	Existing Width (m)	Proposed width (m)	Remarks
1	SH - 294	51+910	51+910	MJB	No proposal	-	Old	24 x 6.35	-	8	-	> Proposal not given in schedule B
2	SH - 294	44+295	44+308	MNB	Widening	-	Old	2 x 7.1	-	8	12	> Widening not done
3	SH - 294	49+980	49+995	MNB	Re Construction	Reconstructed	New	3 x 7.0	3 x 7.0	12	12	-
4	SH - 300	57+100	57+115	MNB	Widening	Widened	Old	1 x 7.6	-	7.9	24	-
5	SH - 300	58+150	58+150	MNB	New Construction	Constructed	New	2 x 6.0	2 x 6.0	24	24	> Existing cause way converted into MNB.
6	SH - 300	58+250	58+250	MNB	Re Construction	Reconstructed	New	3 x 10.0	3 x 10.0	24	24	-
7	SH -	95+58	95+58	MNB	Widening	-	Old	2 x 6.0	-	9	24	>

Sl. No	SH.No	Existing Chainage	Design Chainage	Type of Structure	Proposed type as per schedule B	Structure statusAs per site	Age of Structure	Existing Span arrangement (m)	Proposed Span arrangement (m)	Existing Width (m)	Proposed width (m)	Remarks
	280	7	7									Widening not done
8	SH - 280	99+560	99+559	MNB	Re Construction	Reconstructed	New	3 x 7.0	3 x 7.0	12	12	-
9	SH - 280	101+750	101+750	MNB	Re Construction	Reconstructed	New	1 x 8.0	1 x 8.0	12	12	-
10	SH - 280	102+675	102+670	MNB	New Construction	Constructed	New	2 x 7.5	2 x 7.5	8.5	16	> Existing cause way converted into MNB.
11	SH - 280	107+687	107+687	MNB	No proposal	-	Old	1 x 7.5	-	12.3	-	> Proposal not given in schedule B
12	SH - 280	108+925	108+922	MNB	Widening	Widened	Old	4 x 6.0	-	7.9	12	-
13	SH - 280	110+180	110+180	MNB	New Construction	Not Constructed	Old	1 x 3.4	2 x 5.0	12	12	> Slab culvert is present Minor bridge should be constructed
14	SH - 280	113+345	113+342	MNB	New Construction	Constructed	New	2 x 6.0	2 x 6.0	10	10	> Existing slab culvert converted into MNB.
15	SH - 280	115+875	115+860	MNB	Re Construction	-	Old	6 x 5.0	6 x 8.0	7.9	12	> Not Constructed
16	SH - 280	118+340	118+330	MNB	New Construction	Constructed	New	2 x 4.0	2 x 4.0	10.75	10.75	> Existing cause way converted into MNB.
17	SH - 280	119+370	119+358	MNB	Re Constructi	Reconstructed	New	1 x 10.0	1 x 10.0	-	12	-

Sl. No	SH.No	Existing Chainage	Design Chainage	Type of Structure	Proposed type as per schedule B	Structure statusAs per site	Age of Structure	Existing Span arrangement (m)	Proposed Span arrangement (m)	Existing Width (m)	Proposed width (m)	Remarks
					on							
18	SH - 280	121+350	121+340	MNB	Widening	Widened	Old	2 x 4.5	-	7.9	12	-

3.6 PACKAGE-6: ASARA -BHATKULI- AMARAVATI

3.6.1 ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table 3-38: Package-6, details of Executed Works

S.No	Description	Unit	As per Site
1	Start Chainage (Km)	Km.	65.25
2	End Chainage (Km)	Km.	93.65
3	Length of the Project Corridor	Km's	28.4
4	Minor Bridges	Nos.	13
5	Culverts (Pipe)	Nos.	34
6	Culvert (Slab/Box)	Nos.	5
7	Major Junctions	Nos.	3
8	Minor junctions	Nos.	24
9	Bus Bays with Shelter	Nos.	21
10	Truck Lay bye	Nos.	2
11	RCC Cover Drain	Km's	3
12	Earthen Drain	Km's	45.7
13	Road Markings	Sq.m	11993
14	W-Beam Safety Barriers	Km's	0.730
15	Rigid Concrete Barrier	Km's	0.660
16	Concrete Railing	Kms	0.14
17	Kilometre Stones	Nos.	25
18	Hectometre Stones	Nos.	91
19	Road Signs	No's	272
20	Urban Length	Kms	2.6
21	Rural Length	Kms	25.8

Lined Covered drains exist mostly at build up locations in Built-up areas along the project road. Length of Lined Covered is about 3 Kms. Details of the Lined Covered Drains are presented in **Appendix 6** of this report

Table 3-39: Package-6,Details of Lined Covered Drains along the Project Road

S. No.	Chainage		Side	Length (Km)	Type	Remarks
	From	To				
1	76.900	77.250	BHS	0.350	RCC Covered Drain	
2	77.250	77.600	BHS	0.350	RCC Covered Drain	
3	85.600	85.900	BHS	0.300	RCC Covered Drain	
4	86.600	86.900	BHS	0.300	RCC Covered Drain	
5	88.600	88.800	BHS	0.200	RCC Covered Drain	
6	92.550	93.650	BHS		RCC Covered Drain	Road Under Construction
Total Length				1.500 x 2		

Table 3-40: Package-6, Earthen Drain along the Project Road

S. No.	Chainage		Side	Length (Km)	Type
	From	To			
1	65.250	76.900	BHS	23.300	Earthen Drain
2	77.600	85.600	BHS	16.000	Earthen Drain
3	85.900	86.600	BHS	1.400	Earthen Drain
4	86.900	88.600	BHS	3.400	Earthen Drain
5	91.400	92.400	LHS	1.000	Earthen Drain
6	91.800	92.400	RHS	0.600	Earthen Drain

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.

Metal Beam Crash Barrier are observed for a length of 0.730 Kms along the project corridor. Details of Metal Beam Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Crash Barrier are observed for a length of 0.660 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Railing are observed for a length of 0.140 Kms along the project corridor. Details of Concrete Railing are provided in the **Appendix 6** of this report.

Table 3-41: Package-6, Summary of Safety Barriers along Project Road

Safety Barrier	Length (km)
Metal Beam Crash Barrier	0.730
Concrete Crash Barrier	0.660
Pedestrians Guard Rail	0
Concrete Railing	0.140

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 Crash Barrier have been provided along the project road.

233 no's of Road signs are observed along the project corridor. Details of Road Signs are presented in the **Appendix 6** of this report.

Table 3-42: Package-6, Road Signs along the Project Road

Description	Total
Octagonal	1
Circular	10
Triangular	47
Rectangular	46
Facility informatory	0
Chevron	93
Hazard	33
Route Marker	3
SafetyBoards	0
Toll Boards	0
Cantilever Gantry	0
Over Head Gantry	0
Variable Message Sign	0
Project Descriptive	0
Total	**233**

Road user facilities such as Busbays with shelters and Truck Laybys have been provided along the corridor. The project Road has total 21 numbers of Bus-bay with shelters and 2 numbers of truck laybys along the project Road. The details of the bus bay and bus shelter are presented in the **Appendix 6** of this report and truck laybys are presented in the table below.

Table 3-43: Package-6, Locations of Bus-Bay and Bus Shelters

S. No.	Chainage (km)	SH. No	Side	As per Site
1	65.450	SH-280	RHS	Bus bay with shelter
2	66.800	SH-280	LHS	Bus bay with shelter
3	66.800	SH-280	RHS	Bus bay with shelter
4	69.050	SH-280	LHS	Bus bay with shelter
5	69.050	SH-280	RHS	Bus bay with shelter
6	71.650	SH-280	LHS	Bus bay with shelter
7	71.650	SH-280	RHS	Bus bay with shelter
8	71.750	SH-280	LHS	Bus bay with shelter
9	71.750	SH-280	RHS	Bus bay with shelter
10	77.900	SH-280	LHS	Bus bay with shelter
11	77.900	SH-280	RHS	Bus bay with shelter
12	80.950	SH-280	LHS	Bus bay with shelter
13	81.200	SH-280	RHS	Bus bay with shelter
14	81.550	SH-280	LHS	Bus bay with shelter
15	81.550	SH-280	RHS	Bus bay with shelter
16	85.620	SH-280	LHS	Bus bay with shelter

S. No.	Chainage (km)	SH. No	Side	As per Site
17	85.620	SH-280	RHS	Bus bay with shelter
18	86.500	SH-280	LHS	Bus bay with shelter
19	86.500	SH-280	RHS	Bus bay with shelter
20	88.450	SH-280	LHS	Bus bay with shelter
21	88.450	SH-280	RHS	Bus bay with shelter

Table 3-44: Package-6, Locations of Truck lay byes

S. No	Chainage		Length (km)	SH.No	Side	Type of Pavement	Width (m)	Tappering Entry	Tappering Exit	Seperator Details		
	From	To								Length (m)	Width (m)	Height (m)
1	84.880	85.120	0.240	SH-280	LHS	BT	7	68	70	100	0.35	0.50
2	84.880	85.120	0.240	SH-280	RHS	BT	7	75	60	100	0.35	0.50
	Total Length/No		0.480									

3.6.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 3-45: Package-6, Details of CD & Other Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)
1	65+785	65+785	MNB	Widening	Widened	Old	1 x 7.9	12
2	68+255	68+240	MNB	Widening	Widened	Old	2 x 8.0	12
3	70+280	70+255	MNB	Widening	Widened	Old	2 x 5.0	12
4	71+320	71+300	MNB	New	New	New	1 x 6.0	12
5	71+425	71+405	MNB	New	New	New	1 x 6.0	12
6	71+670	71+670	MNB	New	Not Constructed	-	1 x 6.0	-
7	74+715	74+681	MNB	Widening	Widened	Old	1 x 9.0	12
8	76+215	76+200	MNB	Widening	Widened	Old	1 x 7.4	12
9	76+625	76+625	MNB	New	Constructed	New	2 x 5.0	12
10	77+285	77+285	MNB	Reconstruction		Old	3 x 6.0	24
11	78+525	78+525	MNB	No proposal	Retained	Old	8 x 6.0	7.4
12	82+500	82+478	MNB	Widening	Widened	Old	3 x 8.0	12
13	89+015	89+015	MNB	New	Not Constructed	-	1 x 7.5	-
14	89+575	89+550	MNB	New	Not Constructed	-	2 x 4.0	-
15	92+875	92+875	MNB	No proposal	Retained	Old	3 x 10.0	11

3.7 PACKAGE-7: AMARAVATI- CHANDUR BYPASS- DHAMANGAON

3.7.1 ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table 3-46: Package-7, details of Executed Works

S.No	Description	Unit	As per Site	SH-297	Chandur Bypass	SH-296
1	Start Chainage (Km)	Km.		3	0	26.5
2	End chainage (Km)	Km.		28.85	4.7	44.8
3	Length of the Project Corridor	Km's	48.85	25.85	4.7	18.3
4	Minor Bridges	Nos.	14	8	1	5
5	Culverts (Pipe)	Nos.	70	34	9	27
6	Culvert (Slab/Box)	Nos.	6	1	1	4
7	Major Junctions	Nos.	10	5	2	3
8	Minor junctions	Nos.	39	20	0	19
9	Bus Bays with Shelter	Nos.	26	11	0	15
10	Truck Lay bye	Nos.	2	2	Nil	Nil
11	Solar Blinkers	Nos.	2	Nil	Nil	Nil
12	RCC Cover Drain	Km's	6.62	2.64	0	3.98
13	Earthen Drain	Km's	62.8	20	9.4	33.4
14	Road Markings	Sq.m	21952.5	11580	2115	8257.5
15	W-Beam Safety Barriers	Km's	20.397	0.705	0.405	19.287
16	Rigid Concrete Barrier	Km's	0.4815	0.208	0.118	0.1555
17	Delineators	Nos.	55	46	0	9
18	Kilometre Stones	Nos.	36	13	5	18
19	Hectometre Stones	Nos.	142	49	19	74
20	Road Signs	No's	720	440	30	250
21	Urban Length	Kms	5.05	2.75	0	2.3
22	Rural Length	Kms	43.3	23.1	4.7	15.5

Lined Covered drains exist mostly at built-up areas along the project road. Length of Lined Covered is about 6.620 Kms. Details of the Lined Covered Drains are presented in **Appendix 6** of this report

Table 3-47: Package-7, Details of Lined Covered Drains along the Project Road

S.No	Chainage		SH No.	Side	Length (km)	Remarks
	From	To				
1	15.050	15.390	SH-297	LHS	0.340	Covered Drain
2	15.050	15.390	SH-297	RHS	0.340	Covered Drain
3	19.350	20.100	SH-297	LHS	0.750	Covered Drain
4	19.350	20.100	SH-297	RHS	0.750	Covered Drain
5	24.900	25.360	SH-297	RHS	0.460	Covered Drain
6	26.500	28.000	SH-296	LHS	1.500	Covered Drain
7	26.500	28.000	SH-296	RHS	1.500	Covered Drain
8	44.000	44.600	SH-296	RHS	0.600	Covered Drain
8	44.640	44.830	SH-296	LHS	0.190	Covered Drain
9	44.640	44.830	SH-296	RHS	0.190	Covered Drain
Total					**6.620**	

Table 3-48: Package-7, Earthen Drain along the Project Road

S.No	Chainage		SH No.	Side	Length (km)
	From	To			
1	3.000	3.600	SH-297	LHS	0.600
2	4.200	4.400	SH-297	LHS	0.200
3	13.400	15.000	SH-297	LHS	1.600
4	15.300	15.600	SH-297	LHS	0.300
5	16.000	16.400	SH-297	LHS	0.400
6	18.800	20.600	SH-297	LHS	1.800
7	23.400	29.000	SH-297	LHS	5.600
8	0.000	4.700	CHANDUR BYPASS	LHS	4.700
9	28.000	44.800	SH-296	LHS	16.800
10	4.200	4.400	SH-297	RHS	0.200
11	13.400	15.000	SH-297	RHS	1.600
12	15.300	15.600	SH-297	RHS	0.300
13	16.000	16.400	SH-297	RHS	0.400
14	18.800	20.600	SH-297	RHS	1.800
15	23.400	23.800	SH-297	RHS	0.400
16	24.200	29.000	SH-297	RHS	4.800
17	0.000	4.700	CHANDUR BYPASS	RHS	4.700
18	28.000	31.800	SH-296	RHS	3.800
19	32.000	44.800	SH-296	RHS	12.800
Total					**62.800**

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.

Metal Beam Crash Barrier are observed for a length of 20.397 Kms along the project corridor. Details of Metal Beam Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Crash Barrier are observed for a length of 0.481 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Table 3-49: Package-7, Summary of Safety Barriers along Project Road

Safety Barrier	Length (km)
Metal Beam Crash Barrier	20.397
Concrete Crash Barrier	0.481
Pedestrians Guard Rail	0.0
Concrete Railing	0.0

List of major and minor junctions developed are presented in the **Appendix 6** of this Report.

Road furniture in the form of Signs/Markings, Delineators and traffic safety blinkers have been provided along the project road.

582 no's of Road signs are observed along the project corridor. Details of Road Signs are presented in the **Appendix 6** of this report.

Table 3-50: Package-7, Road Signs along the Project Road

Description	LHS	RHS	Total
Octagonal	2	0	2
Circular	16	18	34
Triangular	67	72	139
Rectangular	45	48	93
Facility informatory	0	0	0
Chevron	145	119	264
Hazard	24	25	49
Route Marker	0	0	0
Safety Boards	0	0	0
Toll Boards	0	0	0
Cantilever Gantry	0	0	0
Over Head Gantry	1	0	1
Variable Message Sign	0	0	0
Project Descriptive	0	0	0
Total	**300**	**282**	**582**

Total 55 no's 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.

Sl. No.	Chainage	SH No.	Side	Remarks
1	4.250	SH-297	LHS	Bus Bay with Bus Shelter
2	5.000	SH-297	LHS	Bus Bay with Bus Shelter
3	9.800	SH-297	RHS	Bus Bay with Bus Shelter
4	15.200	SH-297	RHS	Bus Bay with Bus Shelter
5	15.800	SH-297	RHS	Bus Bay with Bus Shelter
6	19.650	SH-297	LHS	Bus Bay with Bus Shelter
7	19.810	SH-297	RHS	Bus Bay with Bus Shelter
8	23.850	SH-297	LHS	Bus Bay with Bus Shelter
9	24.800	SH-297	LHS	Bus Bay with Bus Shelter
10	25.200	SH-297	RHS	Bus Bay with Bus Shelter
11	26.000	SH-297	RHS	Bus Bay with Bus Shelter
12	28.875	SH-296	LHS	Bus Bay with Bus Shelter
13	28.875	SH-296	RHS	Bus Bay with Bus Shelter
14	30.760	SH-296	LHS	Bus Bay with Bus Shelter
15	30.760	SH-296	RHS	Bus Bay with Bus Shelter
16	31.240	SH-296	RHS	Bus Bay with Bus Shelter
17	31.250	SH-296	LHS	Bus Bay with Bus Shelter
18	31.900	SH-296	RHS	Bus Bay with Bus Shelter
19	32.600	SH-296	LHS	Bus Bay with Bus Shelter
20	32.980	SH-296	LHS	Bus Bay with Bus Shelter
21	32.980	SH-296	RHS	Bus Bay with Bus Shelter
22	35.200	SH-296	LHS	Bus Bay with Bus Shelter
23	35.200	SH-296	RHS	Bus Bay with Bus Shelter
24	37.650	SH-296	LHS	Bus Bay with Bus Shelter
25	37.950	SH-296	RHS	Bus Bay with Bus Shelter
26	44.100	SH-296	RHS	Bus Bay with Bus Shelter

Table 3-51: Package-7, Locations of Truck lay byes

S. No	Chainage		Length (km)	SH.No	Side		Type of Pavement	Width (m)	Tappering Entry	Tappering Exit	Seperator Details		
	From	To									Length (m)	Width (m)	Height (m)
1	14.340	14.480	0.140	SH-297	LHS	RHS	BT	4	65	75	40.00	1.20	0.30
	Total Length/No		0.140										

3.7.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 3-52: Package-7, Details of CD & Other Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)
1	2+545	2+545	MNB	Reconstruction	Reconstructed	New	5 x 7	12
2	14+795	14+987	MNB	Widening	Widened	Old	1 x 6.5	12
3	15+980	16+070	MNB	Reconstruction	Not constructed	Old	3 X 5	8.3
4	18+650	18+743	MNB	New construction	Not Constructed	Old	5 X 1.2	9.9
5	20+160	20+247	MNB	Reconstruction	Reconstructed	New	2 x 6	12
6	23+605	23+694	MNB	New construction	Not Constructed	Old	2 x 5	12
7	24+685	24+770	MNB	Reconstruction	Reconstructed	New	2 x 7.55	12
8	25+485	25+570	MNB	Reconstruction	Reconstructed	New	2 x 8	12
9	28+740	28+830	MNB	Widening	Widened	Old	3 x 6.5	12
10	30+300	30+302	MNB	Widening	Widened	Old	1 x 6	12
11	31+540	31+539	MNB	Reconstruction	Reconstructed	New	1 x 8	12
12	34+875	34+875	MNB	Widening	Widened	Old	2 x 6.35	12
13	38+025	38+025	MNB	No proposal	Retained	Old	1 x 6	11
14	41+110	41+110	MNB	Reconstruction	Reconstructed	New	1 x 15	12
15	44+525	44+525	MNB	New construction	New Reconstructed	New	2 x 6	12

3.8 PACKAGE-8: CHIKALDHARA-PARATWADA, CHIKALDHARA -GHATANG

3.8.1 ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table 3-53: Package-8, details of Executed Works

S. No	Description	Unit	As per Site	SH-305	MDR-8
1	Start Chainage (Km)	Km.		24	0
2	End chainage (Km)	Km.		56.338	20.236
3	Length of the Project Corridor	Km's	52.574	32.338	20.236
4	Major Bridges	Nos.	1	1	0
5	Minor Bridges	Nos.	9	4	5
6	Culverts (Pipe)	Nos.	126	60	66
7	Culvert (Slab/Box)	Nos.	14	11	3
8	Major Junctions	Nos.	3	2	1
9	Minor junctions	Nos.	35	27	8
10	RCC Cover Drain	Km's	0.84	0.84	0
11	RCC Open Lined Drain	Km's	0	0	0
12	Earthen Drain	Km's	9.1	9.1	0
13	Road Markings	Sq.m	23748	14642.1	9106.2
14	W-Beam Safety Barriers	Km's	2.883	2.883	Nil
15	Rigid Concrete Barrier	Km's	0.5	0.5	Nil
16	Delineators	Nos.	23	23	0
17	Kilometre Stones	Nos.	10	10	0
18	Hectometre Stones	Nos.	37	37	0
19	Road Signs	No's	39	39	Nil
20	Urban Length	Kms	5.72	4.22	1.5
21	Rural Length	Kms	46.854	28.118	18.736

Lined Covered drains exist mostly in built-up areas along the project road. Length of Lined Covered is about 0.840 Kms. Details of the Lined Covered Drains are presented in **Appendix 6** of this report

Table 3-54: Package-8,Details of Lined Covered Drains along the Project Road

S. No	Chainage		Side	Length (Km)	Type
	From	To			
1	53.300	53.700	BHS	0.400	RCC Covered Drain
2	50.600	50.640	RHS	0.040	RCC Covered Drain
Total Length				0.840	

Table 3-55: Package-8,Earthen Drain along the Project Road

S. No	Chainage		Side	Length (Km)	Remarks
	From	To			
1	46.800	47.150	BHS	0.350	
2	48.250	50.400	BHS	2.150	
3	50.950	53.000	BHS	2.050	

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.

Metal Beam Crash Barrier are observed for a length of 2.883 Kms along the project corridor. Details of Metal Beam Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Crash Barrier are observed for a length of 0.500 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Table 3-56: Package-8,Summary of Safety Barriers along Project Road

Safety Barrier	Length (km)
Metal Beam Crash Barrier	2.883
Concrete Crash Barrier	0.500
Concrete Railing	0
Steel Railing	0

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.

39 no's of Road signs are observed along the project corridor. Details of Road Signs are presented in the **Appendix 6** of this report.

Table 3-57: Package-8,Road Signs along the Project Road

Description	Total
Octagonal	**0**
Circular	**3**
Triangular	**25**
Rectangular	**1**
Facility informatory	**0**
Chevron	**0**
Hazard	**10**
Route Marker	**0**
Safety Boards	**0**
Toll Boards	**0**
Cantilever Gantry	**0**
Over Head Gantry	**0**
Variable Message Sign	**0**
Project Descriptive	**0**
Total	**39**

Total 23 no's of delineators are observed along the project corridor on both sides. Details of Delineators are presented in the **Appendix 6** of this report.

3.8.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 3-58: Details of CD & Other Structures

S No.	RELEVANT SH/MDR /ODR	Existing Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)
1	SH 305	53+130	MJB	New Construction	New	New	40 x 6.0	12
2	SH 305	28+060	MNB	Retain	Retained	Old	2 x 4.15	8.2
3	SH 305	37+950	MNB	Retain	Retained	Old	2 x 5.25	8.1
4	SH 305	47+345	MNB	Retain	Retained	Old	1 x 6.35	8.2
5	SH 305	48+950	MNB	Retain	Retained	Old	1 x 3.80 + 1 x 3.52	8
6	MDR 8	5+549	MNB	Retain	Retained	Old	2 x 5.10	8.3
7	MDR 8	6+260	MNB	Retain	Retained	Old	2 x 4.00	8
8	MDR 8	8+460	MNB	Retain	Retained	Old	2 x 4.20	8.3
9	MDR 8	16+488	MNB	Retain	Retained	Old	2 x 3.20	8.25
10	MDR 8	17+008	MNB	Retain	Retained	Old	2 x 3.20	8.2

3.9 PACKAGE-9: MORSHI- DAPORI & WARUD -JARUD- HATURNA

3.9.1 ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table 3-59: Package-9, Details of Executed Works

S.No	Description	Unit	As per Schedule	As per Site	MDR-45	MDR-66
1	Start Chainage (Km)	Km.			0	0
2	End chainage (Km)	Km.			30.653	15.652
3	Length of the Project Corridor	Km's			30.653	15.652
4	Medical Aid-Post	Nos.	1	NIL	NIL	NIL
5	Traffic Aid-Post	Nos.	1	NIL	NIL	NIL
6	Major Bridges	Nos.	1	NIL	NIL	1
7	Minor Bridges	Nos.	7	8	6	2
8	Culverts (Pipe)	Nos.	56	66	42	24
9	Culvert (Slab/Box)	Nos.	5	5	5	0
10	Major Junctions	Nos.	6	6	4	2
11	Minor junctions	Nos.	13	13	11	2
12	RCC Cover Drain	Km's	8.132	1.87	0	1.87
13	RCC Open Lined Drain	Km's	NIL	NIL	NIL	NIL
14	Masonary Drain	Km's	NIL	NIL	NIL	NIL
15	Separator Drain	Kms	NIL	NIL	NIL	NIL
16	Hume pipe drain	Kms	NIL	NIL	NIL	NIL
17	Earthen Drain	Km's	38.173	38.173	24.151	14.022
18	Median drain	Km's	NIL	NIL	NIL	NIL
19	Median Cuts	No's	NIL	NIL	NIL	NIL
20	Chutes	Nos.	NIL	NIL	NIL	NIL
21	Median Opening	Nos.	NIL	NIL	NIL	NIL
22	Median Kerb Damages	Km's	NIL	NIL	NIL	NIL
23	Median Plantation_Functional	Km's	NIL	NIL	NIL	NIL
24	Median Plantation_ Non-Functional	Km's	NIL	NIL	NIL	NIL
25	Road Markings	Sq.m	20743.2	20743.2	13793.85	6949.35
26	W-Beam Safety Barriers	Km's	4.511	4.511	3.747	4.511
27	Rigid Concrete Barrier	Km's	0.147	0.147	0.075	0.072
28	Delineators	Nos.	700	700	444	256
29	Kilometre Stones	Nos.	47	44	28	16
30	Hectometre Stones	Nos.	186	174	111	63
31	Road Signs	No's	NIL	606	413	193
32	Urban Length	Kms	8.052	8.052	5.652	2.4
33	Rural Length	Kms	38.253	38.253	25.001	13.252

Lined Covered drains exist mostly in built-up areas along the project road. Length of Lined Covered is about 1.870 Kms. Details of the Lined Covered Drains are presented in **Appendix 6** of this report

Table 3-60: Package-9, Details of Lined Covered Drains along the Project Road

S. No.	Chainage		SH.No	Side	Length (Km)	Remarks
	From	To				
1	4.510	4.700	MDR-66	BHS	0.380	Lined Covered drain
2	4.510	4.550	MDR-66	RHS	0.040	Lined Covered drain
3	5.350	5.550	MDR-66	BHS	0.400	Lined Covered drain
4	12.000	12.500	MDR-66	LHS	0.500	Lined Covered drain
5	14.850	15.100	MDR-66	LHS	0.250	Lined Covered drain
6	15.350	15.500	MDR-66	BHS	0.300	Lined Covered drain
	Total Length				**1.870**	

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.

Metal Beam Crash Barrier are observed for a length of 4.511 Kms along the project corridor. Details of Metal Beam Crash Barrier are provided in the **Appendix 6** of this report.

Concrete Crash Barrier are observed for a length of 0.147 Kms along the project corridor. Details of Concrete Crash Barrier are provided in the **Appendix 6** of this report.

Table 3-61: Package-9, Summary of Safety Barriers along Project Road

Safety Barrier	Length (km)
Metal Beam Crash Barrier	4.511
Concrete Crash Barrier	0.147
Pedestrians Guard Rail	0
Concrete Railing	0

List of major and minor junctions developed are presented in the **Appendix 6** of this Report.

Road furniture in the form of Signs, Markings, and Crash Barriers, have been provided along the project road.

594 no's of Road signs are observed along the project corridor. Details of Road Signs are presented in the **Appendix 6** of this report.

Table 3-62: Package-9, Road Signs along the Project Road

Description	Total
Octagonal	**4**
Circular	**53**
Triangular	**112**
Rectangular	**34**
Facility informatory	**0**
Chevron	**331**
Hazard	**60**

Description	Total
Route Marker	**0**
Safety Boards	**0**
Toll Boards	**0**
Cantilever Gantry	**0**
Over Head Gantry	**0**
Variable Message Sign	**0**
Project Descriptive	**0**
Total	**594**

Total 700 no's 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.

3.9.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 3-63: Details of CD & Other Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)	Remarks
1	MDR-66	5+180	MNB	Retain	Retained	Old	2 x 10	8.40	
2	MDR-66	8+444	MJB	No Proposal	Retained	Old	10 x 4.5	8.50	
3	MDR-66	15+510	MNB	New	New	New	1 x 7.5	12.00	Span- 2 x 7.5m proposed in Sch-B
4	MDR-45	8+452	MNB	Retain	Retained	Old	1 x 11.2	8.4	
5	MDR-45	12+713	MNB	Retain	Retained	Old	2 x 6	9.00	
6	MDR-45	15+050	MNB	Retain	Retained	Old	2 x 6	8.30	
7	MDR-45	16+200	RUB	No Proposal	Retained	Old	1 x 6.9	6.00	
8	MDR-45	22+350	MNB	Retain	Retained	Old	3 x 4.7	8.5	
9	MDR-45	29+000	MNB	Retain	Retained	Old	2 x 7	9.00	
10	MDR-45	30+510	MNB	Reconstruction	New	New	1 x 7.5	8.60	Span- 2 x 7.5m proposed in Sch-B

The Quality audit consists of analysis and interpretations of the collected data from project roads such as test pits, pavement conditions, Roughness, FWD and detailed observations of CD structures

4.1 PACKAGE 1: SH-312, DARYAPUR-MHAISANG AND SH-280, AKOLA-MHAISANG

4.1.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay in nature and embankment appears to be in good condition over the entire length of project. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

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 of various type with low PI values at most of the locations. 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 majority of the locations. Results of Subgrade CBR are as follows:

Table 4-1: Package1, Details of Soaked CBR valuses

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-24	0+150	LHS	84	50	44	16	40	48	28	20	SC	2.09	8.60	18.24	1.83	88	30.00
AM-TP-25	10+000	RHS	84	46	31	16	53	46	33	13	SC	1.79	19.40	7.31	1.79	100	21.74
AM-TP-26	20+450	LHS	77	43	35	23	42	44	35	9	SC	2.12	12.00	18.24	1.98	93	28.57

Gist of the FDD test results carried out existing subgrade are presented in the following table.

Table 4-2: Package1, Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	Up/Down				
AM-TP-24	0+150	LHS	SC	2.09	1.83	88
AM-TP-25	10+000	RHS	SC	1.79	1.79	100
AM-TP-26	20+450	LHS	SC	2.12	1.98	93

The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit for existing subgrade samples varies between 44 and 48. All the samples satisfying the liquid limit criterion (LL<=50),
- Plasticity Index for all 03 samples Subgrade samples varies between 9 and 20 are satisfying the Plasticity Index criterion (PI<=25).
- Maximum Dry Density for subgrade samples varies between 1.75 and 2.12 gm/cc. All the samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies between 8.6 to 19.4
- Free Swelling Index of all 03 samples are satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in good condition.

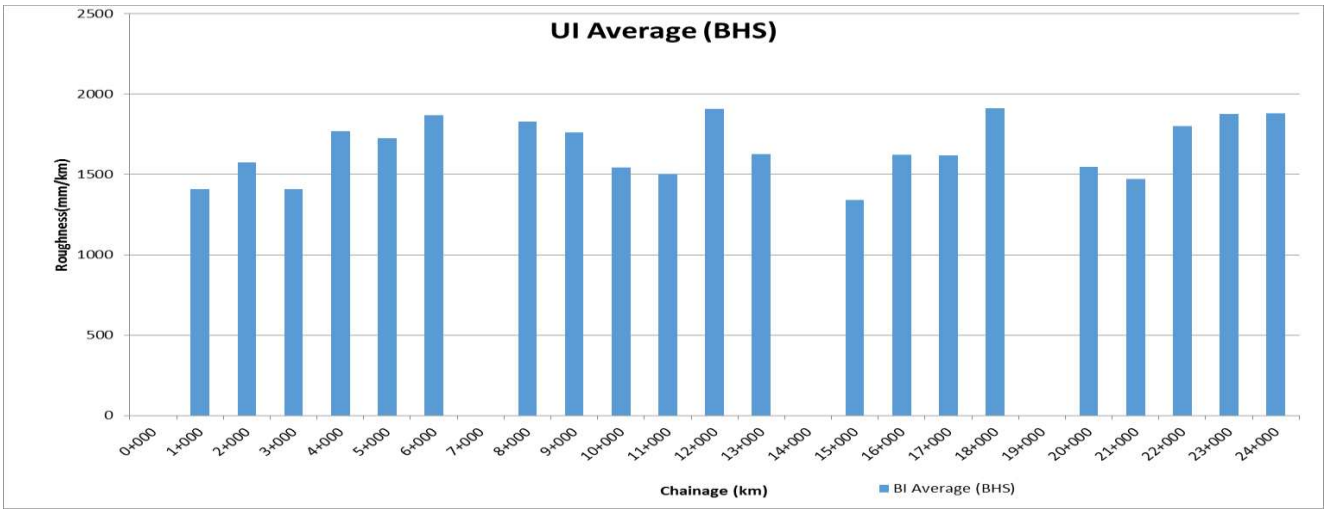
The test results and photographs are presented at **Appendix 7** of this report.

4.1.2 PAVEMENT CONDITION

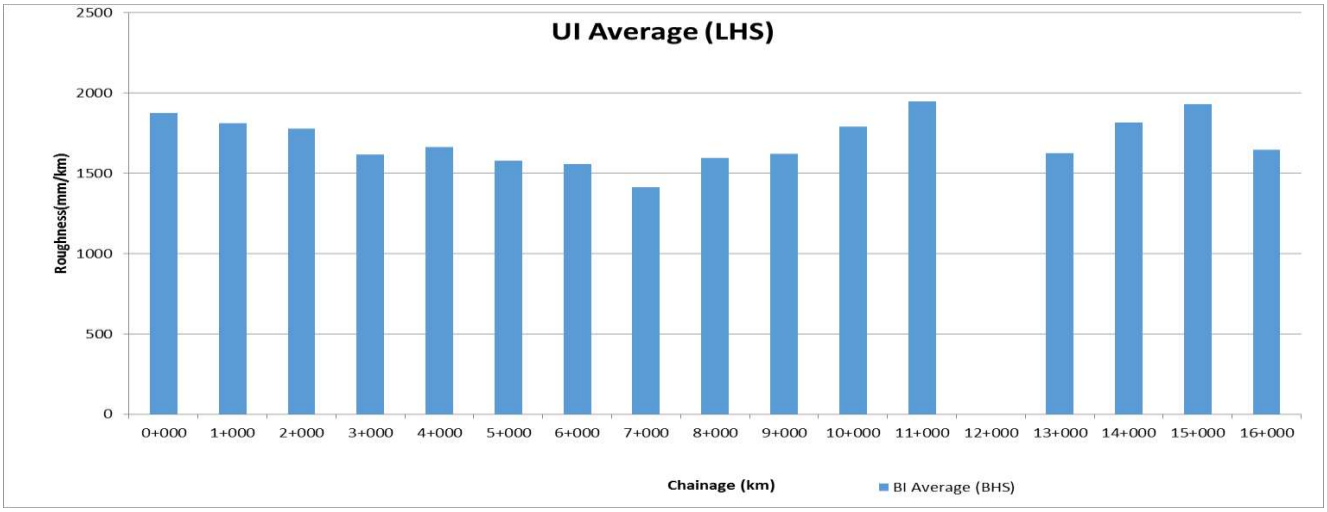
The present condition of Pavement appears to be good. The Riding quality of the project corridor is good. No Cracks, potholes and patches were observed in the project corridor. Pavement Condition report covering the data collection for each km length has been presented in **Appendix-2** of this report.

4.1.3 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:



Package1, UI Avg (BHS)_SH-280



Package1, UI Avg (BHS)_SH-312

Almost entire project road is having good riding quality. From the above charts, no section of the project road requires functional overlay as unevenness Index (UI) is less than 2750 mm/km.

4.1.4 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 4-3: Package1, Summary of Design Moduli of different layers – BHS

S. No	Side	From	To	SH. No	Length	15th Percentile MR values		
						MR for BT	MR for Granular	MR for Subgrade
1	BHS	0.00	6.00	SH-280	6.0	2638	387	87
2	BHS	6.00	13.00	SH-280	7.0	2753	385	87
3	BHS	13.00	25.00	SH-280	12.0	2736	373	86
4	BHS	0.00	8.50	SH-312	8.5	2086	392	87
5	BHS	8.50	16.50	SH-312	8.0	2124	394	87
Total Length					**41.500**			

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 2086Mpa to 2753Mpa in BHS Carriageway however, the MR value of BT layer restricted to 3000 Mpa. The MR value for Granular Layers is 373Mpa to 394Mpa in BHS Carriageway. Similarly, the MR value for Subgrade Layer is 87 Mpa in BHS Carriageway.

4.1.5 PAVEMENT COMPOSITION

As per Pavement Design Report crust composition for the main carriageway and service road is as:

Main carriageway	
BC, mm	40
DBM, mm	50
WMM, mm	250
GSB, mm	200
PQC, mm	250
DLC, mm	100
Subgrade, mm	500

However, from the test pits dug at 03 locations along the main carriageway reveal the following

a) Main Carriageway Crust

	BT, mm	WMM, mm	GSB, mm	Total Crust, mm
Maximum	100	200	250	460
Minimum	100	200	120	420
Average	100	200	170	440

4.1.6 CD STRUCTURES

The CD structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, all 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 4-4: Package1, Summary of Major Structures

S. No	Type of Str	Total No. of Str's AS per		
		Sch-A	Sch-B	Site
1	Major Bridges	1	1	1
2	Minor Bridges	7	9	9
3	Box/Slab Culverts	21	21	21
4	Pipe Culverts	41	40	41

As per Schedule 40 no's Pipe culverts & 21 no's Slab and Box culverts, total 61 no's Culverts.

Chainage: 15+350
General Description
BHS

- Type of Structure : Major Bridge
- Span Arrangement : 21 x 7.4 +1 x 4.9 m
- Total deck width of structure : 7.9 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Steel hallow pipe
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Segregation observed at some locations of piers.
- No major distress found.

Chainage: 2+600
General Description
BHS

- Type of Structure : Minor Bridge
- Span Arrangement : 4 x 5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Floor apron not visible.

Chainage: 5+000
General Description
BHS

- Type of Structure : Minor Bridge
- Span Arrangement : 4 x 4.0 m
- Total deck width of structure : 10.80 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Steel hallow pipe railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Quadrant pitching not found.
- No distress found.

Chainage: 7+900
General Description
BHS

- Type of Structure : Minor Bridge
- Span Arrangement : 6 x 3 m
- Total deck width of structure : 12.00 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Floor apron not visible.
- ➢ No distress found.

Chainage: 7+950
General Description
BHS

- Type of Structure : Minor Bridge
- Span Arrangement : 2 x 5.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- No distress found.

Chainage: 9+950
General Description
BHS

- Type of Structure : Minor Bridge
- Span Arrangement : 2 x 5.0 m
- Total deck width of structure : 12.00 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Floor apron not visible.
- ➢ No distress

Chainage: 13+050
General Description
BHS

- Type of Structure : Minor Bridge
- Span Arrangement : 4 x 5.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Floor protection not visible
- No distress

Chainage: 13+990
General Description
BHS

- Type of Structure : Minor Bridge
- Span Arrangement : 3 x 6.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Existing old PCC substructure widened with RCC with solid slab.
- Quadrant pitching partially damaged.

Chainage: 19+400
General Description
LHS RHS

- Type of Structure : Minor Bridge
- Span Arrangement : 6 x 5.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Floor apron not visible.

Chainage: 23+780
General Description
LHS RHS

- Type of Structure : Minor Bridge
- Span Arrangement : 1 x 7.5 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Quadrant pitching not found.
- No structural distress

Package-1, Details of Culverts:

Sr. No	Section	Existing Chainage (km)	Proposed Ch. (km)	Existing Type of Struc.	Proposed Type of Struc.	Type of Culvert As per Site	Proposed Span Arrangement (m)	Proposal As per Sch-B	Age of Culvert As per Site	Width (m)	Floor Protection (Yes/No)	Quadrant Stone pitching (Yes/No)	Observations As per Site
Akola to Mhaisang													
1	SH-280	1+000	1+113	HPC	Box Culvert		1x3.00	Reconstruction		15			
2	SH-280	1+100	1+167	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	15	No	No	Quadrant pitching and floor apron not provided.
3	SH-280	2+000	2+136	Slab Culvert	HPC	Pipe	2 x 1200	Reconstruction	New	12	No	No	Quadrant pitching and floor apron not provided.
4	SH-280	5+400	5+458	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	No	Yes	Floor apron not provided.
5	SH-280	5+800	5+868	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Yes	Yes	Crack observed on head wall
6	SH-280	6+450	6+562	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Yes	Yes	Fair condition
7	SH-280	7+150	7+235	Slab Culvert	Slab Culvert	Slab Culvert	1 x 3.50	Retained	Old	12.8	Not visible	No	Quadrant pitching and floor apron not visible
8	SH-280	7+300	7+435	Slab Culvert	Box Culvert	Pipe	2x1200	Reconstruction	New	15	Not visible	No	Quadrant pitching and floor apron not visible
9	SH-280	8+230	8+332	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	No	Yes	Floor apron not provided.
10	SH-280	8+600	8+684	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Not visible	Yes	Floor apron not visible, Quadrant pitching is partially damaged.
11	SH-280	8+900	9+013	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Yes	Yes	Fair condition
12	SH-280	9+620	9+706	HPC	HPC	Pipe	2 x 1200	Reconstruction	New	12	Yes	Yes	Vegetation observed on went area location
13	SH-280	10+700	10+829	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Yes	Yes	Fair condition
14	SH-280	10+996	11+054	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	No	Yes	Floor apron not provided.

Sr. No	Section	Existing Chainage (km)	Proposed Ch. (km)	Existing Type of Struc.	Proposed Type of Struc.	Type of Culvert As per Site	Proposed Span Arrangement (m)	Proposal As per Sch-B	Age of Culvert As per Site	Width (m)	Floor Protection (Yes/No)	Quadrant Stone pitching (Yes/No)	Observations As per Site
15	SH-280	11+970	12+089	HPC	Box Culvert	NV	1 x 3.00	Reconstruction	NV	12	NV	NV	Not visible
16	SH-280	12+250	12+346	HPC	HPC	Pipe	2 x 1200	Reconstruction	New	12	No	Yes	Floor apron not provided.
17	SH-280	14+350	14+481	HPC	HPC	Pipe	1 x 1200	Reconstruction	Old	15	No	No	Floor apron, Quadrant pitching, and head wall is not provided
18	SH-280	14+900	15+024	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Not visible	Yes	Fair condition
19	SH-280	15+500	15+585	Slab Culvert	HPC	Box	2 x 1200	Reconstruction	New	12	Yes	Yes	Fair condition
20	SH-280	15+750	15+838	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	No	Yes	Fair condition
21	SH-280	17+500	17+581	Slab Culvert	Slab Culvert	Slab Culvert	1 x 3.00	Retained	Old	10.7	NV	Yes	Honey combs are observed on soffit of the slab
22	SH-280	17+700	17+763	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Yes	Yes	Fair condition
23	SH-280	17+880	17+934	Slab Culvert	Box Culvert	Box	1 x 5.00	Reconstruction	New	12	Yes	Yes	Fair condition
24	SH-280	18+150	18+267	HPC	HPC	Not visible	1 x 1200	Reconstruction	Not visible	12	Not visible	Not visible	Not visible
25	SH-280	18+550	18+650	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	No	Yes	Vegetation observed on Quadrant pitching
26	SH-280	18+850	18+921	Slab Culvert	Slab Culvert	Slab Culvert	1 x 3.50	Reconstruction	New	10.7	Yes	Yes	Fair condition
27	SH-280	19+900	20+035	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Yes	Yes	Vegetation observed on Quadrant pitching & Went area location
28	SH-280	20+100	20+188	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Yes	Yes	Fair condition
29	SH-280	23+020	23+116	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Yes	Yes	Fair condition
30	SH-280	23+700	23+734	Slab Culvert	Box Culvert	Box	1x3.00	Reconstruction	New	12	Yes	Yes	Fair condition
31	SH-280	24+200	24+228	HPC	HPC	Not visible	1 x 1200	Reconstruction	Not visible	12	Not visible	Not visible	Not visible

Sr. No	Section	Existing Chainage (km)	Proposed Ch. (km)	Existing Type of Struc.	Proposed Type of Struc.	Type of Culvert As per Site	Proposed Span Arrangement (m)	Proposal As per Sch-B	Age of Culvert As per Site	Width (m)	Floor Protection (Yes/No)	Quadrant Stone pitching (Yes/No)	Observations As per Site
32	SH-280	24+400	24+299	Slab Culvert	Box Culvert	Box	1 x 3.00	Reconstruction	New	12	Yes	Yes	Fair condition
33	SH-280	24+600	24+488	Slab Culvert	HPC	Box	2 x 1200	Reconstruction	New	12	Yes	Yes	Fair condition
Dunyapur to Mhaisang													
34	SH-312	0+000	0+020	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	15	No	Yes	Vegetation observed on Quadrant pitching
35	SH-312	0+350	0+350	HPC	HPC	Pipe	2 x 1200	Reconstruction	New	15	No	Yes	Vegetation observed on Quadrant pitching & Went area location
36	SH-312	2+850	2+660	HPC	HPC	Not visible	1 x 1200	Reconstruction	Not visible	12	Not visible	Not visible	Not visible
37	SH-312	3+200	3+225	HPC	HPC	Not visible	1 x 1200	Reconstruction	Not visible	12	Not visible	Not visible	Not visible
38	SH-312	4+800	4+885	HPC	HPC	Pipe	2 x 1200	Reconstruction	New	12	No	Yes	Vegetation observed on Quadrant pitching
39	SH-312	6+100	6+115	HPC	HPC	Pipe	2 x 1200	Reconstruction	New	12	No	Yes	Vegetation observed on Quadrant pitching & Went area location
40	SH-312	6+250	6+260	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Yes	Yes	Vegetation observed on Quadrant pitching
41	SH-312	6+500	6+530	HPC	HPC	Pipe	2 x 1200	Reconstruction	New	12	Yes	Yes	Vegetation observed on Went area location
42	SH-312	6+700	6+770	HPC	HPC	Not visible	2 x 1200	Reconstruction	Not visible	12	Not visible	Not visible	Not visible
43	SH-312	7+000	7+030	HPC	HPC	Pipe	2 x 1200	Reconstruction	New	12	No	No	More vegetation on Quadrant pitching & went area location
44	SH-312	7+700	7+695	HPC	HPC	Pipe	2 x 1200	Reconstruction	New	15	No	Yes	Vegetation observed on Quadrant pitching
45	SH-312	8+800	8+820	Slab Culvert	Box Culvert	Box	1x3.00	Reconstruction	New	12	Yes	Yes	Fair condition
46	SH-312	9+150	9+200	Slab Culvert	Box Culvert	Box	1x5.00	Reconstruction	New	12	Yes	Yes	Fair condition
47	SH-312	9+800	9+850	Slab Culvert	HPC	Pipe	2 x 1200	Reconstruction	New	12	No	No	No Floor apron, No Quadrant pitching

Sr. No	Section	Existing Chainage (km)	Proposed Ch. (km)	Existing Type of Struc.	Proposed Type of Struc.	Type of Culvert As per Site	Proposed Span Arrangement (m)	Proposal As per Sch-B	Age of Culvert As per Site	Width (m)	Floor Protection (Yes/No)	Quadrant Stone pitching (Yes/No)	Observations As per Site
48	SH-312	10+250	10+330	Slab Culvert	Box Culvert	Box	1 x 6.00	Reconstruction	New	12	Yes	Yes	Fair condition
49	SH-312	10+950	10+985	Slab Culvert	Box Culvert	Box	1x3.00	Reconstruction	New	12	Yes	Yes	Previous patch repair works are done
50	SH-312	11+250	11+330	Slab Culvert	HPC	Pipe	2 x 1200	Reconstruction	New	12	No	Yes	Floor apron not provided.
51	SH-312	11+900	11+955	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Yes	Yes	Vegetation observed on Quadrant pitching
52	SH-312	12+000	12+105	Slab Culvert	Box Culvert	Pipe	1x1200	Reconstruction	New	12	Yes	Yes	Vegetation observed on Quadrant pitching
53	SH-312	12+600	12+695	Slab Culvert	Box Culvert	Box	1 x 3.00	Reconstruction	New	12	Yes	Yes	Fair condition
54	SH-312	13+250	13+280	Slab Culvert	Box Culvert	Box	1x3.00	Reconstruction	New	12	Yes	Yes	Vegetation observed on Quadrant pitching
55	SH-312	13+550	13+550	Slab Culvert	Box Culvert	Box	1x6.00	Reconstruction	New	12	Yes	Yes	Fair condition
56	SH-312	14+400	14+520	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	15	Yes	Yes	Vegetation observed on Quadrant pitching
57	SH-312	15+200	15+240	HPC	HPC	Not visible	1 x 1200	Reconstruction	Not visible	12	Not visible	Not visible	Not visible
58	SH-312	15+650	15+675	HPC	HPC	Not visible	1 x 1200	Reconstruction	Not visible	12	Not visible	Not visible	Not visible
59	SH-312	16+000	16+040	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	No	Yes	More vegetation on Quadrant pitching & went area location
60	SH-312	16+800	16+480	HPC	HPC	Pipe	1 x 1200	Reconstruction	New	12	Not visible	Yes	Floor apron not visible due to full of water

Photos depicting the existing culvert are presented below

Pipe Culvert at Km 1+100	Pipe Culvert at Km 2+000
Pipe Culvert at Km 5+400	Pipe Culvert at Km 5+800
Pipe Culvert at Km 6+450	Pipe Culvert at Km 8+230

Pipe Culvert at Km 8+600	**Pipe Culvert at Km 8+900**
Pipe Culvert at Km 9+620	**Pipe Culvert at Km 10+700**
Pipe Culvert at Km 10+990	**Pipe Culvert at Km 12+250**

Pipe Culvert at Km 14+350	Pipe Culvert at Km 14+900
Pipe Culvert at Km 15+750	Pipe Culvert at Km 17+700
Pipe Culvert at Km 18+550	Pipe Culvert at Km 19+900

Pipe Culvert at Km 20+100	**Pipe Culvert at Km 23+020**
Slab Culvert at Km 7+150	**Slab Culvert at Km 7+300**
Slab Culvert at Km 15+500	**Slab Culvert at Km 17+500**

Slab Culvert at Km 17+880

Slab Culvert at Km 18+850

Slab Culvert at Km 23+700

Slab Culvert at Km 24+400

Pipe Culvert at Km 0+000

Pipe Culvert at Km 0+350

 Pipe Culvert at Km 4+800	 **Pipe Culvert at Km 6+100**
 Pipe Culvert at Km 6+250	 **Pipe Culvert at Km 6+500**
 Pipe Culvert at Km 7+000	 **Pipe Culvert at Km 7+700**

Pipe Culvert at Km 11+900

Pipe Culvert at Km 14+400

Pipe Culvert at Km 16+000

Pipe Culvert at Km 16+800

Slab Culvert at Km 8+800

Slab Culvert at Km 9+150

Slab Culvert at Km 10+250	**Slab Culvert at Km 10+950**
Pipe Culvert at Km 11+250	**Pipe Culvert at Km 12+000**
Slab Culvert at Km 12+600	**Slab Culvert at Km 13+250**

4.1.7 DRAINAGE AND SLOPE PROTECTION

RCC covered drains constructed along the corridor in built-up locations appear to be in sound condition for most of length and functioning well.

4.1.8 TRAFFIC SAFETY AND ROAD FURNITURE

Metal beam crash barriers provided along the project road appear to be intact at the given locations.

Roadway delineators installed along the length of corridor appear to be good condition at most of locations. Very few delineators got damaged.

4.1.9 ROAD USER FACILITITES

The bus stop and bus bay provided along the corridor appear to be fair in condition.

4.2 PACKAGE 2: SH-282, ANJANGAON TO DARYAPUR SECTION

4.2.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay in nature and embankment appears to be in good condition over the entire length of project. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

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 of various type with low PI values at most of the locations. 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 CBR of 10%. Results of Subgrade CBR are as follows:

Table 4-5: Package-2, **Details of Soaked CBR valuses**

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-21	24+000	LHS	83	50	44	17	39	34	23	11	SC	2.03	13.20	14.06	1.98	97	20.00
AM-TP-22	14+900	RHS	73	43	38	27	35	39	25	14	SC	2.01	14.00	13.53	1.99	99	22.73
AM-TP-23	1+200	LHS	81	41	34	19	47	33	23	10	SC	2.07	9.80	23.70	1.90	92	25.00

Gist of the FDD test results carried out existing subgrade are presented in the following table.

Table 4-6: Package-2, Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	Up/Down				
AM-TP-21	24+000	LHS	SC	2.03	1.98	97
AM-TP-22	14+900	RHS	SC	2.01	1.99	99
AM-TP-23	1+200	LHS	SC	2.07	1.90	92

The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit for existing subgrade samples varies between 30 and 40. All the samples satisfying the liquid limit criterion (LL<=50).
- Plasticity Index for all 03 Nos of Subgrade samples varies between 10 and 15 and satisfying the Plasticity Index criterion (PI<=25).
- Maximum Dry Density for subgrade samples varies between 1.80 and 2.17 gm/cc. All the samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies between 8.0 to 16.5
- Free Swelling Index of the samples varies between 22 and 25 satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in good condition.

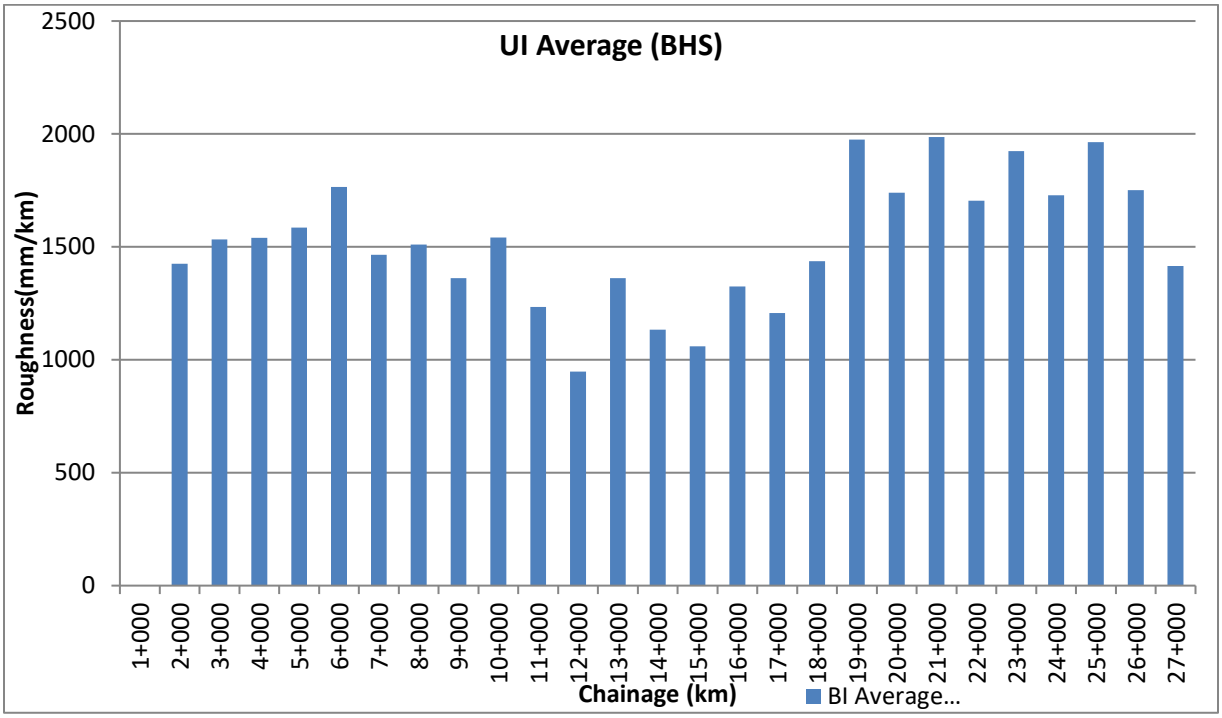
The test results and photographs are presented at **Appendix 7** of this report.

4.2.2 PAVEMENT CONDITION

The visual Pavement condition data has been collected for each km length has been presented in **Appendix 2** of this Report. The pavement condition appears to be fair and the riding quality is satisfactory.

4.2.3 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:



Package-2, **BI Avg (BHS)**

Almost entire project road is having good riding quality. From the above charts, no section of the project road requires functional overlay as unevenness Index (UI) is less than 2000 mm/km.

4.2.4 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 4-7: Package-2, Summary of Design Moduli of different layers - BHS

S.No	Side	From (km)	To (km)	Length (km)	15th Percentile MR values, Mpa		
					MR for BT	MR for Granular	MR for Subgrade
1	BHS	1.000	2.000	1.000	Rigid Pavement		
2	BHS	2.000	11.000	9.000	2791	392	87
3	BHS	11.000	17.000	6.000	3018	383	87
4	BHS	17.000	23.000	6.000	3000	386	87
5	BHS	23.000	27.885	4.885	2675	346	87
Total Length				**26.885**			

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 2675Mpa to 3018Mpa in BHS Carriageway,

however, the MR value of BT layer restricted to 3000 Mpa. The MR value for Granular Layers is 346Mpa to 392Mpa in BHS Carriageway. Similarly, the MR value for Subgrade Layer is 87 Mpa in BHS Carriageway.

4.2.5 PAVEMENT COMPOSITION

TCS drawing shows crust composition for the main carriageway is as:

Main carriageway	
BC, mm	40
DBM, mm	50
WMM, mm	250
GSB, mm	200
PQC, mm	250
DLC, mm	100
Subgrade, mm	500

However, from the test pits dug at 03 locations along the main carriageway reveal the following

b) Main Carriageway Crust

	BT, mm	WMM, mm	GSB, mm	Total Crust, mm
Maximum	120	210	200	510
Minimum	100	190	150	450
Average	105	200	175	475

4.2.6 STRUCTURES

The structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, all 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 4-8: Package-2, Summary of Major Structures

S. No	Type of Str	Total No. of Str's As per		
		Sch-A	Sch-B	Site
1	Major Bridges	Nil	Nil	Nil
2	Minor Bridges	3	3	3
3	Slab Culvert	4	6	6
4	Pipe Culverts	21	19	19

As per Schedule 19 no's Pipe culverts & 6 no's Slab and Box culverts, total 25 no's Culverts.

Chainage: 13+500
General Description

MCW

- Type of Structure : **MNB**
- Span Arrangement : 6 x 5.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Quadrant stone pitching not found.
- Patch works observed at abutment location.
- Segregation observed on crash barrier at some locations.
- Structure is in good condition.
- Drainage spout grating not provided.

Shot on OnePlus

Shot on OnePlus

Chainage: 17+500
General Description

MCW

- Type of Structure : **MNB**
- Span Arrangement : 2 x 4.0 m
- Total deck width of structure : 10.60 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Soil erosion observed near abutment.
- Drainage spouts are not provided.
- Leaching observed in sub structure.
- Cracks observed on abutment.

Shot on OnePlus

Shot on OnePlus

Shot on OnePlus

Chainage: 27+745
General Description

MCW

- Type of Structure : **MNB**
- Span Arrangement : 6 x 5.0 m
- Total deck width of structure : LHS-12.0 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- LHS-Structure under construction.
- RHS completed and good in condition.

Details of Culverts:

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Existing Width (m)	Proposed Width of Culvert (m)	Existing Type of Culvert	Type of Culvert as per Site.	As per Sch-B	As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
1	1+050	1+060	SH-282	1 x 600	1 x 1.2	10.10	21	Pipe	Pipe	Reconstruction	New	No visible	NO	> Silt observed in the pipe. > Vegetation observed on the structure. > Structure is in fair condition.
2	4+250	4+245	SH-282	1x 1000	1 x 1.2	10.10	12	Pipe	Pipe	Reconstruction	New	YES	YES	> Structure is in fair condition. > Silt observed in the pipe.
3	5+650	5+696	SH-282	1x1000	1 x 1.2	10.30	12	Pipe	Pipe	Reconstruction	New	YES	YES	> Structure is in fair condition. > Silt & Debris observed in the pipe.
4	6+200	6+225	SH-282	1x 1000	1 x 1.2	10.20	12	Pipe	Pipe	Reconstruction	New	YES	YES	> Silt & Debris observed in the pipe.
5	6+750	6+760	SH-282	1x1000	1 x 1.2	10.10	12	Pipe	Pipe	Reconstruction	New	No visible	YES	> Structure is in fair condition. > Silt observed in the pipe.
6	8+180	8+213	SH-282	1 x 1000	1 x 1.2	10.20	12	Pipe	Pipe	Reconstruction	New	YES	YES	> Structure is in fair condition.
7	8+400	8+490	SH-282	1x 1000	1 x 1.2	12.70	12	Pipe	Pipe	Reconstruction	New	NO	YES	> Silt observed in the pipe. > Vegetation observed on the structure.
8	8+750	8+775	SH-282	1x1000	1 x 1.2	12.80	12	Pipe	Pipe	Reconstruction	New	YES	YES	> Silt observed in the pipe. > Vegetation observed on the structure. > on side stone pitching is not provided.
9	9+600	9+645	SH-282	1x1000	1 x 1.2	12.70	12	Pip	Pipe	Reconstruction	New	No visible	YES	> Vegetation observed on the structure.
10	11+250	11+311	SH-282	1 x 1200	1 x 1.2	10.10	12	Pipe	Pipe	Reconstruction	New	YES	YES	> Structure is in fair condition. > Silt observed in the pipe.
11	11+950	12+000	SH-282	1x1000	1 x 1.2	10.10	12	Pipe	Pipe	Reconstruction	New	YES	YES	> Structure is in fair condition.
12	13+030	13+090	SH-282	1x1000	1 x 1.2	10.10	12	Pipe	Pipe	Reconstruction	New	NO	YES	> Structure is in fair condition. > Silt observed in the pipe.
13	16+150	16+183	SH-282	-	1 x 3.0	10.00	12	Slab	Slab	Reconstruction	New	No visible	NO	> Structure is in fair condition. > Water stagnated in the structure
14	16+200	16+240	SH-282	-	1 x 4.0	10.00	12	Slab	Slab	Reconstru	New	NO	NO	> Structure is in

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Existing Width (m)	Proposed Width of Culvert (m)	Existing Type of Culvert	Type of Culvert as per Site.	As per Sch-B	As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
										ction				fair condition. > Silt observed under the structure. > Previous patch repair works are done on side walls.
15	16+400	16+414	SH-282	2x600	1 x 1.2	11.10	12	Slab	Slab	Reconstruction	New	NO	NO	> Structure is in fair condition. > Silt observed in the pipe. > Previous patch repair works are done on side walls.
16	17+900	17+940	SH-282	-	1 x 3.0	11.00	12	Slab	Slab	Reconstruction	New	NO	NO	> Structure is in fair condition. > Silt & Debris observed under the structure.
17	18+950	19+020	SH-282	2x800	1 x 1.2	11.20	12	Pipe	Pipe	Reconstruction	New	No visible	YES	> Quadrant pitching damaged at LHS. > Silt observed in the pipe.
18	19+200	19+212	SH-282	1x800	1 x 1.2	12.50	12	Pipe	Pipe	Reconstruction	New	YES	YES	> Structure is in fair condition.
19	19+600	19+656	SH-282	-	1 x 3.0	11.40	12	Slab	Slab	Reconstruction	New	NO	RHS: provided LHS: Not provided	> Previous patch repair works are done.
20	20+600	20+640	SH-282	1x800	1 x 1.2	11.00	12	Pipe	Pipe	Reconstruction	New	No visible	YES	> LHS side structure fully covered with vegetation.
21	22+300	22+424	SH-282	-	1 x 3.0	10.80	12	Slab	Slab	Reconstruction	New	YES	YES	> Honey combing observed on side walls. > Silt observed under the structure.
22	22+550	22+630	SH-282	1 x 800	1 x 1.2	11.10	12	Pipe	Pipe	Reconstruction	New	YES	YES	> Minor cracks observed on Head wall.
23	25+650	25+800	SH-282	-	1 x 3.0	10.10	12	Slab	Slab	Reconstruction	New	YES	YES	> Structure is in Fair condition.
24	26+520	26+664	SH-282	1 x1000	1 x 1.2	10.50	12	Pipe	Pipe	Reconstruction	New	No visible	YES	> Structure is in Fair condition.
25	26+900	27+030	SH-282	2x1000	2 x 1.2	11.10	12	Pipe	Pipe	Reconstruction	New	YES	YES	> Previous patch repair works are done. > Structure is in Fair condition.

Photos depicting the existing culvert are presented below

Pipe Culvert at Km 1+050

Pipe Culvert at Km 4+250

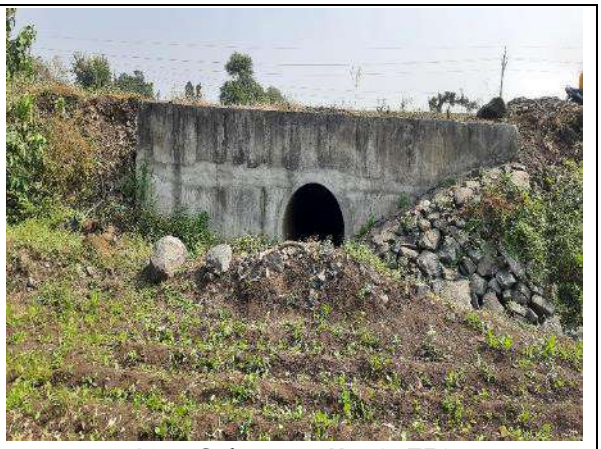
Pipe Culvert at Km 5+650

Pipe Culvert at Km 6+200

Pipe Culvert at Km 6+750

Pipe Culvert at Km 8+180

Pipe Culvert at Km 8+400



Pipe Culvert at Km 8+750

Pipe Culvert at Km 9+600

Pipe Culvert at Km 11+250

Pipe Culvert at Km 11+950

Pipe Culvert at Km 13+030

Slab Culvert at Km 16+150

Slab Culvert at Km 16+200

Slab Culvert at Km 16+400

Slab Culvert at Km 17+900

Pipe Culvert at Km 18+950

Pipe Culvert at Km 19+200

Slab Culvert at Km 19+600	Pipe Culvert at Km 20+600
Slab Culvert at Km 22+300	Pipe Culvert at Km 22+550
Slab Culvert at Km 25+650	Pipe Culvert at Km 26+520

4.2.7 DRAINAGE AND SLOPE PROTECTION

RCC covered drains constructed along the corridor appear to be in sound condition for most of length and functioning well.

4.2.8 TRAFFIC SAFETY AND ROAD FURNITURE

Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.

Roadway delineators installed along the length of corridor appear to be good condition at most of locations. Very few delineators got damaged.

4.2.9 ROAD USER FACILITITES

The bus stop and bus bay provided along the corridor appear to be fair in condition.

4.3 PACKAGE 3: SH-282, DARYAPUR-MURTIZAPUR

4.3.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay in nature and embankment appears to be in good condition over the entire length of project. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

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 of various type with low PI values at most of the locations. 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 majority of the locations. Results of Subgrade CBR are as follows:

Table 4-9: Package-3, Details of Soaked CBR valuses

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-19	28+900	LHS	76	45	36	24	40	36	26	10	SC	2.06	11.40	25.06	2.03	99	27.27
AM-TP-20	45+000	RHS	68	33	25	32	43	35	27	8	SC	2.10	12.20	18.24	1.97	94	18.18

Gist of the FDD test results carried out existing subgrade are presented in the following table.

Table 4-10: Package-3, Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	Up/Down				
AM-TP-19	28+900	LHS	SC	2.06	2.03	99
AM-TP-20	45+000	RHS	SC	2.10	1.97	94

The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit for existing subgrade samples varies between 35 and 36. All the samples satisfying the liquid limit criterion (LL<=50).
- Plasticity Index for 2 out of 2 samples Subgrade samples varies between 8 and 10.All number of samples satisfying the Plasticity Index criterion (PI<=25).
- Maximum Dry Density for subgrade samples varies between 2.06 and 2.10 gm/cc. All the samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies between 11.40 to 12.20
- Free Swelling Index for 2 out of 2 existing subgrade samples varies between 18.18 and 27.273. All samples are satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in good condition.

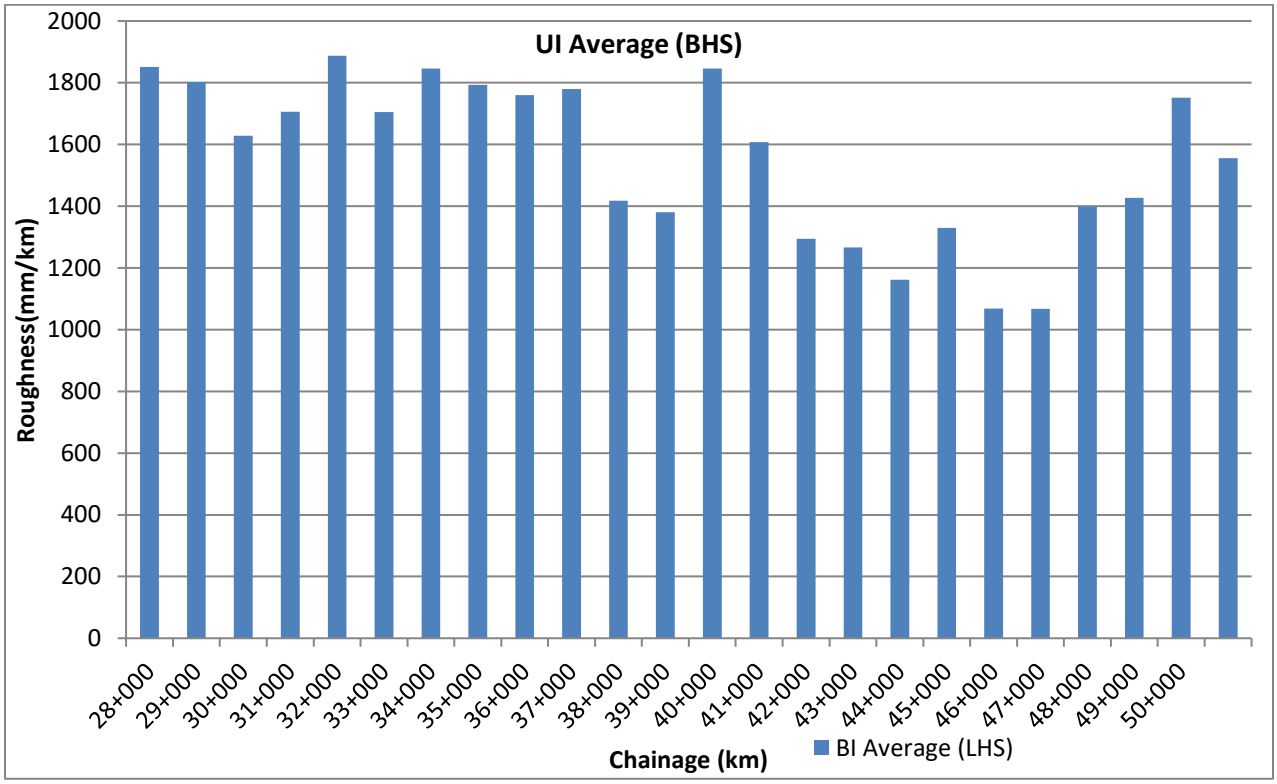
The test results and photographs are presented at **Appendix 7** of this report.

4.3.2 Visual PAVEMENT CONDITION

The present condition of Pavement appears to be good. The Riding quality of the project corridor is good. No Cracks, potholes and patches were observed in the project corridor. Pavement Condition report covering the data collection for each km length has been presented in **Appendix-2** of this report.

4.3.3 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:



Package-3, BI Avg (BHS)

Almost entire project road is having good riding quality. From the above charts, no section of the project road requires functional overlay as unevenness Index (UI) is less than 2000 mm/km.

4.3.4 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 4-11: Package-3, Summary of Design Moduli of different layers – BHS

S.No	Side	From	To	Length	15th Percentile MR values		
					MR for BT	MR for Granular	MR for Subgrade
1	BHS	28.50	34.00	5.500	2960	330	87
2	BHS	34.00	40.50	6.500	2976	390	87
3	BHS	40.50	50.00	9.500	3085	391	87

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 2960Mpa to 3085Mpa in BHS, The MR value for Granular Layers is 330Mpa to 391Mpa in BHS Carriageway. Similarly, the MR value for Subgrade Layer is 87 Mpa in BHS Carriageway.

4.3.5 PAVEMENT COMPOSITION

TCS drawing shows crust composition for the main carriageway is as:

Main carriageway	
BC, mm	40
DBM, mm	50
WMM, mm	250
GSB, mm	200
PQC, mm	250
DLC, mm	100
Subgrade, mm	500

However, from the test pits dug at 02 locations along the main carriageway reveal the following

c) Main Carriageway Crust

	BT, mm	WMM, mm	GSB, mm	Total Crust, mm
Maximum	100	280	300	680
Minimum	90	210	220	520
Average	95	245	260	600

4.3.6 STRUCTURES

The structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, all 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 4-12: Package-3, Summary of Major Structures

S.No	Type of Str	Total No. of Str's		
		Sch-A	Sch-B	Site
1	Road Over Bridges	1	1	1
2	Major Bridges	1	1	1
3	Minor Bridges	4	4	4
4	Slab Culvert	5	6	6
5	Pipe Culverts	14	14	14

As per Schedule 14 no's Pipe culverts & 6 no's Slab and Box culverts, total 20 no's Culverts.

Chainage: 36+500
General Description

- Type of Structure : **MJB**
- Span Arrangement : 20 x 8.5 m
- Total deck width of structure : 8 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall
- Type of Superstructure : RCC Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure is in good condition.
- Hand railing partially damaged.

Shot on OnePlus	Shot on OnePlus
Shot on OnePlus	Shot on OnePlus

Chainage: 34+850

General Description

- Type of Structure : **MNB**
- Span Arrangement : 8 x 7 m
- Total deck width of structure : 9.9 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : -
- Type of Railing / Crash Barrier : Concrete Hand rails
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Reinforcement exposed bottom of the deck slab.
- Segregation observed on soffit of slab and bottom slab at some of the locations.
- Segregation observed on substructures at some locations.
- Corrosion strains are observed at bottom of slab.
- Leaching observed on piers.
- Structure is in good condition.

Chainage: 40+220
General Description

- Type of Structure : **MNB**
- Span Arrangement : 5 x 5 m
- Total deck width of structure : 10.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall
- Type of Superstructure : RCC Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Pipe Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching observed in pears.
- Spalling observed in pears.
- Segregation observed on Pier and Pier caps at some of locations.
- Segregation observed on soffit of slab and reinforcement exposed at some locations.
- Vegetation observed on super structure.
- Structure is in good condition.

Chainage: 40+840
General Description

- Type of Structure : **MNB**
- Span Arrangement : 3 x 5.3 m
- Total deck width of structure : 12 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Concrete Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Spalling observed on super structure.
- Cracks observed in abutment location.
- Segregation observed on substructure at some locations.
- Honeycombs are observed on top slab and side wall.

Chainage: 45+130

General Description

- Type of Structure : **MNB**
- Span Arrangement : 6 x 5 m
- Total deck width of structure : 10.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall
- Type of Superstructure : RCC Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Pipe Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching observed in pears.
- Spalling observed in pears.
- Segregation observed on substructure locations.
- Vegetation observed on super structure.

Chainage: 49+400

General Description

- Type of Structure : **ROB**
- Span Arrangement : 3 x 14 m
- Total deck width of structure : 11 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Circular Pier
- Type of Superstructure : RCC Slab
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Parapet
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure is in good condition.
- Leaching observed on pier cap.

Details of Culverts:

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Existing Width (m)	Proposed Width of Culvert (m)	Existing Type of Culvert	Type of Culvert as per Site	As per Sch-B	As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
1	28+350	28+290	SH-282	1 x 2.20	-	10.1	-	Slab	Slab	Retained	old	Not visible	No	> Water stagnated under the structure.
2	28+810	28+610	SH-282	1 x 2.20	-	10.6	-	Slab	Not Found	Retained	-	-	-	> Not found in the Site.
3	28+850	28+656	SH-282	1x8.00	1 x 1.20	10.3	12	Pipe	Not visible	Reconstruction	Not visible	Not visible	Not visible	> Pipe culvert is not visible, buried under Debris.
4	29+020	29+127	SH-282	1 x 5.00	-	10.6	-	Slab	Slab	Retained	old	Not visible	No	> Water stagnated in the structure. > Vegetation observed on the structure.
5	29+300	29+590	SH-282	1 x 8.00	1 x 1.20	10.2	12	Pipe	Pipe	Reconstruction	old	Not visible	No	> Pipe culvert is buried with Vegetation & Debris.
6	30+750	30+850	SH-282	2 x 8.00	1 x 1.20	10.1	12	Pipe	Not visible	Reconstruction	Not visible	Not visible	No	> Structure is not visible at this location.
7	31+180	31+243	SH-282	1x8.00	1 x 1.20	10.3	12	Pipe	Pipe	Reconstruction	New	Not visible	Yes	> Stagnated water and debris are present. > Structure is in Fair condition.
8	32+190	32+388	SH-282	-	1 x 3.00	10.5	12	Slab	Slab	Reconstruction	New	Not visible	No	> Silt & Debris observed under the structure. > Structure is in Fair condition.
9	33+350	33+435	SH-282	1x10.00	1 x 1.20	11	12	Pipe	Pipe	Reconstruction	New	Yes	Yes	> Silt observed in the pipe. > Structure is in fair condition.
10	35+250	35+558	SH-282	1 x 8.00	1 x 1.20	11.4	12	Pipe	Not visible	Reconstruction	Not visible	Not visible	No	> Structure is not visible at this location.
11	35+880	36+012	SH-282	1x10.00	1 x 1.20	11.3	12	Pipe	Pipe	Reconstruc	New	Yes	Yes	> Silt observed in the

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Día of Pipe)	Existing Width (m)	Proposed Width of Culvert (m)	Existing Type of Culvert	Type of Culvert as per Site	As per Sch-B	As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
										tion				pipe. > Structure is in fair condition.
12	36+080	36+170	SH-282	1x10.00	1 x 1.20	18.3	12	Pipe	Pipe	Reconstruction	New	Not visible	No	> Vegetation observed in the pipe.
13	37+400	37+400	SH-282	3 x 8.00	2 x 1.20	12.1	12	Pipe	Pipe	Reconstruction	New	Yes	Yes	> Structure is in Fair condition.
14	39+200	39+136	SH-282	2 x 8.00	1 x 1.20	12.1	12	Pipe	Pipe	Reconstruction	New	Not visible	Yes	> Silt observed in the pipe. > Structure is in fair condition.
15	39+320	39+250	SH-282	1x10.00	1 x 1.20	12.5	12	Pipe	Pipe	Reconstruction	New	Not visible	Yes	> Structure is in fair condition.
16	40+720	40+660	SH-282	1 x 2.20	-	10.8	-	Slab	Slab	Retained	old	Not visible	No	> Water stagnated under the bridge.
17	42+350	42+315	SH-282	1 x 8.00	1 x 1.20	12.1	12	Pipe	Pipe	Reconstruction	New	Yes	Yes	> Crack observed on Head wall.
18	42+550	42+493	SH-282	1x10.00	1 x 1.20	12.1	12	Pipe	Pipe	Reconstruction	New	Not visible	Yes	> Vegetation observed in the pipe.
19	43+510	43+315	SH-282	2x8.00	1 x 1.20	12.1	12	Pipe	Pipe	Reconstruction	New	Yes	Yes	> Silt observed in the pipe. > Structure is in fair condition.
20	50+400	50+215	SH-282	1 x 2.00	-	8	-	Slab	Slab	Retained	old	Not visible	No	> Spalling of concrete observed at side of Deck slab.

Photos depicting the existing culvert are presented below

Pipe Culvert at Km 30+750	Pipe Culvert at Km 31+180
Slab Culvert at Km 32+190	Pipe Culvert at Km 33+350
Pipe Culvert at Km 35+250	Pipe Culvert at Km 35+880

Pipe Culvert at Km 36+080

Pipe Culvert at Km 37+400

Pipe Culvert at Km 39+200

Pipe Culvert at Km 39+320

Slab Culvert at Km 40+720

Pipe Culvert at Km 42+350

Pipe Culvert at Km 42+550	**Slab Culvert at Km 50+400**

4.3.7 DRAINAGE AND SLOPE PROTECTION

RCC covered drains constructed along the corridor appear to be in sound condition for most of length and functioning well.

Slope protection in the form of RCC wall has been provided in the ROB location is in good condition. The details of the slope protection is mentioned in the tables above.

4.3.8 TRAFFIC SAFETY AND ROAD FURNITURE

Metal beam crash barriers provided along the project road appear to be intact over entire length.

Roadway delineators installed along the length of corridor appear to be good condition at most of locations.

4.3.9 ROAD USER FACILITITES

The Busbay with Bus Shelter and bus bay, provided along the corridor appear to be fair in condition.

4.4 PACKAGE 4: SH-47, DARYAPUR-WAIGAON

4.4.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay in nature and embankment appears to be in good condition over the entire length of project. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

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 of various type with low PI values at most of the locations. 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 majority of the locations. Results of Subgrade CBR are as follows:

Table 4-13: Package-4, Details of Soaked CBR valuses

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	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 %										
AM-TP-14	184+000	LHS	80	47	34	20	46	37	28	9	SC	2.00	10.80	11.29	1.86	93	25.00
AM-TP-15	204+100	RHS	90	74	66	10	24	58	44	14	CH	1.78	21.40	4.95	1.75	98	60.00
AM-TP-16	214+000	LHS	77	47	41	23	36	52	33	19	SC	1.99	13.00	10.75	1.75	88	20.00
AM-TP-17	224+050	RHS	88	39	37	12	51	45	31	14	SC	2.06	12.60	25.06	1.98	96	20.83
AM-TP-18	194+000	LHS	83	48	36	17	47	44	32	12	SC	1.90	14.50	9.03	1.88	99	26.09

Gist of the FDD test results carried out existing subgrade are presented in the following table.

Table 4-14: Package-4, Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	Up/Down				
AM-TP-14	184+000	LHS	SC	2.00	1.86	93
AM-TP-15	204+100	RHS	CH	1.78	1.75	98
AM-TP-16	214+000	LHS	SC	1.99	1.75	88
AM-TP-17	224+050	RHS	SC	2.06	1.98	96
AM-TP-18	194+000	LHS	SC	1.90	1.88	99

The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit for existing subgrade samples varies between 37 and 58. Samples 3 No.s against of 5 samples are satisfying the liquid limit criterion (LL<=50).
- Plasticity Index for 05 out of 05 samples Subgrade samples varies between 9 and 19. All The samples satisfying the Plasticity Index criterion (PI<=25).
- Maximum Dry Density for subgrade samples varies between 1.78 and 2.06 gm/cc. All the samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies between 10.8 to 21.4
- Free Swelling Index for 04 out of 05 existing subgrade samples varies between 20 and 30. For one sample, the FSI is 60. 04 samples are satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in good condition.

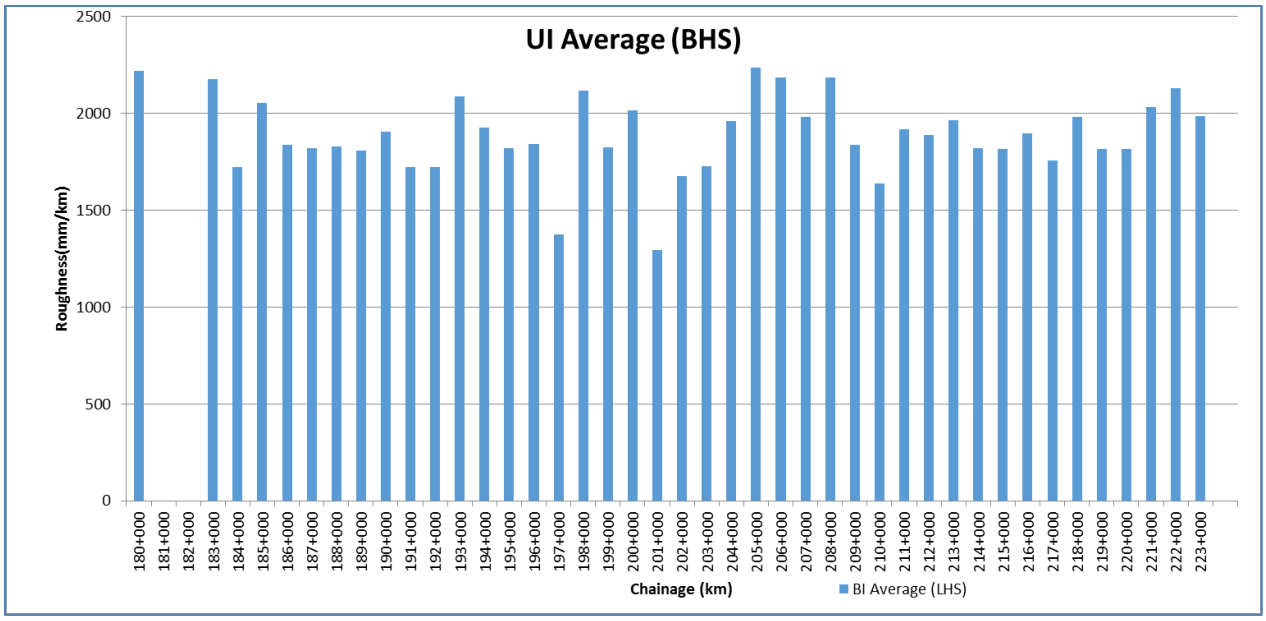
The test results and photographs are presented at **Appendix 7** of this report.

4.4.2 PAVEMENT CONDITION

The present condition of Pavement appears to be good. The Riding quality of the project corridor is good. No Cracks, potholes and patches were observed in the project corridor. Pavement Condition report covering the data collection for each km length has been presented in **Appendix-2** of this report.

4.4.3 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:



Package-4, BI Avg (BHS)

Almost entire project road is having good to Fair riding quality. From the above charts, no section of the project road requires functional overlay as unevenness Index (UI) is less than 2750 mm/km.

4.4.4 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 4-15: Package-4, Summary of Design Moduli of different layers – LHS

S. No	Side	From	To	Length	15th Percentile MR values		
					MR for BT	MR for Granular	MR for Subgrade
1	BHS	180.00	180.50	0.5	2221	391	87
2	BHS	180.50	182.75	2.3			
3	BHS	182.75	184.00	1.3			
4	BHS	184.00	190.00	6.0	2762	393	87
5	BHS	190.00	196.50	6.5	2741	388	87
6	BHS	196.50	204.00	7.5	2387	338	87
7	BHS	204.00	211.00	7.0	2439	389	87
8	BHS	211.00	218.00	7.0	2442	393	86
9	BHS	218.00	224.00	6.0	2414	393	87

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 2221Mpa to 2762Mpa in BHS Carriageway however, the MR value of BT layer restricted to 3000 Mpa. The MR value for Granular Layers is 338Mpa to 393Mpa in BHS Carriageway. Similarly, the MR value for Subgrade Layer is 86Mpa to 87Mpa in BHS Carriageway.

4.4.5 PAVEMENT COMPOSITION

TCS drawing shows crust composition for the main carriageway and service road is as:

Main carriageway	
BC, mm	40
DBM, mm	50
WMM, mm	250
GSB, mm	200
PQC	250
DLC	100
Subgrade, mm	500

However, from the test pits dug at 6 locations along the main carriageway.

d) Main Carriageway Crust

	BT, mm	WMM, mm	GSB, mm	PQC, mm	DLC, mm	Total Crust, mm
Maximum	120	260	280	280	100	860
Minimum	80	200	110	280	100	410
Average	100	220	200	280	100	580

4.4.6 CD STRUCTURES

The CD structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, all 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 4-16: Package-4, Summary of Major Structures

S. No	Type of Str	Total No. of Str's		
		Sch-A	Sch-B	Site
1	Major Bridges	2	2	2
2	Minor Bridges	13	14	13
3	Slab Culvert	21	15	15
4	Pipe Culverts	23	29	29

As per Schedule 29 no's Pipe culverts & 15 no's Slab and Box culverts, total 44 no's Culverts.

Chainage: 180+450

General Description

- Type of Structure : Major Bridge
- Span Arrangement : 12 x 9.0 m
- Total deck width of structure : 8.4 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type
- Type of Superstructure : RCC Solid slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC & Steel hallow pipe Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Reinforcement Exposed in Hand rails.
- Honey combing observed in piers.
- Vegetation observed on quadrant pitching.
- Structure condition fair.

Chainage: 201+650

General Description

- Type of Structure : Major Bridge
- Span Arrangement : 10 x 6.5 m
- Total deck width of structure : 8.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC & Steel hallow pipe Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Erosion of soil is observed near pier foundation.
- Hand rail is damaged.
- Structure condition fair.

Chainage: 186+530
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 3 x 4.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : RCC hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching observed on Pier.
- Hand railing damaged.
- Minor cracks observed on Abutments & Pier.
- Honey combing observed on soffit of slab.

Chainage: 187+800
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 3 x 4.4 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : RCC crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Vegetation observed on quadrant pitching.
- Drainage spouts clogged with debris.

Chainage: 188+960
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 3 x 3.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : RCC crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Honey comb & Corrosion strain observed on soffit of the slab.
- Structure condition fair.

Chainage: 193+450
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 3 x 4.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type
- Type of Superstructure : RCC Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : RCC hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching observed on structure.
- Spalling and crack observed on pier and abutment.
- Hand railing damaged.

Chainage: 195+570
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 3 x 5.0 m
- Total deck width of structure : 10.8 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type Abutment & Pier
- Type of Superstructure : RCC Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : RCC hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching observed on pier & abutment of structure.
- Hand railing damaged.

Chainage: 197+440
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 3 x 10.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : RCC Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 205+600
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 4 x 5.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- 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 pitching.
- Leaching observed on pier.
- Structure condition fair.

Chainage: 207+820
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 3 x 4.5 m
- Total deck width of structure : 12.1 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type Abutment & Pier
- Type of Superstructure : RCC Slab
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Bushes and vegetation growth observed on Quadrant pitching.
- Leaching observed on abutment & pier.
- Structure condition fair.

Chainage: 210+350

General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 11 x 4.5 m
- Total deck width of structure : 8.3 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Steel hallow pipe railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Scouring observed at piers.
- Hand railing damaged.
- Spalling and reinforcement exposed on soffit of top slab.

Chainage: 215+980

General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 2 x 9.0 m
- Total deck width of structure : 12.1 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Steel hallow pipe railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure condition fair.

Chainage: 217+100

General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 4 x 4.5 m
- Total deck width of structure : 15.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Not Found
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Hand railing not found.
- Reinforcement exposed in soffit of the slab.
- Leaching observed at abutment & pier.
- Quadrant pitching covered with bushes.

Chainage: 220+300

General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 2 x 6.0 m
- Total deck width of structure : 12.1 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Steel hallow pipe railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Vegetation observed on Quadrant pitching.
- Leaching observed on abutment and pier.
- Structure condition fair.

Chainage: 220+600
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 2 x 6.0 m
- Total deck width of structure : 12.1 m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : MS Pipe hand rail
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching observed on abutment and pier.
- Quadrant pitching's partially damaged and vegetation growth observed on it.
- Structure condition fair.

Details of Culverts:

S. No	SH. No	Existing Chainage (Km)	Design Chainage (Km)	Existing Type of Structure	Existing Arrangement	Proposed Type of Structure	Type of Culvert as per Site	Proposed Span Arrangements (m)	Width (m)	Proposal As per Sch-B	Age of culvert As per site	Floor Protection	Quadrant pitching	Observations as per site
1	SH-47	180+300	180+270	Slab Culvert	1 x 5.70	Slab Culvert	Slab Culvert	-	8.3	Retained	Old-Retained	No	Yes	> Quadrant pitching partially damaged & bushes observed on it. > Structure condition fair.
2	SH-47	180+370	180+340	Subway	1 x 6.00	Subway	Subway	-	10.8	Retained	Old-Retained	-	Yes	> Structure condition fair.
3	SH-47	180+930	180+880	HPC	1 x 1200	HPC	-	1 x 1.20	12.5	Reconstruction	-	-	-	> Structure not found.
4	SH-47	181+300	181+315	HPC	1 x 1000	HPC	-	1 x 1.20	12	Reconstruction	-	-	-	> Structure not found.
5	SH-47	182+600	182+635	HPC	1 x 1.50	HPC	-	1 x 1.20	10.9	Reconstruction	-	-	-	> Structure not found.
6	SH-47	182+650	182+675	HPC	1x1.50	HPC	-	1 x 1.20	10.7	Reconstruction	-	-	-	> Structure not found.
7	SH-47	182+900	182+925	HPC	1 x 1000	HPC	-	1 x 1.20	12	Reconstruction	-	-	-	> Structure not found.
8	SH-47	189+540	189+620	HPC	1 x 1000	HPC	-	1 x 1.20	10.3	Reconstruction	-	-	-	> Structure not found.
9	SH-47	190+180	190+310	HPC	2 x1200	HPC	-	1 x 1.20	11	Reconstruction	-	-	-	> Structure not found.
10	SH-47	190+520	190+630	Slab Culvert	1 x 2.00	Box Culvert	HPC	1 x 3.00	12	Reconstruction	New	-	Yes	> Structure condition good.
11	SH-47	191+080	191+225	Slab Culvert	1 x 2.50	Box Culvert	Box Culvert	1 x 3.00	10.5	Reconstruction	New	-	Yes	> Structure condition good.
12	SH-47	192+800	192+940	HPC	2 x 800	HPC	HPC	1 x 1.20	10.4	Reconstruction	Old-Retained	-	Yes	> Pipe buried with mud. > Vegetation growth observed on Quadrant pitching's & at vent way. > Structure condition good.
13	SH-47	193+40	193+440	Slab	1x4.00	Slab	Slab	-	10.4	Retained	Old-Retained	-	Yes	> Leaching observed on

S. No	SH. No	Existing Chainage (Km)	Design Chainage (Km)	Existing Type of Structure	Existing Arrangement	Proposed Type of Structure	Type of Culvert as per Site	Proposed Span Arrangements (m)	Width (m)	Proposal As per Sch-B	Age of culvert As per site	Floor Protection	Quadrant pitching	Observations as per site
		0		Culvert		Culvert	Culvert							abutments. > Structure condition Fair.
14	SH-47	193+750	193+860	HPC	5 x1200	Box Culvert	HPC	1 x 1.20	10.3	Reconstruction	New	-	-	> culvert found in Bushes > Head wall not found in LHS.
15	SH-47	194+150	194+295	HPC	2 x 1200	HPC	-	2 x 1.20	11	Reconstruction	-	-	-	> Structure not found.
16	SH-47	194+600	194+720	Slab Culvert	1 x 2.50	Slab Culvert	-	-	11.8	Retained	Old-Retained	No	Yes	> Leaching observed on abutments. > Reinforcement exposed on soffit of slab. > Structure condition Fair. > Vegetation observed on Quadrant pitching's.
17	SH-47	195+350	195+480	HPC	1 x 1200	HPC	-	1 x 1.20	10.9	Reconstruction	-	-	-	> Structure not found.
18	SH-47	197+300	197+425	HPC	2 x 800	HPC	-	1 x 1.20	10.9	Reconstruction	-	-	-	> Structure not found.
19	SH-47	198+150	198+515	Slab Culvert	1x2.20	Box Culvert	Box Culvert	1 x 3.00	10.4	Reconstruction	New	No	Yes	> Structure condition good.
20	SH-47	200+750	200+870	Slab Culvert	1 x 5.20	Slab Culvert	Slab Culvert	-	10.5	Retained	Old-Retained	No	No	> Head walls not found. > Quadrant pitching's damaged. > Leaching observed on Abutments.
21	SH-47	201+830	201+930	HPC	3 x1200	Box Culvert	Box Culvert	1 x 3.00	10.1	Reconstruction	New	No	Yes	> Structure condition good.
22	SH-47	203+100	203+200	HPC	1 x 800	HPC	HPC	1 x 1.20	10.1	Reconstruction	New	No	Yes	> Stone pitching partially damaged. > Vent way filled with vegetation.
23	SH-47	203+250	203+290	HPC	2 x 1000	HPC	HPC	2 x 1.20	10.2	Reconstruction	Old-Retained	No	Yes	> Stone pitching partially damaged.

S. No	SH. No	Existing Chainage (Km)	Design Chainage (Km)	Existing Type of Structure	Existing Arrangement	Proposed Type of Structure	Type of Culvert as per Site	Proposed Span Arrangements (m)	Width (m)	Proposal As per Sch-B	Age of culvert As per site	Floor Protection	Quadrant pitching	Observations as per site
														> Vent way filled with vegetation.
24	SH-47	204+600	204+640	Slab Culvert	1 x 3.00	Slab Culvert	Slab Culvert	-	10.9	Retained	Old-Retained	No	Yes	> Head walls not found. > Leaching observed on Abutments.
25	SH-47	209+720	209+780	Slab Culvert	1 x 1.50	HPC	HPC	1 x 1.20	10.6	Reconstruction	Old-Retained	No	Yes	> Structure condition fair. > Quadrant pitching's damaged.
26	SH-47	209+990	210+080	Slab Culvert	1 x 2.00	Box Culvert	Box Culvert	1 x 3.00	12	Reconstruction	New	Yes	Yes	> Vegetation observed on floor protection. > Structure condition good.
27	SH-47	211+950	211+740	HPC	2 x 800	HPC	HPC	1 x 1.20	10.5	Reconstruction	New	No	Yes	> Pipe buried with mud. > Structure condition good.
28	SH-47	212+170	211+990	Slab Culvert	1x2.80	Slab Culvert	Slab Culvert	-	12.1	Retained	Old-Retained	No	Yes	> Wing walls provided. > Hand railing damaged.> Structure condition fair.
29	SH-47	213+070	212+885	HPC	1 x 600	HPC	HPC	1 x 1.20	10.3	Reconstruction	New	No	Yes	> Structure condition fair.
30	SH-47	213+260	213+080	HPC	1 x 600	HPC	-	1 x 1.20	10.1	Reconstruction	-	-	-	> Structure not found.
31	SH-47	213+950	213+795	HPC	2 x 800	HPC	HPC	1 x 1.20	10.5	Reconstruction	Old-Retained	No	Yes	> Pipe partially filled with mud. > Structure condition fair.
32	SH-47	215+550	215+420	HPC	1 x 1000	HPC	HPC	1 x 1.20	12.8	Reconstruction	New	No	Yes	> Pipe partially filled with mud. > Structure condition fair.
33	SH-47	216+750	216+630	HPC	1 x 1000	HPC	HPC	1 x 1.20	10.9	Reconstruction	New	No	Yes	> Pipe filled with mud & vent way covered with vegetation. > Quadrant pitching partially damaged. > Structure condition fair.
34	SH-47	216+95	216+820	Slab	1 x	HPC	HPC	2 x 1.20	10	Reconstructio	New	No	Yes	> Pipe partially filled with

S. No	SH. No	Existing Chainage (Km)	Design Chainage (Km)	Existing Type of Structure	Existing Arrangement	Proposed Type of Structure	Type of Culvert as per Site	Proposed Span Arrangements (m)	Width (m)	Proposal As per Sch-B	Age of culvert As per site	Floor Protection	Quadrant pitching	Observations as per site
		0		Culvert	1.50					n				mud. > Structure condition good.
35	SH-47	217+150	217+070	HPC	5 x 1200	HPC	HPC	-	15.1	Retained	Old-Retained	No	Yes	> Vent way covered with vegetation. > Quadrant pitching partially damaged and vegetation growth observed on it. > Structure conation fair.
36	SH-47	217+580	217+530	Slab Culvert	1 x 1.50	HPC	HPC	2 x 1.20	12	Reconstruction	New	No	Yes	> Pipes are buried with silt. > Vegetation observed on Quadrant pitching's.
37	SH-47	218+600	218+600	Slab Culvert	1 x 4.00	Slab Culvert	Slab Culvert	-	12	Retained	Old-Retained	No	Yes	> Crash Barriers are under construction on BHS. > Leaching observed on Abutment. > Structure condition fair.
38	SH-47	219+400	219+420	Slab Culvert	1 x 1.50	HPC	HPC	2 x 1.20	11.9	Reconstruction	New	No	Yes	> Quadrant pitching partially damaged. > Structure condition fair.
39	SH-47	221+750	221+820	HPC	1 x1200	HPC	HPC	1 x 1.20	10	Reconstruction	New	No	Yes	> Quadrant pitching partially damaged. > Pipe Buried with mud. > Structure not visible on LHS due to vegetation. > Structure condition fair.
40	SH-47	221+960	222+040	Slab Culvert	1 x 1.80	Box Culvert	Box Culvert	1 x 3.00	12	Reconstruction	New	No	No	> Quadrant pitching not found. > Structure condition good.
41	SH-47	222+550	222+640	Slab Culvert	1 x 1.40	HPC	HPC	2 x 1.20	10	Reconstruction	New	No	No	> Pipes not visible. > Head wall found.
42	SH-47	223+220	223+350	HPC	2 x1000	HPC	HPC	2 x 1.20	10	Reconstruction	New	No	Yes	> Vent way filled with mud and stones. > Structure condition good.

S. No	SH. No	Existing Chainage (Km)	Design Chainage (Km)	Existing Type of Structure	Existing Arrangement	Proposed Type of Structure	Type of Culvert as per Site	Proposed Span Arrangements (m)	Width (m)	Proposal As per Sch-B	Age of culvert As per site	Floor Protection	Quadrant pitching	Observations as per site
43	SH-47	223+530	223+615	HPC	2 x1000	HPC	HPC	2 x 1.20	11.3	Reconstruction	New	No	Yes	> Quadrant pitching partially damaged & bushes observed on it. > Structure condition good.
44	SH-47	223+800	223+930	Slab Culvert	1 x 1.00	HPC	HPC	1 x 1.20	12.5	Reconstruction	New	No	Yes	> Quadrant pitching partially damaged & bushes observed on it. > Pipe partially filled with mud. > Structure condition good.

Photos depicting the existing culvert are presented below

Pipe Culvert at Km 192+800	Slab Culvert at Km 193+400
Pipe Culvert at Km 193+750	Slab Culvert at Km 194+600
Slab Culvert at Km 198+150	Slab Culvert at Km 200+750

Slab Culvert at Km 201+830

Pipe Culvert at Km 203+100

Pipe Culvert at Km 203+250

Slab Culvert at Km 204+600

Pipe Culvert at Km 209+720

Slab Culvert at Km 209+990

Pipe Culvert at Km 211+950

Slab Culvert at Km 212+170

Pipe Culvert at Km 213+070

Pipe Culvert at Km 216+950

Pipe Culvert at Km 217+150

Pipe Culvert at Km217+580

Slab Culvert at Km 218+600	**Pipe Culvert at Km 219+400**

4.4.7 DRAINAGE AND SLOPE PROTECTION

RCC covered drains constructed along the corridor appear to be in sound condition for most of length and functioning well.

4.4.8 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.

Roadway delineators installed along the length of corridor appear to be good condition at most of locations. Very few delineators got damaged.

4.4.9 ROAD USER FACILITITES

The bus bay with bus shelter provided along the corridor appear to be fair in condition.

4.5 PACKAGE 5: AMARAVATI- KURHA- KAUNDYNAPUR

4.5.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay, silt sand type 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 of various type with low PI values at most of the locations. 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 majority of the locations. Results of Subgrade CBR are as follows:

Table 4-17: Package-5, Details of Soaked CBR valuses

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-7	51+400	RHS	95	73	55	5	40	33	25	8	CL	1.91	16.00	10.00	1.80	94	27.27
AM-TP-8	123+200	LHS	87	66	40	13	47	-	NP	NP	SM	2.07	13.40	12.38	1.99	96	10.00
AM-TP-9	103+050	RHS	75	45	38	25	37	48	37	11	SC	2.00	10.60	11.29	1.76	88	30.43
AM-TP-10	113+050	RHS	80	46	38	20	42	41	33	8	SC	1.93	15.80	7.98	1.85	96	23.81

Gist of the FDD test results carried out existing subgrade are presented in the following table.

Table 4-18: Package-5, Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	Up/Down				
AM-TP-7	51+400	RHS	CL	1.91	1.80	94
AM-TP-8	123+200	LHS	SM	2.07	1.99	96
AM-TP-9	103+050	RHS	SC	2.00	1.76	88
AM-TP-10	113+050	RHS	SC	1.93	1.85	96

The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit for existing subgrade samples varies between 30 and 60. All the samples satisfying the liquid limit criterion (LL<=50).
- Plasticity Index for 03 out of 04 samples Subgrade samples varies between 2 and 25 and one non-plastic. 03 number of samples satisfying the Plasticity Index criterion (PI<=25).
- Maximum Dry Density for subgrade samples varies between 1.80 and 2.17 gm/cc. All the samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies between 8.0 to 16.5
- Free Swelling Index for 04 out of 04 existing subgrade samples varies between 8.33 and 47.83. For Four samples are satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in good condition.

The test results and photographs are presented at **Appendix 7** of this report.

4.5.2 Aggregate and sand sources

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 4-19: Package-5, Test Results of Aggregate Samples

S. No	Sample	Location(km)	Up/Dn	A.I.V	Water Absorption	Specific Gravity
1	AM-AQ-4	43+100	LHS	10.20	0.35	2.80
2	AM-AQ-5	105+300	LHS	10.44	0.25	2.83
3	AM-AQ-6	101+600	RHS	11.18	0.29	2.84

Table 4-20: Package-5, Test Results of Sand Sources

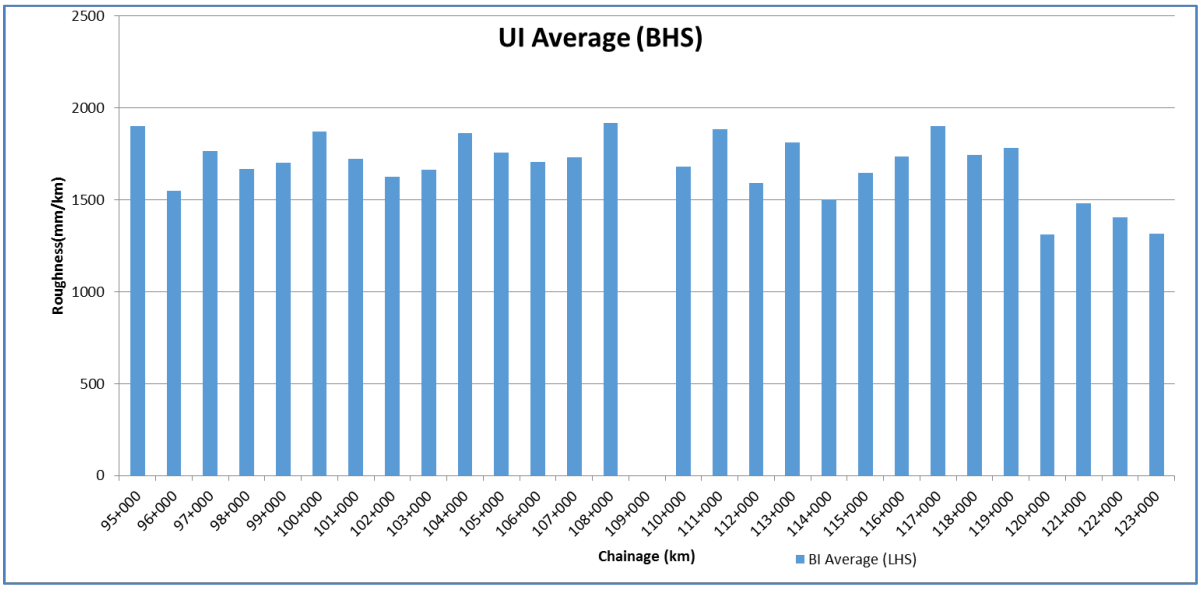
Sl No	Sample No	CHAIN AGE	SIDE	10 mm Passing %	4.75 mm Passing %	2.36 mm Passing %	1.18mm Passing %	600mm Passing %	300mm Passing %	150mm Passing %	FM	ZONE
1	HC-SQ-1 AM-M-SAND-5	105+300	LHS	100	98	70	46	33	23	13	3.17	NO ZONE

4.5.3 PAVEMENT CONDITION

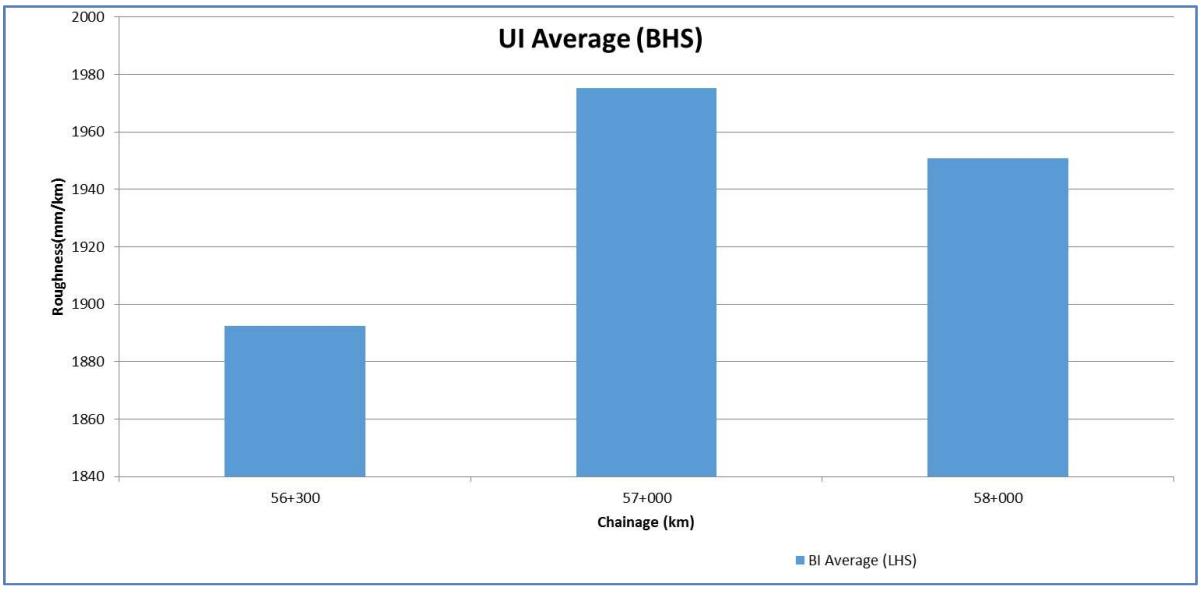
The present condition of Pavement appears to be good. The Riding quality of the project corridor is good. No Cracks, potholes and patches were observed in the project corridor. Pavement Condition report covering the data collection for each km length has been presented in **Appendix-2** of this report.

4.5.4 ROUGHNESS

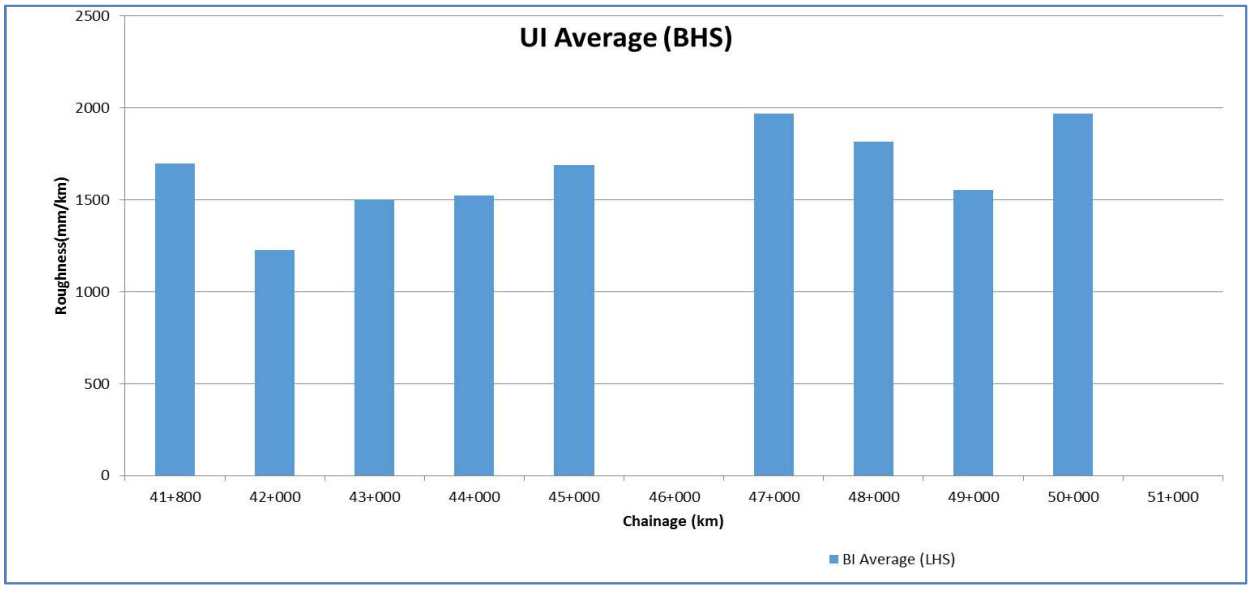
The roughness surveys conducted along the corridor indicate good riding quality over the length of project corridor. Bar diagrams showing the Kilometer wise roughness along the project road are presented below:



Package-5, BI Avg (BHS)_SH-280



Package-5, UI Avg (BHS) _SH-294



Package-5, BI Avg (BHS) _SH-300

Almost entire project road is having good to Fair riding quality. From the above charts, no section of the project road requires functional overlay as unevenness Index (UI) is less than 2750 mm/km.

4.5.5 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 4-21: Package-5, Summary of Design Moduli of different layers - BHS @ SH-280

S.No	Side	From	To	Length	15th Percentile MR values		
					MR for BT	MR for Granular	MR for Subgrade
1	BHS	95.00	100.50	5.5	2223	388	87
2	BHS	100.50	108.00	7.5	2259	389	86
3	BHS	108.00	115.50	7.5	2316	386	87
4	BHS	115.50	123.68	8.2	2315	357	87

Table 4-22: Package-5, Summary of Design Moduli of different layers - BHS @ SH-300 & 294

S.No	Side	From	To	Length	15th Percentile MR values		
					MR for BT	MR for Granular	MR for Subgrade
1	BHS	41.80	45.50	3.7	2230	388	87
2	BHS	45.50	47.00	1.5			
3	BHS	47.00	51.00	4.0			
4	BHS	51.00	52.02	1.0			
5	BHS	56.30	58.45	2.2	2324	389	87

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 2223Mpa to 2324Mpa in BHS Carriageway however, the MR value of BT layer to be restricted to 3000 Mpa, if they are above 3000Mpa. The MR value for Granular Layers is 357Mpa to 389Mpa in BHS Carriageway. Similarly, the MR value for Subgrade Layer is 87 Mpa in BHS Carriageway.

4.5.6 PAVEMENT COMPOSITION

TCS drawing shows crust composition for the main carriageway is as:

Main carriageway	
BC, mm	40
DBM, mm	80
WMM, mm	250
GSB, mm	260
PQC,mm	280
DLC,mm	100
GSB Sun-Base Cum Drainage Layer,mm	200
Subgrade, mm	500

However, from the test pits dug at 04 locations along the main carriageway reveal the following.

e) `Main Carriageway Crust

	BT, mm	WMM, mm	GSB, mm	Total Crust, mm
Maximum	130	260	240	630
Minimum	120	200	220	540
Average	125	235	230	590

4.5.7 CD STRUCTURES

The CD structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, all 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 4-23: Package-5, Summary of Major Structures

S. No	Type of Str	Total No.of Str's AS per		
		Sch-A	Sch-B	Site
1	Major Bridges	1	Nil	1
2	Minor Bridges	11	16	17
3	Box/Slab Culverts	18	18	19
4	Pipe Culverts	49	48	48

As per Schedule 48 no's Pipe culverts & 18 no's Slab and Box culverts, total 66 no's Culverts.

Chainage: 51+910

General Description

- Type of Structure : MJB
- Span Arrangement : 24 x 6.35 m
- Total deck width of structure : 8.0 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Steel Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Vegetation observed on the Piers
- No access to inspect Structure due to high water flow
- Quadratic Pitching not Provided

Shot on OnePlus	Shot on OnePlus
Shot on OnePlus	Shot on OnePlus

Chainage: 44+295

General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 7.1 m
- Total deck width of structure : 8 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type & Abutment
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Irrigation canal under the bridge
- Widening has not done as per schedule B
- Hand railing partially damaged.

Chainage: 49+980
General Description

- Type of Structure : MNB
- Span Arrangement : 3 x 7 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 : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Floor Protection not visible
- Structure is in good condition.

Chainage: 57+100
General Description

- Type of Structure : MNB
- Span Arrangement : 1 x 7.6 m
- Total deck width of structure : 24 m
- Type of Foundation : Open
- Type of Substructure : RCC Abutment
- Type of Superstructure : RCC Soli Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Vegetation, Debris, Silt & Plastic waste present throughout vent way
- Quadratic Pitching not found
- Structure is in fair condition
- Reinforcement bars not curtailed on top slab and crash barrier.

Chainage: 58+150
General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 6 m
- Total deck width of structure : 24 m
- Type of Foundation : Raft
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Debris & silt observed on Vent way
- Previous patch repair work done on side wall.

Chainage: 58+250
General Description

- Type of Structure : MNB
- Span Arrangement : 3 x 10 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 : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Patch repair works are observed on top slab and side wall.
- Reinforcement bars are not curtailed on side walls.
- Structure condition is good

Chainage: 95+587

General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 6 m
- Total deck width of structure : 9.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Abutment & Pier
- Type of Superstructure : RCC Solid slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Steel Hand rail
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Quadratic pitch not provided.
- Hand rail is damaged.
- Debris, silt & Vegetation observed in vent Way
- Widening not done as per schedule B

Chainage: 99+560

General Description

- Type of Structure : MNB
- Span Arrangement : 3 x 7 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching observed near Drainage spouts, No Down take pipe provided
- Debris & silt observed on vent way

Chainage: 101+750
General Description

- Type of Structure : MNB
- Span Arrangement : 1 x 8 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 : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure is in good condition

Chainage: 102+675

General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 7.5 m
- Total deck width of structure : 18 m
- Type of Foundation : Raft
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Vegetation & Debris observed near vent way
- Structure condition is good

Chainage: 107+687

General Description

- Type of Structure : MNB
- Span Arrangement : 1 x 7.5 m
- Total deck width of structure : 12.3 m
- Type of Foundation : Not visible
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Segregation observed on Soffit of the slab.
- Honey combs observed in the Soffit of the slab
- Reinforcement Exposed over the Soffit of the slab
- Vegetation growth over the structure, Down take pipe not provided
- Quadratic pitching not provided & Hand Rail damage observed

Chainage: 108+925
General Description

- Type of Structure : MNB
- Span Arrangement : 4 x 6 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Open
- Type of Substructure : RCC Abutment & Piers
- Type of Superstructure : RCC Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Quadratic pitching partial damaged.
- Debris & silt observed on Vent way
- Drainage spouts clogged; Down take pipe not provided

Chainage: 110+180
General Description

- Type of Structure : MNB (Not Constructed)
- Span Arrangement : 1 x 3.4m
- Total deck width of structure : 12.0 m
- Type of Foundation : Open
- Type of Substructure : RCC Abutment
- Type of Superstructure : RCC Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Not Provided
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Slab culvert is Exist
- As per schedule B Minor Bridge should be constructed.

Chainage: 113+345
General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 6.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Raft
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Debris & silt observed on Vent way
- Structure condition is good.

Chainage: 115+875

General Description

- Type of Structure : MNB
- Span Arrangement : 6 x 5.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Abutment & Pier
- Type of Superstructure : RCC Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Reconstruction has not done as per Schedule B
- Quadratic pitching not provided
- Honey combs are formed on the Piers

Chainage: 118+340
General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 4 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 : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Reinforcement bars not curtailed in side walls.
- Structure condition is good

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Chainage: 119+370
General Description

- Type of Structure : MNB
- Span Arrangement : 1 x 10 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 : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure condition is good.

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Chainage: 121+350

General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 4.5 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Open
- Type of Substructure : RCC Abutment & Pier
- Type of Superstructure : RCC Slab
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Wing wall with stone pitching provided.
- Debris & silt observed on Vent way
- Structure condition is good

Details of Culverts:

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Span Arrangement (Nos. x Dia of Pipe)	Width of Culvert (m)	Existing Type Of Culvert	Type of Culvert As per site	Proposal As per Sch-B	Age of Culvert	Floor Protection	Quadrant Stone pitching	Observations as per site
1	42+075	42+090	SH - 294	2x1.200	12	Pipe	-	Reconstruction	-	-	-	-
2	42+400	42+400	SH - 294	1x1.200	-	-	-	New Construction	-	-	-	-
3	42+737	42+750	SH - 294	1x3.2	10.6	Slab	Slab	Retained	Old	Not Visible	No	> Partially Buried > Vegetation observed on the structure > Debris & Vegetation observed on Vent Way
4	43+000	43+012	SH - 294	1 x 4.35	10.75	Slab	Slab	Retained	Old	Not Visible	Yes	> Vegetation observed on the structure > Debris & Vegetation observed on Vent Way
5	43+500	43+517	SH - 294	1x5.9	10.5	Slab	Slab	Retained	Old	Not Visible	Yes	> Vegetation observed on the structure > Debris & Vegetation observed on Vent Way > Distresses of concrete observed on Soffit of the slab
6	44+485	44+450	SH - 294	1x1200	12	Pipe	-	Reconstruction	-	-	-	-
7	45+945	45+958	SH - 294	1x4.55	10.9	Slab	Slab	Retained	Old	Not Visible	No	> Vegetation observed on the structure > Debris & Vegetation observed on Vent Way > Distresses of concrete observed on Soffit of the slab
8	46+312	46+326	SH - 294	2x1200	12	Pipe	-	Reconstruction	-	-	-	-
9	46+600	46+616	SH - 294	1x1200	12	Pipe	-	Reconstruction	-	-	-	-
10	46+855	46+868	SH - 294	1x1200	12	Pipe	-	Reconstruction	-	-	-	-
11	47+613	47+613	SH - 294	1x1200	12	Pipe	-	Reconstruction	-	-	-	-
12	48+400	48+400	SH - 294	1x1200	-	-	-	New	-	-	-	-

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Span Arrangement (Nos. x Dia of Pipe)	Width of Culvert (m)	Existing Type Of Culvert	Type of Culvert As per site	Proposal As per Sch-B	Age of Culvert	Floor Protection	Quadrant Stone pitching	Observations as per site
								Construction				
13	48+675	48+689	SH - 294	1x3.0	10.9	Slab	Slab	Retained	Old	Not Visible	Yes	> Vegetation observed on the structure > Debris & Vegetation observed on Vent Way
14	49+078	49+093	SH - 294	1x4.3	10.7	Slab	Slab	Retained	Old	Not Visible	Yes	> Vegetation observed on the structure > Debris & Vegetation observed on Vent Way
15	49+282	49+300	SH - 294	1x1200	12	Pipe	-	Reconstruction	-	-	-	-
16	50+290	50+300	SH - 294	1x1200	12	Pipe	-	Reconstruction	-	-	-	-
17	50+502	50+515	SH - 294	1x1200	12	Pipe	-	Reconstruction	-	-	-	-
18	50+900	50+912	SH - 294	1x1200	12	Pipe	-	Reconstruction	-	-	-	-
19	56+855	56+870	SH - 300	1x1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
20	57+665	57+675	SH - 300	1x4.3	24	Slab	Slab	Widening	Old	Not Visible	No	> Vegetation observed on the structure > Debris & Vegetation observed on Vent Way
21	97+670	97+667	SH - 280	1x5.0	15	Slab	Slab	Reconstruction	New	Yes	Yes	> Debris & Vegetation should be cleaned near Vent Way
22	98+210	98+206	SH - 280	2 x 1200	15	Pipe	Pipe	Reconstruction	New	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way > Utility Pipe is observed
23	98+637	98+635	SH - 280	1x1200	15	Pipe	Pipe	Reconstruction	New	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
24	100+525	100+522	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
25	100+660	100+655	SH - 280	2 x 1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
26	100+965	100+965	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
27	101+060	101+058	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
28	101+312	101+312	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
29	101+600	101+595	SH - 280	1 x 1200	12	Pipe	-	Reconstruction	-	-	-	> Structure not Found

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Span Arrangement (Nos. x Dia of Pipe)	Width of Culvert (m)	Existing Type Of Culvert	Type of Culvert As per site	Proposal As per Sch-B	Age of Culvert	Floor Protection	Quadrant Stone pitching	Observations as per site
30	102+140	102+136	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
31	103+360	103+353	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
32	104+060	104+056	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	Yes	> Vegetation, Debris & Silt observed in Vent Way > Honey combs & Spalling observed on Head Wall
33	104+290	104+283	SH - 280	1x5.0	12	Slab	Slab	New Construction	New	Not Visible	Yes	> Debris & Vegetation should be cleaned near Vent Way > Quadratic Pitching Damage Observed on LHS
34	104+845	104+839	SH - 280	2 x 1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	Yes	> Vegetation, Debris & Silt observed in Vent Way
35	105+755	105+755	SH - 280	2 X1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	Yes	> Vegetation, Debris & Silt observed in Vent Way
36	106+237	106+236	SH - 280	2 X1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
37	106+875	106+873	SH - 280	2 X1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	Yes	> Vegetation, Debris & Silt observed in Vent Way
38	107+930	107+924	SH - 280	3 x 1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	Yes	> Vegetation, Debris & Silt observed in Vent Way
39	108+365	108+360	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	Yes	> Vegetation, Debris & Silt observed in Vent Way
40	108+627	108+624	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
41	109+100	109+100	SH - 280	1x1200	-	-	-	New Construction	-	-	-	-
42	109+182	109+178	SH - 280	2 x 1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way > LHS side fully buried & RHS Side partially Buried
43	110+180	110+180	SH - 280	1x1200	12	Slab	Slab	New Construction	Old	Not Visible	No	> Slab is Present it should be constructed as MNB as per schedules

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Span Arrangement (Nos. x Dia of Pipe)	Width of Culvert (m)	Existing Type Of Culvert	Type of Culvert As per site	Proposal As per Sch-B	Age of Culvert	Floor Protection	Quadrant Stone pitching	Observations as per site
44	110+225	110+227	SH - 280	1x5.0	12	Slab	Slab	Reconstruction	Old	Not Visible	No	> Debris & Vegetation should be cleaned near Vent Way > Leaching observed on Abutments & Return Wall
45	110+405	110+402	SH - 280	1x1200	12	Pipe	-	Reconstruction	-	-	-	-
46	111+245	111+242	SH - 280	1x5.0	12	Pipe	Pipe	New Construction	Not Constructed	Not Visible	No	> Pipe is present Slab culvert should be constructed > Pipe Covered with Water
47	111+335	111+335	SH - 280	1x5.0	12	Pipe	Pipe	New Construction	Not Constructed	Not Visible	No	> Pipe is present Slab culvert should be constructed > Debris & silt observed
48	112+010	112+003	SH - 280	1x5.0	12	Slab	Slab	Reconstruction	New	Not Visible	Yes	> Debris & Vegetation should be cleaned near Vent Way
49	112+375	112+375	SH - 280	1x1200	12	Pipe	Pipe	New Construction	New	Not Visible	Yes	> Debris & Vegetation should be cleaned near Vent Way
50	112+885	112+880	SH - 280	3 x 1200	12	Pipe	Pipe	Widening	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
51	112+980	112+972	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
52	113+520	113+515	SH - 280	2x1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
53	114+182	114+177	SH - 280	2x1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
54	114+355	114+348	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
55	114+450	114+444	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
56	115+690	115+683	SH - 280	2 x 1200	12	Pipe	Pipe	Widening	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Span Arrangement (Nos. x Dia of Pipe)	Width of Culvert (m)	Existing Type Of Culvert	Type of Culvert As per site	Proposal As per Sch-B	Age of Culvert	Floor Protection	Quadrant Stone pitching	Observations as per site
57	116+840	116+833	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way > Partially Buried
58	119+670	119+664	SH - 280	1x3.35	12	Slab	Slab	Widening	Old	Yes	Yes	> Debris & Vegetation should be cleaned near Vent Way > Utility Pipe is observed > Honey combs are formed on abutment
59	119+935	119+930	SH - 280	1x1200	12	Pipe	Pipe	Reconstruction	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way > Partially Buried
60	120+385	120+378	SH - 280	2x1200	12	Pipe	Pipe	Reconstruction	New	Not Visible	Yes	> Vegetation, Debris & Silt observed in Vent Way
61	121+070	121+060	SH - 280	1x4.3	10.3	Slab	Slab	Retained	Old	Not Visible	No	> Debris & Vegetation should be cleaned near Vent Way
62	121+930	121+922	SH - 280	3 x 1200	12	Pipe	Pipe	Widening	Old	Not Visible	No	> Vegetation, Debris & Silt observed in Vent Way
63	122+305	122+298	SH - 280	1x4.0	10.75	Slab	Slab	Retained	Old	Not Visible	Yes	> Debris & Vegetation should be cleaned near Vent Way > Vegetation observed on the structure > Honey combs are formed on Super structure
64	122+780	122+774	SH - 280	1x4.0	10.8	Slab	Slab	Retained	Old	Yes	Yes	> Debris & Vegetation should be cleaned near Vent Way > Vegetation observed on the structure > Honey combs are formed on Super structure

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Span Arrangement (Nos. x Dia of Pipe)	Width of Culvert (m)	Existing Type Of Culvert	Type of Culvert As per site	Proposal As per Sch-B	Age of Culvert	Floor Protection	Quadrant Stone pitching	Observations as per site
65	122+930	122+920	SH - 280	1x3.85	10.05	Slab	Slab	Retained	Old	Not Visible	Yes	> Debris & Vegetation should be cleaned near Vent Way > Vegetation observed on the structure > Honey combs are formed on Super structure
66	123+030	123+020	SH - 280	2x1200	12	Pipe	-	Reconstruction	-	-	-	> Structure not Found

Pictures of Pipe Culverts

Pipe Culvert at Km 101+312	Pipe Culvert at Km 104+060
Pipe Culvert at Km 104+845	Pipe Culvert at Km 106+875

Pipe Culvert at Km 111+245

Pipe Culvert at Km 112+375

Pipe Culvert at Km 112+885

Pipe Culvert at Km 114+182

Pipe Culvert at Km 115+690

Pipe Culvert at Km 116+840

 Pipe Culvert at Km 119+935	 **Pipe Culvert at Km 120+385**
 Pipe Culvert at Km 121+930	 **Pipe Culvert at Km 123+030**

<u>Pictures of Slab Culverts</u>

Slab Culvert at Km 42+737

Slab Culvert at Km 43+500

Slab Culvert at Km 110+180

Slab Culvert at Km 112+010

Slab Culvert at Km 48+675

Slab Culvert at Km 119+670

Slab Culvert at Km 118+340

Slab Culvert at Km 97+670

Slab Culvert at Km 104+290

Slab Culvert at Km 122+305

Slab Culvert at Km 122+930

4.5.8 DRAINAGE AND SLOPE PROTECTION

RCC covered drains constructed along the corridor appear to be in sound condition for most of length and functioning well.

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4.5.9 TRAFFIC SAFETY AND ROAD FURNITURE

Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.

Roadway delineators installed along the length of corridor appear to be good condition at most of locations. Very few delineators got damaged.

4.5.10 ROAD USER FACILITITES

The Bus Bay with Bus shelter, Truck lay bye provided along the corridor appear to be fair in condition.

4.6 PACKAGE 6: ASARA -BHATKULI- AMARAVATI

4.6.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay in nature and embankment appears to be in good condition over the entire length of project. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

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 of various type with low PI values at most of the locations. 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 majority of the locations. Results of Subgrade CBR are as follows:

Table 4-24: Package-6, Details of Soaked CBR valuses

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-11	86+00	LHS	76	45	35	24	41	40	28	12	SC	2.03	9.40	14.06	1.95	96	21.24
AM-TP-12	65+450	LHS	82	48	38	18	44	37	31	6	SM-SC	2.04	12.40	13.97	1.84	90	16.67

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-13	76+000	RHS	87	62	56	13	31	52	32	20	CH	1.86	16.00	4.84	1.85	99	56.52
AM-TP-39	88+200	LHS	73	34	25	27	48	34	26	8	SC	2.06	9.4	22.29	1.867	91	21.74

Gist of the FDD test results carried out existing subgrade are presented in the following table.

Table 4-25: Package-6, Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	Up/Down				
AM-TP-11	86+00	LHS	SC	2.03	1.95	96
AM-TP-12	65+450	LHS	SM-SC	2.04	1.84	90
AM-TP-13	76+000	RHS	CH	1.86	1.85	99
AM-TP-39	88+200	LHS	SC	2.06	1.867	91

The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit for existing subgrade samples varies between 34 and 52. All the samples satisfying the liquid limit criterion (LL<=50).
- Plasticity Index for 04 out of 04 samples Subgrade samples varies between 6 and 20 number of samples satisfying the Plasticity Index criterion (PI<=25).
- Maximum Dry Density for subgrade samples varies between 1.86 and 2.06 gm/cc. All the samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies between 9.4 to 16.0
- Free Swelling Index for 04 out of 04 existing subgrade samples varies between 16.67 and 56.52. For one sample, the FSI is 56.52. 03 samples are satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in good condition.

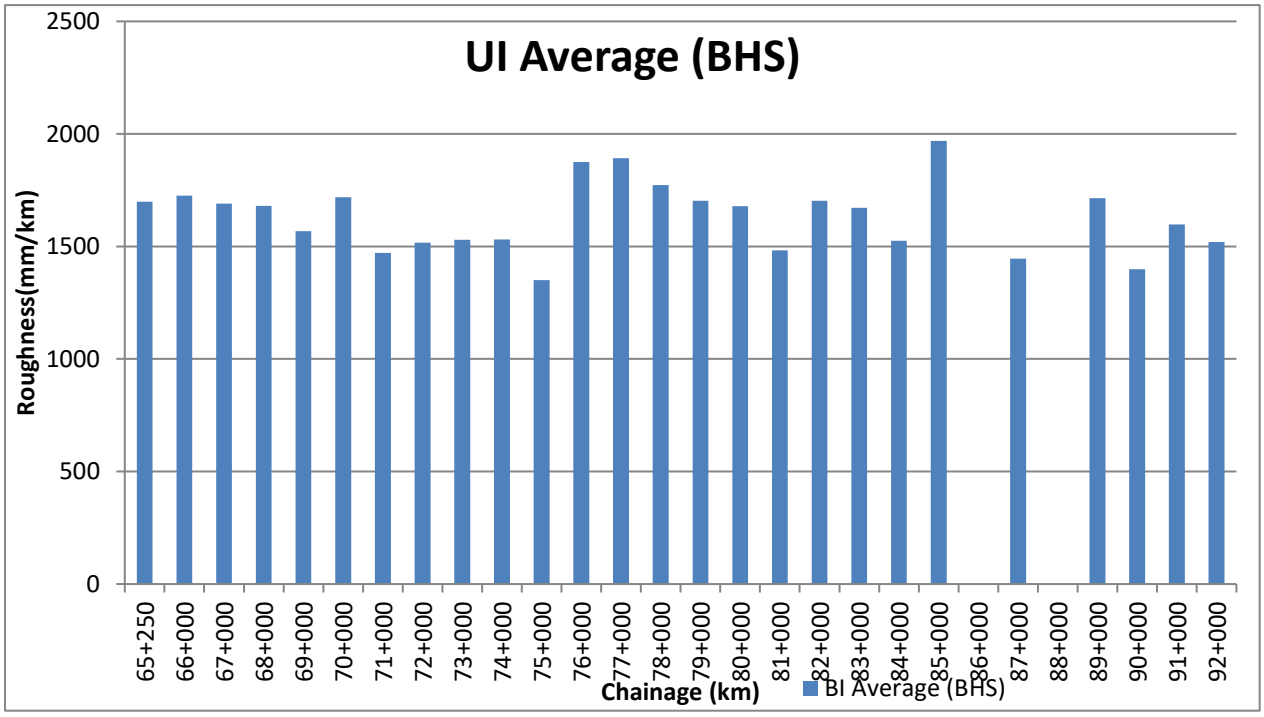
The test results and photographs are presented at **Appendix 7** of this report.

4.6.2 PAVEMENT CONDITION

The present condition of Pavement appears to be good. The Riding quality of the project corridor is good. No Cracks, potholes and patches were observed in the project corridor. Pavement Condition report covering the data collection for each km length has been presented in Appendix-2 of this report.

4.6.3 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:



Package-6, UI Avg (BHS)

Almost entire project road is having good to Fair riding quality. From the above charts, no section of the project road requires functional overlay as unevenness Index (UI) is less than 2000 mm/km.

4.6.4 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 4-26: Package-6, Summary of Design Moduli of different layers – BHS

S.No	Side	From	To	Length	15th Percentile MR values		
					MR for BT	MR for Granular	MR for Subgrade
1	BHS	65.25	73.50	8.3	1957	391	87
2	BHS	73.50	78.50	5.0	1973	390	87
3	BHS	78.50	85.50	7.0	1969	367	87
4	BHS	85.50	92.00	6.5	1979	349	87
5	BHS	92.00	93.65	1.7			
Total Length				28.500			

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 1957Mpa to 1979Mpa in BHS however, the MR value of BT layer restricted to 1979 Mpa. The MR value for Granular Layers is 349 Mpa to 391Mpa in BHS Similarly, the MR value for Subgrade Layer is 87 Mpa in BHS Carriageway.

4.6.5 PAVEMENT COMPOSITION

TCS drawing shows crust composition for the main carriageway is as:

Main carriageway	
BC, mm	40
DBM, mm	65
WMM, mm	250
GSB, mm	200-250
PQC, mm	280
DLC, mm	100
Subgrade, mm	500

However, from the test pits dug at 04 locations along the main carriageway reveal the following

f) Main Carriageway Crust

	BT, mm	WMM, mm	PQC, mm	DLC, mm	GSB, mm	Total Crust, mm
Maximum	150	340	300	100	260	750
Minimum	100	220	300	100	200	550
Average	120	300	300	100	230	645

4.6.6 CD STRUCTURES

The CD structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, all 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 4-27: Package-6, Summary of Major Structures

S. No	Type of Str	Total No. of Str's AS per		
		Sch-A	Sch-B	Site
1	Major Bridges	Nil	Nil	Nil
2	Minor Bridges	9	13	13
3	Box/Slab Culverts	6	5	5
4	Pipe Culverts	39	34	34

As per Schedule 34 no's Pipe culverts & 5 no's Slab and Box culverts, total 39 no's Culverts.

Chainage: 65+785
General Description
BHS

- Type of Structure : MNB
- Span Arrangement : 1 x 7.9 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 68+255
General Description
BHS

- Type of Structure : MNB
- Span Arrangement : 2 x 8.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching is observed.
- Widening Joints are not attached properly.
- Finishing is not done properly.

Chainage: 70+280
General Description
BHS

- Type of Structure : MNB
- Span Arrangement : 2 x 5.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching is observed.
- Structure is in good condition.

Chainage: 71+320

General Description
BHS

- Type of Structure : MNB
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Raft foundation
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure is in good condition.

Chainage: 71+425
General Description
BHS

- Type of Structure : MNB
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Raft foundation
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Floor apron damaged.
- Structure is in good condition.

Chainage: 74+715

General Description
BHS

- Type of Structure : MNB
- Span Arrangement : 1 x 9.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Water stagnated at the abutment area.
- Repair work is observed on the abutments.

Chainage: 76+215
General Description
BHS

- Type of Structure : MNB
- Span Arrangement : 1 x 7.4 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching is observed.
- Structure is in fair condition.

Chainage: 76+625
General Description
BHS

- Type of Structure : MNB
- Span Arrangement : 2 x 5.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : -
- Type of Bearing : -
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure is in Good condition.

Chainage: 77+285

General Description
BHS

- Type of Structure : MNB
- Span Arrangement : 3 x 6.0 m
- Total deck width of structure : 24.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 78+525
General Description

- Type of Structure : MNB (Stone Masonry)
- Span arrangement : 8 x 6.5 m
- Total deck width of structure : 7.4 m
- Type of Foundation : Not visible
- Type of Substructure : Stone Masonry Wall Type
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Pipe Hand Rails
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Vegetation growth over the abutment.
- Garbage piled up near the pier bottom.
- Railings are placed half-way, new railings to be placed.
- Sapling and reinforcement exposed on top slab and pier cap.

Chainage: 82+500
General Description

- Type of Structure : MNB
- Span Arrangement : 3 x 8.0 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure is in fair condition

Chainage: 92+875
General Description

- Type of Structure : MNB
- Span Arrangement : 3 x 10.0 m
- Total deck width of structure : 11.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Steel Hand Rails
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Hand railing partially damaged.
- Debris and garbage accumulated in water way.
- Leaching is observed on top slab and piers.

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type of Culvert	As per Sch-B	As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
1	66+995	66+997	SH-280	1 x 900	1 x 1.20	12	Pipe	Reconstruction	New	No	Yes	> Vegetation observed on the structure.
2	67+475	67+477	SH-280	1 x 3.0	-	15	Slab	Widening	Widening done	Yes	Yes	> Reinforcement is exposed on the soffit of top slab at construction joint. > Cracks are observed on the Abutment.
3	69+360	69+364	SH-280	1 x800	1 x 1.20	12	Pipe	Reconstruction	New	No	Yes	> Silt observed in the pipe.
4	69+515	69+519	SH-280	1 x 900	1 x 1.20	12	Pipe	Reconstruction	New	No	Yes	> Silt observed in the pipe. > Structure is in fair condition.
5	70+745	70+746	SH-280	1 x 2.0	-	15	Slab	Widening	Widening done	No	No	> Water stagnated in the structure. > Honey combing observed on the side face of top slab.
6	70+935	70+936	SH-280	I x 800	1 x 1.20	12	Pipe	Reconstruction	New	No	Yes	> Silt observed in the pipe. > Structure is in fair condition.
7	75+005	74+938	SH-280	1 x 900	1 x 1.20	12	Pipe	Reconstruction	New	No	Yes	> Silt observed in the pipe. > Structure is in fair condition.
8	75+270	75+203	SH-280	1 x 900	1 x 1.20	12	Pipe	Reconstruction	New	No	No	> Structure is submerged under stagnated water at one side.
9	75+480	75+413	SH-280	1 x 900	1 x 1.20	12	Pipe	Reconstruction	New	No	Yes	> Structure is in fair condition.
10	75+775	75+708	SH-280	I x 900	1 x 1.20	12	Pipe	Reconstruction	New	No	No	> Structure is in fair condition.
11	76+950	76+880	SH-280	1 x 2.2	-	24	Slab	Widening	Widening done	No	No	> Water stagnated in the structure.
12	77+670	77+585	SH-280	1 x 900	1 x 1.20	12	Pipe	Reconstruction	New	No	Yes	> Structure is in fair condition.
13	77+810	77+725	SH-280	1 x 900	1 x 1.20	12	Pipe	Reconstruction	New	No	Yes	> Silt observed in the pipe. > Structure is in fair condition.
14	77+950	77+865	SH-280	1 x900	1 x 1.20	12	Pipe	Reconstruction	New	No	Yes	> Silt observed in the pipe. > Structure is in fair condition.
15	78+905	78+830	SH-280	1 x 800	1 x 1.20	12	Pipe	Reconstruction	New	Not Visible	Yes	> Silt observed in the pipe. > Structure is in fair condition. > Vegetation observed on the structure.
16	79+470	79+410	SH-280	2 x 1200	2 x 1.20	12	Pipe	Reconstruction	New	No	No	> Silt observed in the pipe. > Structure is in fair condition.
17	80+025	79+960	SH-280	1 x 1000	1 x 1.20	12	Pipe	Reconstruction	New	Not Visible	No	> Structure is in fair condition. > Vegetation observed on the structure.

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type of Culvert	As per Sch-B	As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
18	80+350	80+285	SH-280	1 x 800	1 x 1.20	12	Pipe	Reconstruction	New	Not Visible	Yes	> Silt observed in the pipe. > Structure is in fair condition. > Vegetation observed on the structure.
19	81+460	81+395	SH-280	1 x 2.9	1 x 5.0	15	Slab	Reconstruction	Widening done	Yes	Yes	> Structure is in fair condition.
20	82+685	82+615	SH-280	2 x 1000	2 x 1.20	12	Pipe	Reconstruction	New	Not Visible	Yes	> Silt observed in the pipe. > Structure is in fair condition. > Vegetation observed on the structure.
21	83+870	83+800	SH-280	1 x 2.0	-	15	Slab	Widening	Widening done	Yes	Yes	> Leaching observed on abutment.
22	84+010	83+960	SH-280	2x900	2 x 1.20	12	Pipe	Reconstruction	New	Not Visible	Yes	> Silt observed in the pipe. > Structure is in fair condition. > Vegetation observed on the structure.
23	84+545	84+475	SH-280	2 x 1000	2 x 1.20	12	Pipe	Reconstruction	New	Not Visible	Yes	> Silt observed in the pipe. > Structure is in fair condition.
24	84+880	84+810	SH-280	3 x 1000	3 x 1.20	12	Pipe	Reconstruction	New	Not Visible	Yes	> Structure is in fair condition. > Vegetation observed on the structure.
25	85+395	85+325	SH-280	1 x 1000	1 x 1.20	12	Pipe	Reconstruction	New	Not Visible	Yes	> Water stagnated in the structure > Structure is in fair condition.
26	85+565	85+495	SH-280	1 x 800	1 x 1.20	12	Pipe	Reconstruction	New	Not Visible	No	> Water stagnated in the structure. > Structure is in fair condition.
27	86+705	86+638	SH-280	1 x 800	1 x 1.20	15	Pipe	Reconstruction	New	Not provided	No	> Structure is in fair condition
28	86+865	86+798	SH-280	1 x 800	1 x 1.20	15	Pipe	Reconstruction	Not Visible	Not Visible	Not Visible	> Structure is not visible at this location as drain is present.
29	87+215	87+148	SH-280	1 x 900	1 x 1.20	15	Pipe	Reconstruction	New	Not Visible	No	> Silt observed in the pipe. > Structure is in fair condition. > Vegetation observed on the structure.
30	87+480	87+413	SH-280	2 x 1000	2 x 1.20	15	Pipe	Reconstruction	New	Not Visible	Yes	> Silt observed in the pipe. > Structure is in fair condition.
31	87+862	87+795	SH-280	3 x 1200	3 x 1.20	15	Pipe	Reconstruction	New	Not Visible	Yes	> Silt observed in the pipe. > Vegetation observed on the structure.
32	88+150	88+083	SH-280	1 x 800	1 x 1.20	15	Pipe	Reconstruction	New	Not Visible	No	> Structure is in fair condition. > Vegetation observed on the structure.
33	88+555	88+488	SH-280	2 x 1200	2 x 1.20	15	Pipe	Reconstruction	New	Not Visible	Yes	> Structure is in fair condition. > Vegetation observed on the structure.
34	89+385	89+320	SH-280	1 x 1200	1 x 1.20	15	Pipe	Reconstru	New	Not Visible	No	> Structure is in fair condition.

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type of Culvert	As per Sch-B	As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
								ction				> Vegetation observed on the structure.
35	89+715	89+650	SH-280	1 x 800	1 x 1.20	15	Pipe	Reconstruction	New	Not Visible	No	> Slab culvert found in this location.
36	90+625	90+555	SH-280	1 x 900	1 x 1.20	15	Pipe	Reconstruction	New	Not Visible	No	> Pipe is buried with silt and stones.
37	93+087	93+020	SH-280	1 x 800	1 x 1.20	15	Pipe	Reconstruction	-	Not Visible	No	> Structure is not visible at this location.
38	93+600	93+533	SH-280	1 x 800	1 x 1.20	15	Pipe	Reconstruction	Old	Not provided	No	> Stagnated water and debris are present.
39	93+675	93+608	SH-280	1 x 1000	1 x 1.20	15	Pipe	Reconstruction	Old	Not provided	No	> Stagnated water and debris are present.

Photos depicting the existing culvert are presented below

Pipe Culvert at Km 69+360	Pipe Culvert at Km 69+515
Pipe Culvert at Km 75+270	Pipe Culvert at Km 77+950
Pipe Culvert at Km 78+905	Pipe Culvert at Km 80+025

Pipe Culvert at Km 80+350	Pipe Culvert at Km 84+010
Pipe Culvert at Km 84+545	Pipe Culvert at Km 85+395
Pipe Culvert at Km 87+215	Pipe Culvert at Km 87+862

Pipe Culvert at Km 88+555

Pipe Culvert at Km 89+385

Pipe Culvert at Km 90+625

Pipe Culvert at Km 93+600

Pipe Culvert at Km 75+755

Pipe Culvert at Km 82+685

Slab Culvert at Km 67+475

Slab Culvert at Km 70+745

Slab Culvert at Km 76+950

Box Culvert at Km 81+460

Slab Culvert at Km 83+870

Slab Culvert at Km 89+575

4.6.7 DRAINAGE AND SLOPE PROTECTION

RCC covered drains constructed along the corridor appear to be in sound condition for most of length and functioning well.

4.6.8 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.

Roadway delineators installed along the length of corridor appear to be good condition at most of locations. Very few delineators got damaged.

4.6.9 ROAD USER FACILITITES

The bus stop and bus bay, Truck lay bye provided along the corridor appear to be fair in condition.

4.7 PACKAGE 7: AMARAVATI- CHANDUR BYPASS- DHAMANGAON

4.7.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay in nature and embankment appears to be in good condition over the entire length of project. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

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 of various type with low PI values at most of the locations. 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%. Results of Subgrade CBR are as follows:

Table 4-28: Package-7, Details of Soaked CBR values

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-1	3+000	LHS	70	36	26	30	44	33	25	8	SC	2.03	10.20	14.15	1.81	89	23.81
AM-TP-2	13+800	RHS	74	40	25	26	49	34	30	4	SM-SC	2.20	9.60	29.20	1.97	90	10.00
AM-TP-3	24+050	LHS	77	39	30	23	47	39	31	8	SC	2.07	12.40	23.70	1.91	92	18.18
AM-TP-4	28+000	RHS	59	20	16	41	43	33	29	4	SM-SC	2.15	11.80	29.20	2.06	96	13.04
AM-TP-5	38+000	LHS	76	33	25	24	51	34	29	5	SM-SC	2.04	11.00	12.38	1.94	95	22.73
AM-TP-6	44+800	LHS	91	62	39	9	52	31	27	4	SM-SC	2.04	13.2	12.38	1.80	88	14.29

Gist of the FDD test results carried out existing subgrade are presented in the following table.

Table 4-29: Package-7, Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	Up/Down				
AM-TP-1	3+000	LHS	SC	14.15	1.81	89
AM-TP-2	13+800	RHS	SM-SC	29.20	1.97	90
AM-TP-3	24+050	LHS	SC	23.70	1.91	92
AM-TP-4	28+000	RHS	SM-SC	29.20	2.06	96
AM-TP-5	38+000	LHS	SM-SC	12.38	1.94	95
AM-TP-6	44+800	LHS	SM-SC	12.38	1.80	88

The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit for existing subgrade samples varies between 31 and 39. All the samples satisfying the liquid limit criterion (LL<=50).
- Plasticity Index for 6 out of 6 samples Subgrade samples varies between 4 and 8. All number of samples satisfying the Plasticity Index criterion (PI<=25).
- Maximum Dry Density for subgrade samples varies between 2.03 and 2.20 gm/cc. All the samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies between 9.60 to 12.40
- Free Swelling Index for6 out of 6 existing subgrade samples varies between 10.00 and 23.81. All samples are satisfying the FSI criterion (FSI<=50%).

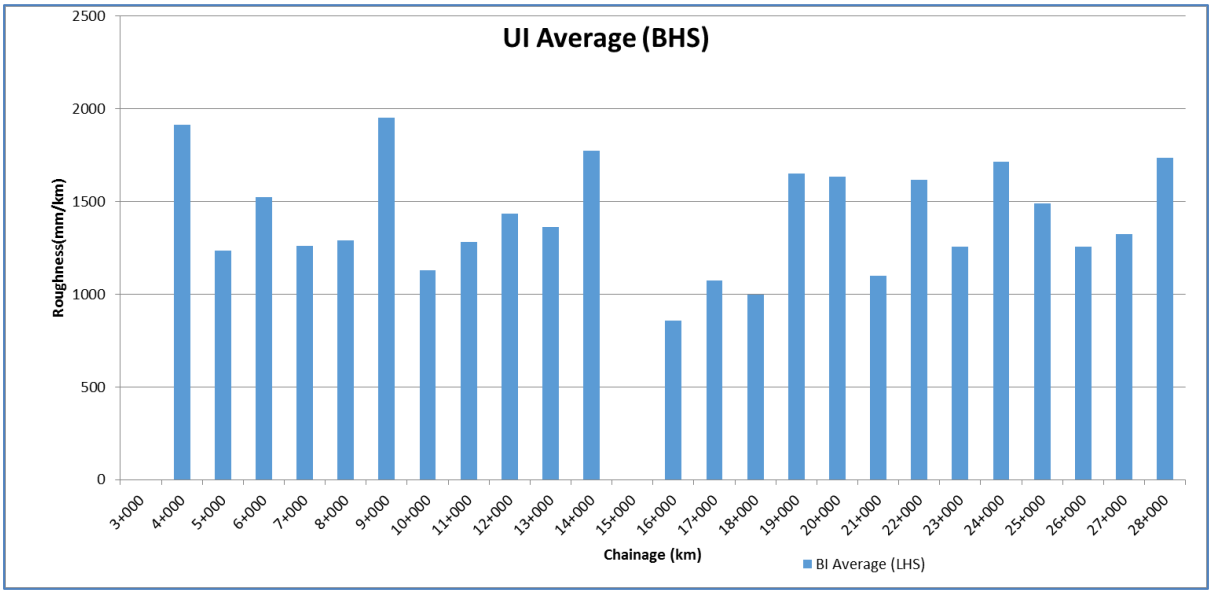
The test results and photographs are presented at **Appendix 7** of this report.

4.7.2 PAVEMENT CONDITION

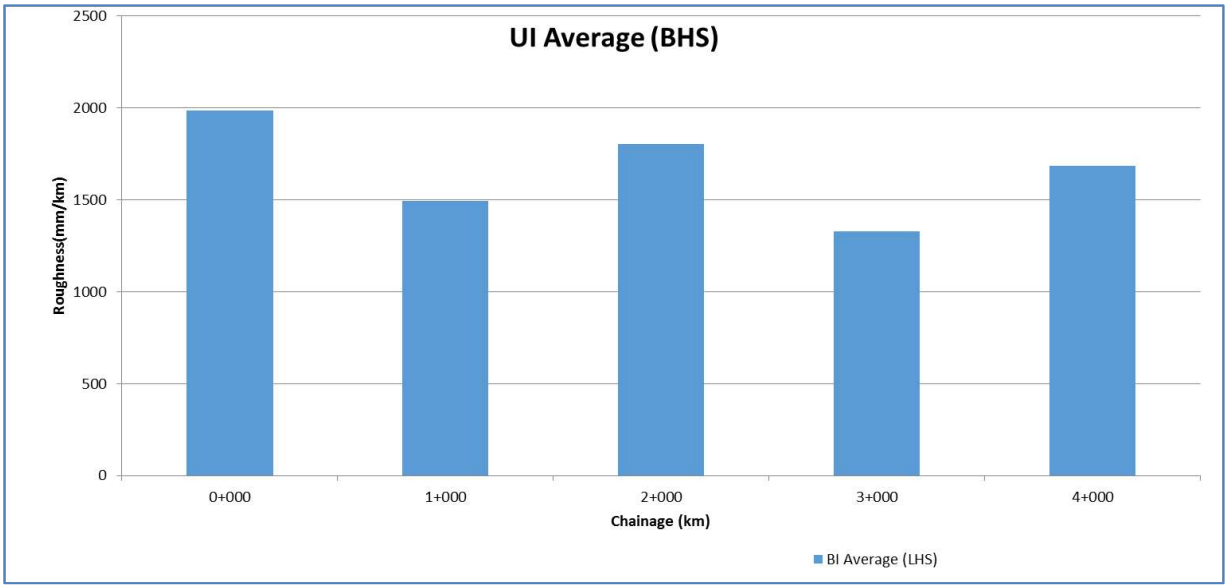
The present condition of Pavement appears to be good. The Riding quality of the project corridor is good. No Cracks, potholes and patches were observed in the project corridor. Pavement Condition report covering the data collection for each km length has been presented in Appendix-2 of this report.

4.7.3 ROUGHNESS

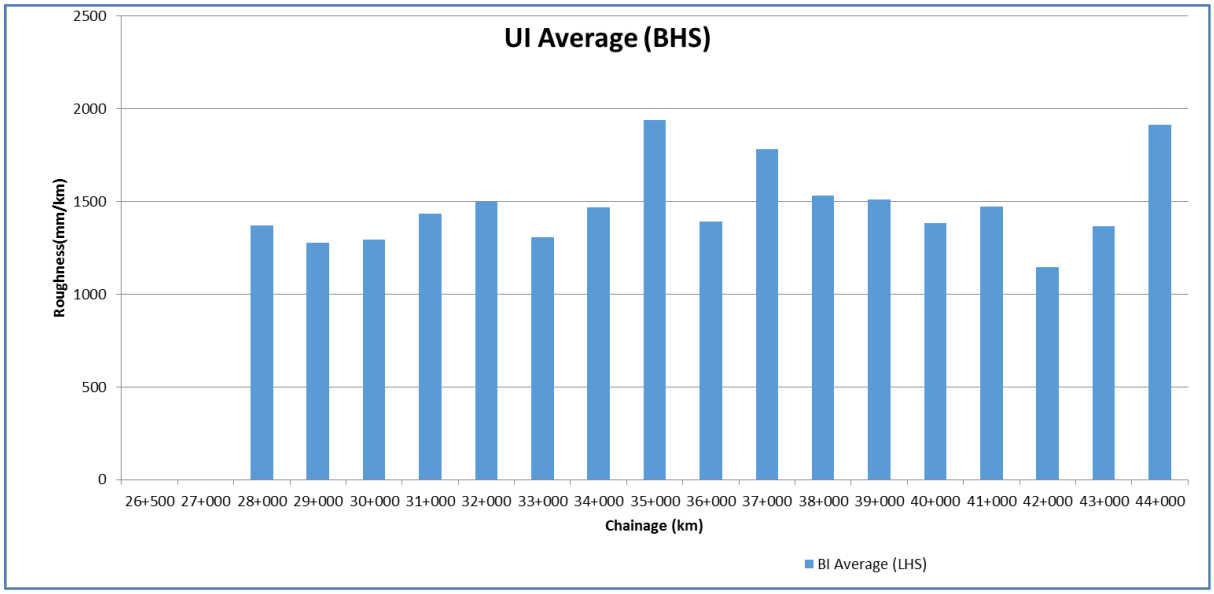
The roughness surveys conducted along the corridor indicate good riding quality over the length of project corridor. Bar diagrams showing the Kilometer wise roughness along the project road are presented below:



Package-7, UI Avg (BHS)_SH-297



Package-7, UI Avg (BHS)_Chandur Bypass



Package-7, UI Avg (BHS)_SH-296

Almost entire project road is having good riding quality. From the above charts, no section of the project road requires functional overlay as unevenness Index (UI) is less than 2000 mm/km.

4.7.4 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 4-30: Package-7, Summary of Design Moduli of different layers

S.No	Side	From	To	Length	15th Percentile MR values		
					MR for BT	MR for Granular	MR for Subgrade
SH-297 & Chandur Bypass							
1	BHS	0.000	4.700	4.700	2544	344	87
2	BHS	3.000	4.501	1.501	Rigid		
3	BHS	4.501	14.000	9.499	2174	348	87
4	BHS	14.000	20.500	6.500	2158	389	87
5	BHS	20.500	28.850	8.350	2156	353	87
SH-296							
6	BHS	26.500	28.000	1.500	Rigid		
7	BHS	28.000	35.500	7.500	3076	368	87
8	BHS	35.500	44.850	9.350	3075	305	87

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 2156 Mpa to 3076Mpa in BHS Carriageway however, the MR value of BT layer restricted to 3000 Mpa. The MR value for Granular Layers is 305Mpa to 389Mpa in BHS Carriageway. Similarly, the MR value for Subgrade Layer is 87 Mpa in BHS Carriageway.

4.7.5 PAVEMENT COMPOSITION

TCS drawing shows crust composition for the main carriageway is as:

Main carriageway	
BC, mm	40
DBM, mm	80
WMM, mm	250
PQC, mm	280
DLC, mm	100
GSB, mm	260
Subgrade, mm	500

However, from the test pits dug at 6 locations along the main carriageway reveal the following

g) Main Carriageway Crust

	BT, mm	WMM, mm	PQC, mm	DLC, mm	GSB, mm	Total Crust, mm
Maximum	140	260	300	100	330	700
Minimum	100	200	300	100	200	600
Average	115	245	300	100	265	630

4.7.6 CD STRUCTURES

The CD structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, all 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 4-31: Package-7, Summary of Major Structures

S. No	Type of Str	Total No. of Str's AS per		
		Sch-A	Sch-B	Site
1	Major Bridges	Nil	Nil	Nil
2	Minor Bridges	12	14	12
3	Box/Slab Culverts	18	6	7
4	Pipe Culverts	64	70	74

As per Schedule 70 no's Pipe culverts & 6 no's Slab and Box culverts, total 76 no's Culverts.

Chainage: 2+545
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 5 x 7 m
- Total deck width of structure : 12 m
- Type of Foundation : Not visible
- Type of Substructure : RCC BOX
- Type of Superstructure : RCC BOX
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Structure is in good condition.
- Garbage accumulated around pier P3.

Chainage: 14+987
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 1 x 6.5 m
- Total deck width of structure : 13 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Crack on retaining wall.
- Debris observed on stone pitching.
- Reinforcement not curtailed in top slab.

Chainage: 16+070
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 3 X 5 m
- Total deck width of structure : 8.30 m
- Type of Foundation : Not visible
- Type of Substructure : Stone masonry Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Pipe hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Soil pitching found.
- Drainage holes clogged.
- Silt accumulated in water way.

Chainage: 18+743
General Description

- Type of Structure : Pipe Culvert
- Span Arrangement : 5 x 1.2 m
- Total deck width of structure : 9.9 m
- Type of Foundation : Open
- Type of Substructure : -
- Type of Superstructure : -
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : No hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Instead of Minor bridge pipe culvert is found.
- Quadratic pitching found.
- 5 pipes are found damaged.
- Crack found on pipe.
- Structure is not in good condition.

Chainage: 20+247
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 2 x 6 m
- Total deck width of structure : 12 m
- Type of Foundation : Not visible
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Vegetation growth on Stone pitching.
- Water stagnation.
- Floor protection not found.
- Soil erosion & garbage found.

Chainage: 23+694
General Description

- Type of Structure : Pipe Culvert
- Span Arrangement : 2 x 1.2 m
- Total deck width of structure : 9.0 m
- Type of Foundation : Open
- Type of Substructure : -
- Type of Superstructure : -
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : No hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Instead of Minor bridge pipe culvert is found.
- Stone pitching found.
- 2 pipes found.
- Soil erosion & garbage found.

Chainage: 24+770
General Description
BHS

- Type of Structure : Minor Bridge
- Span Arrangement : 2 x 7.55 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Concrete barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Floor apron not found.
- Drainage holes clogged.
- Honeycomb observed on wing wall.
- Silt accumulated in water way.

Chainage: 25+570
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 2 x 8 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Concrete barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Floor apron not visible.
- Segregation observed on wall.

Chainage: 28+830
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 3 x 6.5 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Quadratic pitching damaged
- Segregation on return wall.

Chainage: 30+302
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Concrete barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching and water strain observed
- Floor protection provided.

Chainage: 31+540
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 1 x 8 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Concrete barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- spalling and water mark near down take pipe.
- Segregation of concrete observed on top slab.
- Repair work observed on side wall.

Chainage: 34+875
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 2 x 6.35 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Concrete barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Spalling observed on bottom of top slab.
- Quadrant pitching not found.

Chainage: 38+025
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 11.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Concrete hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Quadrant pitching damage.
- Crack observed hunch location.
- Spalling observed on bottom of top slab.

Chainage: 41+110
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 1 x 15 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Elastomeric bearing
- Type of Railing / Crash Barrier : RCC crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- segregation observed on girder.
- Quadrant pitching covered with vegetation.
- Previous repair work has done on girders.

Chainage: 44+525
General Description

- Type of Structure : Minor Bridge
- Span Arrangement : 2 x 6 m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Concrete Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Vegetation growth observed on quadrant locations.
- Structure is in fair condition.

Details of Culverts:

S. No	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Ex Type of Culvert	As per Sch-B	Age of Culvert As per site	Quadrant pitching	Floor protection	Observations as per site
SH-297												
1	3+345	3+450	SH 297	1 x 1.45	2 x 1200	21.0	Pipe	New constructed	Old(slab)	Yes	No	>vent way clogged with debris. >Structure is in good condition. > vegetation and debris observed
2	4+505	4+600	SH 297	1 x 0.60	1 x 1200	15.0	Pipe	New constructed	New	Yes	No	>Structure is in good condition.
3	4+795	4+898	SH 297	1x0.55	1 x 1200	15.0	Pipe	New constructed	New	Yes	No	> vegetation and debris observed. >Structure is in good condition.
4	4+950	5+050	SH 297	1 x 0.60	1 x 1200	15.0	Pipe	New constructed	Old	Not visible	Not visible	>Structure is partially visible due heavy vegetation.
5	5+100	5+202	SH 297	1 x 0.50	1 x 1200	15.0	Pipe	New constructed	Old	Yes	No	> vegetation and debris observed. >Structure is in good condition. >vent way clogged with debris and stone.
6	5+400	5+598	SH 297	1 x 1000	1 x 1200	15.0	Pipe	Reconstruction	Not visible	Not visible	Not visible	>Structure is partial visible due heavy vegetation.
7	5+790	5+888	SH 297	lx 1000	1 x 1200	15.0	Pipe	Reconstruction	NOT FOUND	NOT FOUND	NOT FOUND	>Not available.
8	6+000	6+097	SH 297	1 x 0.80	1 x 1200	15.0	Pipe	New constructed	Old	Yes	No	> vegetation and debris observed near vent way.
9	6+068	6+165	SH 297	1 x 1000	1 x 1200	15.0	Pipe	Reconstruction	New	No	No	>vegetation and debris observed near vent way.
10	7+530	7+624	SH 297	1 x 0.60	1 x 1200	15.0	Pipe	New constructed	New	Yes	No	> vegetation and debris observed near vent way.
11	7+732	7+827	SH 297	1x0.63	1 x 1200	15.0	Pipe	New constructed	Old	Yes	No	> vegetation observed near vent way.
12	8+258	8+350	SH 297	2x750	1 x 1200	15.0	Pipe	Reconstruction	Old	No	No	>water stagnated. >Debris are observed.
13	8+678	8+770	SH 297	1x0.50	1 x 1200	15.0	Pipe	New constructed	Old	Yes	No	> vegetation and debris observed. >Structure is in good

S. No	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Ex Type of Culvert	As per Sch-B	Age of Culvert As per site	Quadrant pitching	Floor protection	Observations as per site
												condition. >vent way fully clogged with debris and stone.
14	9+332	9+424	SH 297	1X750	1 x 1200	15.0	Pipe	Reconstruction	New	No	No	>Half of vent way buried with soil. >Debris are observed.
15	9+865	9+958	SH 297	1 x 1000	1 x 1200	15.0	Pipe	Reconstruction	New	Not visible	Not visible	> vegetation and debris observed near vent way. >A pot hole formed on floor protection.
16	10+902	10+995	SH 297	1x0.3	1 x 1200	15.0	Pipe	New constructed	New	Not visible	Not visible	>Structure is partially visible due heavy vegetation.
17	11+620	11+712	SH 297	1x0.6	1 x 1200	15.0	Pipe	New constructed	New	Yes	No	> vegetation and debris observed >Structure is in good condition.
18	11+655	11+760	SH 297	1 x 1000	1 x 1200	15.0	Pipe	Reconstruction	New	Yes	No	> vegetation and debris observed near vent way.
19	12+498	12+588	SH 297	1x0.8	1 x 1200	15.0	Pipe	New constructed	New	Yes	No	> vegetation and debris observed
20	12+790	12+880	SH 297	1x0.6	1 x 1200	15.0	Pipe	New constructed	New	Yes	No	>vent way clogged with debris and stone. >Structure is in good condition.
21	12+900	12+992	SH 297	1x900	1 x 1200	15.0	Pipe	Reconstruction	New	Not visible	Not visible	>Structure is partial visible due heavy vegetation and debris.
22	13+330	13+420	SH 297	4x750	2 xl200	15.0	Pipe	Reconstruction	old	Yes	Yes	>Debris are observed. >Pipe damaged. >Stone pitching damaged
23	14+645	14+735	SH 297	2 x 1000	2 x 1200	15.0	Pipe	Reconstruction	old	Not visible	Not visible	>heavy vegetation and debris. >Half of vent way buried with soil.
24	15+050	15+142	SH 297	1 x 1000	1 x 1200	16.0	Pipe	Reconstruction	New	No	No	>Debris are observed. >Half of vent way buried with soil.
25	15+422	15+513	SH 297	1x750	1 x 1200	15.0	Pipe	Reconstruction	New	Yes	Yes	> good condition.
26	17+902	18+994	SH 297	4x750	2 X1200	15.0	Pipe	Reconstruction	New	Not visible	Not visible	>Structure is partially visible due heavy vegetation.
27	18+650	18+650	SH 297	5 X1200		10.0	Pipe	Retained	old	Not visible	No	>Structure is partially visible due heavy vegetation.

S. No	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Ex Type of Culvert	As per Sch-B	Age of Culvert As per site	Quadrant pitching	Floor protection	Observations as per site
												>water stagnated.
28	18+860	18+950	SH 297	1x900	1 x 1200	15.0	Pipe	Reconstruction	old	Yes	No	>Half of vent way buried with soil. > good condition.
29	20+572	20+660	SH 297	1x750	1 x 1200	15.0	Pipe	Reconstruction	New	Yes	Not visible	>Structure is partially visible due heavy vegetation.
30	21+000	21+090	SH 297	1 x 750	1x1200	15.0	Pipe	Reconstruction	old	Yes	Not visible	>heavy vegetation and debris are observed.
31	21+768	21+768	SH 297	2x1200	10	15	Pipe	Widening	old	No	No	>heavy vegetation is observed. >scoring observed on floor apron.
32	23+605	23+605	SH 297	2x1200	10.3	10.3	Pipe	Retained	old	No	Not visible	>Structure is partially visible due heavy vegetation. >Half of vent way buried with debris. >spalling on sub structure.
33	24+372	24+372	SH 297	1 x 1200	10	15	Pipe	Widening	old	Yes	No	>Structure is partially visible due heavy debris. >heavy vegetation observed
34	25+868	25+589	SH 297	2 x 1200	8.5	15	Pipe	Widening	old	Yes	No	>heavy vegetation observed
35	26+502	25+868	SH 297	1 x.1000	1 x 1200	15.0	Pipe	Reconstruction	old	Yes	No	>Pipe damaged. >heavy vegetation observed.
36	28+910	28+910	SH 297	5 x 1200	5 x 1200	18.9	Pipe	Retained	New	No	Not visible	>heavy vegetation observed. >vent way not visible due to vegetation.
SH 296												
1	26+975	26+890	SH 296	1X900	1 x 1200	21.0	Pipe	Reconstruction	NOT FOUND	NOT FOUND	NOT FOUND	>Not found.
2	27+100	27+067	SH 296	1X900	1 x 1200	21.0	Pipe	Reconstruction	NOT FOUND	NOT FOUND	NOT FOUND	>Not found.
3	27+325	27+332	SH 296	1 x 3.00	1 x 5.00	15	Slab	Reconstruction	New	Yes	Not visible	>Structure is in good condition. > vegetation observed.
4	27+605	27+600	SH 296	3x750	2 x 1200	21.0	Pipe	Reconstruction	old	Yes	Yes	>Debris observed on vent area. >heavy vegetation observed
5	27+780	27+780	SH 296	3x750	2 x 1200	12.0	Pipe	Reconstruction	New	No	Not visible	>Structure is not visible due heavy vegetation and debris. >vent way buried with soil.
6	28+830	28+830	SH 296	1X750	1 x1200	12.0	Pipe	Reconstruction	New	Yes	Not visible	>Structure is partially visible due heavy vegetation.

S. No	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Ex Type of Culvert	As per Sch-B	Age of Culvert As per site	Quadrant pitching	Floor protection	Observations as per site
7	29+060	28+955	SH 296	1X600	1 x 1200	12.0	Pipe	Reconstruction	NOT FOUND	NOT FOUND	NOT FOUND	>Not found.
8	29+340	29+334	SH 296	2x900	2 x 1200	12.0	Pipe	Reconstruction	New	Yes	No	>Structure is in good condition.
9	30+125	30+119	SH 296	3x900	2 x 1200	12.0	Pipe	Reconstruction	New	Yes	No	>Structure is in good condition.
10	30+860	30+860	SH 296	1x750	1 x 1200	12.0	Pipe	Reconstruction	New	Yes	Not visible	>Half of vent way buried with soil. >heavy vegetation observed.
11	31+050	31+048	SH 296	1x750	1 x 1200	12.0	Pipe	Reconstruction	New	Yes	Not visible	>Half of vent way buried with vegetation and debris. >vegetation observed.
12	31+900	31+890	SH 296	2x750	1 x 1200	12.0	Pipe	Reconstruction	New	Yes	Yes	>Structure is in good condition.
13	32+125	32+120	SH 296	1x600	1 x 1200	12.0	Pipe	Reconstruction	New	Not visible	Not visible	>vent way cover with vegetation and debris.
14	32+260	32+257	SH 296	1x750	1 x 1200	12.0	Pipe	Reconstruction	New	Yes	Not visible	>vent way cover with vegetation and debris.
15	32+370	32+358	SH 296	3x750	2 x 1200	12.0	Pipe	Reconstruction	New	No	No	>Structure is in good condition.
16	32+590	32+582	SH 296	1x750	1 x 1200	12.0	Pipe	Reconstruction	New	Yes	No	>Half of vent way buried with soil. > vegetation observed. > vegetation observed.
17	32+950	32+942	SH 296	1x750	1 x 1200	12.0	Pipe	Reconstruction	New	Not visible	Not visible	>vent way cover with vegetation and debris.
18	35+340	35+332	SH 296	3x750	2 x 1200	12.0	Pipe	Reconstruction	New	Yes	Not visible	>heavy vegetation observed. >Structure is in good condition.
19	35+575	35+565	SH 296	1x750	1 x 1200	12.0	Pipe	Reconstruction	New	Yes	No	>Structure is in good condition.
20	35+925	35+915	SH 296	3x900	2 x 1200	12.0	Pipe	Reconstruction	New	No	No	>heavy vegetation observed. >Structure is in good condition.
21	36+310	36+300	SH 296	2x900	2 x 1200	12.0	Pipe	Reconstruction	New	No	No	>Half of vent way buried with soil. >heavy vegetation observed.
22	36+935	36+925	SH 296	1x3.0	10.6	12.0	Slab	Widening	New	No	Not visible	>vegetation observed. >Structure is in good condition.
23	37+500	37+485	SH 296	2X750	1 x 1200	12.0	Pipe	Reconstruction	New	Yes	NA	>vegetation observed. >Structure is in good

S. No	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Ex Type of Culvert	As per Sch-B	Age of Culvert As per site	Quadrant pitching	Floor protection	Observations as per site
												condition.
24	38+675	38+665	SH 296	3X750	2 x 1200	12.0	Pipe	Reconstruction	New	Yes	NA	>Half of vent way buried with soil. >heavy vegetation observed.
25	39+225	39+214	SH 296	3X900	1x5.0	12.0	Slab	New constructed	NOT FOUND	NOT FOUND	NOT FOUND	>Not found.
26	39+516	39+510	SH 296	3X900	2 x 1200	12.0	Pipe	Reconstruction	New	Yes	No	>vent way clogged with debris and stone. >Structure is in good condition.
27	40+125	40+117		3X1000	1x5.0	12.0	Slab	New constructed	New	Not visible	Not visible	>Structure is partially visible due heavy vegetation and debris.
28	41+275	41+265	SH 296	2X750	1 x 1200	12.0	Pipe	Reconstruction	New	Yes	No	>Structure is in good condition.
29	41+700	41+688	SH 296	2X750	1 x 1200	12.0	Pipe	Reconstruction	New	Yes	No	>vent way clogged with debris and stone. >Structure is in good condition.
30	42+320	42+320	SH 296	3X750	1x5.0	12.0	Slab	New constructed	New	Yes	No	>Structure is in good condition.
31	43+475	43+460	SH 296	2X750	1 x 1200	12.0	Pipe	Reconstruction	New	Yes	No	>Half of vent way buried with soil. >vegetation observed.
32	43+800	43+782	SH 296	3X1000	3 x 1200	15.0	Pipe	Reconstruction	New	Not visible	Not visible	>Structure is partially visible due heavy vegetation and debris.
33	44+525	44+525	SH 296	5 x 1200	5 x 1200	12.0	Pipe	Retained	New	Yes	No	>vent way clogged with debris and stone. >Structure is in good condition.
CHANDUR BYPASS												
1	0+00	0+00	CHANDUR BYPASS	1 x 1200	1 x 1200	21.0	Pipe	Retained	New	Yes	No	>Structure is in good condition. >vegetation observed.
2	0+090	0+095	CHANDUR BYPASS	1x750	1 x 1200	15.0	Pipe	Reconstruction	New	Yes	No	>Structure is in good condition.
3	0+422	0+426	CHANDUR BYPASS	1 x 750	1 x 1200	15.0	Pipe	Reconstruction	New	Yes	Not visible	>Structure is in good condition. > vegetation observed.
4	0+562	0+565	CHANDUR BYPASS	1x750	1 x 1200	15.0	Pipe	Reconstruction	New	Not visible	Not visible	>structure partially visible due to heavy vegetation

S. No	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Existing Arrangement (m)	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Ex Type of Culvert	As per Sch-B	Age of Culvert As per site	Quadrant pitching	Floor protection	Observations as per site
												observed
5	0+688	0+691	CHANDUR BYPASS	1x750	1 x 1200	15.0	Pipe	Reconstruction	New	Yes	No	>Half of vent way buried with soil. >head wall damaged.
6	1+370	1+366	CHANDUR BYPASS	2x750	2 x 1200	15.0	Pipe	Reconstruction	New	Yes	No	>Structure is in good condition. > vegetation observed.
7	1+755	1+757	CHANDUR BYPASS	1x750	1 x 1200	15.0	Pipe	Reconstruction	New	Yes	Not visible	>Half of vent way buried with soil. > vegetation and debris observed.
8	2+162	2+162	CHANDUR BYPASS	2 x 1200	8.5	15	Pipe	Widening	New	Yes	Yes	>Structure is in good condition. > vegetation observed.
9	3+138	3+140	CHANDUR BYPASS	1 x 1200	1x5.0	15.0	Slab	New constructed	New	Yes	No	>Structure is in good condition. > vegetation observed.
10	4+053	4+055	CHANDUR BYPASS	1 x 1000	1 x 1200	15.0	Pipe	Reconstruction	New	Yes	Yes	>Structure is in good condition. > vegetation observed.
11	4+333	4+335	CHANDUR BYPASS	1x750	1 x 1200	15.0	Pipe	Reconstruction	New	Yes	Yes	>Structure is in good condition. > vegetation observed.

Photos depicting the existing culvert are presented below

SH-297

Pipe Culvert at Km 3+345

Pipe Culvert at Km 4+505

Pipe Culvert at Km 4+795

Pipe Culvert at Km 4+950

Pipe Culvert at Km 5+100

Slab Culvert at Km 5+400

Slab Culvert at Km 5+790	Pipe Culvert at Km 6+000
Slab Culvert at Km 6+068	Pipe Culvert at Km 7+530
Pipe Culvert at Km 7+732	Slab Culvert at Km 8+258

 Pipe Culvert at Km 12+498	 **Pipe Culvert at Km** 12+790
 Pipe Culvert at Km 9+865	 **Pipe Culvert at Km 10+902**
 Pipe Culvert at Km 12+900	 **Pipe Culvert at Km 13+330**

Pipe Culvert at Km 14+645	**Pipe Culvert at Km** 15+050
Pipe Culvert at Km 15+422	**Pipe Culvert at Km 17+902**
Pipe Culvert at Km 18+650	**Pipe Culvert at Km 18+860**

Pipe Culvert at Km 20+572	Pipe Culvert at Km 21+000
Pipe Culvert at Km 21+768	Pipe Culvert at Km 23+605
Pipe Culvert at Km 24+372	Pipe Culvert at Km 25+868

SH-296

Pipe Culvert at Km 26+975	**Slab Culvert at Km** 27+100
Pipe Culvert at Km 27+325	**Pipe Culvert at Km 27+605**
Pipe Culvert at Km 27+780	**Pipe Culvert at Km 28+830**

Pipe Culvert at Km 29+060	**Pipe Culvert at Km 29+340**
Pipe Culvert at Km 30+125	**Pipe Culvert at Km 30+860**
Pipe Culvert at Km 31+050	**Pipe Culvert at Km 31+900**

Pipe Culvert at Km 32+125	**Pipe Culvert at Km** 32+260
Pipe Culvert at Km 32+370	**Pipe Culvert at Km 32+590**
Pipe Culvert at 32+950	**Pipe Culvert at Km 35+340**

Pipe Culvert at Km 35+575	Pipe Culvert at Km 35+925
Pipe Culvert at Km 36+310	Slab Culvert at Km 36+935
Pipe Culvert at 37+500	Pipe Culvert at Km 38+675

Pipe Culvert at Km 39+225	Pipe Culvert at Km 39+516
Pipe Culvert at Km 40+125	Pipe Culvert at Km 41+275
Pipe Culvert at 41+700	Pipe Culvert at Km 42+320

CHANDUR BYPASS

Pipe Culvert at Km 0+00

Pipe Culvert at Km 0+090

Pipe Culvert at Km 0+422

Pipe Culvert at Km 0+562

Pipe Culvert at 0+688

Pipe Culvert at Km 1+370

Pipe Culvert at Km 1+755	Pipe Culvert at Km 2+162
Slab Culvert at Km 3+138	Pipe Culvert at Km 4+053
Pipe Culvert at 4+333	Pipe Culvert at Km 4+680

4.7.7 DRAINAGE AND SLOPE PROTECTION

RCC covered drains constructed along the corridor appear to be in sound condition for most of length and functioning well.

4.7.8 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.

Roadway delineators installed along the length of corridor appear to be good condition at most of locations. Very few delineators got damaged.

4.7.9 ROAD USER FACILITITES

The bus bay with shelter, Truck lay bye provided along the corridor appear to be fair in condition.

4.8 PACKAGE 8: CHIKALDHARA-PARATWADA, CHIKALDHARA -GHATANG

4.8.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay in nature and embankment appears to be in good condition over the entire length of project. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

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 of various type with low PI values at most of the locations. 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 majority of the locations. Results of Subgrade CBR are as follows:

Table 4-32: Package-8, Details of Soaked CBR valuses

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-28	55+900	RHS	72	21	12	28	60	-	NP	NP	SW-SM	2.30	7.80	35.38	1.99	86	38.10
AM-TP-29	46+910	LHS	66	22	15	34	51	33	26	7	SM-SC	2.11	8.90	33.25	2.02	96	30.00
AM-TP-30	36+830	RHS	81	48	41	19	40	41	32	9	SC	1.90	12.00	9.03	1.82	96	21.74
AM-TP-31	26+450	LHS	69	32	22	31	47	38	33	5	SM-SC	1.83	18.20	8.60	1.82	100	21.74
AM-TP-32	0+140	RHS	92	79	58	8	34	37	28	9	CI	1.85	17.00	9.03	1.78	96	20.83

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-33	10+200	LHS	91	79	69	9	22	52	40	12	CH	1.67	23.80	NA	1.66	100	63.64

List of the FDD test results carried out existing subgrade are presented in the following table.

Table 4-33: Package-8, Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	Up/Down				
AM-TP-28	55+900	RHS	SW-SM	2.30	1.99	86
AM-TP-29	46+910	LHS	SM-SC	2.11	2.02	96
AM-TP-30	36+830	RHS	SC	1.90	1.82	96
AM-TP-31	26+450	LHS	SM-SC	1.83	1.82	100
AM-TP-32	0+140	RHS	CI	1.85	1.78	96
AM-TP-33	10+200	LHS	CH	1.67	1.66	100

The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit for existing subgrade samples varies between 30 and 60. All the samples satisfying the liquid limit criterion (LL<=50), except 1 sample it is (LL>50).
- Plasticity Index for 06 out of 06 samples Subgrade samples varies between 2 and 25 and one are non-plastic. 05 number of samples satisfying the Plasticity Index criterion (PI<=25).
- Maximum Dry Density for subgrade samples varies between 1.67 and 2.30 gm/cc. Five samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies between 7.8 to 23.80
- Free Swelling Index for 06 out of 06 existing subgrade samples varies between 20.83 and 63.84. For One sample, the FSI is 63.64. 05 samples are satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in good condition. The test results and photographs are presented at **Appendix 7** of this report.

4.8.2 Aggregate & SAND source

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 4-34: Package-8, Test Results of Aggregate Samples

S. No	Sample	Location(km)	Up/Dn	A.I.V	Water Absorption	Specific Gravity
1	AM-AQ-8	55+900	RHS	10.24	0.31	2.82
2	HC-AQ-2	452+800	RHS	18.29	0.35	2.64
3	HC-AQ-3	540+180	RHS	13.57	0.28	2.64
4	HC-AQ-4	442+750	LHS	13.35	0.23	2.69

Table 4-35: Package-8, Test Results of Sand Sources

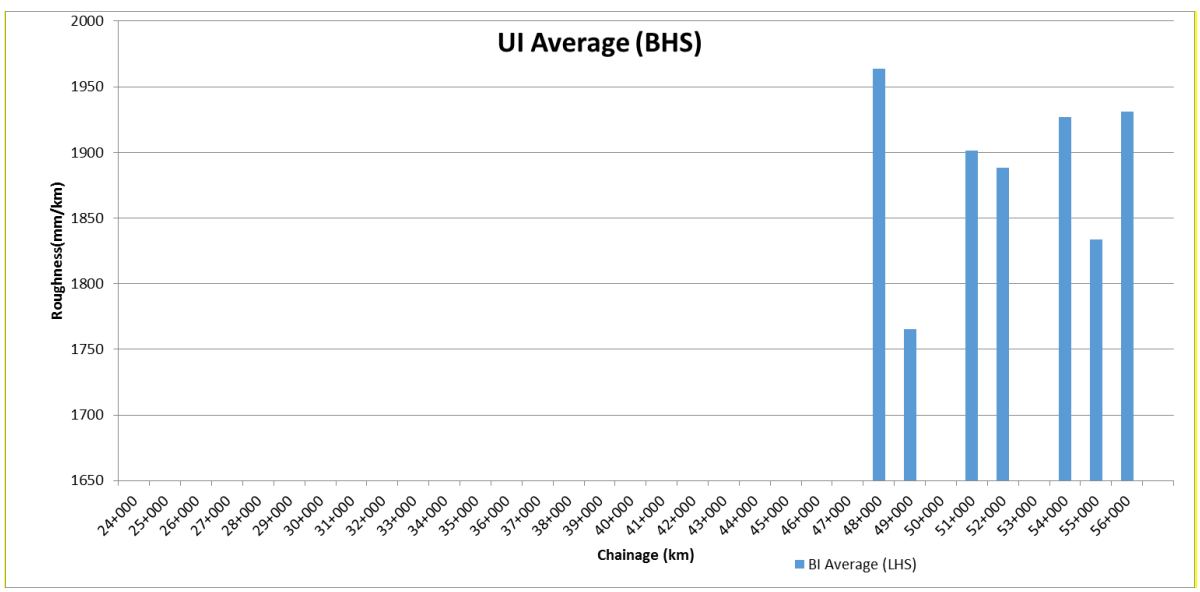
Sl No	Sample No	CHAINAGE	SIDE	10 mm Passing %	4.75 mm Passing %	2.36 mm Passing %	1.18mm Passing %	600mm Passing %	300mm Passing %	150mm Passing %	FM	ZONE
1	AM-M-SAND-8	55+900	RHS	100	93	83	57	37	17	5	3.06	**ZONE-II**

4.8.3 PAVEMENT CONDITION

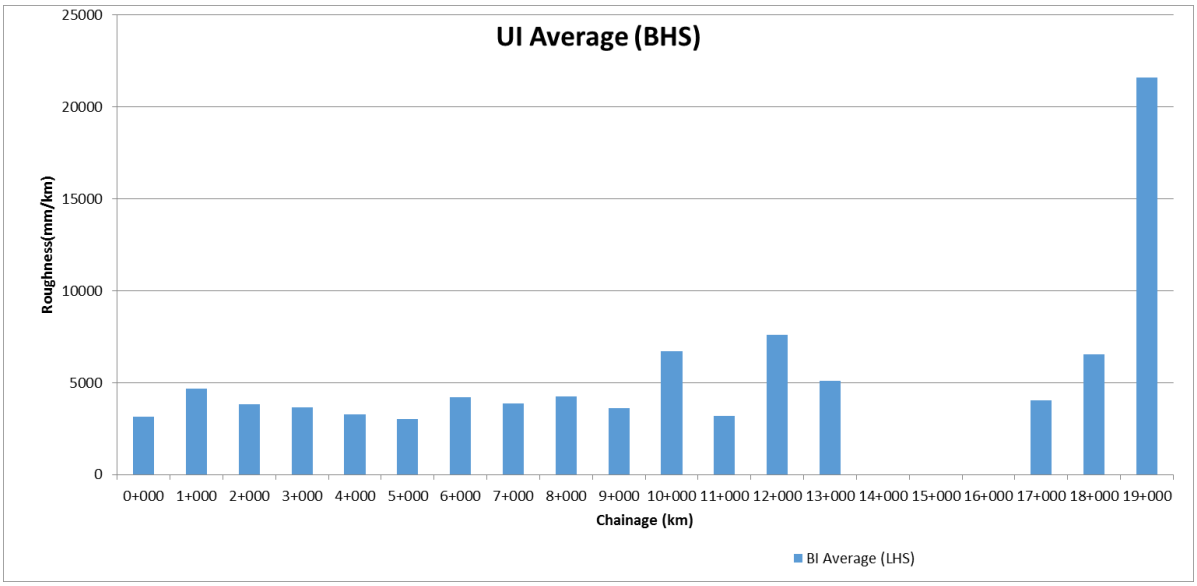
The present condition of Pavement appears to be good in the completed stretches and the riding quality in these sections is good. No Cracks, potholes and patches were observed in the completed stretches. Pavement Condition report covering the data collection for each km length has been presented in Appendix-2 of this report.

4.8.4 ROUGHNESS

The roughness surveys conducted along the corridor indicate good riding quality over the completed length of project corridor. Bar diagrams showing the Kilometer wise roughness along the completed stretch of project road are presented below:



Package-8, SH-305



Package-8, MDR-8

The completed length of the project road is having good riding quality. From the above charts, no section of the completed road requires functional overlay as unevenness Index (UI) is less than 2000 mm/km.

4.8.5 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 4-36: Package-8, Summary of Design Moduli of different layers -BHS

S.No	Side	From	To	Length	15th Percentile MR values		
					MR for BT	MR for Granular	MR for Subgrade
1	BHS	0.50	6.50	6.0	2732	389	87
2	BHS	6.50	12.50	6.0	2766	389	87
3	BHS	12.50	20.20	7.7	2828	390	87
4	BHS	24.00	30.00	6.0	2335	389	87
5	BHS	30.00	39.00	9.0	2338	383	87
6	BHS	39.00	45.00	6.0	2352	386	87
7	BHS	45.00	56.00	11.0	2348	392	87

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 2335Mpa to 2828Mpa in BHS Carriageway however, the MR value of BT layer restricted to 3000 Mpa. The MR value for Granular Layers is 383Mpa to 392Mpa in BHS Carriageway. Similarly, the MR value for Subgrade Layer is 87 Mpa in BHS Carriageway.

4.8.6 PAVEMENT COMPOSITION

As per submitted pavement design report crust composition for the main carriageway:

Main carriageway	
BC, mm	40
DBM, mm	50
WMM, mm	250
GSB, mm	150/200
PQC, mm	250
DLC, mm	100
Subgrade, mm	500

However, from the test pits dug at 06 locations along the main reveal the following.

h) Main Carriageway Crust

	BT, mm	WMM, mm	GSB, mm	PQC, mm	DLC, mm	Total Crust, mm
Maximum	130	250	220	260	100	570
Minimum	80	250	200	260	100	180
Average	105	250	210	260	100	380

4.8.7 CD Structures

The CD structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, all 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 4-37: Package-8, Summary of Major Structures

S. No	Type of Str	Total No. of Str's AS per		
		Sch-A	Sch-B	Site
1	Major Bridges	Nil	1	1
2	Minor Bridges	9	9	9
3	Box/Slab Culverts	13	13	12
4	Pipe Culverts	89	127	125

As per Schedule 127 no's Pipe culverts & 13 no's Slab and Box culverts, total 140 no's Culverts.

Chainage: 53+130
General Description

- Type of Structure : **MJB**
- Span Arrangement : 40 x 6 m
- Total deck width of structure : 12 m
- Type of Foundation : RCC Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Drainage spouts Grating not Provided
- Quadratic Pitching not Provided
- Honey Combing Observed on the Retaining Wall
- Protection works not provided

Chainage: 5+549
General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 5.10 m
- Total deck width of structure : 8.3 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Not Provided
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Vegetation observed on Abutment and Piers
- Leaching observed on Abutment & Piers
- Honey combs are observed on the structure
- Quadrant Pitching not provided
- Scour observed

Chainage: 06+260

General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 4.0 m
- Total deck width of structure : 8.0 m
- Type of Foundation : Not Visible
- Type of Substructure : Stone Masonry Wall type Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Not Provided
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching observed on Abutment & Piers
- Honey combs are observed on the Soffit of the slab
- Reinforcement is exposed on the Soffit of the slab
- Spalling of concrete is observed on the Soffit of the slab
- Quadrant pitching not provided

Chainage: 08+460

General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 4.2 m
- Total deck width of structure : 8.30 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Not Provided
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Hand railing not found
- Quadratic pitching not provided

Chainage: 16+488

General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 3.2 m
- Total deck width of structure : 8.25 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Not Provided
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Hand railing not found
- Quadrant pitching not provided
- Vegetation growth observed on the pier
- Leaching observed on the abutment & piers

Chainage: 17+008

General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 3.20 m
- Total deck width of structure : 8.20 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Not Provided
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Hand railing not found
- Quadratic pitching not provided
- Leaching observed on the abutment & piers

Chainage: 28+060

General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 4.15 m
- Total deck width of structure : 8.0 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Not Provided
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Hand railing not found
- Quadrant pitching not provided
- Reinforcement exposed on the soffit of the slab at some locations
- Spalling of concrete observed on Abutment & Pier
- Honey combs are observed on Soffit of the slab, Abutments & Piers
- Leaching observed on the abutment & piers

Chainage: 37+950

General Description

- Type of Structure : MNB
- Span Arrangement : 2 x 5.25 m
- Total deck width of structure : 8.10 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Not Provided
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Hand railing not found
- Quadrant pitching not provided
- Reinforcement exposed on the soffit of the slab
- Honey combs are observed on soffit of the slab

Chainage: 47+345

General Description

- Type of Structure : MNB
- Span Arrangement : 1 x 6.35 m
- Total deck width of structure : 8.20 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Not Provided
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Hand railing not found
- Quadrant pitching not provided
- Reinforcement exposed on the soffit of the slab
- Cracks are observed on side of deck slab

Chainage: 48+950

General Description

- Type of Structure : MNB
- Span Arrangement : 1 x 3.8 +1 x 3.52 m
- Total deck width of structure : 8.0 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Not available
- Type of Railing / Crash Barrier : Not Provided
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Hand railing not found
- Quadrant pitching not provided
- Vegetation growth observed on the Super Structure
- Reinforcement exposed on the soffit of the slab
- Crack observed on Abutment wall

Details of Culverts:

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
MDR-8												
1	0+870	0+870	MDR 8	1X1.200	12.5	HPC	HPC	New Construction	Not Constructed	-	-	> Structure not constructed
2	0+930	0+930	MDR 8	1X1.200	10	HPC	HPC	New Construction	Not Constructed	-	-	> Structure not constructed
3	1+120	1+120	MDR 8	1X1.200	10	HPC	HPC	New Construction	Not Constructed	-	-	> Structure not constructed
4	2+126	2+126	MDR 8	1X1.200	12.5	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is Damaged
5	2+615	2+615	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is Damaged
6	2+770	2+770	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is Damaged
7	2+878	2+878	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is Damaged
8	3+015	3+015	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Reinforcement exposed on pipe; Pipe is Damaged
9	3+060	3+060	MDR 8	1X1.200	10	HPC	HPC	New Construction	Not Constructed	-	-	> Structure not constructed
10	3+180	3+180	MDR 8	1X1.200	10	HPC	HPC	New Construction				
11	3+398	3+389	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is Damaged

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
12	3+610	3+601	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
13	3+820	3+820	MDR 8	1X1.200	10	HPC	HPC	New Construction				
14	3+920	3+920	MDR 8	1X1.200	10	HPC	HPC	New Construction				
15	4+030	4+030	MDR 8	1X1.200	10	HPC	HPC	New Construction				
16	4+230	4+230	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is Damaged
17	4+603	4+603	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Reinforcement exposed on pipe; Pipe is Damaged
18	4+720	4+720	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
19	4+795	4+795	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
20	5+100	5+100	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is Damaged
21	5+745	5+745	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Reinforcement exposed on pipe; Pipe is Damaged > Utility pipe is observed
22	5+930	5+930	MDR 8	1X1.200	10	HPC	HPC	New Construction	Not Constructed	-	-	> Structure not constructed
23	5+978	5+978	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Head wall Damage observed > Utility pipe is observed

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
24	6+698	6+698	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Spalling & Honey comb are formed near the pipe > Utility pipe is observed
25	6+900	6+900	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is damaged > Utility pipe is observed
26	7+120	7+120	MDR 8	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
27	7+175	7+175	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is damaged
28	7+365	7+365	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Head wall Damage observed > Pipe is Damaged
29	7+562	7+562	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is damaged > Utility pipe is observed
30	7+785	7+785	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Spalling & Honey comb are formed near the pipe
31	7+825	7+825	MDR 8	2X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is damaged
32	8+020	8+020	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	
33	9+069	9+069	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
34	9+520	9+520	MDR 8	1X1.200	10	HPC	HPC	New Construction	Not Constructed	-	-	> Structure not constructed
35	9+685	9+685	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
36	10+050	10+050	MDR 8	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
37	10+200	10+200	MDR 8	3X1.200	10	HPC	HPC	New Construction	Not Constructed	-	-	> Structure not constructed
38	10+600	10+600	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
39	10+890	10+890	MDR 8	1X1.850	12	Slab	Slab	Retain	Old	Not Visible	No	> Reinforcement completely exposed at the soffit of the slab > Structure is in Poor condition > Immediate Maintenance required > Spalling & Distresses of concrete observed on the soffit of the slab > Debris & Silt observed on the vent area
40	11+230	11+230	MDR 8	1X1.200	10	HPC	HPC	New Construction	Not Constructed	-	-	> Structure not constructed
41	11+812	11+812	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Damage observed in head wall
42	12+220	12+220	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	
43	12+600	12+600	MDR 8	1X1.200	10	HPC	HPC	New Construction				
44	12+765	12+765	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
45	13+340	13+340	MDR 8	1X1.200	10	HPC	HPC	New Construction				
46	13+550	13+550	MDR 8	1X1.200	10	HPC	HPC	New Construction				
47	13+865	13+865	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Damage observed in head wall
48	14+210	14+210	MDR 8	1X1.200	10	HPC	HPC	New Construction				

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
49	14+320	14+340	MDR 8	1X1.200	10	HPC	HPC	New Construction				
50	14+490	14+490	MDR 8	1X1.200	10	HPC	HPC	New Construction				
51	14+600	14+600	MDR 8	1X1.200	10	HPC	HPC	New Construction	Not Constructed	-	-	> Structure not constructed
52	15+030	15+030	MDR 8	1X2.00, 1X2.50	8.3	Slab	Slab	Retain	Old	Yes	No	> Reinforcement exposed on the soffit of the slab > Honey combs are formed on the soffit of the slab > Leaching observed on the Abutments > Debris & Silt observed on the vent area
53	15+200	15+200	MDR 8	1X5.70	8.2	Slab	Slab	Retain	Old	Yes, Damaged	No	> Debris & Silt observed on the vent area > Honey combs are formed on Abutment > vegetation observed on the structure
54	16+730	16+730	MDR 8	1X1.200	12.5	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is partially buried
55	16+908	16+908	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
56	17+540	17+540	MDR 8	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
57	18+120	18+120	MDR 8	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
58	18+460	18+460	MDR 8	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
59	18+680	18+680	MDR 8	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
60	18+840	18+840	MDR 8	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
61	19+010	19+010	MDR 8	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
62	19+190	19+190	MDR 8	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
63	19+280	19+280	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is damaged
64	19+530	19+530	MDR 8	1X1.200	10	HPC	HPC	New Construction				

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
65	19+625	19+625	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
66	20+048	20+048	MDR 8	1X1.200	12.5	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is damaged
67	20+070	20+070	MDR 8	1X1.200	10	HPC	HPC	New Construction				
68	20+180	20+180	MDR 8	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
69	20+253	20+253	MDR 8	2X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
SH-305												
70	24+053	24+053	SH 305	1X1.200	10	HPC.	HPC.	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
71	27+478	27+478	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
72	27+830	27+830	SH 305	1X5.35	9.2	Slab	Slab	Retain	Old	Not Visible	No	> Debris & Silt observed on the vent area > Not accessible to see the Sub structure
73	28+363	28+363	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
74	28+574	28+574	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
75	32+665	32+665	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
76	34+025	34+025	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
77	34+437	34+437	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
78	35+098	35+098	SH 305	1X1.200	12.5	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
79	35+309	35+309	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Utility pipe observed
80	35+435	35+435	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Utility pipe observed
81	35+540	35+540	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is damaged
82	36+742	36+742	SH 305	1X5.00	8	Slab	Slab	Retain	Old	Not Visible	No	> Debris & Silt observed on vent area > Honey combs are formed on the Abutment > Distresses & Spalling observed on the Abutment
83	37+064	37+064	SH 305	1X1.200	14	HPC	HPC	Retain	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
84	37+385	37+385	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
85	38+565	38+565	SH 305	1X1.000	8.5	HPC	HPC	Retain	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
86	38+642	38+642	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
87	38+925	38+925	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe is damaged.
88	39+285	39+285	SH 305	2X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
89	39+682	39+682	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
90	39+876	39+876	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area

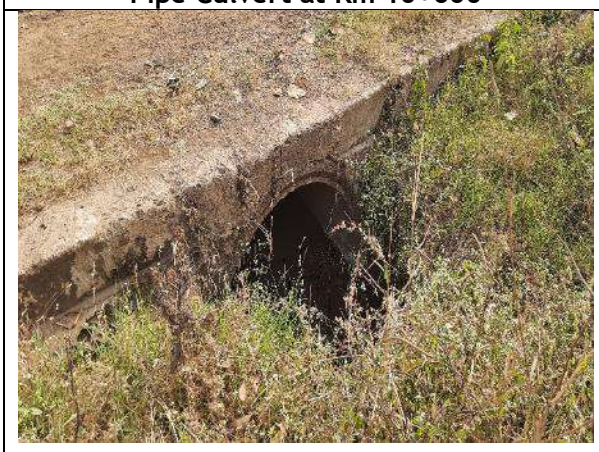
Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
91	40+035	40+035	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
92	40+225	40+225	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
93	40+483	40+483	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
94	40+922	40+922	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
95	41+026	41+026	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Buried
96	41+065	41+065	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
97	41+125	41+125	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
98	41+191	41+191	SH 305	2X1.200	8.4	HPC	HPC	Retain	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
99	41+635	41+635	SH 305	1X1.200	8.5	HPC	HPC	Retain	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
100	41+828	41+828	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
101	41+879	41+879	SH 305	1X1.200	8.3	HPC	HPC	Retain	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
102	42+232	42+232	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
103	42+338	42+338	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
104	42+650	42+650	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
105	42+755	42+755	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
106	42+825	42+825	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
107	43+016	43+016	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
108	43+170	43+170	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
109	43+356	43+356	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
110	43+478	43+478	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
111	43+603	43+603	SH 305	1X1.200	10.	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
112	44+262	44+262	SH 305	1X1.200	10	HPC	HPC	Reconstruction	-	-	-	> Pipe not found
113	44+676	44+676	SH 305	1X1.200	12.5	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Pipe & Head wall damage observed
114	44+745	44+745	SH 305	1X1.200	15	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
115	44+900	44+900	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
116	45+039	45+039	SH 305	1X1.200	12.5	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
117	45+465	45+465	SH 305	1X1.200	10	HPC	HPC	Reconstruction	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
118	45+975	45+975	SH 305	1X1.200	10	HPC	HPC	Reconstruction	-	-	-	> Structure not found
119	46+190	46+190	SH 305	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
120	46+600	46+600	SH 305	2X1.200	8.4	HPC	HPC	Retain	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
121	46+825	46+825	SH 305	1X1.200	8.4	HPC	HPC	Retain	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area
122	47+139	47+139	SH 305	1X3.10	11.25	Slab	Slab	Retain	-	-	-	> Structure not found
123	47+295	47+295	SH 305	1X3.20	8.8	Slab	Slab	Retain	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Vegetation observed on the structure

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
												> Structure is in fair condition
124	48+382	48+382	SH 305	1X2.95	11.25	Slab	Slab	Retain	Old	Not Visible	No	> Vegetation & Debris observed throughout vent area > Vegetation observed on the structure > Structure is in fair condition > Leaching observed on the Abutment
125	48+710	48+710	SH 305	1X1.200	10	HPC	HPC	Reconstruction	New	Not Visible	No	> Vegetation & Debris observed throughout vent area
126	48+720	48+720	SH 305	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
127	49+625	49+652	SH 305	1X1.200	12.5	HPC	HPC	Reconstruction	New	Not Visible	No	> Vegetation & Debris observed throughout vent area
128	50+572	50+572	SH 305	1X1.200	12.5	HPC	HPC	Reconstruction	New	Not Visible	No	> Vegetation & Debris observed throughout vent area > Partially buried
129	50+812	50+812	SH 305	1X1.200	12.5	HPC	HPC	Reconstruction	New	Not Visible	No	> Vegetation & Debris observed throughout vent area
130	51+828	51+828	SH 305	1X4.60	7.7	Slab	Pipe	Retain	Old	Not Visible	No	> Pipe culvert is found instead of Slab > Debris & Silt observed near vent > Spalling & Honey combs are formed at the Head wall
131	51+920	51+920	SH 305	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
132	52+060	52+060	SH 305	1X4.60	10	Slab	Slab	Widening	Old	Not Visible	No	> Vegetation growth is observed on the structure > Widening done. > Reinforcement exposed near Abutment cap > Vegetation & debris is observed near vent area > Structure is in fair condition
133	52+398	52+398	SH 305	1X5.25	8	Slab	Slab	Retain	-	-	-	> Structure not found

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	SH. No	Proposed Span Arrangement (Nos. x Dia of Pipe)	Proposed Width of Culvert (m)	Existing Type Of Culvert	Type of culvert as per Site	Proposal As per Sch-B	Culvert Status As per site	Floor Protection	Quadrant Stone pitching	Observations as per site
134	54+018	54+018	SH 305	1X4.12	8.3	Slab	Slab	Retain	Old	Not Visible	No	> RCC Hand rail pillars Reinforcement exposed > Vegetation & debris is observed near vent area > Structure is in Fair condition
135	54+120	54+120	SH 305	1X1.200	10	HPC	HPC	New Construction	-	-	-	-
136	54+255	54+255	SH 305	1X1.95	7.4	Slab	Slab	Retain	-	-	-	> Structure not found
137	55+950	55+950 -	SH 305	1X1.200	10	HPC	HPC	New Construction				

Photos of Pipe Culverts along the project corridor are presented below

Pipe Culvert at Km 10+600	Pipe Culvert at Km 12+220
	
Pipe Culvert at Km 16+908	Pipe Culvert at Km 19+625
Pipe Culvert at Km 20+070	Pipe Culvert at Km 20+253

Pipe Culvert at Km 27+478	Pipe Culvert at Km 32+665
Pipe Culvert at Km 35+540	Pipe Culvert at Km 38+565
Pipe Culvert at Km 39+285	Pipe Culvert at Km 39+876

Pipe Culvert at Km 40+483	Pipe Culvert at Km 41+125
Pipe Culvert at Km 41+879	Pipe Culvert at Km 42+755
Pipe Culvert at Km 43+603	Pipe Culvert at Km 48+710

Photos of Slab Culverts along the project corridor are presented below:

Slab Culvert at Km 47+295

Slab Culvert at Km 48+382

Slab Culvert at Km 51+828

Slab Culvert at Km 52+060

Slab Culvert at Km 52+398

Slab Culvert at Km 54+018

4.8.8 DRAINAGE AND SLOPE PROTECTION

RCC covered drains constructed along the corridor appear to be in sound condition for most of length and functioning well.

4.8.9 TRAFFIC SAFETY AND ROAD FURNITURE

Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.

Roadway delineators installed along the length of corridor appear to be good condition at most of locations. Very few delineators got damaged.

4.8.10 ROAD USER FACILITITES

There are no road user facilities as such Busbays and truck laybys etc.

4.9 PACKAGE 9: MORSHI- DAPORI & WARUD -JARUD- HATURNA

4.9.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay in nature and embankment appears to be in good condition over the entire length of project. 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 of various type with low PI values at most of the locations. 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 majority of the locations. Results of Subgrade CBR are as follows:

Table 4-38: Package-9,Details of Soaked CBR valuses

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-34	0+200	RHS	92	66	35	8	57	-	NP	NP	SM	2.05	13.00	14.50	1.83	89	19.05
AM-TP-35	9+100	LHS	77	44	36	23	41	54	38	16	SC	1.87	13.00	5.59	1.707	91	33.33
AM-TP-36	5+000	LHS	72	31	24	28	48	40	31	9	SC	2.05	9.6	22.29	1.836	90	36.36
AM-TP-37	14+650	RHS	90	55	38	10	52	46	34	12	SC	1.82	15.8	5.05	1.779	98	26.09

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
AM-TP-38	24+950	LHS	80	54	42	20	38	45	33	12	SC	1.89	11	10.86	1.651	87	28.57

Gist of the FDD test results carried out existing subgrade are presented in the following table.

Table 4-39: Package-9, Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	Up/Down				
AM-TP-34	0+200	RHS	SM	2.05	1.83	89
AM-TP-35	9+100	LHS	SC	1.87	1.707	91
AM-TP-36	5+000	LHS	SC	2.05	1.836	90
AM-TP-37	14+650	RHS	SC	1.82	1.779	98
AM-TP-38	24+950	LHS	SC	1.89	1.651	87

The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit for existing subgrade samples varies between 40 and 54. Except 1 sample, all the samples satisfying the liquid limit criterion (LL<=50).
- Plasticity Index for 5 out of 5 samples Subgrade samples varies between 9 and 16 satisfying the Plasticity Index criterion (PI<=25).
- Maximum Dry Density for subgrade samples varies between 1.82 and 2.05 gm/cc. All the samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies between 9.6 to 15.8.
- Free Swelling Index of existing subgrade samples varies between 19.05 and 36.36. All the samples satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in good condition. The test results and photographs are presented at **Appendix 7** of this report.

4.9.2 Aggregate & SAND source

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 4-40: Package-9, Test Results of Aggregate Samples

S. No	Sample	Location(km)	Up/Dn	A.I.V	Water Absorption	Specific Gravity
9	AM-AQ-9	0+000 (MORSI) (MDR-66) (MDR -45, WARUD (PGK -9)	RHS	11.78	0.38	2.81

Table 4-41: Package-9, Test Results of Sand Sources

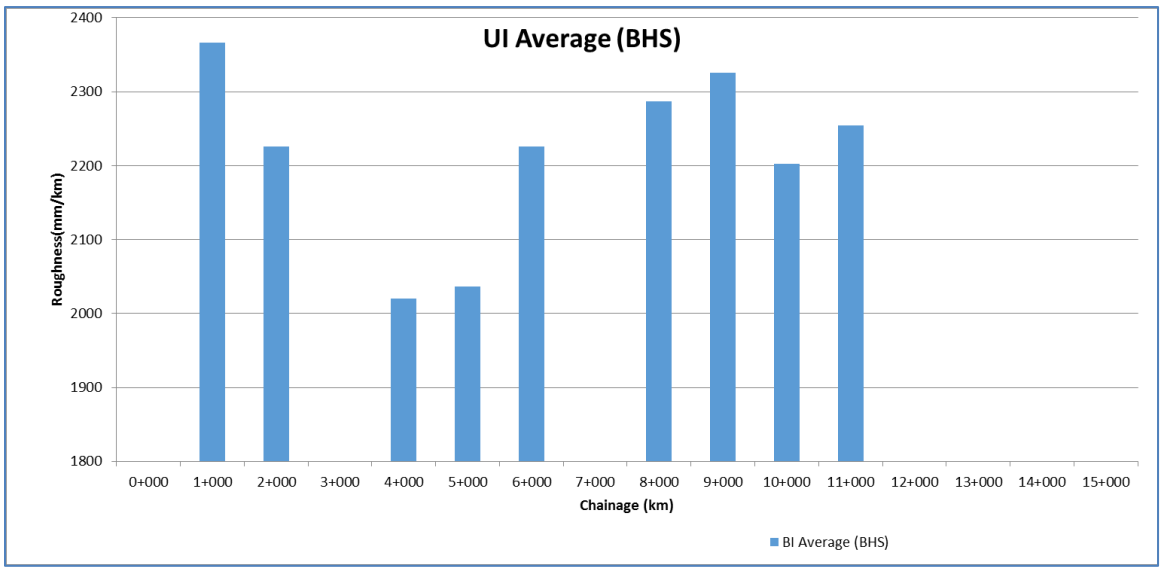
Sl No	Sample No	CHAINAGE	SIDE	10 mm Passing %	4.75 mm Passing %	2.36 mm Passing %	1.18mm Passing %	600mm Passing %	300mm Passing %	150mm Passing %	FM	ZONE
5	AM-M-SAND-9	0+000	RHS	100	96	86	39	31	19	7	3.41	ZONE-I

4.9.3 PAVEMENT CONDITION

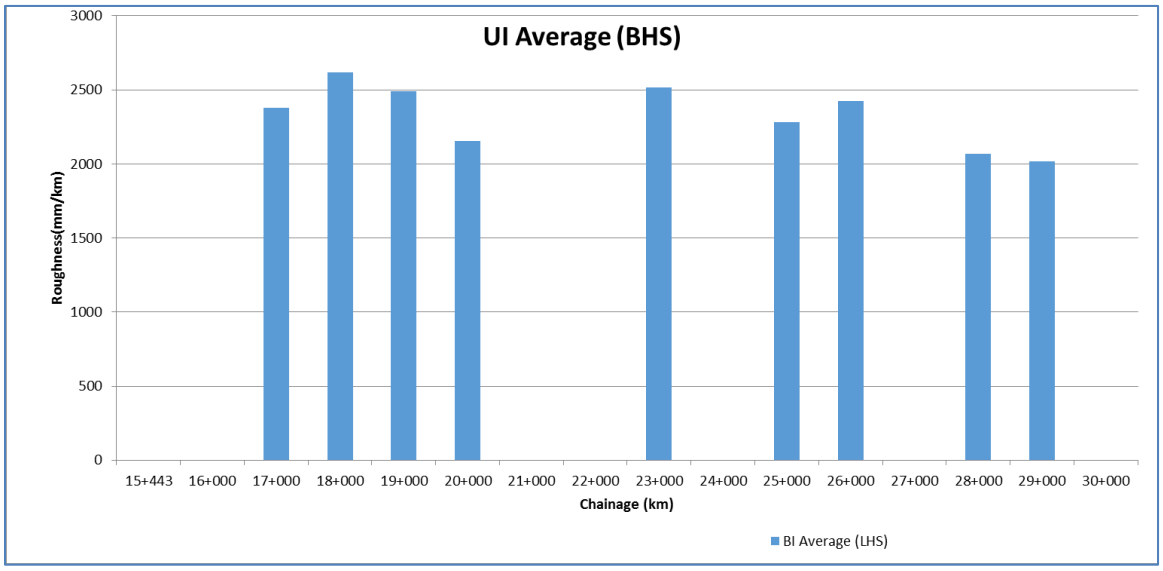
The present condition of Pavement appears to be good. The Riding quality of the project corridor is good to fair. At few locations, cracks, potholes and patches were observed and rectification works were in progress. Pavement Condition report covering the data collection for each km length has been presented in **Appendix-2** of this report.

4.9.4 ROUGHNESS

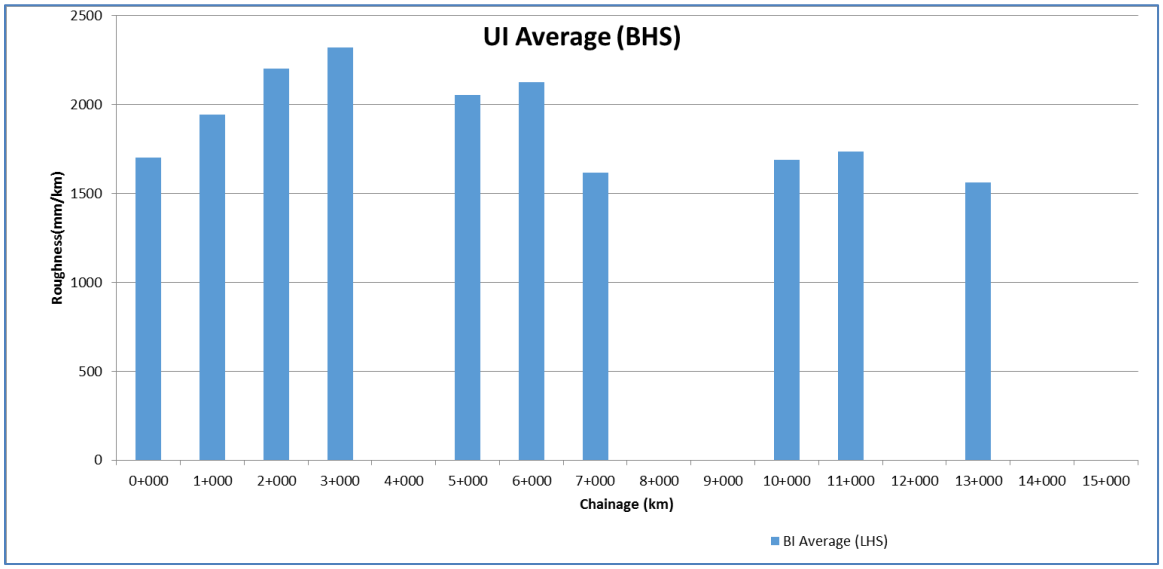
The roughness surveys conducted along the corridor indicate good to fair riding quality over the length of project corridor. Bar diagrams showing the Kilometer wise roughness along the project road are presented below:



Package-9,UI Avg (BHS) Warud – Jarud (MDR – 45)



Package-9,UI Avg (BHS) Jarud - Hathurna (MDR – 45)



Package-9,UI Avg (BHS) Morshi – Dapori (MDR – 66)

Almost entire project road is having good to fair riding quality. From the above charts, no section of the project road requires functional overlay as unevenness Index (UI) is greater than 2000 but less than 2750 mm/km.

4.9.5 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 4-42: Package-9, Summary of Design Moduli of different layers – BHS

S. No	Side	From	To	Length	15th Percentile MR values		
					MR for BT	MR for Granular	MR for Subgrade
MDR-45 (BHS)							
1	BHS	0.00	1.00	1.00	Rigid		
2	BHS	1.00	2.50	1.50	2738	391	87
3	BHS	2.50	4.50	2.00			
4	BHS	4.50	12.00	7.50			
5	BHS	12.00	17.00	5.00	Rigid		
6	BHS	17.00	23.00	6.00	3051	387	87
7	BHS	23.00	24.50	1.50			
8	BHS	24.50	28.50	4.00			
9	BHS	28.50	30.65	2.20			
MDR-66 (BHS)							
10	BHS	0.00	4.00	4.00	2920	392	86
11	BHS	4.00	6.00	2.00			
12	BHS	6.00	14.50	8.50			
13	BHS	14.50	15.65	1.15			

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 2738Mpa to 3051Mpa in BHS Carriageway however, the MR value of BT layer restricted to 3000 Mpa. The MR value for Granular Layers is 387Mpa to 391Mpa in BHS Carriageway. Similarly, the MR value for Subgrade Layer is 87 Mpa BHS in Carriageway.

4.9.6 PAVEMENT COMPOSITION

TCS drawing shows crust composition for the main carriageway is as:

Main carriageway	
BC, mm	40/ 30
DBM, mm	50
WMM, mm	250
GSB, mm	150/ 200
Subgrade, mm	500

However, from the test pits dug at 05 locations along the main carriageway.

i) Main Carriageway Crust

	BT, mm	WMM, mm	GSB, mm	Total Crust, mm
Maximum	90	250	250	600
Minimum	80	200	120	500
Average	85	220	200	550

4.9.7 STRUCTURES

The structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, all 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 4-43: Package-9,Summary of Major Structures

S. No	Type of Str	Total No. of Str's AS per		
		Sch-A	Sch-B	Site
1	Major Bridges	1	Nil	1
2	Minor Bridges	7	8	8
3	Road Under Bridge	Nil	Nil	1
4	Box/Slab Culverts	5	5	5
5	Pipe Culverts	56	66	66

As per Schedule 66 no’s Pipe culverts & 5 no’s Slab and Box culverts, total 71 no’s Culverts.

Chainage: 5+180
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 2 x 10 m
- Total deck width of structure : 8.4 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Concrete Hand Rails
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching observed on structure.
- Finishing works not done properly.
- Vegetation growth observed in vent area.

Chainage: 8+444
General Description
BHS

- Type of Structure : **MJB**
- Span Arrangement : 10 x 4.5 m
- Total deck width of structure : 8.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Hand railing not found.
- Leaching is observed.
- Vegetation growth observed on Quadrant pitching.
- Reinforcement Exposed in soffit of slab.

Chainage: 8+452

General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 11.2 m
- Total deck width of structure : 8.4 m
- Type of Foundation : Not visible
- Type of Substructure : Structure on Stone
- Type of Superstructure : RCC ARCH Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : MS Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Leaching is observed.
- Vegetation growth observed on quadrant pitching.
- Structure condition fair.

Chainage: 12+713
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 2 x 6 m
- Total deck width of structure : 9 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC & MS Pipe Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Leaching is observed.
- Vegetation growth observed at surroundings of structure.
- Structure condition fair.

Chainage: 15+050
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 2 x 6 m
- Total deck width of structure : 8.3 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Pipe Hand Rails
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Leaching is observed.
- Vegetation growth observed on Quadrant pitching.
- Structure condition fair.

Chainage: 15+510
General Description
BHS

- 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 Box
- Type of Superstructure : RCC Box
- Type of Bearing : -
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- No drainage spouts.
- Structure condition good.

Chainage: 16+200

General Description

BHS

- Type of Structure : **RUB**
- Span Arrangement : 1 x 6.9 m
- Total deck width of structure : 6 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : Parapet
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- No drainage spouts.
- Structure condition good.

Chainage: 22+350
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 3 x 4.7 m
- Total deck width of structure : 8.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Vegetation observed at surroundings of structure.
- Segregation observed on soffit of slab.
- Structure condition fair.

Chainage: 29+000
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 2 x 7 m
- Total deck width of structure : 9 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Floor protection works are under progress.
- Structure condition good.

Chainage: 30+510
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 7.5 m
- Total deck width of structure : 8.6 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment
- Type of Superstructure : RCC Slab Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- Quadrant pitching covered with bushes.
- Structure condition good.

Details of Culverts:

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
MORSHI TO DAPORI													
1	MDR 66	0+144	HPC	1 x 750 ø	HPC	-	1 x 1.20	-	Reconstruction	-	-	-	> Structure not found.
2	MDR 66	0+577	HPC	1 x 750 ø	HPC	-	1 x 1.20	-	Reconstruction	-	-	-	
3	MDR 66	1+100	HPC	1 x 750 ø	HPC	HPC	1 x 1.20	10	Reconstruction	New	No	Yes	> Pipe partially buried on BHS. > Structure condition good.
4	MDR 66	2+090	HPC	2 x 900 ø	HPC	HPC	2 x 1.20	10	Reconstruction	New	No	Yes	> Pipe partially buried with silt and stones on BHS. > Structure condition good. > Vegetation growth observed on Quadrant pitching.
5	MDR 66	3+345	HPC	4 x 900 ø	Slab	Box	1 x 5.00 x 3.00	8	Reconstruction	New	No	Yes	> Structure condition good.
6	MDR 66	3+585	HPC	1 x 750 ø	HPC	HPC	1 x 1.20	9	Reconstruction	New	No	Yes	> Pipe buried on BHS. > Vegetation observed at quadrant pitching and at vent way location.
7	MDR 66	4+498	HPC	3 x 750 ø	HPC	HPC	3 x 1.20	9	Reconstruction	New	No	Yes	> Pipe partially buried with stones on BHS. > Structure condition good.
8	MDR 66	5+620	-	-	HPC	HPC	1 x 1.20	12	New Construction	New	No	Yes	> Pipe partially buried with silt. > Structure condition good.

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
9	MDR 66	6+600	-	-	HPC	-	1 x 1.20	12	New Construction	-	No	-	> Structure not found.
10	MDR 66	7+860	-	-	HPC	HPC	1 x 1.20	12	New Construction	New	No	Yes	> Structure condition good.
11	MDR 66	9+260	-	-	HPC	-	1 x 1.20	-	New Construction	-	No	Yes	> Structure not found.
12	MDR 66	9+975	-	-	HPC	HPC	1 x 1.20	12	New Construction	New	No	Yes	> Structure condition good.
13	MDR 66	10+517	HPC	5 x 900 ø	Slab	Box	1 x 5.00 x 3.00	8	Reconstruction	New	Yes	Yes	> Structure condition good.
14	MDR 66	10+589	HPC	1 x 750 ø	HPC	HPC	1 x 1.20	8.5	Reconstruction	New	No	Yes	> Vent way filled with stones and silt. > Structure condition good.
15	MDR 66	10+730	HPC	2 x 750 ø	HPC	HPC	2 x 1.20	9	Reconstruction	New	No	Yes	> Pipes partially buried. > Quadrant pitching partially damaged and vegetation growth observed on it. > Vent way filled with silt. > Structure condition good.
16	MDR 66	10+955	HPC	5 x 750 ø	Slab	Box	1 x 5.00 x 3.00	8	Reconstruction	New	Yes	Yes	> Floor protection not found on LHS. > Quadrant pitching partially damaged and vegetation growth observed on it on LHS. > Structure condition good.
17	MDR 66	11+284	HPC	2 x 1200 ø	HPC	HPC	2 x 1.20	8.5	Reconstruction	New	No	Yes	> Pipe partially

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
													buried. > One of the pipes on LHS covered with silt. > structure condition good.
18	MDR 66	11+545	HPC	4 x 1200 ø	Slab	Box	1 x 5.00 x 3.00	8.5	Reconstruction	New	No	Yes	> Floor protection works under construction on LHS. > Structure condition good.
19	MDR 66	12+055	HPC	3 x 600 ø	HPC	HPC	3 x 1.20	8.5	Reconstruction	New	No	Yes	> Pipes partially buried. > Vegetation growth observed on quadrant pitching. > Structure condition good.
20	MDR 66	12+510	HPC	3 x 1200 ø	HPC	HPC	3 x 1.20	8.5	Widening	Old-Retain	No	Yes	> Quadrant pitching partially damaged on RHS. > Structure condition Fair.
21	MDR 66	13+140	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	9	Reconstruction	New	No	Yes	> Structure condition good.
22	MDR 66	13+330	HPC	1 x 900 ø	HPC	-	1 x 1.20	-	Reconstruction	-	-	-	
23	MDR 66	13+875	HPC	2 x 750 ø	HPC	HPC	2 x 1.20	9	Reconstruction	New	No	Yes	> Vegetation Growth Observed on Quadrant pitching. > Structure condition good.
24	MDR 66	14+465	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	9.5	Reconstruction	New	No	Yes	> Vegetation Growth Observed at vent way.

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
													> Structure condition good.
WARUD TO JARUD													
25	MDR 45	0+081	HPC	1 x 600 ø	HPC	-	1 x 1.20	-	Reconstruction	-	-	-	> Structure not found.
26	MDR 45	0+142	HPC	1 x 600 ø	HPC	Slab	1 x 2.5 x 2	9	Reconstruction	Old-Retain	No	Yes	> Head wall damaged. > Quadrant pitching partially damaged and vegetation growth observed on it. > Structure condition fair.
27	MDR 45	0+991	Slab	1X2.6X2	Slab	HPC	1 x 1.20	-	Widening	New	No	Yes	> vent way partially filled with mud. > Structure condition good.
28	MDR 45	1+851	HPC	1 x 1200 ø	HPC	HPC	1 x 1.20	9.5	Widening	Old-Retain	No	Yes	> Vent way covered with vegetation. > Structure condition fair.
29	MDR 45	2+256	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	8.5	Reconstruction	New	No	Yes	> Vent way covered with vegetation. > Structure condition good.
30	MDR 45	2+815	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	9.5	Reconstruction	New	No	Yes	> Vent way covered with vegetation on LHS. > Vegetation growth observed on Quadrant pitching's

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
													> Structure condition good.
31	MDR 45	3+010	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	8	Reconstruction	New	No	Yes	> Culvert Buried with Silt. > No Head wall on BHS.
32	MDR 45	3+388	HPC	1 x 1200 ø	HPC	HPC	1 x 1.20	8	Widening	New	No	Yes	> Pipe Not found on LHS. > Pipes are buried with silt and debris on RHS. > No Head Wall Found on RHS. > Structure Condition good.
33	MDR 45	3+697	HPC	1 x 900 ø	HPC	-	1 x 1.20	-	Reconstruction	-	No	-	> Structure Not found.
34	MDR 45	4+502	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	8.5	Reconstruction	New	No	Yes	> Vegetation growth observed on Quadrant pitching. > Structure Condition good.
35	MDR 45	5+006	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	9	Reconstruction	New	No	Yes	> Vegetation growth observed on Quadrant pitching and vent way location. > Pipes are buried with silt. > Structure Condition good.
36	MDR 45	5+200	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	8.5	Reconstruction	New	No	Yes	> Vegetation observed at vent way and on quadrants Pitching.

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
													> Structure condition good.
37	MDR 45	6+250	-	-	HPC	HPC	1 x 1.20	12	New Construction	New	No	Yes	> Vegetation observed at vent way and on quadrants Pitching. > Structure condition good.
38	MDR 45	7+317	HPC	1 x 900 ø	HPC	HPC	1 x 0.9	8.5	Reconstruction	Old-Retain	No	Yes	> Vegetation observed at vent way and on quadrants Pitching. > Structure condition fair.
39	MDR 45	7+693	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	10	Reconstruction	New	No	Yes	> Pipe Partially damaged on LHS. > Bushes observed on Quadrant pitching. > Structure condition good.
40	MDR 45	8+378	HPC	1 x 1200 ø	HPC	HPC	1 x 1.20	9.5	Widening	Old-Retain	No	Yes	> Vegetation observed at vent way and on quadrants Pitching. > Structure condition fair.
41	MDR 45	8+609	HPC	1 x 900 ø	HPC	NF	1 x 1.20	-	Reconstruction	-	No	-	> Structure Not found.
42	MDR 45	8+700	HPC	2 x 1000 ø	HPC	HPC	2 x 1.20	9.5	Reconstruction	New	No	Yes	> RHS fully covered with vegetation. > Structure condition good.

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
43	MDR 45	9+820	HPC	1 x 900 ø	HPC	HPC	1 x 0.9	8	Reconstruction	Old-Retain	No	Yes	> Culvert covered with bushes on BHS. > Structure condition fair.
44	MDR 45	10+521	HPC	1 x 600 ø	HPC	HPC	1 x 1.20	8.5	Reconstruction	Old-Retain	No	Yes	> Pipes are covered with bushes on BHS. > Pipes are Buried. > Structure condition fair.
45	MDR 45	12+035	HPC	2 x 900 ø	HPC	HPC	2 x 1.20	8.5	Reconstruction	New	No	Yes	> Pipe not visible on LHS. > Pipes are covered with vegetation on RHS. > Quadrant Pitching also covered with Bushes.
46	MDR 45	13+260	HPC	1 x 1200ø	HPC	HPC	1 x 1.20	11	Widening	Old-Retain	No	Yes	> Pipes are partially buried on BHS. > Structure condition fair.
47	MDR 45	13+925	HPC	1 x 800 ø	HPC	HPC	1 x 1.20	8	Reconstruction	New	No	Yes	> Pipes are partially buried on BHS. > Head walls not found. > Structure condition fair.
48	MDR 45	15+217	HPC	1 x 500 ø	HPC	HPC	1 x 1.20	8	Reconstruction	Old-Retain	No	Yes	> Pipes are partially buried on BHS. > Head walls not

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
													found. > Structure condition fair.
49	MDR 45	15+427	HPC	1 x 500 ø	HPC	HPC	1 x 1.20	8	Reconstruction	New	No	Yes	> Pipes are partially buried on BHS. > Head walls not found. > Structure condition fair.
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50	MDR 45	15+555	Slab	1 x 3.1 x 3.3	Slab	Slab	1 x 3.1 x 3.3	9	Widening	Old-Retain	No	Yes	> vent way partially covered with debris. > Structure condition is fair.
51	MDR 45	15+732	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	8.5	Reconstruction	Old-Retain	No	Yes	> Pipes are partially buried on BHS. > Head walls not found. > Structure condition fair.
52	MDR 45	17+252	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	10	Reconstruction	New	No	Yes	> Pipes are partially buried on BHS.
53	MDR45	18+050	-	-	HPC	HPC	1 x 1.20	12	New Construction	New	No	Yes	> Vent way covered with Bushes on LHS and Filled with Stones on RHS. > Structure condition good.
54	MDR 45	19+280	-	-	HPC	HPC	1 x 1.20	12	New Construction	New	No	Yes	> Bushes observed at Quadrant pitching locations.

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
													> Structure condition good.
55	MDR 45	20+365	HPC	1 x 900 ø	HPC	HPC	1 x 1.20	10.5	Reconstruction	New	No	Yes	> Bushes observed at Quadrant pitching locations. > Structure condition good.
56	MDR 45	20+610	HPC	1 x 850 0	HPC	HPC	1 x 1.20	10	Reconstruction	New	No	Yes	> Bushes observed at vent way and quadrant pitching locations. > Quadrant pitching damaged partially. > Structure condition good.
57	MDR 45	20+911	HPC	1 x 900 0	HPC	HPC	1 x 1.20	9.5	Reconstruction	New	No	Yes	> Bushes observed at Quadrant pitching locations. > Structure condition good.
58	MDR 45	21+050	-	-	HPC	HPC	1 x 1.20	12	New Construction	New	No	Yes	> Bushes observed at vent way and quadrant pitching locations. > Vent way partially filled with silt. > Quadrant pitching damaged partially. > Structure condition good.
59	MDR 45	22+750	-	-	HPC	-	1 x 1.20	-	New Construction	-	No	-	> Structure not found.

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
60	MDR 45	24+572	Slab	1X2.5X2	Slab	Slab	1 x 2.5 x 2	12	Widening	Old-Retain	No	Yes	> Structure condition fair.
61	MDR 45	24+572	HPC	2 x 900 0	HPC	-	-	-	Retain	-	-	-	> Structure not found. > At same location Slab culvert widened observed.
62	MDR 45	25+738	HPC	2 x 1000 0	HPC	Slab	1 x 2.5 x 2	9	Widening	Old-Retain	No	Yes	> Structure condition fair.
63	MDR 45	26+140	HPC	2 x 1000 0	HPC	HPC	2 x 1.00	10	Widening	Old-Retain	No	Yes	> Structure condition fair.
64	MDR 45	26+250	HPC	2 x 1200 0	HPC	HPC	2 x 1.20	10	Widening	Old-Retain	No	Yes	> Vegetation growth observed at vent way location and on quadrant pitching. > Structure condition fair.
65	MDR 45	26+715	HPC	1 x 800 0	HPC	HPC	1 x 1.20	10	Reconstruction	New	No	Yes	> Vegetation growth observed at vent way location and on quadrant pitching. > Structure condition good.
66	MDR 45	27+722	HPC	1 x 800 0	HPC	HPC	1 x 1.20	8.5	Reconstruction	New	No	Yes	> Pipes are buried. > Head walls not found. > Structure condition good.
67	MDR 45	27+729	Slab	1X3X1.5	Slab	HPC	1 x 1.20	8.5	Widening	New	No	Yes	> Pipes are buried. > Head walls not

Sl. No	Relevant STI/MDR/ODR	Proposed Chainage	Existing Structure	Existing Span Arrangement	Proposed Structure	Type of Culvert as per Site	Proposed Span Arrangement	Width (m)	Proposal As per Sch-B	Age of Culvert as per site	Floor Protection	Quadrant Stone pitching	Observations as per site
													found. > Structure condition good.
68	MDR 45	27+960	Slab	1X4.8X1.5	Slab	Slab	1 x 4.8 x 1.5	9	Widening	New	No	Yes	> Structure condition fair.
69	MDR 45	28+778	HPC	1 x 10000	HPC	HPC	1 x 1.0	9.5	Widening	Old-Retain	No	Yes	> Pipes are buried. > Vegetation observed on Quadrant pitching.
70	MDR 45	30+135	HPC	1 x 900 0	HPC	HPC	1 x 1.20	8	Reconstruction	Old-Retain	No	Yes	> Pipes are buried. > Head walls not found. > Structure condition good.
71	MDR 45	30+357	HPC	1 x 800 0	HPC	HPC	1 x 1.20	8	Reconstruction	Old-Retain	No	Yes	> Pipes are buried. > Head walls not found. > Structure condition good.

Photos depicting the existing culvert are presented below

Pipe Culvert at Km 1+100	Pipe Culvert at Km 2+090
Box Culvert at Km 3+345	Pipe Culvert at Km 4+498
Pipe Culvert at Km 7+860	Pipe Culvert at Km 9+975

Box Culvert at Km 10+517	Pipe Culvert at Km 10+589
Pipe Culvert at Km 10+730	Box Culvert at Km 10+955
Box Culvert at Km 11+545	Pipe Culvert at Km 12+055

Pipe Culvert at Km 12+510	Pipe Culvert at Km 13+140
Pipe Culvert at Km 13+875	Pipe Culvert at Km 14+465

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Box Culvert at Km 1+42

Pipe Culvert at Km 2+256

Pipe Culvert at Km 2+815

Pipe Culvert at Km 4+502

Pipe Culvert at Km 5+006

Pipe Culvert at Km 5+200

Pipe Culvert at Km 6+250	Pipe Culvert at Km 7+317
Pipe Culvert at Km 8+700	Pipe Culvert at Km 9+91
Pipe Culvert at Km 12+035	Pipe Culvert at Km 13+260

Pipe Culvert at Km 15+217	**Pipe Culvert at Km 15+427**
Slab Culvert at Km 15+555	**Pipe Culvert at Km 17+252**
Pipe Culvert at Km 18+050	**Pipe Culvert at Km 19+280**

Pipe Culvert at Km 20+365	**Pipe Culvert at Km 20+610**
Pipe Culvert at Km 20+911	**Pipe Culvert at Km 21+050**
Slab Culvert at Km 24+572	**Slab Culvert at Km 25+738**

Pipe Culvert at Km 26+140	**Pipe Culvert at Km 26+250**
Pipe Culvert at Km 26+715	**Pipe Culvert at Km 27+722**
Pipe Culvert at Km 27+729	**Slab Culvert at Km 27+960**

4.9.8 DRAINAGE AND SLOPE PROTECTION

RCC covered drains constructed along the corridor appear to be in sound condition for most of length and functioning well.

4.9.9 TRAFFIC SAFETY AND ROAD FURNITURE

Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.

Roadway delineators installed along the length of corridor appear to be good condition at most of locations. Very few delineators got damaged.

4.9.10 ROAD USER FACILITITES

There are no road user facilities as such Busbays with shelters and truck laybys in this package.

5.1 DESIGN TRAFFIC LOADING

5.1.1 Package-1 to Package-4

Design Traffic loading(msa) has been estimated by considering the adopted VDFs and with assumed growth rates as 5% for entire concession period. For Package-1 to 4, AADTs has been given in the pavement report for the YR2019 are presented below are projected to YR2022 and further estimated design traffic for 10-years to ascertain OL requirement.

Table 5-1: Traffic Volume (AADT)

Sl.No	Description	Package-1		Package-2		Package-3		Package-4		Maximum Considered For Pkg-1 to Pkg-4
		Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	
	Average Annual Daily Traffic (AADT) in the year 2019									
(a)	Bus	44	-	86	-	46	-	172	-	172
(b)	LCV	33	-	64	-	37	-	89	-	89
(c)	2-Axle	57	-	203	-	79	-	87	-	203
(d)	3-Axle	26	-	67	-	29	-	41	-	67
(e)	MAV	22	-	72	-	57	-	36	-	72

Table 5-2: Traffic Growth Rates (GR %)

Period	Car/Van/Taxi	Bus	LCV	2-Axle	3-Axle	4 to 6 Axle
2022 - 2031	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%

Table 5-3: Estimated Design traffic loading

Year	Design MSA
10th year from 2022	10

The computation of traffic loadings is presented in **Appendix 8** of this Report.

5.1.2 Package-5 to Package-7

Design Traffic loading(msa) has been estimated by considering the adopted VDFs and with assumed growth rates as 5% for entire concession period. For Package-5 to 7, AADTs has been given in the pavement report for the YR2019 are presented below are projected to YR2022 and further estimated design traffic for 10-years to ascertain OL requirement.

Table 5-4: Traffic Volume (AADT)

Sl.No	Description	Package-5		Package-6		Package-7		Maximum Considered For Pkg-5 to 7
		Welspun	Samarth	Welspun	Samarth	Welspun	Samarth	
	Average Annual Daily Traffic (AADT) in the year 2019							
(a)	Bus	77	-	26	-	132	-	132
(b)	LCV	102	-	85	-	70	-	102
(c)	2-Axle	344	-	62	-	33	-	344
(d)	3-Axle	75	-	4	-	28	-	75
(e)	MAV	21	-	1	-	12	-	21

Table 5-5: Traffic Growth Rates (GR %)

Period	Car/Van/Taxi	Bus	LCV	2-Axle	3-Axle	4 to 6 Axle
2022 - 2031	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%

Table 5-6: Estimated Design traffic loading

Year	Design MSA
10th year from 2022	14

The computation of traffic loadings is presented in **Appendix 8** of this Report

5.1.3 Package 8 & 9

Design Traffic loading(msa) has been estimated by considering the adopted VDFs and with assumed growth rates as 5% for entire concession period. For Package-5 to 7, AADTs has been given in the pavement report for the YR2019 are presented below are projected to YR2022 and further estimated design traffic for 10-years to ascertain OL requirement.

Table 5-7: Traffic Volume (AADT)

Sl.No	Description	Package-8		Package-9		Maximum Considered
		Welspun	Samarth	Welspun	Samarth	
2	Average Annual Daily Traffic (AADT) in the year 2019					
(a)	Bus	168	-	22	-	168
(b)	LCV	258	-	130	-	258
(c)	2-Axle	166	-	8	-	166
(d)	3-Axle	191	-	51	-	191
(e)	MAV	142	-	3	-	142

Table 5-8: Traffic Growth Rates (GR %)

Period	Car/Van/Taxi	Bus	LCV	2-Axle	3-Axle	4 to 6 Axle
2022 - 2031	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%

Table 5-9: Estimated Design traffic loading

Year	Design MSA
10th year from 2022	8

The computation of traffic loadings is presented in **Appendix 8** of this Report

5.2 PAVEMENT REHABILITATION AND STRENGTHENING

For Design the Overlay Thickness the following method as suggested in IRC: 115 has been used

- The existing pavement is considered as a 3-layer system consisting of subgrade, granular and bituminous layer. The remaining life of exiting pavement in terms of Fatigue and Rutting life (MSA) are estimated
- The remaining life is compared with design traffic loading. An overlay with assumed thickness is considered on exiting pavement where required.

- The Total system including the proposed Overlay (Trial thickness) is assumed as a four-layer system and considered the relevant MR values for all the four layers namely New BT layer, existing Bituminous surface, Total existing Granular layers and Subgrade layers.
- The MR value for the New BT is assumed as 3000 MPA (considering VG40 Bituminous grade) 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 5-10: Package-1, 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	Critical Life
SH-280-BHS																
1	0.00	6.000	6.0	2638	387	87	100	380	100	480	2638	344.0	189.5	26	71	26
2	6.00	13.00	7.0	2753	385	87	100	380	100	480	2753	342.9	187.5	26	72	26
3	13.00	25.00	12.0	2736	373	86	100	380	100	480	2736	349.3	191.9	24	66	24
SH-312-BHS																
1	0.00	8.50	8.5	2086	392	87	100	380	100	480	2086	352.4	201.2	25	64	25
2	8.50	16.50	8.0	2124	394	87	100	380	100	480	2124	351.0	199.4	25	65	25

It can be seen from the above table that remaining life of existing pavement is more than 24 MSA in the project road. So, there is no immediate overlay required along the project corridor.

Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Package-1, Appendix 9** of this Report.

Table 5-11: Package-2, 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	Critical Life
BHS																
1	1.00	2.00	1.00	Rigid Pavement												
2	2.00	11.00	9.00	2791	392	87	105	375	105	480	2791	336.3	179.9	30	79	30
3	11.00	17.00	6.00	3018	383	87	105	375	105	480	2791	335.9	177.9	29	79	29
4	17.00	23.00	6.00	3000	386	87	105	375	105	480	2791	334.9	177.2	30	80	30
5	23.00	27.885	4.885	2675	346	87	105	375	105	480	2791	354.3	197.8	22	62	22

It can be seen from the above table that remaining life of existing pavement is more than 22 MSA on BHS carriageway. So, there is no immediate overlay required along the project corridor.

Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Package-2, Appendix 9** of this Report.

Table 5-12: Package-3, 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	Critical Life
BHS																
1	27.885	28.600	0.615	Rigid Pavement												
2	28.500	34.000	5.500	2960	330	87	95	500	95	595	2960	265.3	204.3	17	231	17
3	34.000	40.500	6.500	2976	390	87	95	500	95	595	2976	247.4	182.9	27	317	27
4	40.500	50.000	9.500	3085	391	87	95	500	95	595	3000	246.9	182.1	27	319	27

It can be seen from the above table that remaining life of existing pavement is more than 17 MSA on BHS carriageway. So, there is no immediate overlay required along the project corridor. Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Package-3, Appendix 9** of this Report.

Table 5-13: Package-4, 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	Critical Life
1	180.00	180.50	0.5	2221	391	87	95	430	95	525	2221	309.1	201.1	24	115	24
2	180.50	182.75	2.3						Rigid							
3	182.75	184.00	1.3													
4	184.00	190.00	6.0	2762	393	87	95	430	95	525	2762	301.1	187.8	26	130	26
5	190.00	196.50	6.5	2741	388	87	95	430	95	525	2741	303	189.9	25	126	25
6	196.50	204.00	7.5	2387	338	87	95	430	95	525	2387	325.2	218.4	16	92	16
7	204.00	211.00	7.0	2439	389	87	95	430	95	525	2439	306.6	196.5	24	120	24
8	211.00	218.00	7.0	2442	393	86	95	430	95	525	2442	307	195.1	25	119	25
9	218.00	224.00	6.0	2414	393	87	95	430	95	525	2414	305.7	195.7	24	121	24

It can be seen from the above table that remaining life of existing pavement is more than 24 MSA on both carriageways. So, there is no immediate overlay required along the project corridor. Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Package-4, Appendix 9** of this Report.

Table 5-14: Package-5, 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	Critical Life
BHS-SH-280																
1	95.00	100.50	5.5	2223	388	87	120	475	120	595	2223	246.3	177.5	38	323	38
2	100.50	108.00	7.5	2259	389	86	120	475	120	595	2259	246.9	176.2	39	319	39
3	108.00	115.50	7.5	2316	386	87	120	475	120	595	2316	245.5	175.5	39	328	39
4	115.50	123.68	8.2	2315	357	87	120	475	120	595	2315	253.2	184.6	32	285	32
BHS-SH-300 & 294																
5	41.80	45.50	3.7	2230	388	87	120	475	120	595	2000	249.6	183.9	37	304	37
6	45.50	47.00	1.5													
7	47.00	51.00	4.0													
8	51.00	52.02	1.0													
9	56.30	58.45	2.2	2324	389	87	120	475	120	595	2000	249.4	183.5	37	305	37

It can be seen from the above table that remaining life of existing pavement is more than 32 MSA on BHS carriageway. So, there is no immediate overlay required along the project corridor.

Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Package-5, Appendix 9** of this Report.

Table 5-15: Package-6, 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	Critical Life
BHS																
1	65.250	73.500	8.250	1957	391	87	120	535	120	655	1957	214.2	183.4	38	608	38
2	73.500	78.500	5.000	1973	390	87	120	535	120	655	1973	214.2	183.3	38	608	38
3	78.500	85.500	7.000	1969	367	87	120	535	120	655	1969	219.7	191.3	32	542	32
4	85.500	92.000	6.500	1979	349	87	120	535	120	655	1979	224.1	197.4	28	496	28
5	92.000	93.650	1.650	Under Construction												

It can be seen from the above table that remaining life of existing pavement is more than 32 MSA on BHS carriageway. So, there is no immediate overlay required along the project corridor.

Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Package-6, Appendix 9** of this Report.

Table 5-16: Package-7, 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	Critical Life
SH-297 & Chandur Bypass																
1	0.00	4.70	4.70	2544	344	87	120	525	120	645	2544	224	181.3	32	497	32
2	3.00	4.50	1.50	Rigid												
3	4.50	14.00	9.50	2174	348	87	120	525	120	645	2174	227.3	191.3	29	465	29
4	14.00	20.50	6.50	2158	389	87	120	525	120	645	2158	217.5	178.3	39	568	39
5	20.50	29.00	8.50	2156	353	87	120	525	120	645	2156	226.3	190.1	30	474	30
SH-296																
7	27.89	28.50	0.61	Rigid												
8	28.50	34.00	5.50	2960	330	87	95	500	95	595	2960	265.3	204.3	17	231	17
9	34.00	40.50	6.50	2976	390	87	95	500	95	595	2976	247.4	182.9	27	317	27
10	40.50	50.00	9.50	3085	391	87	95	500	95	595	3000	246.9	182.1	27	319	27

It can be seen from the above table that remaining life of existing pavement is more than 17 MSA on BHS carriageway. So, there is no immediate overlay required along the project corridor.

Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Package-7, Appendix 9** of this Report.

Table 5-17: Package-8, 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	Critical Life
	MDR-08															
1	0.50	6.50	6.0	2732	389	87	80	100	80	180	2732	101.40	272.60	6	18057	6
2	6.50	12.50	6.0	2766	389	87	80	100	80	180	2766	101.20	271.90	6	18219	6
3	12.50	20.20	7.7	2828	390	87	80	100	80	180	2828	100.70	270.10	6	18633	6
	SH-305															
4	24.00	30.00	6.0	2335	389	87	80	100	80	180	2335	103.90	281.50	6	16169	6
5	30.00	39.00	9.0	2338	383	87	80	100	80	180	2338	104.20	284.20	6	15959	6
6	39.00	45.00	6.0	2352	386	87	80	100	80	180	2352	104.00	282.50	6	16099	6
7	45.00	56.00	11.0	2348	392	87	90	386	90	476	2348	357.90	202.90	22	59	22

It can be seen from the above table that remaining life of existing pavement is more than between 6 MSA & 22 msa. Hence, it is to note that for 11km of SH-305 there is no immediate overlay requirement due to recent construction and balance length of SH-305 and MDR-08 has warranted the overlay requirement as this portion has no construction activity taken up due to pending forest permissions.

Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Package-8, Appendix 9** of this Report.

Table 5-18: Package-9, 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	Critical Life
BHS-MDR-45																
1	0.00	1.00	1.0	Rigid												
2	1.00	2.50	1.5	2738	391	87	90	420	90	510	2000	329	210.9	21	87	21
3	2.50	4.50	2.0													
4	4.50	12.00	7.5													
5	12.00	17.00	5.0	Rigid												
6	17.00	23.00	6.0	3051	387	87	90	420	90	510	2000	330.4	212.6	21	85	21
7	23.00	24.50	1.5													
8	24.50	28.50	4.0													
9	28.50	30.65	2.2													
BHS-MDR-66																
10	0.00	4.00	4.0	2920	392	86	80	450	80	530	2000	315.70	216.80	19	105	19
11	4.00	6.00	2.0													
12	6.00	14.50	8.5													
13	14.50	15.65	1.2													

It can be seen from the above table that remaining life of existing pavement is more than 19 MSA on BHS carriageway. So, there is no immediate overlay required along the project corridor.

Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Package-9, Appendix 9** of this Report.

5.3 STRUCTURAL REHABILITATION

All the structure found to be in good condition except little minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- Repair/ Replacement of Existing Bearings
- Repair / Replacement of Existing Expansion Joints
- Repair / Replacement of Existing Wearing Coat
- Profile Correction for Existing Deck Slab by Cement Concrete
- Sealing of Cracks for Bridges by Epoxy Resin
- Replacement of Spalled Concrete of ECW by Epoxy Mortar
- Cement Grouting for Repair of Existing Bridges
- Guniting / Shotcreting for Repair of Existing Bridges
- Providing & Fixing of Drainage Spouts
- Repair of Substructure Component
- Repair / Replacement of Railing & Crash Barrier
- Epoxy Bonding between New and Old Concrete.

CHAPTER 6. OPERATION AND MAINTENANCE

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 2750mm/Km as per Schedule K.

6.1 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

Roughness surveys to be performed twice in a year during the O&M period. Roughness values should not exceed 2750 mm/Km.

Maximum allowable deflection is 1.2mm as per IRC: SP:73-2015, the structural evaluation of the pavement shall be made by taking deflection measurements every 5 years, in accordance with the procedure given relevant IRC code.

Article-17 of CA, during Operation and Maintenance period, irrespective of condition of the road, there shall be special maintenance in year-3 and year-7 from date of COD.

- 3rd year: Treatment of entire length by using Micro Seal Surfacing.
- 7th year: renewal of entire length by using 40mm thick bituminous.

6.2 INPUTS FOR M&M SCHEDULE

6.2.1 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<2400 mm/Km
- Section 3: Roughness>2400<2750 mm/Km
- Section 4: Roughness>2750 mm/KM

Depending upon the roughness values number of sections were considered as input to HDM analysis.

As the project road is two lanes, analysis has been done combining the LHS & RHS direction data

6.2.2 TRAFFIC (AADT)

- Package 1 to 4

Package 1 to 4 is considered as ONE-SET for analysis. Accordingly, Client supplied AADTs for the YR2019 obtained from the Pavement Design reports are presented below and maximum of these are considered mode-wise to input for HDM model as below:

Feb'19

Vehicle mode	Package-1		Package-2	Package-3	Package-4	Maximum of 4 Packages
	Section-1	Section-2				
CAR	660	829	1152	874	1768	**1768**
Bus	44	39	86	46	172	**172**
LCV	33	27	64	37	89	**89**
2 Axle Truck	23	57	203	79	87	**203**
3 Axle Truck	25	26	67	29	41	**67**
MAV	19	22	72	57	36	**72**

- Package 5 to 7

Package 5 to 7 is considered as ONE-SET for analysis. Accordingly, Client supplied AADTs for the YR2019 obtained from the Pavement Design reports are presented below and maximum of these are considered mode-wise to input for HDM model as below:

Vehicle Type	**Package-5**	**Package-6**	**Package-7**	**Maximum in 3 pkgs, For Pkg 5 to Pkg 7**
CAR	1161	421	1348	1348
Bus	77	26	132	132
LCV	102	85	70	102
2 Axle Truck	344	62	33	344
3 Axle Truck	75	4	28	75
MAV	21	1	12	21

- Package 8 to 9

Package 8 and 9 is considered as ONE-SET for analysis. Accordingly, Client supplied AADTs for the YR2019 obtained from the Pavement Design reports are presented below and maximum of these are considered mode-wise to input for HDM model as below:

Vehicle Type	Package-8	Package-9		Maximum of Both For Pkg 8 & 9
		Km.0+250	Km.1+000	
CAR	2080	422	194	2080
Bus	168	9	22	168
LCV	258	130	128	258
2 Axle Truck	166	8	3	166
3 Axle Truck	191	6	51	191
MAV	142	1	3	142

6.2.3 VECHILE DAMAGE FACTORS (VDF)

- Package 1 to 4

Package 1 to 4 is considered as ONE-SET for analysis. According, maximum VDF obtained by DD-consultants for Package 1 to 4 and Client supplied VDFs values from the Pavement Design reports are compared below and maximum of these two values are considered mode-wise to input for HDM model as below:

VDF combined either direction

Vehicle Type	DD-Consultants	Client PD report	Maximum of Both for input to HDM, For Pkg1 to Pkg 4
	Max VDF of Pkg1 to Pkg 4	Max VDF of Pkg1 to Pkg 4	
BUS	2.210	1.059	2.210
LCV	0.470	0.553	0.553
2-Axle	3.640	7.661	7.661
3-Axle	5.010	5.141	5.141
MAV	16.300	22.266	22.266

- Package 5 to 7

Package 5 to 7 is considered as ONE-SET for analysis. According, maximum VDF obtained by DD-consultants for Package 5 to 7 and Client supplied VDFs values from the Pavement Design reports are compared below and maximum of these two values are considered mode-wise to input for HDM model as below:

VDF combined either direction

Vehicle Type	DD-Consultants	Client PD report	Maximum of Both for input to HDM, For Pkg 5 to Pkg 7
	Max VDF of Pkg5 to Pkg 7	Max VDF of Pkg5 to Pkg 7	
BUS	0.460	0.800	0.800
LCV	0.090	0.970	0.970
2-Axle	2.440	6.380	6.380
3-Axle	4.280	8.030	8.030
MAV	6.410	15.900	15.900

- Package 8 to 9

Package 8 & 9 is considered as ONE-SET for analysis. Accordingly, from Client supplied VDFs values from the Pavement Design reports are compared below and maximum of these two values are considered mode-wise to input for HDM model as below:

VDF combined either direction

Sl.No	Description	Package-8		Package-9		Maximum Considered For Pkg-8 & Pkh-9
		Welspun	Samarth	Welspun	Samarth	
1	Vehicle Damage Factor (VDF)					
(a)	Bus	1.47	-	0.61	-	1.47
(b)	LCV	1.61	-	0.54	-	1.61
(c)	2-Axle	2.16	-	3.37	-	3.37
(d)	3-Axle	2.05	-	5.27	-	5.27
(e)	MAV	2.52	-	6.32	-	6.32

6.2.4 HDM INPUTS

FWD and Roughness values are used as obtained from surveys and investigations as below:

- Package 1 to 4

Side	BHS			
Ranges	<2000	>=2000 and <2400	>=2400 and <2750mm	>=2750
	case-1	case-2	case-3	case-4
Length	122120	13000	-	-
Roughness	1805	2131	-	-
IRI	2.56	2.97	-	-
Deflection	0.41	0.20	-	-
BT Crust	90	90	-	-
Granular Crust	450	450	-	-

- Package 5 to 7

Side	BHS			
Ranges	<2000	>=2000 and <2400	>=2400 and <2750mm	>=2750
	case-1	case-2	case-3	case-4
Length	118525	-	-	-
Roughness	1637	-	-	-
IRI	2.35	-	-	-
Deflection	0.43	-	-	-
BT Crust	115	-	-	-
Granular Crust	490	-	-	-

- Package 8 to 9

Side	BHS			
Ranges	<2000	>=2000 and <2400	>=2400 and <2750mm	>=2750
	case-1	case-2	case-3	case-4
Length	15000	18000	22305	-
Roughness	1798	2197	2512	-
IRI	2.55	3.05	3.44	-
Deflection	0.29	0.25	0.26	-
BT Crust	80	80	80	-
Granular Crust	450	450	450	-

6.2.5 OPTIONS FOR MM SCHEDULE

Article-17 of CA, during Operation and Maintenance period, irrespective of condition of the road, there shall be special maintenance in year-3 and year-7 from date of COD.

- 3rd year: Treatment of entire length by using Micro Seal Surfacing.
- 7th year: renewal of entire length by using 40mm thick bituminous.

Apart from the above, as per Schedule-K, it is also required to maintain the roughness of project roads well under a level of 2750mm/Km throughout operation period.

Thus, apart from above scheduled maintenance options of MCS in 3rd year and 40mm BC in 7th year, model is also given responsive maintenance strategies of following;

- ✓ Opt-1: Responsive Overlay of 30mm BC whenever roughness is >2750mm/KM with regular maintenance

6.3 ROUGNESS PROGRESSION

Package 1 to 4 as ONE-SET, Package 5 to 7 as ONE-SET and Package 8 to 9 as ONE-SET is considered for Roughness progression for each alternative maintenance option has been done using the deterioration models in HDM-4. Following graphs represents the roughness progression for each alternative:

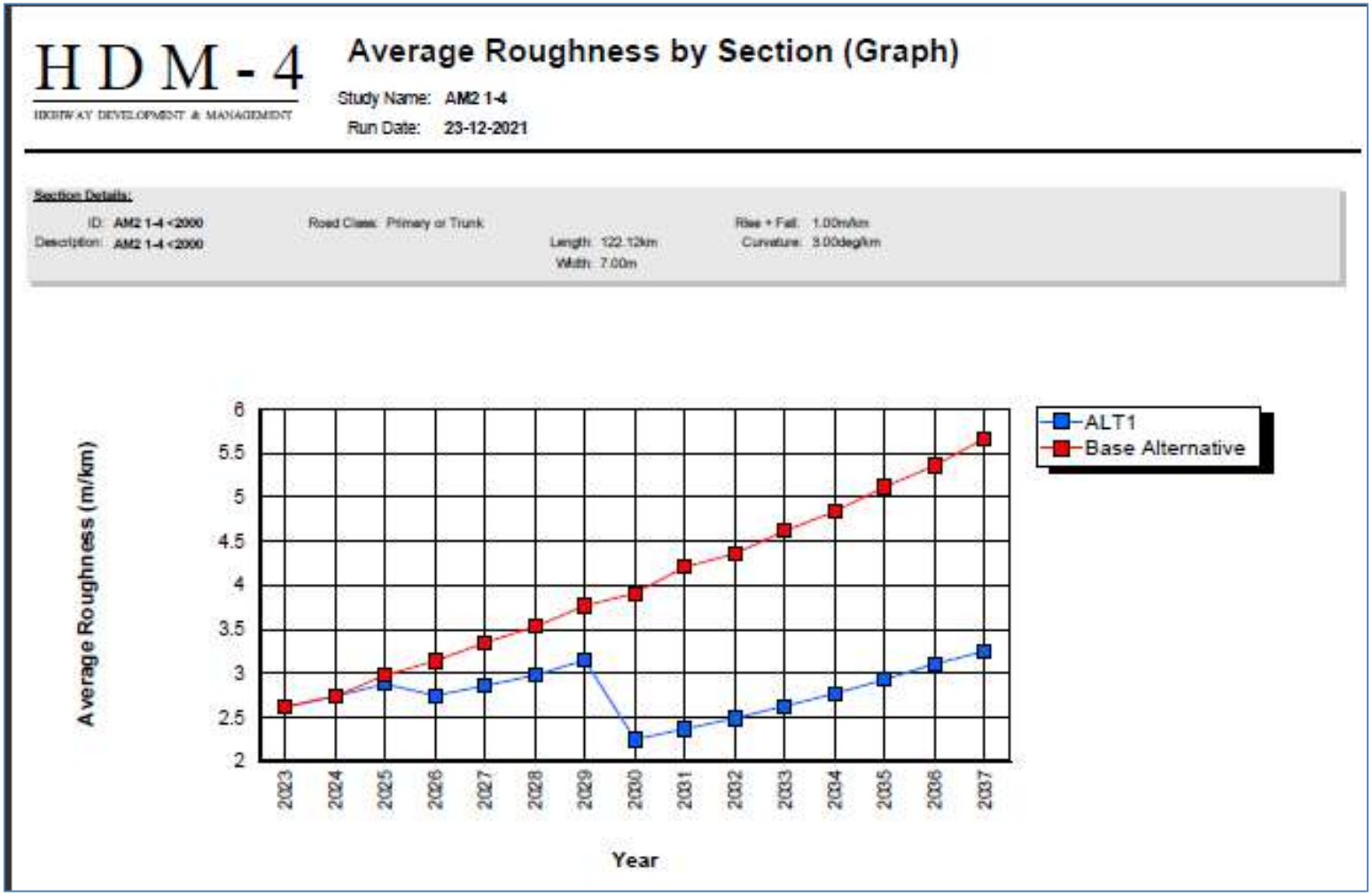

Figure 1: Package 1 to 4 ,Average Roughness in BHS Carriageway (Case-1<2000mm/Km)

HDM-4 Average Roughness by Section (Graph)

Section Details:

ID: AM2 1-4 <2300
Description: AM2 1-4 <2300
Road Class: Primary or Trunk
Length: 13.00km
Width: 7.00m
Rise + Fall: 1.00m/km
Curvature: 3.00deg/km

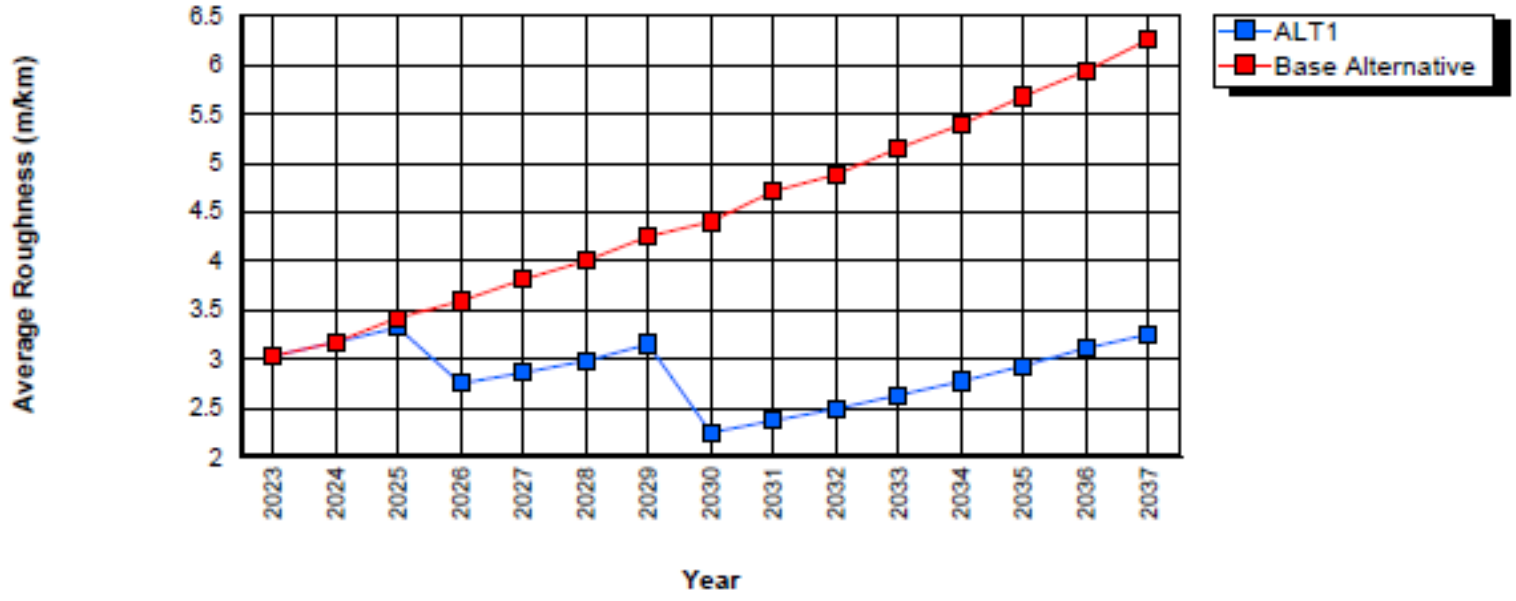

Figure 2: Package 1 to 4, **Average Roughness in BHS (UP) Carriageway (Case-2:>2000mm/km &<2400mm/Km)**

HDM-4
HIGHWAY DEVELOPMENT & MANAGEMENT

Average Roughness by Section (Graph)

Study Name: **AM2 5-7**
Run Date: **23-12-2021**

Section Details:

ID: **AM2 5-7 <2000**
Description: **AM2 5-7 <2000**
Road Class: Primary or Trunk
Length: 118.53km
Width: 7.00m
Rise + Fall: 1.00m/km
Curvature: 3.00deg/km

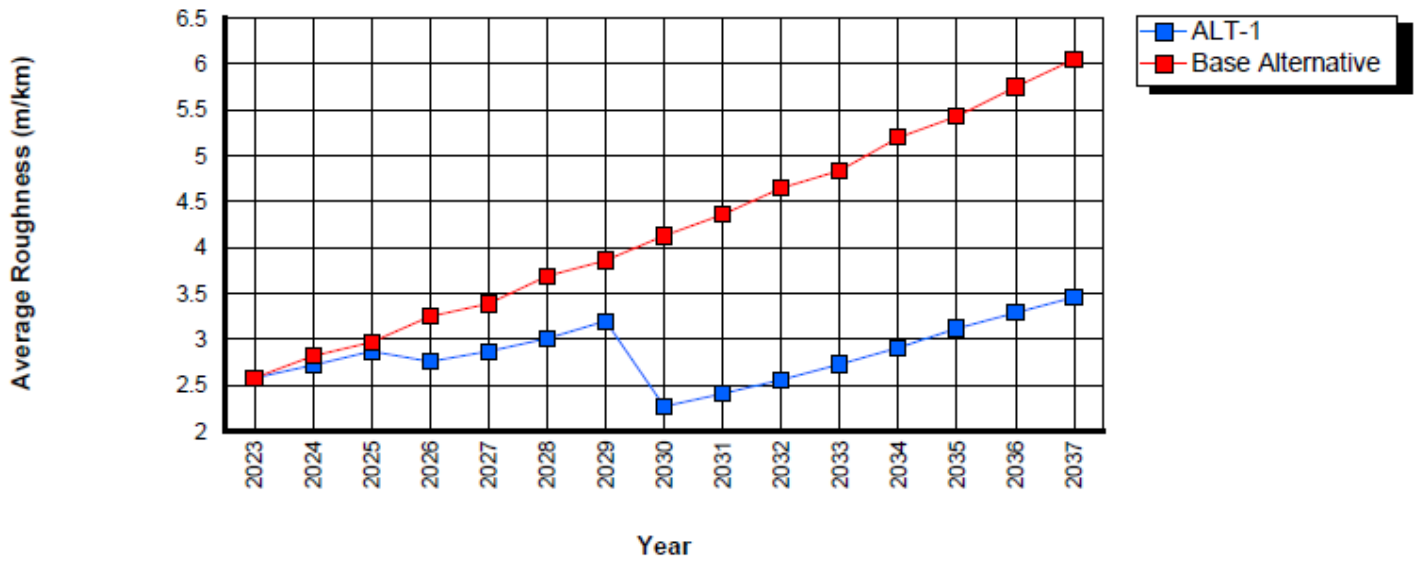

Figure 3: Package 5 to 7, Average Roughness in BHS Carriageway (Case-1<2000mm/Km)

HDM-4
HIGHWAY DEVELOPMENT & MANAGEMENT

Average Roughness by Section (Graph)

Study Name: **AM2 8-9**
Run Date: **23-12-2021**

Section Details:

ID: AM2 8-9 <2000
Description: AM2 8-9 <2000
Road Class: Primary or Trunk
Length: 15.00km
Width: 7.00m
Rise + Fall: 1.00m/km
Curvature: 3.00deg/km

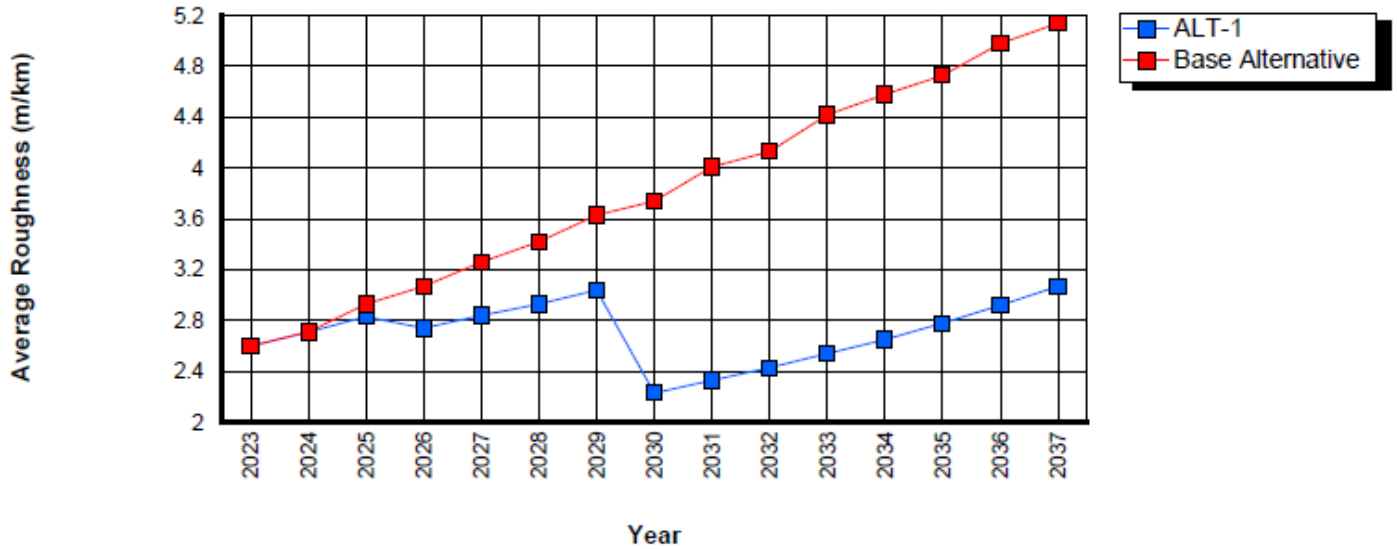

Figure 4: Package 8 to 9, Average Roughness in BHS Carriageway (Case-1:<2000mm/Km)

H D M - 4 Average Roughness by Section (Graph)

Section Details:

ID: AM2 8-9 <2300
Description: AM2 8-9 <2300
Road Class: Primary or Trunk
Length: 18.00km
Width: 7.00m
Rise + Fall: 1.00m/km
Curvature: 3.00deg/km

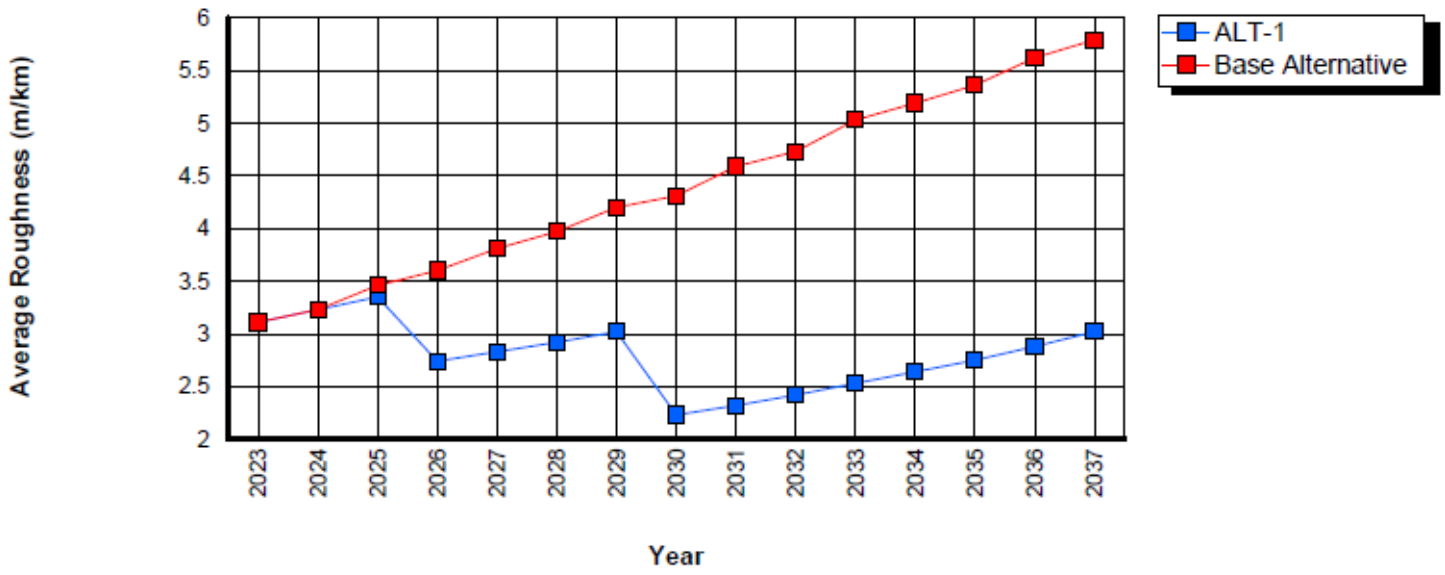

Figure 5: Package 8 to 9, Average Roughness in BHS Carriageway (Case-2:>2000 &<2400mm/Km)

H D M - 4 Average Roughness by Section (Graph)

Section Details:

ID: AM2 8-9 <2500
Description: AM2 8-9 <2500
Road Class: Primary or Trunk
Length: 22.31km
Width: 7.00m
Rise + Fall: 1.00m/km
Curvature: 3.00deg/km

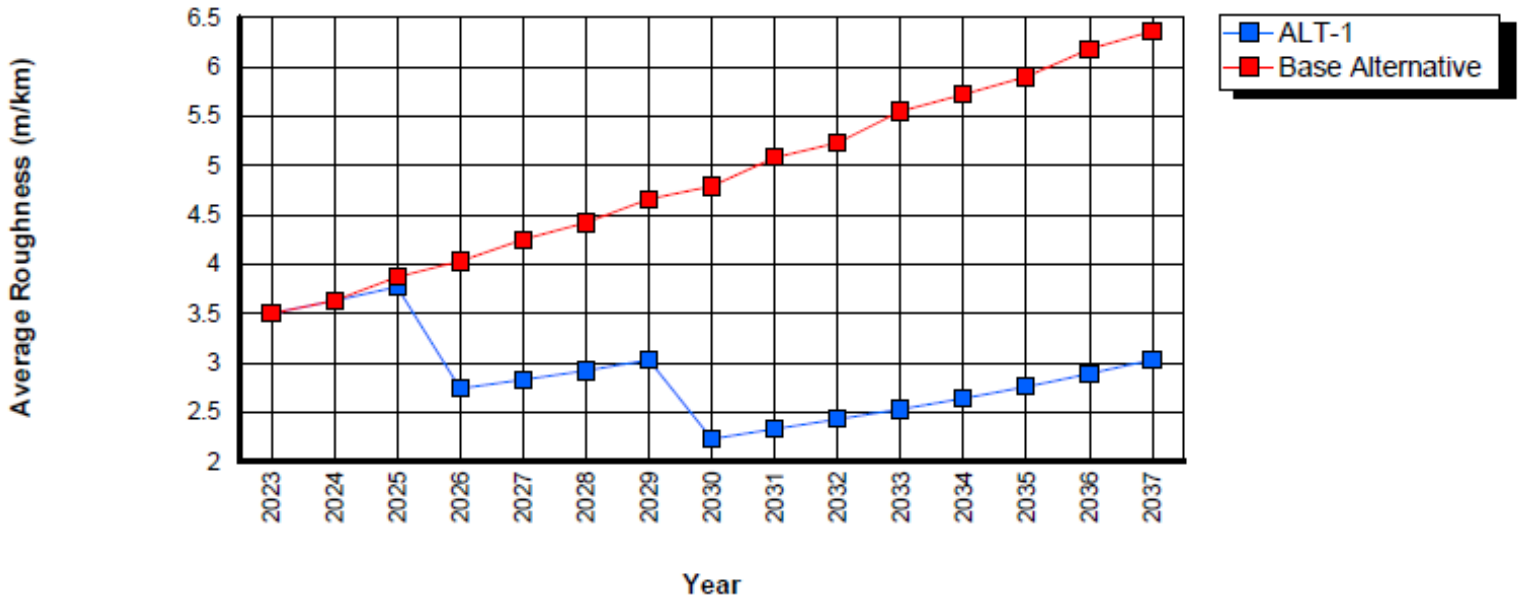

Figure 6: Package 8 to 9, Average Roughness in BHS Carriageway (Case-3:>2400 & <2750mm/Km)

6.4 M&M SCHEDULE

Package 1 to 4 as ONE-SET, Package 5 to 7 as ONE-SET and Package 8 to 9 as ONE-SET for analysis. As per Operation and Maintenance period, irrespective of condition of the road, there shall be special maintenance in year-3 and year-7 from date of COD. Accordingly, MM schedule with 40mm BC OL is as given below:

Table 6-1: Package 1 to 4, Adopted MM schedule for the project

BHS MM Schedule										Remarks
Base Year	Criteria:	Obtained				Adjusted				
		Option-1 (scheduled 40mm OL)				Option-1 (scheduled 40mm OL)				
		IRI<2000	2000-2400	2400-2750	>=2750	IRI<2000	2000-2400	2400-2750	>=2750	
	Length:	122120	13000			122120	13000			
	Year	Case-1	Case-2	Case-3	Case-4	Case-1	Case-2	Case-3	Case-4	
0	2022									
1	2023									
2	2024									
3	2025	MCS	MCS			MCS	MCS			
4	2026									
5	2027									
6	2028									
7	2029	1	1			1	1			
8	2030									
9	2031									
10	2032									

Table 6-2: Package 5 to 7, Adopted MM schedule for the project

BHS MM Schedule										Remarks
Base Year	Criteria:	Obtained				Adjusted				
		Option-1 (scheduled 40mm OL)				Option-1 (scheduled 40mm OL)				
		IRI<2000	2000-2400	2400-2750	>=2750	IRI<2000	2000-2400	2400-2750	>=2750	
	Length:	118525				118525				
	Year	Case-1	Case-2	Case-3	Case-4	Case-1	Case-2	Case-3	Case-4	
0	2022									
1	2023									
2	2024									

BHS MM Schedule										Remarks
Base Year	Criteria:	Obtained				Adjusted				
		Option-1 (scheduled 40mm OL)				Option-1 (scheduled 40mm OL)				
		IRI<2000	2000-2400	2400-2750	>=2750	IRI<2000	2000-2400	2400-2750	>=2750	
	Length:	118525				118525				
	Year	Case-1	Case-2	Case-3	Case-4	Case-1	Case-2	Case-3	Case-4	
3	2025	MCS				MCS				
4	2026									
5	2027									
6	2028									
7	2029	1				1				
8	2030									
9	2031									
10	2032									

Table 6-3: Package 8 to 9, Adopted MM schedule for the project

BHS MM Schedule										Remarks
Base Year	Criteria:	Obtained				Adjusted				
		Option-1 (scheduled 40mm OL)				Option-1 (scheduled 40mm OL)				
		IRI<2000	2000-2400	2400-2750	>=2750	IRI<2000	2000-2400	2400-2750	>=2750	
	Length:	15000	18000	22305		15000	18000	22305		
	Year	Case-1	Case-2	Case-3	Case-4	Case-1	Case-2	Case-3	Case-4	
0	2022									
1	2023									
2	2024									
3	2025	MCS	MCS	MCS		MCS	MCS	MCS		
4	2026									
5	2027									
6	2028									
7	2029	1	1	1		1	1	1		
8	2030									
9	2031									
10	2032									

6.5 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.
- 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.
- 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.
- All Metallic Bearings need to be taken up for servicing.

Wearing Coat:

Since there is a very week component of the bridge structure which is subjected to severe deterioration due to Loading, Environment etc. It is necessary to replace the Wearing coat at 15years frequency. As of now we have considered sealing of cracks by Fog Seal which is other does not show any distress than cracking by viz. Pot holes, abrading etc. based on this aspect BOQ is formed.

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:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 7-1: Summary of Unit Rates

S.No	Type of Material	Units	Source	Average Lead in Kms	Market Rates Adopted with Lead for Rate Analysis
1	Aggregate				
a)	40 mm	Cum	Crusher	45.72	1265.8
b)	20 mm	Cum	Crusher	45.72	1334.8
c)	12 mm	Cum	Crusher	45.72	1244.8
d)	6 mm	Cum	Crusher	45.72	1183.8
e)	Dust	Cum	Crusher	45.72	1184.8
2	Gravel/ Murrum				
	Embankment	cum	Borrows for Embankment	7.00	369.00
	Subgrade	cum	Borrows for Subgrade	7.00	369.00
3	Other Major Material				
	Bitumen 60/70	tonne	Mumbai	681.00	39767.00
	Bitumen 80/100	tonne	Mumbai	681.00	39767.00
	CRMB	tonne	Mumbai	681.00	39767.00
	Emulsion	tonne	Mumbai	681.00	46984.00
	Steel	tonne	Outlet	81.00	49983.50
	HTS Strands	tonne	Amravati	81.00	57144.50
	Cement	tonne	Amravati	81.00	7067.50
	Structural Steel	tonne	Amravati	81.00	58044.50
	VG-40	tonne	Mumbai	681.00	for MMR 39767.00 for Capex 51159.00

Sl.no	Activities	Unit	Rate (Rs) per Unit	Remarks
1	BC	Cum	9892.00	VG-40
2	Tack Coat	Sqm	13	
3	DBM	Cum	9093.00	VG-40
4	PC	Sqm	36.00	
5	WMM	Cum	2702.00	
6	GSB	Cum	2003.00	
7	Embankment	Cum	665.00	
8	Subgrade	Cum	708.00	
9	Shoulder Filling	Cum	708.00	
10	Thermoplastic Paint	Sqm	451	
11	Road Studs	Nos	193	
12	DLC	Cum	4247	
13	PQC	Cum	8926	

Note: Bitumen price for MMR has been considered to be 35000 Rs/Ton. The present market rate of bitumen for future major maintenance cycles is based on discussions with Actis team and considering the past data on bitumen prices for over 10 years.

7.2 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs are estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Items which are not executed as part of scope or in damaged condition have been considered for immediate costs as a part of 1-year capex. Following items are mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

Summary of Immediate costs are included in table below:

Table 7-2: Summary of immediate Repairs Cost

S.no	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
1	Immediate Repair's (Highway)	LS	1	39,43,586	39,43,586
2	Immediate Repair's - Structures	LS	1	5,62,02,220	5,62,02,220
Total Cost:					6,01,45,806
Total Cost including GST (12 %):					**6,73,63,303**
Total Cost in Lakhs:					**673.63**

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 VG 40 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	Providing and laying apron/ stone pitching on slopes of guide bunds/ road embankment / other location
12	Providing and laying stone aggregate filter material (150 mm compacted thickness) underneath pitching
13	Unlined drain
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
	(iii) Diagonal Chevrons Markings
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

B. Bridges

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
10. Carrying out 50 to 60 mm thick 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 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:

- ✓ 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

Following table includes the cost of Major Maintenance works for the project:

Table 7-3: Summary of Major Maintenance Costs

Year	Periodic Maintenance cost in Lakhs				
	Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of **ATMS**	Replacement of **TMS**	Structure specified repairs
2024	-	-			-
2025	4,744.37	-	-	-	107.09
2026	-	-	-	-	-
2027	-	-	-	-	-
2028	-	-	-	-	-
2029	12,090.14	295.56	-	-	-
2030	-	-	-	-	-
2031	-	-	-	-	-
2032	-	-	-	-	67.94
2033	-	-	-	-	-
	-	-	-	-	-
Total:	**16,834.50**	**295.56**	**-**	**-**	**175.03**

Note: The cost is inclusive of GST without escalation and the amount is in Lakhs.

7.5 OPERATIONS COSTS

Cost towards Operations include the following:

- Electricity Bill of lighting
- Operation and management costs of rest areas and lay byes
- SPV Costs
- Survey Costs
- Insurance
- IE Fee
- Administrative Cost
- Electricity Bill of lighting

Following table depicts the cost of operations for the project:

Table 7-4: 1st year O&M Costs, FY2024(including GST)

S No	Description	Amount in Lakhs.
	SPV - Expenditure	
1	SPV staff	42.00
2	Highway lighting	-
3	Tolling and HTMS AMC/ Spare Parts	-
4	Surveys & Investigations (BBD, Roughness)	10.25
5	IE fees	93.00
6	Insurance Charges	175.20
7	Audit Charges	25.00
8	Admin cost - Board Meeting Expenses, valuation etc.	28.00
	Agency - Expenditure	-
9	Toll Operation - Agency	-
10	Route patrolling	104.80
11	Routine maintenance	335.59
12	Repair of Road - BoQ Items	223.87
13	Repair of Structures	16.58
	Total Amount in Lakhs	**1,054.30**

Note: The cost is inclusive of GST without escalation and the amount is in Lakhs.

7.6 TOTAL OPERATION & MAINTENANCE COSTS

Year on year operation cost is summation of following:

- ✓ Immediate Costs
- ✓ Routine Maintenance & Incident Management
- ✓ Periodic Maintenance
- ✓ Operations Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 7-5: Cost Abstract

O & M COSTS SUMMARY			All costs at 2023-2024 price		
Calendar Year	SUMMARY OF VARIOUS EXPENSES in Rs. Lakhs				
	Immediate Repair's Cost	Toll Collection Expenses and Patrolling expenses	Routine Maintenance Expenses	Periodic Maintenance (Functional +Structural Overlay)	Total Cost
2023-2024	-	-	1054.53	-	1054.53
2024-2025	673.63	-	1054.53	4851.45	6579.61
2025-2026		-	1081.69	-	1081.69
2026-2027		-	1054.53	-	1054.53
2027-2028		-	1054.53	-	1054.53
2028-2029		-	1054.53	12385.70	13440.22
2029-2030		-	1054.53	-	1054.53
2030-2031		-	1085.41	-	1085.41
2031-2032		-	717.77	67.94	785.71
Total Cost:	**673.63**	**0.00**	**9,212.03**	**17,305.09**	**27,190.76**

SIT/PJRP/2312188/060
22nd December 2023

To
M/S Actis Highway Infra Ltd
The Sponsor

Sub: Submission of Technical Reports for Walter Projects

K/A Mr. Rakshit Jain,

We are pleased to submit hereby the "Technical Report" in hard/soft copies for the following assets.

S. No	Project Title
1	Technical Diligence of Delhi-Meerut Expressway (Section from km 0.000 to UP Border) including 8 laning of NH-24 in the state of Delhi. (Design Length-8.716)
✓ 2	Technical Diligence for 4-Laning of Chutmalpur - Ganeshpur of NH-72A from Ch. 0.000 to Ch. 17.900 & Roorkee – Chutmalpur - Gagalehri of NH-73 from Ch. 0.000 to Ch. 35.400 in the state of Uttar Pradesh & Uttarakhand on Hybrid Annuity Basis (Pkg-1)
3	Technical Diligence for 4-Laning of Gagalheri–Saharapur–Yamunanagar (UP/Haryana Border) section of NH-73 from Km 35.400 to Km 86.855 in the State of Uttar Pradesh under NHDP-IV on Hybrid Annuity Mode (PKG-II)
4	Technical Diligence for Four Laning Chikhali – Tarsod (Package-IIA) Section of NH-6 from Km 360.000 to Km 422.700 in the State of Maharashtra to be executed on Hybrid Annuity pattern under NHDP Phase IV (CTHPL)
5	Technical Diligence of Two Lanning with paved shoulders Road on Package HAM-AM-2 in the State of Maharashtra under MRIP on Hybrid Annuity Mode
6	Technical Diligence for the 8 Laning of NH-1 from Mukarba Chowk at km 15.500 to km 86.000 in the State of Haryana on DBFOT Basis

Thanking you and assuring you best services all the time.

Yours faithfully,

For Samarth Infraengg Technocrats Pvt Ltd.,

SAMARTH INFRAENGG TECHNOCRATS PVT. LTD.

Authorized Signatory
Name: [Mr. Kalva Kiran Kumar]
Designation: [Director]

TECHNICAL REPORT

Technical Diligence for 4-Lane Chutmalpur - Ganeshpur of NH-72A from Ch. 0.000 to Ch. 17.900 & Roorkee – Chutmalpur -Gagalehri of NH-73 from Ch. 0.000 to Ch. 35.400 in the state of Uttar Pradesh & Uttarakhand on Hybrid Annuity Basis (Pkg-1)

SAMARTH INFRAENGG Technocrats Private Limited

DECEMBER 2023

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
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
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

The Government of India find entrusted to the Authority the development maintenance and management of National Highway No. 72A and 73 including the section from km 0.000 to km 16.000 of NH-72A and from km 0.000 to km 33.000 of NH-73 (approx. 53.300 km). The Authority had resolved to augment the existing road from km 0.000 to km 16.000 of NH-72A and from km 0.000 to km 33.000 of NH-73 (approximately 53.300 km) on the Chutmalpur-Ganeshpur and Roorkee-Chutmalpur-Gagalheri sections of National Highway No. 72A and 73 respectively (hereinafter called the "NH 72A and 73") in the States of Uttarakhand and Uttar Pradesh by Four-Laning thereof (the "Project") on design, build, operate and transfer (the "DBOT Annuity" or "Hybrid Annuity") basis. which shall be partly financed by the Concessionaire who shall recover its investment and costs through payments to be made by the Authority, in accordance with the terms and conditions to be set forth in a concession agreement to be entered into.

The Authority had accordingly invited the bid proposals and upon the evaluation of received bids, the Authority has awarded the Project to M/s **MBL Infrastructures Ltd**. Consequent to this, M/s **MBL Infrastructures Ltd**, formed a Special Purpose Vehicle (SPV) in the name of **MBL(CGRG) Road Limited,** (Concessionaire) for implementation/execution of the project. Further, recently the name of the Concessionaire has been changed to M/s **NXT-INFRA CGRG Highways Limited** with effect from Dt. 30.10.2023.

Concessionaire could not achieve the Financial Close within the stipulated time and has submitted a proposal for induction of **Welspun Enterprise Ltd** (Welspun") as a "Sponsor" of the project and subsequent to detailed deliberations, Authority approved for acquisition of 49% equity in the project company by Welspun.

After delinking from km 0+000 to km 11+288 (Roorkee Bypass), The Concessionaire has achieved PCOD for the remaining length of project on 5th August 2020. To process the PCOD, NHAI has made 2nd supplementary agreement on 31.07.2020 to complete this delinked Roorkee bypass works within 90days of issuance of PCOD.

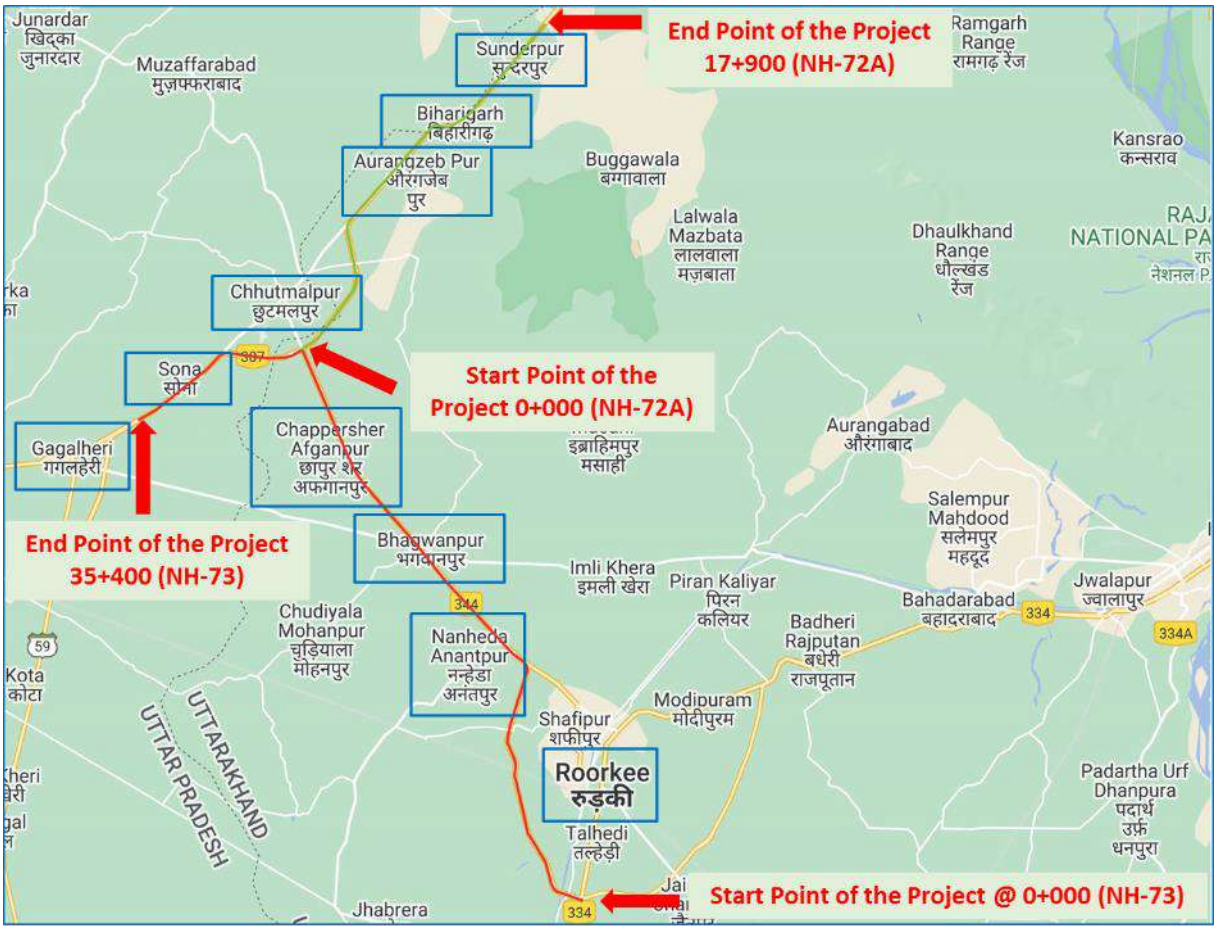
This project road is acquired by M/s Actis GP LLP and is presently under Operation and Maintenance phase.

Actis GP LLP Ltd has engaged M/s Samarth Infra-engg Technocrats to undertake due-diligence study for self-assessment and/or for its Concessioning Authority and/ or for InvIT purpose and/ or for its present/ future investors/ lenders whom this Report will be presented as Vendors Technical Due Diligence Report.

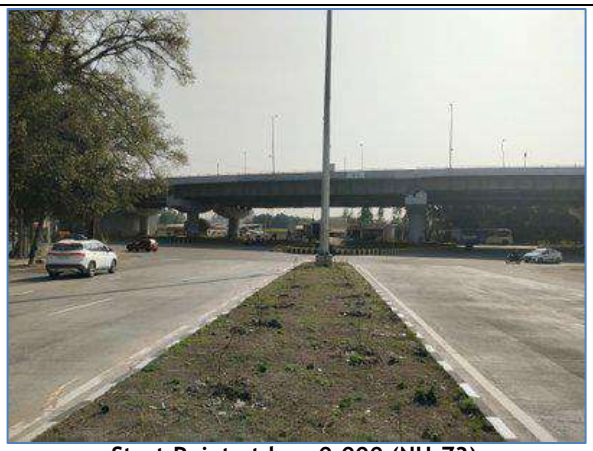
This report highlights about the project at a glance and to evaluate the asset condition and work out O&M Cost, Major Maintenance cost and additional facilities cost/improvement works of the project during the Concession period.

1.2 PROJECT AT GLANCE

The project corridor has 4-lane divided carriageway consisting of two section of National Highway, NH-72A and NH-73. It has Rigid pavement in the entire length with 7.0m & 10.5m wide carriageway plus 1.5m paved shoulder and 0.5m Shyness on each side. The project corridor generally runs in Plain terrain. The project NH-73 passes through villages like Roorkee, Bhagwanpur, Chutmalpur, Sona and Gagalehri and NH-72A passes through Chutmalpur, Aurangzebpur, Biharigarh and Sundarpur etc. Most length of project road runs through plain terrain and. The existing NH-73 numbering has been changed with new NH-344 and NH-72A numbering has changed to new NH-307.



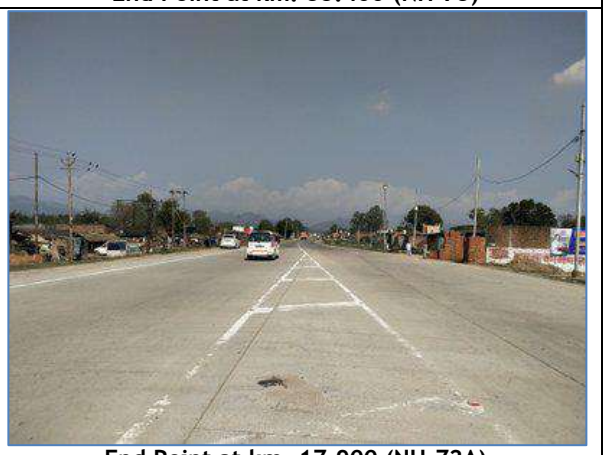
Photographs showing the various corridors of the project road are presented below:



Start Point at km. 0.000 (NH-73)

End Point at km. 35.400 (NH-73)

Start Point at km. 0.000 (NH-72A)



End Point at km. 17.900 (NH-72A)

Following Table highlights the total project at a glance:

Sl No.	Description	Date
1.	Date of Signing the Concession Agreement	27th May 2016
2.	Appointment Date	28th Feb 2018
3.	Scheduled Project completion	27th Feb 2020
4.	Date of issue of Partial Provisional Completion Certificate (Except Roorkee Bypass -11.288 KM)	5th Aug 2020
5.	Scheduled End of Concession	4th Aug 2035
6.	Date of Issue of Final Completion Certificate	Not yet received

1.3 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 due diligence for said project.

The scope of services as defined in the "terms of reference" for consultants is as below:

1. Review of Contractual documents

- ✓ Review of CA/ Schedules pertaining to scope of work
- ✓ Collection of relevant records and documents and review of same
- ✓ Review correspondences with NHAI/IE on technical issues
- ✓ Review of EPC contracts/Maintenance Contracts
- ✓ Review of As-built drawings & Detailed Project Reports and Designs
- ✓ Review of COS works if any
- ✓ Review the technical approvals from IE or another agency required under the CA

2. Field Investigations

- ✓ Review and Update of Field investigations survey data done during Technical Due Diligence time.

3. Major Maintenance

- ✓ Review of current maintenance system.
- ✓ Updating of Maintenance costs to be incurred over the period of the concession keeping in mind the maintenance requirements of the Concession Agreement.

4. Operations cost

- ✓ Updating of O&M cost for the concession period.

5. BOQ and Cost Estimates

- ✓ Updating of BOQ & Cost for Immediate works (1st year Capex)
- ✓ Updating of BOQ and Costs for Major Maintenance
- ✓ Updating of BOQ and cost for Routine maintenance, Route Patrolling
- ✓ Updating of BOQ and Cost for Operations
- ✓ Updating of year-by-year O&M cost
- ✓ The costs would be updated till the end of the concession period including any expected extension of Concession periods as informed to us.

6. Reports & Presentation

- ✓ Draft O&M cost
- ✓ Final Reports along with Final BoQ

1.4 REVIEW OF CONCESSION AGREEMENT

1. Concession Parties and date of execution of Agreement: NHAI referred as "Authority" entered in to Agreement with M/s MBL (CGRG) Road Ltd referred as "Concessionaire" on 27.05.2016. Further, first supplementary concession agreement made on 19.01.2018, WELSPUN Enterprises Limited has acquired 49% of equity with neither party shall be liable to pay damages for non- achievement of Appointed Date.
2. Appointed Date, Commercial Operation Date (Article 3 & 4, Article 12): As the Concession Agreement was signed on 27 May, 2016, with the settlement agreement made on 19th Jan 2018. With no penalties on either party, appointed date issued by Authority on 28 Feb 2018. Accordingly, construction period is 730 days from Appointed date, and Concession period is 15 years from COD.

3. Concession Period (Clause 3): This includes Construction Period of 730 days and Operation Period of 15 years commencing from COD. As the Appointed Date is declared on 28.02.2018, considering 730days as Construction period, the scheduled construction completion date is 27.02.2020. IE has proposed to delinking Roorkee bypass (km0 to km11.288) due to LA issue and issued PCOD on 05.08.2020 with an agreement to complete this delinked portion within 90days. Accordingly, 15yrs from COD, end of concession period is 04.08.2035 (scheduled date 26.02.2035)

4. Obligations of Concessionaire & Authority (Article 5 & 6): The Concessionaire and Authority have fulfilled most of the obligations.

   From PCOD on 05.08.2020 the delinked items shall be finished with 90days i.e., on 03. Nov2020. For this EOT-1 granted 165days on account of COVID-19 from the i.e., upto 17.04.2021.

   IE has recommended EOT-2 considering second wave of COVID-19 upto the 28.01.2022 and approval from NHAI is not available in the data provided.

5. Representation and warranties (Article 7): The Concessionaire shall at no time undertake any change of ownership except in accordance with Clause 5.3. Concessionaire has submitted a proposal for induction of Welspun Enterprise Ltd (Welspun") as a sponsor of the project and subsequent to detailed deliberations, Authority approved for acquisition of 49% equity in the project company by Welspun.

6. Performance Security (Article-9.3): The performance security bank guarantee (PSBG) is Rs 47.10 Cr.

7. Right of Way (Article 10): If the Authority is unable to provide the remaining site within 180 days from the Appointed Date, the remaining Site of the Project Highway shall be removed from the scope of the work under the provision of Change of Scope. Right of Way is granted within 180 (one hundred and eighty) days of the Appointed Date shall be completed on or before the Scheduled Completion Date.

8. Construction of the Project (Schedule-G, Article12): Construction period 730 days from the appointed date i.e., schedule date of completion is on 27th Feb 2020. As EOT granted for 165 days due to COVID outbreak, the revised schedule date, i.e., on 17th April 2021.

Milestone	Completion days	Schedule date	Actual achieved	Delay/(early) days	% Total Capital Cost (TCC) / Physical progress in %
MS-I	214	29/09/2018	18/10/2018	18	20% of TCC / 20% Physical Progress
MS-II	365	27/02/2019	27/02/2019	-	35% of TCC / 35% Physical Progress
MS-III	548	29/08/2019	14/10/2019	45 days	75% of TCC / 75% Physical Progress
MS-IV	730	27/02/2020	05/08/2020	-	100% of TCC /100% Physical Progress

   Note: No penalties on either party for delayed completion, accordingly issued PCOD on 05.08.2020, with 2nd Supplementary agreement made to complete the unfinished Roorkee bypass works within 90days from issuance of PCOD. Due to Covid-19 EOT-1 granted for 165days and the revised schedule completion date 17.04.2021. Further, considering second wave of COVID-19 IE recommended concessionaire's proposal for extension up to 28.01.2022 and approval from NHAI is not available in the report. Presently, Roorkee bypass is also completed and under operation.

9. Monitoring of Construction (Article 13): The Concessionaire shall, perform all the tests as per Schedule-I, with the instructions of the Independent Engineer. Half of the costs incurred on such tests, and to the extent certified by the Independent Engineer as reasonable, shall be reimbursed by Authority the to the Concessionaire.

10. Completion Certificate/ Provisional Certificate (Article-14): Independent Engineer may, upon request of Concessionaire, issue a provisional certificate for completion of 100% construction site,

which made available to the Concessionaire up to 182days from Appointed Date. Provisional certificate should have list of outstanding items in the punch list. These shall be completed within 90 days from issue of Provisional certificate. Authority shall recover damages for any delay in completion as per clause 14.4.1.

IE has issued the Provisional Certificate excluding the Roorkee bypass of 11.288km length on 5th August 2020.

11. Change of Scope (Article 16): Any additional works and services which are not included in scope of project shall be addressed in Change of Scope Notice. The costs thereof shall be expended by concessionaire and reimbursed by Authority with an advance payment of 20% of agreed COS cost.

    All COS works completed and all related payments done by Authority.

12. Reduction of Scope (Article 16.6): if Concessionaire fails to complete the construction works on Force Majeure or for reasons attributable to Authority or under right-of-way clause 10.3.1. On direction of Authority, IE shall assess the civil cost for reduced scope as per Clause 16.6.1. Thus, revised Bid Project Cost shall be calculated. Accordingly, O&M cost shall be reduced or increase in proportion to reduction or increase in the length of the Project Highway.

13. Operation & Maintenance (Article 17): Concessionaire to maintain project road as per Schedule-K requirements. The roughness value exceeding 2750mm/km in a stretch of 1km should be rectified with 180days.

14. Safety requirements (Article 18): All costs and expenses arising related to safety requirement shall be borne by Concessionaire as per scope of the project. If any not forming the scope shall be as per Article 16, change of scope.

15. Renumeration to Independent Engineer (Article 21.3): As per Schedule-M, one- half of remuneration towards the cost and expenses of the Independent Engineer during the development and construction period shall be borne by Concessionaire by do not exceeding 3% of the BPC. Payment in excess of 3% shall borne entirely by Authority. All the payments made to independent Engineer during O&M period shall be borne equally by Authority and Concessionaire.

16. Financial Close (Article 22.1): Concessionaire to achieve Financial close within 150 days from date of the agreement. In the event of delay, further extension not exceeding 120days, subject to payment of damages to the Authority in the sum calculated at a rate of 0.05% of Performance security for each day of delay. Beyond this further 95 days shall be allowed with 0.1% of Performance security for each day of delay.

17. Bid Project Cost (Article-23): The cost of construction of the project (BPC) is Rs.942 Cr. and will be adjusted for the price index multiple. 40% of this Cost shall be payable to Concessionaire during Construction period in 5 installments of 8% each with adjusted price index multiple. Clarification sought from the Concessionaire about the total amount received against the receivable amount in the consolidated format.

    The remaining 60% of Bid Project Cost, adjusted for Price Index multiple, shall be payable in 30 biannual installments commencing from 180th day of COD with the percentage payments as suggested in the table 23.6.3 along with the interest as per 23.6.4.

    The first year O&M Bid cost is 10 Cr. and any expenses in excess of O&M payments shall be borne by Concessionaire. O&M payments due payable to the Concessionaire shall be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.

18. Mobilization Advance (Article 23.8): Upon request from Concessionaire, 10% of Bid Project Cost shall be paid by Authority. This shall be repaid by Concessionaire with Bank interest compounded annually in 4 equal installments from each payment made by Authority to Concessionaire.

19. Insurance (Article 26): The Concessionaire has been fulfilling this obligation.

20. Force Majeure (Article 28): As per Clause 28.6.2, at any time after the Appointed Date, if any Force Majeure Event occurs) before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; or (b) after COD, the Concessionaire shall be entitled to receive Annuity payments plus interest due and payable under this Agreement.
21. Change in Law (Article 35): As a result of Change in Law, if Concessionaire suffers an increase in cost or reduction in the net after-tax return subject to higher of 1.62 Cr or 2% of Total Annuity payments in any accounting year, Concessionaire may notify Authority to amend the agreement so as to place Concessionaire in same financial position as before the Change in Law.
22. Dispute resolution (Article 38): Any dispute not resolved amicably by conciliation, arbitration shall be held in accordance with rules of Society for Affordable Redressal of Disputes (SAROD), New Delhi or such other rules in-line with Arbitration and Conciliation Act,1996. Place of such arbitration shall be the Delhi and the language of arbitration proceedings shall be English.

1.5 REVIEW OF CORRESPONDENCES

There are several correspondences which are reviewed. Following are the some of the major correspondences that are reviewed for ready reference:

1) Concession Agreement with NHAI, Govt. of India, dated 27.05.2016
2) EPC Agreement with Welspun Enterprises Limited, dated 24.07.2017
3) IE has issued PCOD on 5th August 2020 after delinking the Roorkee Bypass from km 0+000 to km 11+288.To process the PCOD, NHAI has made 2nd supplementary agreement on 31.07.2020 to complete this delinked Roorkee bypass works within 90days.
4) As-built drawings of TCS drawings, Toll Plaza, Structural drawings, service road drawings and were made available in technical correspondence No.TDD-16 & 52
5) Mix design approval are made available in technical correspondence No.TDD-17
6) The Concessionaire has submitted various letters related to Pavement Design and Geotechnical Investigations
7) The Concessionaire has notified the Authority about the outbreak of Corona pandemic under Non-political Force Majeure event pursuant to Article 28 of CA and requested for EOT-1 of 178 days.IE made recommendations for 165 days i.e., upto 17.04.2021 and same is granted by Competent Authority, GM-Tech,PIU, NHAI, Roorkee on 25.05.2021.

   IE has recommended EOT-2 considering second wave of COVID-19 for the 28.01.2022 and approval from NHAI is not available in the report.
8) Concessionaire submitted tests on completion as per Schedule-I.
9) Monthly Inspection Reports of the Independent Engineer(O&M) (MPR)

1.6 REVIEW OF EPC CONTRACTS

(A) <u>EPC CONTRACT:</u>

1) Concession Parties and date of execution of Agreement: M/s MBL (CGRG) Road Ltd (Concessionaire) and Welspun Enterprises Ltd (Contractor) entered into the EPC Agreement on 24th July 2017.
2) Appointment of Contractor, Effective Date and Term (Clause 2): The Concessionaire appointed Welspun Enterprises Limited as the Contractor to execute the EPC Works. The effective date of the Project is 24.07.2017. The EPC contract will be valid and subsisting from the effective date until the termination date.

3) Scope of Contractor's works (Clause 3): The Contractor shall construct the Project Highway on the Site set forth in Schedule A, B, C & D of the Concession Agreement and shall include the scope of work as set out in Annexure A Part II of EPC Agreement.

4) Obligations and Undertakings (Clause 4): The Contractor and concessionaire shall at their own cost and expense observe, undertake, comply with and perform his obligations as set out in EPC Contract.

5) Contract Price and Terms of Payment (Clause 5): The Contract Price payable by the Concessionaire to the Contractor shall be 897 Cr (Annexure -B Part I) and the terms of payment shall be as specified in Annexure -B Part II. Contractor shall provide performance security in the form of corporate bond for an amount equal to 5.4% of Contract price (Annexure -C Part II).

   EPC contract, clause 5.3.1, mobilization advance of 10% of contract price (Annexure -B Part II). shall be paid by Concessionaire within 60days from effective date. And shall start recovery from RA bills from completion of 15% of contract price on proportionate percentage basis.

6) Change in Law (Clause 6): Under this clause, if the Authority make any payment to the Concessionaire, the concessionaire is liable to make over such amounts (less Statutory deductions) to the Contractor.

7) Guarantees, Liabilities, Liens and Indemnities (Clause 8): The Contractor acknowledges that the failure to meet the completion of each of Milestone set out in Annexure-D of EPC and to complete the EPC works on or prior to the Scheduled Completion date shall constitute a Material Breach of Contractor. If the contractor fails to achieve the completion Milestones and Scheduled Construction Completion date as in Annexure-D, he shall pay the damages to Concessionaire at a rate of 0.005% and 0.011% of Contract Price per day respectively until such Milestone/Completion date is achieved subject to a maximum of 10% of Contract Price. During, Construction DLP period (commence from date of issue of PCOD or COD and ending on expiry of 24 months from Completion Certificate), if any defect, damage of any EPC works thereof being non-operational by reason of such shall be borne by Contractor.

8) Change of Scope (Clause 9): All payments for execution of COS shall be made within 15 days from the date of receipt of the same from the Authority in accordance with clause 16.3 of Concession Agreement. In case of reduction in scope of works, the Contract Price shall stand decreased to the of such reduction. If Article-38(Dispute Resolution) is evoked, all risk, cost, expenses incurred by Concessionaire towards such procedure shall be borne by Contractor.

9) Force Majeure (Clause 11): Upon review of the EPC Contract, the "Force Majeure" has the same meaning given to such term in the Concession Agreement.

10) Suspension and Termination (Clause 12): The Concessionaire may, without prejudice to any of its other rights under the Contract, issue "Preliminary Notice" to the Contractor stating the nature of default. If the Contractor fails to remedy or to take effective steps, to remedy the same to the satisfaction of the Concessionaire within 15 days of receipt of the Preliminary Notice, then the Concessionaire shall be entitled to terminate the Contract forthwith, by issuing a Termination Notice to the Contractor. However, no such clause has been invoked on the Contractor.

1.7 RIVEW OF SCHEDULES

The following table depicts the project scope as given in schedules at a glance:

Table 1: Salient Features of Project Corridor

S. No	Description	Unit	As per CA
1	Start Chainage (Km)-NH-73	km.	0.000
2	End chainage (Km)-NH-73	km.	35.400
1	Start Chainage (Km)-NH-72A	km.	0.000
2	End chainage (Km)-NH-72A	km.	17.900

S. No	Description	Unit	As per CA
3	Length of the Project Corridor	km	53.300
4	Service Road / Slip Road	km	39.47
5	Toll Plaza	Nos.	2
6	No. of Lanes	Nos.	As per Manual (IRC: SP 84)
7	**ROBs**	**Nos.**	1
8	Flyovers	Nos.	1
9	VUPs	Nos.	4
10	LVUP's	Nos.	9
11	PUP's	Nos.	04
12	**Major Bridges**	**Nos.**	**03**
13	**Minor Bridges**	**Nos.**	**08**
14	**Culverts (Pipe)**	**Nos.**	42
15	**Culvert (Slab/Box)**	**Nos.**	16
16	Major Junctions	Nos.	2
17	Minor junctions	Nos.	20
18	W-Beam Safety Barriers	km	37.00
19	Rigid Concrete Barrier	km	8.6
20	Kilometer / Hectometer / Boundary Stones	Nos.	104/432/106
21	Gantry Sign Boards	Nos.	03
22	Cantilever Sign Boards	Nos.	11
23	No of Truck Lay bye	Nil	04
24	No of Bus Bays with Shelter	Nos.	38
25	Rest Areas	No's	4

1.8 REVIEW OF PAVEMENT DESIGN

1.8.1 The Review of CA Stipulations for Pavement Design

The Schedule B, Clause 4.8 says Rigid pavement shall be provided on entire project length and at all toll plaza locations, bus bays, truck laybys and wayside amenities location. Flexible pavement shall be provided on service road/slip road sections. The minimum thickness for PQC is 300mm and DLC is 150mm. However, Schedule D suggests that Four-Laning with paved shoulders of the Project Highway shall conform to Manual of Specifications and Standards for Four-Laning of Highways through PPP IRC: SP:84-2014.

A) Rigid Pavement:

Clause 5.3.1 of IRC SP: 84-2014 stipulate that the new pavement shall be designed in accordance with the IRC: 58 Guidelines for the Design of Plain Jointed Rigid Pavements for Highways.

Clause 5.4.2 (i) of IRC SP: 84-2014 stipulates that the rigid pavement shall be designed for a minimum design period of 30 years. Stage Construction shall not be permitted.

Clause 5.4.2 (ii) of IRC SP: 84-2014 specifies that the Pavement Quality Concrete (PQC) shall rest over Dry lean Concrete (DLC) sub base of 150mm thickness.

Clause 5.4.2 (iii) of IRC SP: 84-2014 specifies that "A separation membrane shall be used between the PQC & DLC as per Clause 602.5 of MORTH Specifications".

Clause 5.4.2 (iv) of IRC SP: 84-2014 specifies that the DLC shall meet the minimum cement and comprehensive strength requirement as prescribed in IRC: SP: 49. The DLC shall extend beyond the PQC (including that in shoulder, if any) by 0.75m on either side.

Clause 5.4.2 (v) of IRC SP: 84-2014 specifies that Below DLC layer, a properly designed drainage layer Granular Sub Base (GSB) of 150mm thickness shall be provided throughout the road width. It shall be designed to obtain a drainage coefficient of not less than 30m per day.

B) Flexible Pavement:

Clause 5.3.1 of IRC SP: 84-2014 stipulate that the new pavement shall be designed in accordance with the IRC: 37 Guidelines for the Design of Flexible Pavement.

Clause 5.4.1 (i) of IRC SP: 84-2014 stipulates that the flexible pavement shall be designed for a minimum design period of 15 years or operation period, whichever is more. **Stage Construction will be permissible subject to the requirements specified in para (ii) below**.

Clause 5.4.1 (ii) of IRC SP: 84-2014 specifies that "Alternative strategies or combination of initial design, strengthening and maintenance can be developed by the Concessionaire to provide the specified level of pavement performance over the operation period subject to satisfying the following minimum design requirements".

Clause 5.4.1 (ii) (a) indicates that, the thickness of sub-base and base of pavement section is designed for a minimum design period of 15 years or the operation period, whichever is more and the **initial bituminous surfacing for a minimum design period of 10 years**.

Clause 5.4.1 (ii-(b)) indicates that, the pavement shall be strengthened by bituminous overlay as and when required to extend the pavement life to full operation period. The thickness of bituminous overlay shall be determined on the basis of relevant IRC codes, IRC:81.

Clause 5.5.5 indicates that, the design traffic in case of Service Road shall be 10 MSA. The crust composition shall be provided accordingly.

Clause 5.9.6 (i) of IRC SP: 84-2014 stipulate the thickness of the bituminous overlay shall be determined on the basis of FWD Technique and the design traffic as per the procedure outlined in IRC: 81 as also from structural numbers of existing pavement layers.

Clause 5.9.6 (ii) of the same manual also stipulates that the initial **strengthening shall be done for a minimum design period of 10 years**. Subsequent strengthening to extend the pavement to full operation period shall be implemented at the end of initial design period or earlier, in case of any

structural distress in the pavement or if the surface roughness exceeds the value specified in Schedule-K of the CA.

Clause 5.9.6 (iv) of the same Section stipulate that the thickness of Bituminous Overlay for pavement strengthening shall not be less than 50 mm Bituminous concrete, after attending to the requirements of profile corrective course".

1.8.2 The Review of Pavement Design Report

As per section 5 of Schedule B, the scope of Pavement improvement for the project road includes:

a) Pavement design shall be carried out in accordance with IRC: SP-84-2014 four lane manual, IRC 37-2012 and IRC 58:2015

b) The existing road shall be reconstructed as Rigid Pavement and Flexible Pavement in Service Road/ Slip Road.

c) Flexible Pavement shall be designed for a minimum period of 15 years excluding construction period.

d) Rigid Pavement shall be designed for a minimum period of 30 years.

✓ **Adopted ADT**

The design of Pavement is based on the data provided by the Traffic report. ADT adopted for design of Pavement as per Traffic Report is presented below

Type of Vehicle	ADT at Km 17.500(NH-72A)	ADT at Km 15.800 (NH-73)
Mini Bus	41	62
Bus	756	1017
LCV	630	1724
2A Truck	1011	1949
3A Truck	369	880
MAV	157	612

✓ **New Construction of Rigid Pavement**

Design of New construction was carried out in accordance with IRC 58-2015. The pavement layer for new construction has been designed for 30-year design traffic for the PQC layers. The Pavement layer thickness proposed for new construction is as

ROORKEE-CHUTMALPUR-GAGALHERI SECTION OF NH-73 & NH-72A (MCW)

Length (Km)	Pavement Layer	Design Period (Years)	Pavement Thickness as Per Design (mm)	Adopted as Per Schedule(mm)
35.4 & 17.900	Pavement Quality Concrete (PQC)	30	260	300
	Dry Lean Concrete (DLC)		150	150
	Granular Sub Base (GSB)		150	150
	Subgrade		500	500

✓ **New Construction of Flexible Pavement**

For new construction of service/slip road (with flexible pavement) Roorkee -Chutmalpur-Gagalheri section of NH-73 & NH-72A for 10 msa, 10% CBR and 15-year design period with following thicknesses:

Length (Km)	Pavement Layer	Pavement Thickness as Per Design (mm)
28.080 & 11.181	Bituminous Concrete (BC)	40
	Dense Bituminous Macadam (DBM)	50
	Wet mix Macadam (WMM)	250
	Granular Sub Base (GSB)	200

1.9 REVIEW OF COS WORKS

The list of compiled COS work orders related to the project are presented below for the amount in million rupees:

COS number	Description	Amount	Work done	Work pending to be done	Amount received	Amount pending to be received	Samarth Comments
1	Construction of minor bridge	15	15	-	15	-	Work completed
2	Increase in height CUP	6	6	-	6	-	Work completed
3	Construction of new CUP	34	34	-	34	-	Work completed
4	Construction of new Underpass	5	5	-	5	-	Work completed
5	Construction of VUP	40	40	-	40	-	Work completed
6	Construction of Box Culvert	46	43	3	43	(0)	Work completed
7	ATMS - Provision of MSWIM in lieu of SSWIM in Toll Plaza lanes	26	11	14	11	-	Work completed
8	Proposal of RCC Box and deletion of Service Road	(2)	(2)	-	(2)	-	Work completed
As per correspondence	COS-1	133	-	133	-	-	Details not available
As per correspondence	COS-2	12	-	12	-	-	Details not available
As per correspondence	COS-3	17	-	17	-	-	Details not available
Total in Million Rupees		**333**	**153**	**180**	**153**	**(0)**	

1.10 HEAD OF TERMS

A) Key terms of Concession Agreement

Particulars	Description
Date of Agreement **Settlement Agreement** **Appointed Date**	27-MAY-2016 19-Jan -2018 28-Feb-2018
Employer	NHAI, Government of India
Concessionaire	MBL (CGRG) Road Ltd
Concession Period	15 Years from COD
Length of the Project, Total project Cost	53.3 Km Rs.942 Cr Bid project Cost, 1st year O&M Bid cost Rs 10.00Cr
Achievement of Project Mile Stones	Mile Stone-I: Achieved on 18.10.2018 (As per CA Sch-G, Scheduled Completion Date is 29.09.2018 i.e., 214th day from Appointed Date) Mile Stone-II: Achieved on 27.02.2019 (As per CA Sch-G, Scheduled Completion Date is 27.02.2019 i.e., 365th day from Appointed Date) Mile Stone-III: Achieved on 14.10.2019 (As per CA Sch-G, Scheduled Completion Date is 29.08.2019 i.e., 548th day from Appointed Date) Mile Stone-IV: Achieved on 05.08.2020 (As per CA Sch-G, Scheduled Completion Date is 27.02.2020 i.e., 730th day from Appointed Date)
Construction Period/ **Scheduled completion date**	730 days from the Appointed Date/ 27.02.2020
Annuity	First Year O&M Cost-RS 10.00 Crore, to be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.
Extension of Time **COD** **PCOD** **FCOD**	Authority granted 1st interim EOT recommendations for 165 days of COVID-19 pandemic. Accordingly, revised scheduled completion date to 17th Apr 2021. Further extension from IE recommended EOT-2 considering 2nd wave of COVID-19 upto 28.01.2022. No further correspondence available on the approval of the same PCOD achieved on 05.08.2020 with 2nd settlement agreement, dtd 31.07.2020 with no claims or damages from either party. Final completion certificate is yet to be received.
Respective rights and obligations **of the Parties**	Article 4, 9, 10, 23, 34, 42
Change in Ownership	The Concessionaire shall take prior approval of the Authority for any change in ownership in accordance with the article 5.3 of CA
Dispute Resolution	1.At first instance by mediation by the Independent Engineer 2.Amicable settlement by conciliation by the Chairman of the Authority & Chairman of the board of directors of the Concessionaire 3. Finally by Arbitration in accordance with Arbitration and Conciliation Act 1996
Governing Law and Jurisdiction	Courts New Delhi shall have exclusive jurisdiction over matters arising out of or relating to this Agreement

B) Key terms of EPC Agreement

Particulars	Description
Date of Agreement **Appointed Date**	24-July -2017 24-July-2017
Concessionaire	MBL (CGRG) Road Ltd
Contractor	Welspun Enterprises Limited
Commencement Date **Construction Period**	24-July-2017 Beginning from the commencement Date and ending on the completion of EPC Works
Length of the Project, **Contract Price**	53.3 Km Base price Rs 897 Cr + GST as per clause 5 of EPC agreement, + Price Index Multiple as per CA, Article 23
Achievement of Project Mile Stones	Mile Stone-I: Achieved on 18.10.2018 (As per CA Sch-G, Scheduled Completion Date is 29.09.2018 i.e., 214th day from Appointed Date) Mile Stone-II: Achieved on 27.02.2019 (As per CA Sch-G, Scheduled Completion Date is 27.02.2019 i.e., 365th day from Appointed Date) Mile Stone-III: Achieved on 14.10.2019 (As per CA Sch-G, Scheduled Completion Date is 29.08.2019 i.e., 548th day from Appointed Date) Mile Stone-IV: Achieved on 05.08.2020 (As per CA Sch-G, Scheduled Completion Date is 27.02.2020 i.e., 730th day from Appointed Date)
Extension of Time **COD** **PCOD** **FCOD** **DLP**	Authority granted 1st interim EOT recommendations for 165 days of COVID-19 pandemic. Accordingly, revised scheduled completion date to 17th Apr 2021. Further extension from IE recommended EOT-2 considering 2nd wave of COVID-19 upto 28.01.2022. No further correspondence available on the approval of the same PCOD achieved on 05.08.2020 with 2nd settlement agreement, dtd 31.07.2020 with no claims or damages from either party. Final completion certificate is yet to be received.
Liquidated Damages for Delay	If the Contractor fails to achieve any completions Project Milestones, the following delay damages, on demand, be paid to the Concessionaire not exceeding 10% of Contract Price 1) Milestone-I, II & III: 0.005% of the Contract Price per day until completion of such milestone 3) Milestone-IV: 0.011% of the Contract Price per day for each package until EPC works are completed
Monthly Progress Report	The Contractor shall prepare a monthly report on the progress of the works and submit to the Concessionaire
Retention Money	-
Dispute Resolution	1. Amicable Resolution, 2. Three Member Arbitration in accordance with Arbitration & Conciliation Act 1996

1.11 MAINTENANCE REQUIREMENTS:

Concessionaire shall undertake maintenance requirements as per Schedule-K of CA, below is the requirement

S. No	Description	Length (Km)	Lanes	Applicable Schedule for O&M	Maximum Roughness Allowed
1	CGRG	53.3	4LPS	Schedule-K	2750 mm/Km

As per Manual, IRC SP:84-2014:

S. No	Description	Length (Km)	Lanes	Maximum allowable deflection	Frequency of Roughness Test	Frequency of FWD Test
1	CGRG	53.3	4LPS	1.2mm	Twice a Year	In every 5 Years

- No specific Handing Over (Divestment) requirements are mentioned under CA. It shall be same as Schedule-K

1.12 CLAIMS:

The current year witnessed unprecedented, heavy and concentrated rains in most of North India causing severe devastation to the infrastructure in the states of Himachal Pradesh and Uttarakhand. The GSY project is in the state of Uttarakhand, which witnessed heavy downpour in the months of June & July, 2023 vs the average rainfalls in the last 3 years for same months.

This caused localized but severe damages to certain stretches of the projects, they being located in the immediate plains located in the vicinity of the hilly areas from which water has flowed down at unprecedented quantities.

The Project took immediate measures to protect the site by taking temporary measures, however, given the significant quantities, these measures were not sufficient and have resulted in certain damages.

The Project also notified the Insurance Company immediately of the said occurrence.

Subsequently, a detailed claim has been filed with the Insurance Company ICICI Lombard. However, the Project from the planned expenditure of one-time repair the Company has commenced the repair and rectification works. The estimate of the claim filed by the SPV with the insurance company is Rs 10.21 crores including GST, however, this is an estimate based on maximum possible amount of loss, the actual loss and the rectification cost will be determined at the time of work being carried out. Given the estimate is prepared based on SOR/DSR rates and once actual work is carried out the Company should be able to make full recovery of the cost being incurred on such repair and rectification works.

The following is the estimate for the claim.

Insurance Claim BOQ for CGRG					
Sr.No	Item	Unit	Quantity	Rate	Amount
1	Excavation	cum	60692.25	300	18207675
2	Embankment with Borrow Earth	cum	31505.13	500	15752562.5
3	Embankment with Excavated Earth	cum	60692.25	300	18207675
4	Earthen Shoulder	cum	1202.5	750	901875
5	Dismantling of PQC	cum	767.55	6000	4605300
6	PQC	cum	767.55	14000	10745700
7	DLC	cum	348.675	9000	3138075
8	GSB	cum	622.375	3500	2178312.5
9	MBCB Beam	Rms	134.7	3000	404100
10	MBCB Pole	Nos	30	2000	60000
11	Chute Drain	Rms	615.14	1200	738168
12	Kerb	Rms	1130	1500	1695000
13	BC	cum	19.8	12000	237600
14	DBM	cum	39.6	9000	356400
15	WMM	cum	116.9	4500	525937.5
16	Kerb Painting	Rms	900.0	150	135000
17	Pavement Marking	sqm	184.8	550	101648.25
18	**Retaining Wall**				
a	Dismantling of Retaining wall	cum	320	2500	800000
b	Retaining wall Concrete	cum	320	13000	4160000
c	Retaining wall Steel	mt	40	85000	3400000
19	Quadrant PCC	cum	33	5000	165000
	Total				**8,65,16,029**
	GST 18%				1,55,72,885
	Total				**10,20,88,914**

1.13 SITE OBSERVATIONS:

1. Project road is in compliance to CA provisions.
2. Due to land acquisition problem some service roads are not constructed.
3. Condition of rigid pavement on Roorkee bypass appears to be fair and at few locations settlements observed at high embankments. Condition of rigid pavement beyond Roorkee bypass is good to fair.
4. Slope erosions have been noticed at Roorkee Bypass at high embankment locations especially near ROB. Drainage chutes have failed leading to slope erosion. Geotextile used in slope protection got exposed. Slope protection works and chutes are required to be repaired immediately to protect pavement.

5. Raveling is another predominant distress on rigid pavement along the corridor. Rounded (River Bed Aggregates) are noticed on surface of pavement. This could be one of the reasons for raveling. Raveling is more predominantly seen between Chutmulpur-Ganeshpur section.
6. Substantial local movement of traffic/Parking is observed beyond Roorkee bypass till Chutmulpur. Service roads are only available at some locations in this section. There is lot of side friction in this section.
7. At slip road location flexible pavement settlements are observed.
8. The structures in Project Road have different varieties of super structure such as Bow String Steel Girder, Steel Girders, PSC Box, PSC Girders, RCC Girders, RCC Solid Slab.
9. All the Underpasses & Minor Bridges are box type structures except 2 locations.
10. Elastomeric, Pot PTFE & PIN(Guided) Bearings observed in Girder type Structures.
11. Rusting of bolts have been noticed on Ganga Canal Bridge in Roorkee bypass.
12. Soil nailing noticed at RE walls of at Chutmulpur flyover
13. All the structures appear to be in fair condition.
14. Cleaning of expansion joints, drainage spouts need to be done regularly.
15. The Project contains large stock of Structures and in general it is observed that most of the structures are in relatively fair condition not requiring immediate intervention and also not much maintenance efforts are likely.
16. At the outset in can be said that without any hesitation the remaining life of these structures are much longer than intended project duration.

CHAPTER 2. SURVEYS AND INVESTIGATIONS

2.1 INTRODUCTION

The main objective of undertaking Surveys and Investigations is to appreciate the existing engineering features along the project corridor and to understand the present condition of the various elements of the project road and to prepare required inputs for various rehabilitation and maintenance strategies.

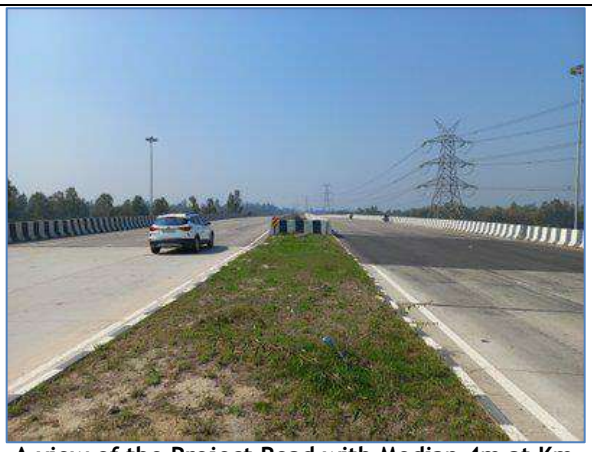
Following Survey and Investigations have been undertaken in the month of March 2022 as a part of study with an objective to understand the present condition of the road and there by access the quality of construction and as well to prepare requisite rehabilitation/corrective designs where necessary.

- Road Inventory Surveys
- Visual Pavement Condition
- FWD Surveys
- Roughness Surveys using 5th Wheel BI
- Pavement Composition surveys (Test Pits)
- Subgrade Investigations & Laboratory testing
- Material Investigations
- Axle Load Survey
- Structure Inventory and Condition Surveys

2.2 ROAD INVENTORY

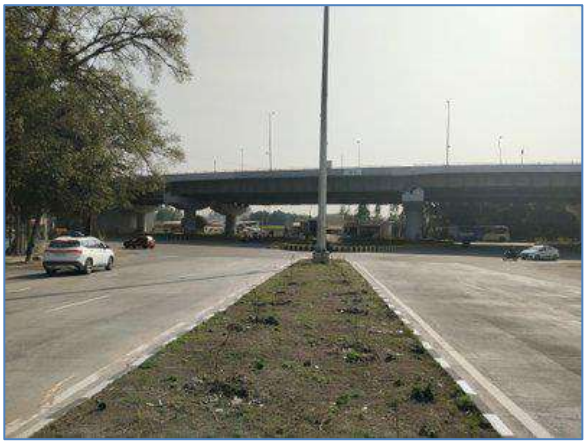
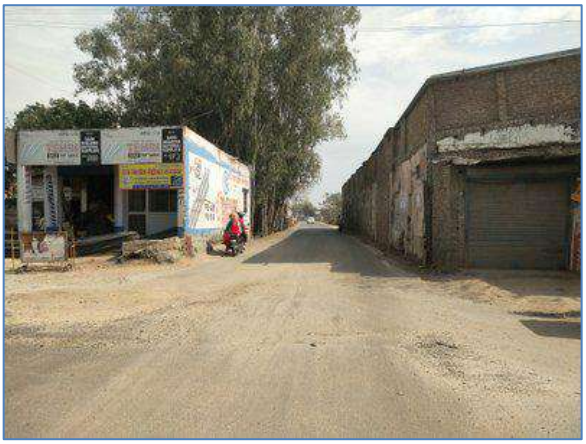
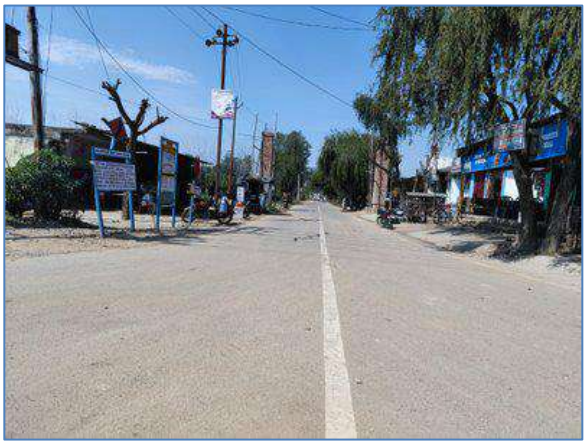
The project corridor has Rigid pavement in the entire length with 7.0m & 10.5m wide carriageway plus 1.5m paved shoulder and 0.5m shyness on each side. The project corridor generally runs in plain terrain. The land use along the project road is Agriculture land and Built-up Area. It passes through villages like Roorkee, Bhagwanpur, Chhutmalpur, Sona and Gagalehri on NH-73 and on NH-72A it passes through Chhutmalpur, Aurangzebpur, Biharigarh and Sundarpur etc. In general, road embankments are in the range of 1.0m-2.5m height. Embankments higher than 2.5m are observed mainly in the approaches of CD structures and Underpass locations.

Typical View of Project Road is shown below:

A view of the Project Road with Median 4m wide at km 0.000 - NH-73	**A view of the Project Road with Median 4m at Km 5.000 – NH-73**
A view of the Project Road with Median 4m at Km 10.000 – NH-73	**A view of the Project Road with Median 4m at Km 20.000 – NH-73**
A view of the Project Road with Median 4m at Km 35.000 – NH-73	 **A view of the Project Road with Median 4m at Km 0.000 – NH-72A**

A view of the Project Road with Median 4m at Km 5.000 - NH-72A	**A view of the Project Road with Median 4m at Km 15.000 - NH-72A**

The Project Road has 2 Major junctions and 20 Minor junctions. Photographs showing junctions locations are presented below:

	
Major Junction @ km 0.000 LHS - NH-73	**Minor Junction @ km 16.673 RHS - NH-73**
	
Minor Junction @ km 7.704 LHS - NH-72A	**Minor Junction @ km 15.764 LHS - NH-72A**

About 22 numbers of High mast lighting is observed along the project road. Mostly they are located at Junctions and Toll Plaza locations. Few photos showing High mast lighting are presented below:

A view of High mast lighting @ km 16.000

A view of High mast lighting @ km 32.300

All together the Project Road has about 28nos of Bus Bay with Bus shelters, 5nos Bus Bay and 7nos Bus Shelters are observed along the project corridor. Few photos taken at the Bus Bays/Bus Shelter are presented below:

Bus Bay with Shelter near km 13.000 LHS – NH-72A

Bus Bay with Shelter near km 15.350 RHS – NH-72A

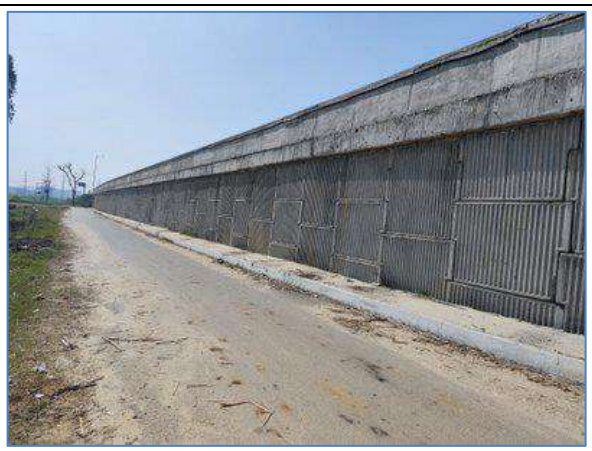
The Project Road has Four (4) nos of Truck lay byes cum Rest Areas. There are 2 on LHS side and 2 on RHS side along the entire stretch. The truck lay byes are provided with Rigid pavement. Toilet blocks are provided at all the truck lay bye locations. Lightning in the form of Single arm, Double arm and High Mast are presented at Truck lay bye locations. Few photos depicting the truck lay bye portion are presented below:

Truck Lay bye Cum Rest Area km 34.650 RHS - NH-73	**Truck Lay bye Cum Rest Area km 10.270 LHS - NH-72A**

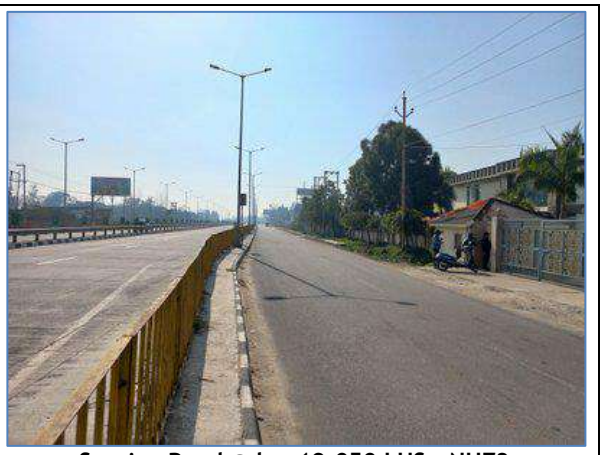
The Project Road has two Toll Plaza at Km 15.900 & Km 32.300. Rigid pavement exists at the toll plaza and in tapering portions at both toll plazas. Toll Plaza has sixteen lanes including two reversable at each plaza locations. Eight high mast lights on either ends of the toll plaza are provided at both the locations.

Toll Plaza @ 15+900 (Bhagwanpur Village)	Admin Building @ 15+900
Toll Plaza @ 32+300 (Sayeed Mazra Village)	Admin Building @ 32+300

Service road/slip roads of varying carriageway width of 5.5m to 7.0m have been observed along the Project Corridor. Service road/slip roads have been constructed at built-up area and Underpass locations of the project corridor. Photos depicting the service road pavement surface type, Condition and the other associated features like drain, pedestrian guard rails and metal Beam crash barriers on the separator are presented below. Few photos taken at service road locations are presented below:

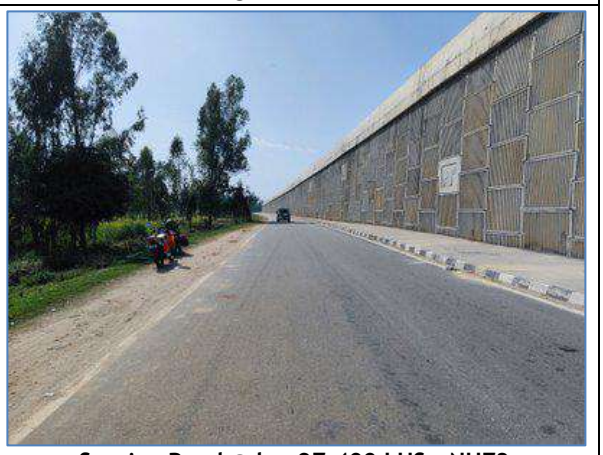


Service Road @ km 2.050 RHS - NH73

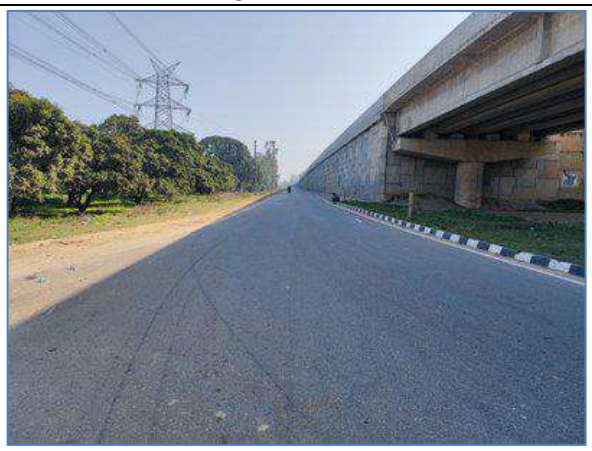


Service Road @ km 12.050 LHS - NH73

Service Road @ km 24.200 RHS - NH73



Service Road @ km 27.400 LHS - NH73



Service Road @ km 0.000 LHS - NH-72A

Service Road @ km 11.700 LHS - NH-72A

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.3 PAVEMENT CONDITION SURVEYS

The present Pavement condition data has been collected by visual in the month of March 2022. The Pavement Condition report covering the data collection for each km length in each direction has been presented in **Appendix 2** of this Report. However, by visual inspection the pavement condition appears to be fair and the riding quality is satisfactory.

Condition of rigid pavement on Roorkee bypass appears to be fair to poor with settlements observed at high embankment locations. Bumpy surface/rough ride is noticed at several places in this bypass. Condition of rigid pavement beyond Roorkee bypass is good to fair.

Slope erosions have been noticed at Roorkee Bypass at high embankment locations especially near ROB. Drainage chutes have failed leading to slope erosion. Geotextile used in slope protection got exposed. Slope protection works and chutes are required to be repaired immediately to protect pavement.

Raveling is another predominant distress on rigid pavement along the corridor. Rounded (River Bed Aggregates) are noticed on surface of pavement. This could be one of the reasons for raveling. Raveling is more predominantly seen between Chutmalpur-Ganeshpur section.

The photographs showing the pavement condition of the Project Road is presented below.

Transverse Cracking at 0+000 RHS @ NH-73	**Fair Condition at 2+000 RHS @ NH-73**	**Ravelling at 4+250 LHS @ NH-73**
Longitudinal Cracking at 6.900 LHS @ NH-73	**Fair Condition at 12+050 LHS @ NH-73**	**Longitudinal Cracking 24+000 RHS @ NH-73**

Longitudinal Wide Joint @ 28+720 RHS @ NH-73	Transverse Cracking @ 24+950 RHS @ NH-73	Ravelling @ 12+800 RHS @ NH-72A
Longitudinal joints at 4+450 LHS @ NH-72A	Fair Condition at 9+000 RHS @ NH-72A	Raveling at 17+000 LHS @ NH-72A

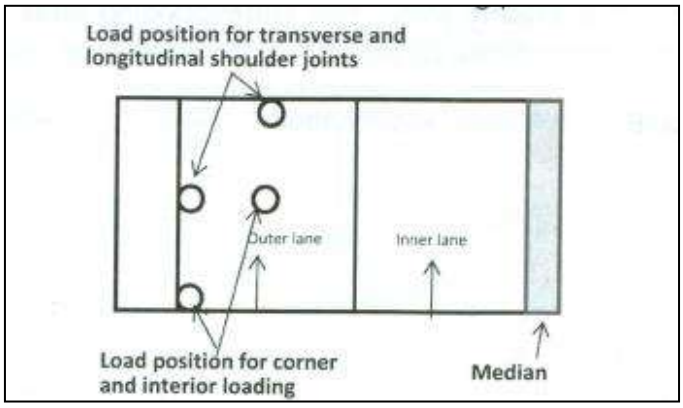
2.4 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

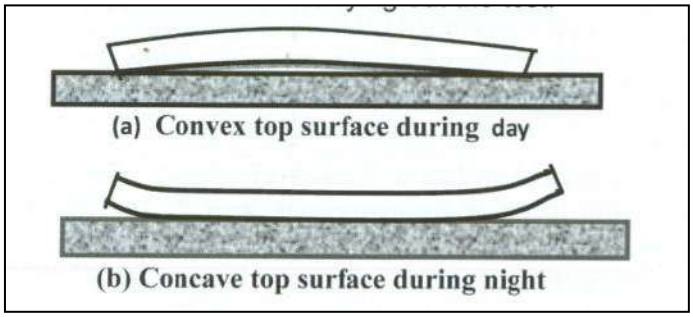
2.4.1 Pavement Evaluation Using FWD-RIGID Pavement

Structural condition of in-service rigid pavement can be evaluated using Falling Weight Deflectometer. FWD surveys are done at interior of panel to determine the Strength of Concrete and Subgrade Support and to Detect voids for loss of support FWD has been done in Wheel path.

For Evaluation of Modulus of Subgrade reaction and Strength of Concrete i.e., “Interior” loading case is done when temp gradient is zero or Negative (Top Surface is Cooler than Bottom), i.e., in the Early Morning or night time has been dine.

Corner loading has no indirect measure from the test, FWD test to be done when pavement is not in curled position and Deflections measured along wheel paths to get void locations. Load position for various cases has been presented below:



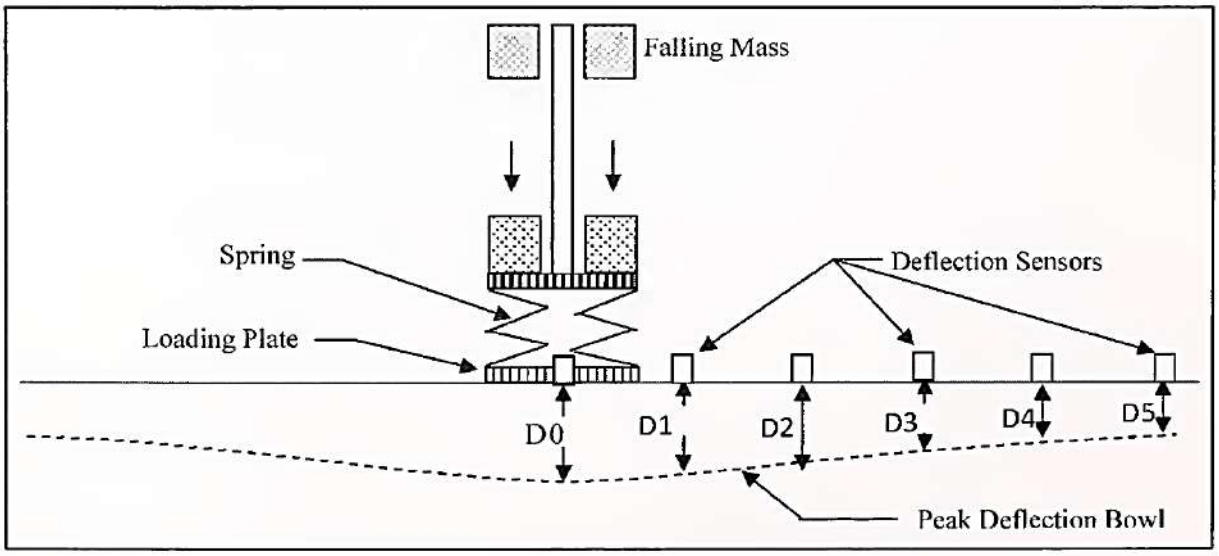


Among equipment available for structural evaluation of pavements, the Falling Weight Deflectometer (FWD) is extensively used world-wide because it simulates, to a large extent, the actual loading conditions of the pavement. When a moving wheel load passes over the pavement it produces load pulses. Normal stresses (vertical as well as horizontal) at a location in the pavement will increase in magnitude from zero to a peak value as the moving wheel load approaches the location. The time taken for the stress pulse to vary from zero to peak value is termed as 'rise time of the pulse'. As the wheel moves away from the location, magnitude of stress reduces from peak value to zero. The time period during which the magnitude of stress pulse varies from 'zero-to-peak-to-zero' is the pulse duration. Peak load and the corresponding pavement responses are of interest for pavement evaluation.

2.4.2 Working Principle of Falling Weight Deflectometer

Falling Weight Deflectometer (FWD) is an impulse-loading device in which a transient load is applied to the pavement and the deflected shape of the pavement surface is measured. The working principle of a typical FWD is illustrated in Fig below. D0, D1, etc., are surface deflections measured at different radial distances. Impulse load is applied by means of a falling mass, which is allowed to drop vertically on a system of springs placed over a circular loading plate. The deflected shape of the pavement surface is measured using displacement sensors which are placed at different radial distances starting with the center of the load plate.

A mass of weights is dropped from a pre-determined height onto a series of springs / buffers placed on top of a loading plate. The corresponding peak load and peak vertical surface deflections at different radial locations are measured and recorded.



Basically, the FWD generates a transient, of different magnitudes of impulse load by selection of a suitable mass and an appropriate height of fall. Under the application of the impulse load, the pavement deflects. Velocity transducers are placed on the pavement surface at different radial locations to measure surface deflections. Geophones or seismometers are used as displacement transducers. Load and deflection data are acquired with the help of a data acquisition system. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

Sample photos taken during FWD Surveys are presented below:

Deflection Measurement in progress	**Maintaining Safety During Survey**

FWD includes a circular loading plate of 300 to 450mm diameter, in the present survey 300mm diameter load plate is used. A falling mass in the range of 50 to 350 kg is dropped from a height of fall in the range of 100 to 600mm to produce load pulses of desired peak load and duration. The target peak load in the range of 40KN to 60KN or Higher may be applied on Concrete Pavement to get a reasonable deflection of the order of 0.15 mm since pavements of major highways in India consisting of 150mm DLC and 300mm PQC are very stiff and a higher load may be required to get a

deflection of about 0.15mm. In the present case target peak load as high as 150 KN is also used to get a reasonable deflection on concrete pavement.

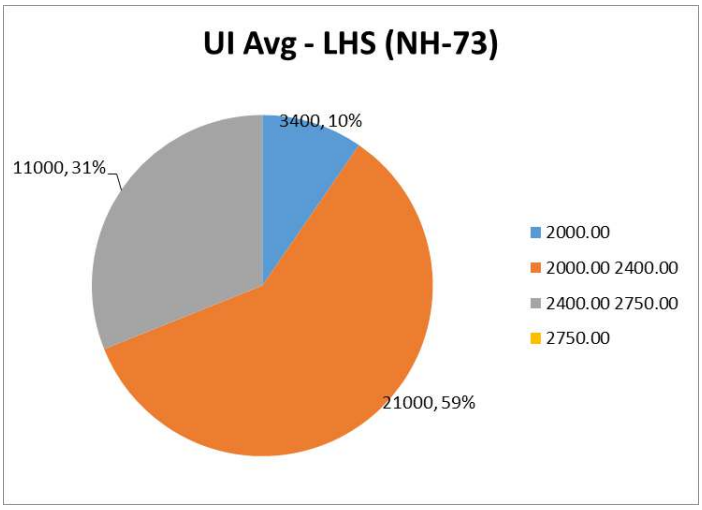
2.4.3 Methodology adopted for carrying the survey

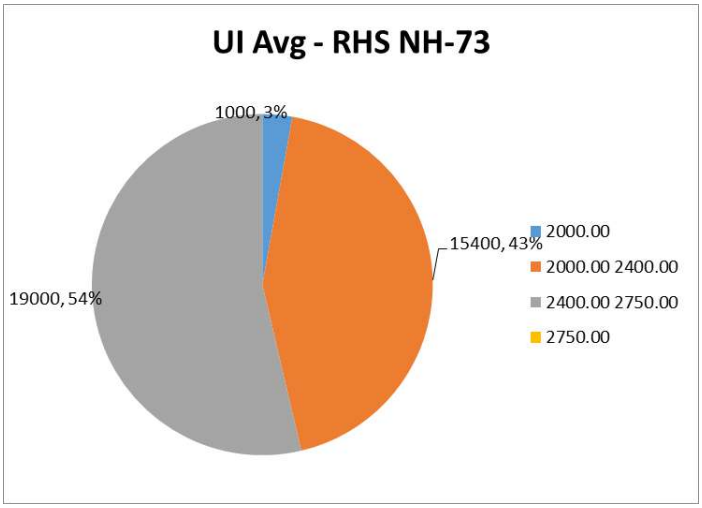
- ✓ The FWD Surveys are carried out as per IRC:117-2014
- ✓ The project road has two longitudinal joint one at center and other paved shoulder. Panel size is nearly 4.5x3.5m
- ✓ Interior points at a distance of 2.25m from edge (1.5m paved shoulder+0.75m for wheel path). These points will also act as under wheel path for detection of voids. Testing was done at two interior points in a km at 200 and 600 (These have been taken at night)
- ✓ Three points @ 0, 400 and 800 in inner lane to know strength/subgrade support.

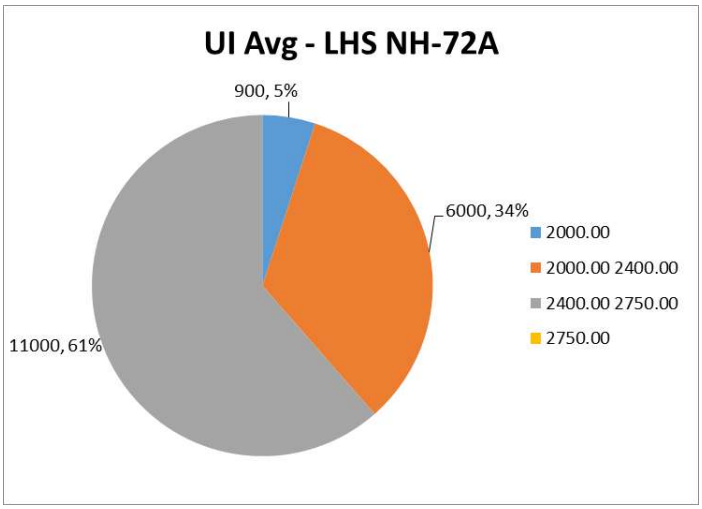
2.5 ROUGHNESS SURVEYS

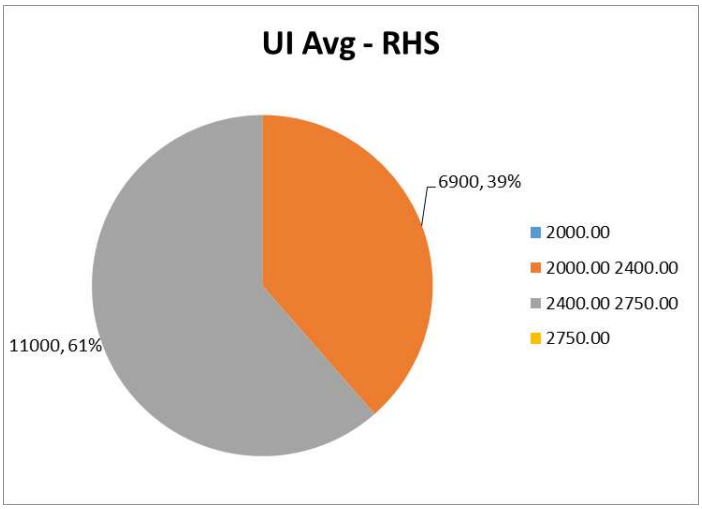
The Roughness data has been collected in the month of March 2022 using **Network Survey Vehicle** and analyzed in terms of International Roughness Index (IRI), separately for each lane, for both direction of travel. Pavement Roughness report covering the data collection and methodology, computation of IRI for each km length in each direction is presented in **Appendix 4** of this Report.

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 total length of the Project Road has fair riding quality (UI<2750 mm/km) in LHS carriageway and RHS carriageway respectively.

2.6 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys conducted in in the month of March 2022. Thus, a total of Fourteen (15 no's) pits have been dug along the corridor and the data on composition of pavement has been noted. 12 out of 15 pits done on Main Carriageway edge and remaining 3 test pits done on Service Road edge. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few photographs are presented below:

Km 1.450 LHS (RK-TP-1)

Km 5.000 RHS (RK-TP-2)

Km 10.000 LHS (RK-TP-3)

Km 15.750 RHS (RK-TP-4)

Km 20.600 LHS (RK-TP-5)	Km 25.600 RHS (RK-TP-6)
Km 30.250 LHS (RK-TP-7)	Km 1.000 LHS (RK-TP-19)
Km 5.000 LHS (RK-TP-20)	Km 10.800 LHS (RK-TP-21)
Km 16.870 RHS (RK-TP-22)	Km 33.630 LHS (RK-SR-TP-2)

Km 6.500 RHS (RK-SR-TP-3)

Km 16.330 RHS (RK-SR-TP-4)

Results of the test pit survey showing average thickness of pavement layers are presented in the Table below.

Table 2: Pavement Composition of Existing Pavement along Project Road

Sl. No	Test Pit Number	Design Chainage	Direction	PQC	DLC	BT	WMM	GSB	Total
1	RK-TP-1	1+450	LHS	300	150	-	-	300	750
2	RK-TP-2	5+000	RHS	300	130	-	-	200	630
3	RK-TP-3	10+000	LHS	320	140	-	-	150	610
4	RK-TP-4	15+750	RHS	300	-	-	-	-	300
5	RK-TP-5	20+600	LHS	300	140	-	-	130	570
6	RK-TP-6	25+600	RHS	300	150	-	-	120	570
7	RK-TP-7	30+250	LHS	300	150	-	-	150	600
8	RK-TP-8	35+000	RHS	300	150	-	-	160	610
9	RK-TP-19	1+000	LHS	300	150	-	-	150	600
10	RK-TP-20	5+000	RHS	350	150	-	-	150	650
11	RK-TP-21	10+800	LHS	350	150	-	-	160	660
12	RK-TP-22	16+870	RHS	300	150	-	-	160	610
13	RK-SR-TP-2	33+630	LHS	-	-	120	200	200	520
14	RK-SR-TP-3	6+500	RHS	-	-	130	250	200	580
15	RK-SR-TP-4	16+330	RHS	-	-	130	240	200	570

Total average crust thickness of the MCW pavement is 625mm. The average thickness of PQC layer is about 310mm. Pavement is mainly composed of a PQC layer, DLC & GSB base over subgrade.

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 15 test pits have been carefully dug from the pavement surface up to sub-grade level. 12 out of 15 pits done on Main Carriage way edge and remaining 3 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

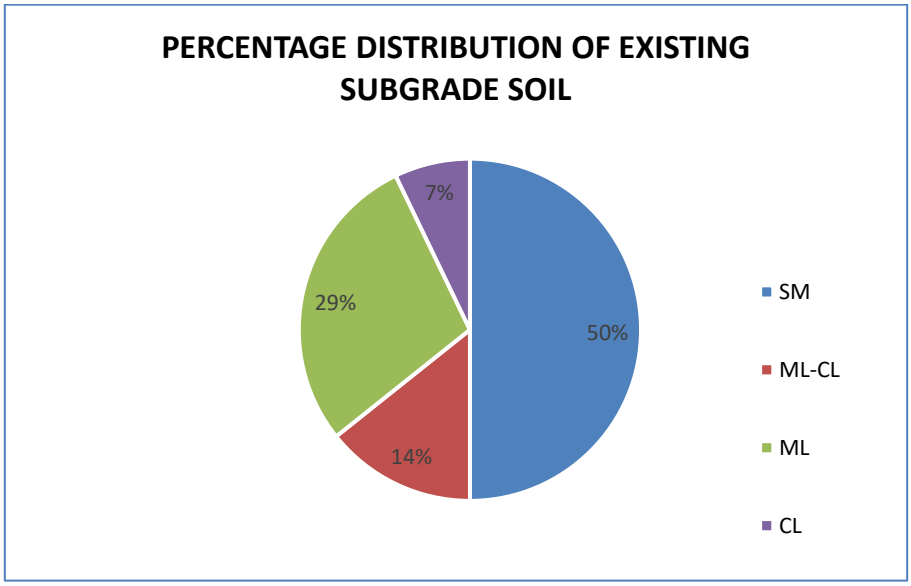
moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

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 that all the Subgrade soil samples collected belongs to Coarse Grained Soil. About 7 Numbers belongs to SM type, 4 Numbers belong to ML type, 2 Numbers belongs to ML-CL type, 1 Number belongs to SM type and for 1 number of sample subgrade is not collected.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.8 BORROW AREA

As obtained information, the 6 sources are identified, potential borrow sources for subgrade are shown in the following table and include certain useful information such as, distance from the project road, location, village name etc. The soil up to 1.5m to 2m may use for embankment. Borrowing soil from these areas would require prior approval of the local authorities' negotiations with private people. Soil samples from these borrow sources have been collected in bulk quantities

by excavating test pits down up to 0.5m-1.0m depth from the existing ground surface. The top organic soil layer of approximately 150 mm thickness has been removed before sampling.

Table 3: Borrow Area Details

Sl. No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Area	Rate	Remarks	Co-ordinate
1	RK-BP-1	2+950	LHS	2.7 Km	Village: Hathiyan Name: Krishnapal Contact no: 8630102292	30 Bigha*8feet	Rate not told	Pvt.land	29.825339 77.838482
2	RK-BP-2	11+330	RHS	1.5 Km	Village: Saliyar Name: Sethraj Contact no: 7983487404	30 Bigha*8feet	Rs- 25000/- 1 BighaX1m	Pvt.land	29.910257 77.85785
3	RK-BP-3	21+420	RHS	1.58 Km	Village: Saidpur Name: Sanjay kumar Contact no: 7830819889	20 Bigha*5feet	Rs- 25000/- 1BighaX1.5m	Pvt.land	29.969105 77.798663
4	RK-BP-4	27+000	RHS	7.2 km	Village: patti dada Name: Anil saini Contact no: 9870812828	21 Bigha*10feet	Rs- 20,000/- 1BighaX10feet	Pvt.land	30.026275 77.815144
5	RK-BP-10	7+700	LHS	3.5 km	Village: Sherpur Khanazadpur Name: Aravindh Kamboj Contact no: 9760262488	25 Bigha*3feet	Rs- 20,000/- 1BighaX1m	Pvt.land	30.081056 77.768253
6	RK-BP-11	9+800	LHS	4.0 km	Village: Takkipur Name: Showsingh Contact no: 7920305436	15 Bigha*20feet	Rs- 20,000/- 1BighaX1m	Pvt.land	30.112025 77.789881

Photographs showing Borrow Area sources are presented Below:

RK-BP-1

RK-BP-2

RK-BP-3

RK-BP-4

RK-BP-10

RK-BP-11

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 4: Aggregate Samples Details

Sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
RK-AQ-1	14+700 (From Chhutmalpur -Ganeshpur pkg-I)	RHS	Biharigarh	Everest stone crusher Owner-Choudary sant.pal Contract no-9719019099	6.0 km	Plenty	53mm-Rs 450/- per tonne 40mm-Rs 450/- per tonne 20mm-Rs 520/- per tonne 12mm-Rs 520/- per tonne 6mm-Rs 480/- per tonne Dust-Rs 510/- per tonne M-sand-Rs 330/- per tonne	Including Royalty & GST 5% Extra	30.111778 77.867892

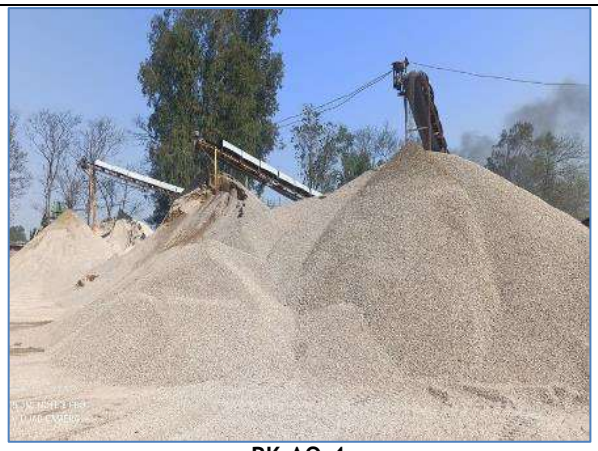
Sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
RK-AQ-2	12+700 (From Chhutmalpur -Ganeshpur pkg-I)	RHS	Biharigarh	kubher Kutiya stone crusher Owner- Hemanth kumar Contract no- 9719011093, 9758842605	7.8 km	Plenty	53mm-Rs 440/- per tonne 40mm-Rs 440/- per tonne 20mm-Rs 470/- per tonne 10mm-Rs 480/- per tonne 6mm-Rs 480/- per tonne Dust-Rs 480/- per tonne Corse-sand-Rs 290/- per tonne	Including Royalty & GST 5% Extra	30.111550 77.891639
RK-AQ-3	0+000 (From Rookee-Yamuna nagar pkg-1	RHS	Ibrahim pur	jai durga Stone mills Owner- ashvani kumar Contract no- 9837002569, 9837468271	24 km	Plenty	53mm-Rs 650/- per tonne 40mm-Rs 650/- per tonne 20mm-Rs 650/- per tonne 10mm-Rs 650/- per tonne 6mm-Rs 650/- per tonne Dust-Rs 650/- per tonne Corse-sand-Rs 750/- per tonne	Including Royalty, Tax & GST 5% Extra	29.912581 78.071525
RK-AQ-4	0+000 (From Rookee-Yamuna nagar pkg-1	RHS	Ibrahim pur	Sri ganga Stone Crusher Owner- R.P Agarwal Contract no- 9719004005, 9058343343	25 km	Plenty	40mm-Rs 620/- per tonne 20mm-Rs 650/- per tonne 10mm-Rs 620/- per tonne 6mm-Rs 620/- per tonne Dust-Rs 650/- per tonne	Including Royalty, Tax & GST 5% Extra	29.908853 78.073256
RK-AQ-5	86+100	RHS	Tapu Majri Yamuna Nagar	Shashank Shekar Stone Crusher Contact Person: Pankaj Chowdary Contact No: 9728315409	16 km	Plenty	40mm-Rs 430/- per ton 20mm-Rs 450/- per ton 10mm - Rs 480/- per ton 6mm -Rs 470/- per ton	GST 5% and Royalty Extra	30.130528 77.405350
RK-AQ-6	86+100	RHS	Tapu Majri Yamuna Nagar	Shiv Shakti Stone Crusher Contact Person: Tapu Ravi Contact no: 8053501857	16 km	Plenty	40mm-Rs 440/- per ton 20mm-Rs 440/- per ton 10mm - Rs 470/- per ton 6mm -Rs 440/- per ton	GST 5% and Royalty Extra	30.131083 77.406461

Photographs showing Aggregate sources are presented Below:

RK-AQ-1

RK-AQ-2

RK-AQ-3



RK-AQ-4

RK-AQ-5

RK-AQ-6

Table 5: Sand Samples Details

Sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
RK-SQ-1	83+550	LHS	Yamuna nagar	Owner-Sachin Contract no-9045125020	12 km	Plenty	Yamuna River - 2200 Rs/- Per Tonne		30.031763 77.292173

Photographs showing Sand sources are presented Below:

RK-SQ-1

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 location one at Km 16.000 (Bhagwanpur Toll Plaza) between 25.02.2022 & 26.02.2022 and the another is at Km 32.200 (Sayeed Mazra Toll Plaza) between 28.02.2022 & 01.03.2022. 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: 37-2012. The standard axle loadings adopted have been presented in the following table.

Details of Standard Axles Used

Axle Configuration	Standard Axle load (Tonnes)*	Remarks
Single Wheel, Single Axle	6.60	As per IRC 37-2012
Dual Wheel, Single Axle	8.16	As per IRC 37-2012
Dual Wheel, Tandem Axle group	15.10	As per IRC 37-2012
Dual Wheel, Tridem Axle group	22.90	As per IRC 37-2012

Few photographs illustrating the survey locations and axle load measurements are presented below.

Survey in Progress at Bhagwanpur Toll plaza

Survey in Progress at Sayeed Mazra Toll Plaza

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 6: VDF Values Estimated at the Toll Plaza Location (Near km 16+000)

Mode Type	UP	DOWN
LCV	0.38	0.24
2 Axle Truck	1.30	0.33
3 Axle Truck	3.82	1.56
MAV (4-6 Axle)	11.27	5.79
Buses	0.77	1.21

VDF Values Estimated at the Toll Plaza Location (Near km 32+200)

Mode Type	UP	DOWN
LCV	0.43	0.23
2 Axle Truck	0.32	2.32
3 Axle Truck	2.02	1.74
MAV (4-6 Axle)	12.69	1.72
Buses	0.71	0.59

CHAPTER 3. VALIDATION OF EXECUTED WORKS

3.1 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground. As a part of the validation, the available as-built drawings and the inventory data received from the Concessionaire were also referred. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the executed works on ground.

Table 7: Details of Executed works

Sl. No.	Particulars	Length/ Nos.	As per Site
1	Start Chainage (Km)-NH-73	km.	0.000
2	End chainage (Km)-NH-73	km.	35.400
3	Start Chainage (Km)-NH-72A	km.	0.000
4	End chainage (Km)-NH-72A	km.	17.900
5	Length of the Project Corridor	Kms	53.300
6	Service Road / Slip Road	Kms	32.65
7	Toll Plaza	Nr.	2
8	No of Lanes (Both side)	Nr.	16
9	ROBs	Nr.	1
10	Flyovers	Nr.	1
11	VUPs	Nr.	5
12	LVUP's	Nr.	9
13	PUP's/CUP's	Nr.	9
14	Major Bridges	Nr.	3
15	Minor Bridges	Nr.	11
16	Culverts (Pipe)	Nr.	44
17	Culvert (Slab/Box)	Nr.	18
18	Major Junctions	Nr.	2
19	Minor junctions	Nr.	20
20	High Embankments	Kms	18.16
21	Partial RCC Wall with Embankment	Kms	0.49
22	RE Blocks/PANELS	Kms	8.48
23	Bus Bays with Shelter	Nr.	28
24	Bus Bays	Nr.	5
25	Bus Shelters	Nr.	7
26	Truck Lay bye	Nr.	4
27	Rest Areas	Nr.	4
28	High Mast Lights	Nr.	22
29	Highway Lighting (length only)	Kms	38.45

Sl. No.	Particulars	Length/ Nos.	As per Site
30	Single Arm Lightings	Nr.	228
31	Double Arm Lightings	Nr.	1299
32	Solar Blinkers	Nr.	30
33	RCC Cover Drain	Kms	11.92
34	Median Cuts	Nr.	639
35	Chutes	Nr.	1037
36	Median Opening	Nr.	12
37	Median kerb Damages	m	162.00
38	Median Plantation Functional	Kms	36.98
39	Road Markings	Sqm	79920
40	W-Beam Safety Barriers	Kms	29.370
41	Rigid Concrete Barriers	Kms	11.99
42	Concrete Railing	Kms	0.96
43	Pedestrian Guard Rails	Kms	17.13
44	Delineators	Nr.	59
45	Kilometre Stones	Nr.	97
46	Hectometer Stones	Nr.	244
47	Road Signs	Nr.	803
48	Gantry Sign Boards	Nr.	10
49	Cantilever Sign Boards	Nr.	7
50	Varying Message Signs (VMS)	Nr.	5
51	Emergency Call Box	Nr.	20
52	Anti-Glare	Nr.	3870

The project corridor appears to have been constructed with the cross-sectional elements matching to those given in the manual at the time of execution. The carriageway width of 7 plus paved shoulders of 1.5m and a shyness of 0.5m has been provided over the entire length except at structures approaches locations carriageway width is 10.5 Plus paved shoulders of 2.0m and a shyness of 0.5m is observed.

In the project stretch, the Service/Slip Roads with an overall both side length of km 32.650 have been observed. Location wise details of service roads and slip roads presented in **Appendix 6** are listed as below:

Lined Covered drains in a length of 11.920 km are provided at along the Project corridor, the location and condition of the same are tabulated below

Table 8: Details of Drain along Project Road

S. No.	Existing Km		Length (m)	Direction	Damage(m)	Remark
	From	To				
NH-73						
1	11.570	12.390	0.820	LHS	1.0	RCC Covered Drain
2	12.400	12.520	0.120	LHS		RCC Covered Drain
3	12.520	12.910	0.390	LHS		Not Construction
4	12.910	14.260	1.350	LHS		RCC Covered Drain
5	14.260	15.400	1.140	LHS		Not Construction
6	15.900	16.810	0.910	LHS	2.0	RCC Covered Drain
7	16.810	16.950	0.140	LHS		Not Construction
8	16.950	18.990	2.040	LHS	5.0	RCC Covered Drain
9	33.400	33.640	0.240	LHS	3.0	RCC Covered Drain
10	35.200	35.400	0.200	LHS	3.0	RCC Covered Drain
NH-72A						
11	7.340	8.140	0.800	LHS		RCC Covered Drain
12	11.070	11.250	0.180	LHS		RCC Covered Drain
13	11.250	11.710	0.460	LHS		Not Construction
14	11.710	12.990	1.280	LHS		RCC Covered Drain
15	12.990	13.000	0.010	LHS		Not Construction
16	13.000	13.010	0.010	LHS		RCC Covered Drain
17	15.780	16.030	0.250	RHS		RCC Covered Drain
18	16.600	16.340	0.260	RHS		RCC Covered Drain
19	16.340	16.230	0.110	RHS		Not Construction
20	16.230	16.210	0.020	RHS		RCC Covered Drain
21	16.210	16.190	0.020	RHS		Not Construction
22	16.190	16.180	0.010	RHS		RCC Covered Drain
23	16.180	16.050	0.130	RHS		Not Construction
24	16.050	15.480	0.570	RHS		RCC Covered Drain
25	14.970	14.750	0.220	RHS		RCC Covered Drain
26	13.150	12.240	0.910	RHS		RCC Covered Drain
27	12.240	11.890	0.350	RHS		Not Construction
28	11.890	11.830	0.060	RHS		RCC Covered Drain
29	11.830	11.730	0.100	RHS		Not Construction
30	11.730	11.090	0.640	RHS	3.0	RCC Covered Drain
31	8.140	7.110	1.030	RHS	2.0	RCC Covered Drain
Total Length(m)			**14.770**		**19.0**	

RE walls/RCC walls are provided in approaches of under passes are observed along the Project Corridor. Summary of the embankment slope details are given below

Table 9: Summary of Type of Slope Details

Type of slope Protection	Length km
RE Wall	8.480
Partial RCC Wall with Embankment	0.490
Embankment	18.160

Median width of 4.0m and 1.5m was generally adopted along the project road. Median opening locations are not presented in total stretch:

Table 10: Details of Median Openings along Project Road

Sl. No	Chainage	Length (m)	Reserved Lane	Remarks
CGRG-PKG-1 @ NH-73				
1	9.800	35	Yes	
2	14.510	25	No	
3	17.210	35	Yes	Close
4	19.830	35	Yes	
5	22.230	35	Yes	
6	25.500	35	Yes	
7	30.600	35	Yes	
8	31.400	35	Yes	
CGRG-PKG-1 @ NH-72A				
9	8.430	35	Yes	
10	12.700	25	No	
11	14.800	25	No	
12	15.730	35	Yes	

Solar Blinkers are provided at most of the Traffic signals locations and the number accounts to 30. The table below represents the Solar Blinker and their condition.

Table 11: Details of Solar Blinkers along Project Road

S. No	Chainage	No. of Blinkers	Side	Condition
CGRG-PKG-1 @ NH-73				
1	9.520	1	Median	Working
2	9.550	1	Median	Working
3	14.470	1	Median	Working
4	14.490	1	Median	Working
5	15.560	1	Median	Working
6	16.250	1	Median	Working
7	17.320	1	Median	Working
8	17.360	1	Median	Working
9	18.800	1	Median	Working
10	18.850	1	Median	Working

S. No	Chainage	No. of Blinkers	Side	Condition
11	22.220	1	Median	Working
12	22.250	1	Median	Working
13	25.480	1	Median	Working
14	25.520	1	Median	Working
15	30.720	1	Median	Working
16	30.750	1	Median	Working
17	31.300	1	Median	Working
18	31.400	1	Median	Working
19	34.230	1	Median	Working
20	34.280	1	Median	Working
CGRG-PKG-1 @ NH-72A				
21	0.110	1	Median	Working
22	8.420	1	Median	Working
23	8.480	1	Median	Working
24	9.780	1	Median	Working
25	9.820	1	Median	Working
26	10.220	1	Median	Working
27	12.650	1	Median	Working
28	12.700	1	Median	Working
29	15.750	1	Median	Working
30	15.800	1	Median	Working

Median Kerb along the project corridor is presented in Table below

Table 12: Details of Median Kerb along Project Road

S. No	Side	Height (0.20m)	Width (0.15m)	Remarks
1	LHS	34.400	34.400	73
2	RHS	34.400	34.400	73
3	LHS	17.900	17.900	72A
4	RHS	17.900	17.900	72A

Safety barriers have been provided along the project road at high embankment, sharp curve locations and on the approaches of grade separated and cross drainage structures. The summary of safety barriers provided along the corridor are presented in the following table and the location wise details are presented in **Appendix 6:**

Table 13: Summary of Safety Barriers along Project Road

S. No	Safety Barrier	Length (km)
1	Metal Beam Crash Barrier	29.370
2	Concrete Crash Barrier	11.990
3	Concrete Railing	0.960
4	Pedestrians Guard Rail	17.130

Table 14: Details of Anti-Glare along Project Road

S.No	Chainage		Length km	Side	No of Anti-Glare	Remarks
	From	To				
CGRG-PKG-1 @ NH-73						
1	33.500	33.740	0.240	Median	68	Double faced MCB
2	35.300	35.400	0.100	Median	30	Double faced MCB
3	11.150	15.700	4.550	Median	1274	Double faced MCB
4	16.250	17.210	0.960	Median	271	Double faced MCB
5	17.000	18.980	1.980	Median	565	Double faced MCB
6	23.600	25.300	1.700	Median	480	Double faced MCB
CGRG-PKG-1 @ NH-72A						
7	7.100	8.120	1.020	Median	287	Double faced MCB
8	11.050	12.700	1.650	Median	465	Double faced MCB
9	12.720	13.100	0.380	Median	108	Double faced MCB
10	15.410	15.700	0.290	Median	81	Double faced MCB
11	15.800	16.650	0.850	Median	241	Double faced MCB
Total Length			**13.720**		**3870**	

There are 2 major and 20 Minor Junction along the Project Corridor. Summary of Junctions are presented in table below and the location wise details are presented in **Appendix 6**

Table 15: List of Junctions along Project Road

S. No.	Chainage (km)	Type of Junction	Side	Type of Junction		Surface Type of Access Road		Width of Access Road		Remarks
				LHS	RHS	LHS	RHS	LHS (m)	RHS (m)	
CGRG-PKG-1 @ NH-73										
1	0.000	Major	LHS	T	-	BT	-	7.0	-	
2	11.288	Major	RHS	-	T	-	BT	-	8.000	
3	13.193	Minor	BHS	T	T	BT	Paver Block	7.0	-	
4	16.673	Minor	BHS	T	T	CC	BT	6.5	6.00	
5	17.825	Minor	LHS	T	-	CC	-	12.0	-	
6	21.793	Minor	RHS	-	T	-	BT	-	3.75	
7	22.625	Minor	LHS	T	-	CC	-	10.0	-	
8	22.826	Minor	RHS	-	T	-	BT	-	3.50	
9	23.790	Minor	LHS	T	-	Paver Block	-	5.0	-	
10	24.623	Minor	LHS	T	-	BT	-	4.0	-	
11	25.180	Minor	LHS	T	-	BT	-	4.5	-	
12	25.470	Minor	LHS	T	-	Paver Block	-	2.5	-	
13	27.031	Minor	RHS	-	T	-	BT	-	4.0	
14	31.370	Minor	LHS	T	-	CC	-	5.0	-	
15	31.420	Minor	RHS	-	T	-	BT	-	4.0	
16	32.502	Minor	LHS	T	-	BT	-	4.0	-	

S. No.	Chainage (km)	Type of Junction	Side	Type of Junction		Surface Type of Access Road		Width of Access Road		Remarks
				LHS	RHS	LHS	RHS	LHS (m)	RHS (m)	
CGRG-PKG-1 @ NH-73										
17	33.392	Minor	LHS	T	-	BT	-	3.8	-	
CGRG-PKG-1 @ NH-72A										
18	7.704	Minor	LHS	T	-	BT	-	4.0	-	
19	9.864	Minor	LHS	T	-	BT	-	4.0	-	
20	11.671	Minor	LHS	T	-	BT	-	4.0	-	
21	12.683	Minor	RHS	-	T	-	BT	-	8.00	
22	15.764	Minor	LHS	T	-	BT	-	6.0	-	

Road furniture in the form of Signboards (Information, Gantry, Cantilever signs and Toll Boards) Pavement Markings, Delineators, Guard Posts and Highway Lighting have been provided along the project road. The Tables below depict the particular details of the Road Furniture.

Table 16: Details of Road Signs along Project Road

S. No.	Description	LHS (Nos)	RHS (Nos)	Total (Nos)
1	**Octagonal**	0	0	**0**
2	**Circular**	0	0	**0**
3	**Triangular**	41	40	**81**
4	**Rectangular**	146	134	**280**
5	**Facility informatory**	0	0	**0**
6	**Chevron**	81	76	**157**
7	**Hazard**	134	129	**263**
8	**Route Marker**	8	14	**22**
9	**Safety Boards**	0	0	**0**
10	**Toll Boards**	0	0	**0**
11	**Cantilever Gantry**	4	3	**7**
12	**Over Head Gantry**	6	4	**10**
13	**Variable Message Sign**	5	0	**5**
14	**Project Descriptive**	0	0	**0**
Total		**425**	**400**	**803**

High mast lighting is provided at 22 locations mainly at intersections and Toll Plaza locations. Lighting with 1299 No's of Double arm poles and 228 No's of Single arm poles are observed at built-up locations along the project corridor. The location wise details of high mast and highway lighting are presented in **Appendix 6** of this report

The Project Road has about 28 nos. of Bus Bay with Shelters, 7 nos of Bus Shelter and 1 no. of Bus Bay on Main Carriageway and Service Road. The details of the same are presented in **Appendix 6** of this report.

The Project Road has 4 numbers of Truck lay byes along the Project Highway. Details of truck lay bye are presented below.

Table 17: Details of Truck Lay-Byes along Project Road

S. No.	Existing Km		Length	Width(m)	separator	Side	Pavement Type	Toilet Block	Remarks
	From	To							
C-G_NH-72A									
1	10.270	10.850	0.580		1.0	LHS	CC	Available	
2	14.650	14.400	0.250		1.0	RHS	CC	Available	
R-G_NH-73									
3	34.470	34.700	0.230		1.0	LHS	CC	Available	
4	34.650	34.900	0.250		1.0	RHS	CC	Available	

3.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 18: Details of Major CD & Other Structures along Project Road

S. No	Design Chainage	Type of Str.	Side	Str. on	Age of Structure	Span Arrangement (No x Length)	Deck Width	Remarks
1	6+490	ROB	LHS	MCW	New	2 x 40 + 1 x 37 + 2 x 40	12.5	
2	6+490	ROB	RHS	MCW	New	2 x 40 + 1 x 37 + 2 x 40	12.5	
3	27+193	Flyover	LHS	MCW	New	1 x 35 + 1 x 40 + 1 x 35	14.5	
4	27+193	Flyover	RHS	MCW	New	1 x 35 + 1 x 40 + 1 x 35	14.5	
5	10+610	MJB	LHS	MCW	Old	4 x 30	12.5	
6	10+610	MJB	RHS	MCW	New	4 x 30	12.5	
7	0+845	MJB	LHS	MCW	New	1 x 15 + 1 x 90 + 1 x 15	12.5	
8	0+845	MJB	RHS	MCW	New	1 x 15 + 1 x 90 + 1 x 15	12.5	
9	2+598	MJB	LHS	MCW	New	1 x 20 + 1 x 35 + 1 x 10 + 1 x 45 + 1 x 15	12.5	
10	2+598	MJB	RHS	MCW	New	1 x 20 + 1 x 35 + 1 x 10 + 1 x 45 + 1 x 15	12.5	
11	1+195	MNB	LHS	MCW	New	1 x 8	12.5	
12	1+195	MNB	RHS	MCW	New	1 x 8	12.5	
13	1+917	MNB	LHS	MCW	New	2 x 8	12.5	
14	1+917	MNB	RHS	MCW	New	2 x 8	12.5	
15	6+866	MNB	LHS	MCW	New	3 x 3	12.5	
16	6+866	MNB	RHS	MCW	New	3 x 3	12.5	
17	8+044	MNB	LHS	MCW	New	1 x 7	12.5	
18	8+044	MNB	RHS	MCW	New	1 x 7	12.5	
19	8+044	MNB	LHS	SR	New	1 x 7	10.5	
20	8+044	MNB	RHS	SR	New	1 x 7	10.5	
21	8+146	MNB	LHS	MCW	New	3 x 2.5	13.5	

S. No	Design Chainage	Type of Str.	Side	Str. on	Age of Structure	Span Arrangement (No x Length)	Deck Width	Remarks
22	8+146	MNB	RHS	MCW	New	3 x 2.5	13.5	
23	9+053	MNB	LHS	MCW	New	3 x 4	14.5	
24	9+053	MNB	RHS	MCW	New	3 x 4	14.5	
25	11+882	MNB	LHS	MCW	New	1 x 8.3	12.5	
26	11+882	MNB	RHS	MCW	New	1 x 8.3	12.5	
27	11+882	MNB	LHS	SR	New	1 x 8.3	10.5	
28	11+882	MNB	RHS	SR	New	1 x 8.3	10.5	
29	13+420	MNB	LHS	MCW	Old	3 x 6	14.5	
30	13+420	MNB	RHS	MCW	New	3 x 6	14.5	
31	0+386	MNB	LHS	MCW	New	1 x 12	12.5	
32	0+386	MNB	RHS	MCW	New	1 x 12	12.5	
33	0+600	MNB	LHS	MCW	New	2 x 6	12.5	
34	0+600	MNB	RHS	MCW	New	2 x 6	12.5	
35	0+600	MNB	LHS	SR	New	2 x 6	8.5	
36	0+600	MNB	RHS	SR	New	2 x 6	8.5	
37	2+284	MNB	LHS	MCW	New	1 x 8	10.5	
38	2+284	MNB	RHS	MCW	New	1 x 8	10.5	
39	2+284	MNB	LHS	SR	New	1 x 8	10.88	
40	2+284	MNB	RHS	SR	New	1 x 8	10.88	
41	4+355	VUP	LHS	MCW	New	1 x 12.185	14.5	
42	4+355	VUP	RHS	MCW	New	1 x 12.185	14.5	
43	6+130	VUP	LHS	MCW	New	1 x 12	14.5	
44	6+130	VUP	RHS	MCW	New	1 x 12	14.5	
45	12+930	VUP	LHS	MCW	New	1 x 12	12	
46	12+930	VUP	RHS	MCW	New	1 x 12	12	
47	16+674	VUP	LHS	MCW	New	1 x 12	12	
48	16+674	VUP	RHS	MCW	New	1 x 12	12	
49	17+826	VUP	LHS	MCW	New	1 x 12	12	
50	17+826	VUP	RHS	MCW	New	1 x 12	12	
51	1+705	LVUP	LHS	MCW	New	1 x 10.5	14.5	
52	1+705	LVUP	RHS	MCW	New	1 x 10.5	14.5	
53	3+270	LVUP	LHS	MCW	New	1 x 10.5	14.5	
54	3+270	LVUP	RHS	MCW	New	1 x 10.5	14.5	
55	1+900	LVUP	LHS	MCW	New	1 x 12.125	14.5	
56	1+900	LVUP	RHS	MCW	New	1 x 12.125	14.5	
57	5+825	LVUP	LHS	MCW	New	1 x 10.5	12	
58	5+825	LVUP	RHS	MCW	New	1 x 10.5	12	
59	7+300	LVUP	LHS	MCW	New	1 x 10.5	14.5	

S. No	Design Chainage	Type of Str.	Side	Str. on	Age of Structure	Span Arrangement (No x Length)	Deck Width	Remarks
60	7+300	LVUP	RHS	MCW	New	1 x 10.5	14.5	
61	9+265	LVUP	LHS	MCW	New	1 x 10.5	14.5	
62	9+265	LVUP	RHS	MCW	New	1 x 10.5	14.5	
63	10+900	LVUP	LHS	MCW	New	1 x 10.5	14.5	
64	10+900	LVUP	RHS	MCW	New	1 x 10.5	14.5	

4.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. Majority of samples are coarse grain type 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 of SM, ML and ML-CL type. 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 all locations except one location it is less than 10%. Results of Subgrade CBR are as follows:

Table 19: 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 Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %									
RK-TP-1	1+450	LHS	97.76	92.97	21.33	2.24	76.43	-	NP	NP	SM	1.89	10.00	1.83	12.69	5.88
RK-TP-2	5+000	RHS	99.23	98.14	60.62	0.77	38.61	-	NP	NP	ML	2.00	10.80	1.94	13.34	10.00
RK-TP-3	10+000	LHS	99.68	97.58	78.05	0.32	21.63	28	18	10	CL	1.93	10.80	1.87	10.26	4.55
RK-TP-4	15+750	RHS	SAMPLE NOT COLLECTED													
RK-TP-5	20+600	LHS	96.76	91.35	53.08	3.24	43.68	21	17	4	ML-CL	1.99	10.20	1.93	13.98	10.53
RK-TP-6	25+600	RHS	98.83	93.89	19.70	1.17	79.13	-	NP	NP	SM	1.88	8.60	1.82	12.69	0.00
RK-TP-7	30+250	LHS	98.84	96.34	73.84	1.16	25	22	15	7	ML-CL	1.97	8.40	1.91	7.31	4.76
RK-TP-8	35+000	RHS	96.73	93.88	26.70	3.27	70.03	-	NP	NP	SM	1.92	10.20	1.86	13.23	5.88
RK-TP-19	1+000	LHS	97.61	92.8	33.14	2.39	64.47	-	NP	NP	SM	2.04	8.80	1.98	19.28	0.00
RK-TP-20	5+000	RHS	99.36	97.69	45.19	0.64	54.17	-	NP	NP	SM	1.95	9.40	1.89	15.32	0.00
RK-TP-21	10+800	LHS	96.61	89.40	15.75	3.39	80.86	-	NP	NP	SM	1.92	8.40	1.86	13.23	5.88
RK-TP-22	16+870	RHS	97.82	96.14	61.56	2.18	36.26	-	NP	NP	ML	2.02	9.00	1.96	16.98	0.00
RK-SR-TP-2	33+630	LHS	95.85	90.45	40.09	4.15	55.76	-	NP	NP	SM	1.99	8.80	1.93	19.99	11.11
RK-SR-TP-3	6+500	RHS	98.64	97.12	59.04	1.36	39.6	-	NP	NP	ML	1.90	7.40	1.84	11.29	4.76
RK-SR-TP-4	16+330	RHS	90.65	86.3	56.67	9.35	33.98	-	NP	NP	ML	2.04	9.40	1.98	16.98	5.26

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 1.88 and 2.04 gm/cc. Out of 15 samples, all the samples satisfying the MDD criterion (MDD>=1.75 gm/cc)
- OMC for existing subgrade samples varies between 8.6 to 29.80.
- Free Swelling Index for existing subgrade samples varies between 0 to 11.1. All 15 samples satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in fair condition.

The test results and photographs are presented at **Appendix 7** of this report.

Table 20: Test Results of Borrow 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 Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %									
RK-BP-1	2+950	LHS	100	98.49	42.56	0	57.44	-	NP	NP	SM	1.84	8.80	1.78	6.24	0.00
RK-BP-2	11+330	RHS	99.35	97.54	39.16	0.65	60.19	-	NP	NP	SM	1.98	9.40	1.92	17.64	5.26
RK-BP-3	21+420	RHS	100	98.16	24.89	0	75.11	-	NP	NP	SM	1.92	10.60	1.86	7.31	0.00
RK-BP-4	27+000	RHS	100	97.12	19.64	0	80.36	-	NP	NP	SM	1.97	8.40	1.91	17.64	5.88
RK-BP-10	7+700	LHS	99.70	97.77	86.73	0.3	12.97	31	18	13	CL	1.81	15.60	1.76	9.46	13.04
RK-BP-11	9+800	LHS	100	96.4	20.71	0	79.29	-	NP	NP	SM	1.87	11.00	1.81	8.17	0.00

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 21: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	Up/Dn	A.I.V (%)	Water Absorption (%)	Specific Gravity (%)
1	RK-AQ-1	14+700 (From Chutmalpur-Ganeshpur Pkg-I)	RHS	14.39	0.21	2.62
2	RK-AQ-2	12+700 (From Chutmalpur-Ganeshpur Pkg-I)	RHS	15.26	0.20	2.63
3	RK-AQ-3	0+000 (From Roorkee- Yamuna Nagar pkg-1	RHS	14.62	0.26	2.63
4	RK-AQ-4	0+000 (From Roorkee- Yamuna Nagar pkg-1	RHS	14.13	0.23	2.63
5	RK-AQ-5	86+100	RHS	13.03	0.4	2.65
6	RK-AQ-6	86+100	RHS	9.9	0.28	2.67

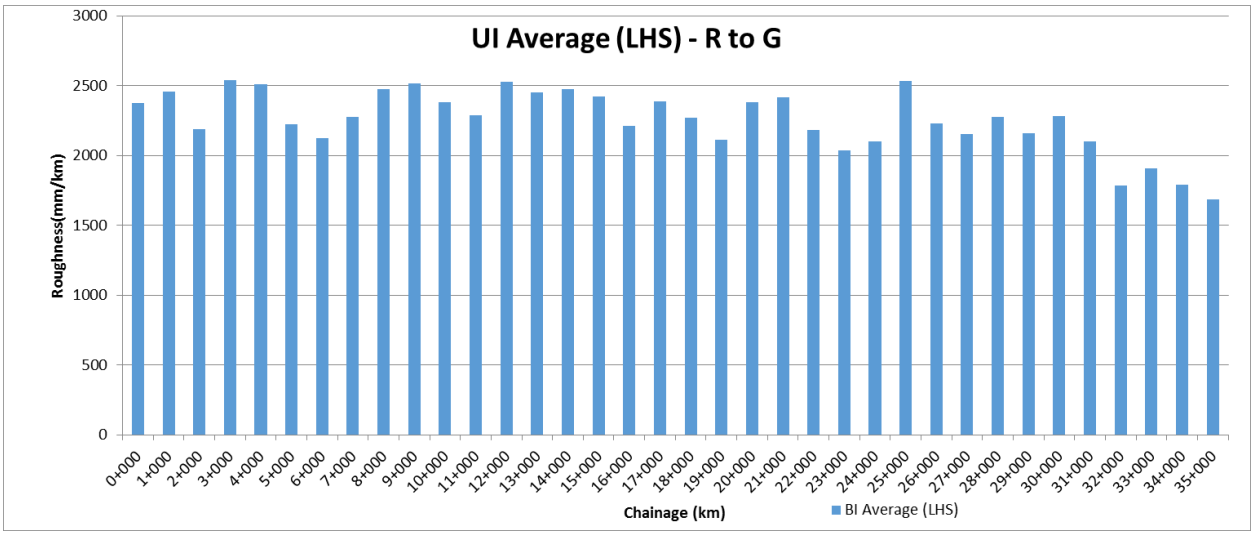
Note: Aggregate samples are meeting the MoRTH specification requirements.

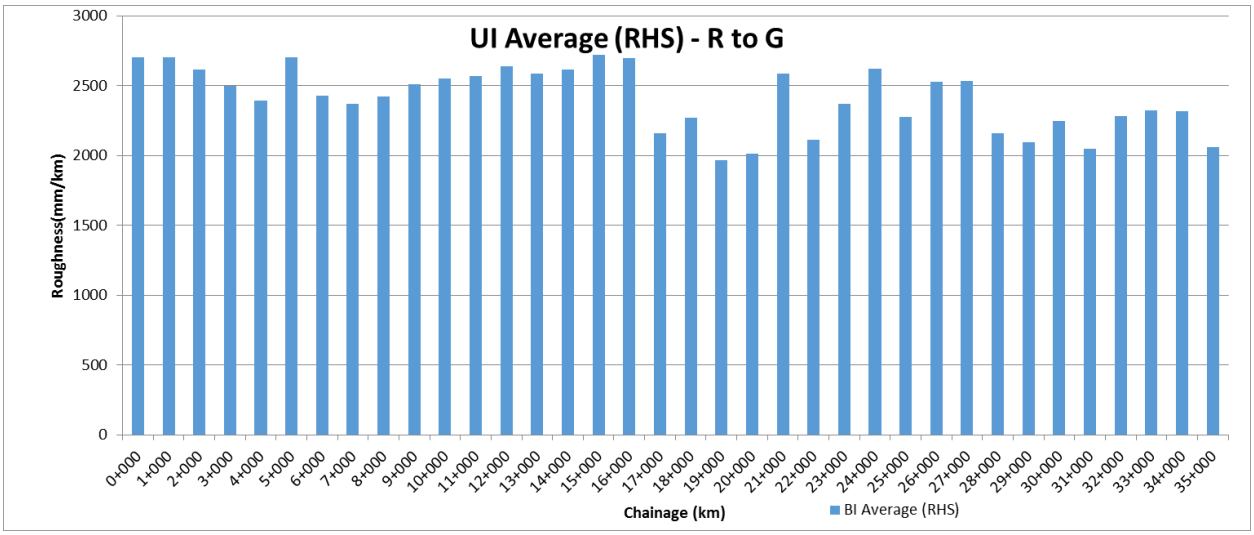
Table 22: Test Results of Sand Samples Details

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	RK-SQ-1	83+550	LHS	100	99	99	98	94	59	11	1.4	No ZONE

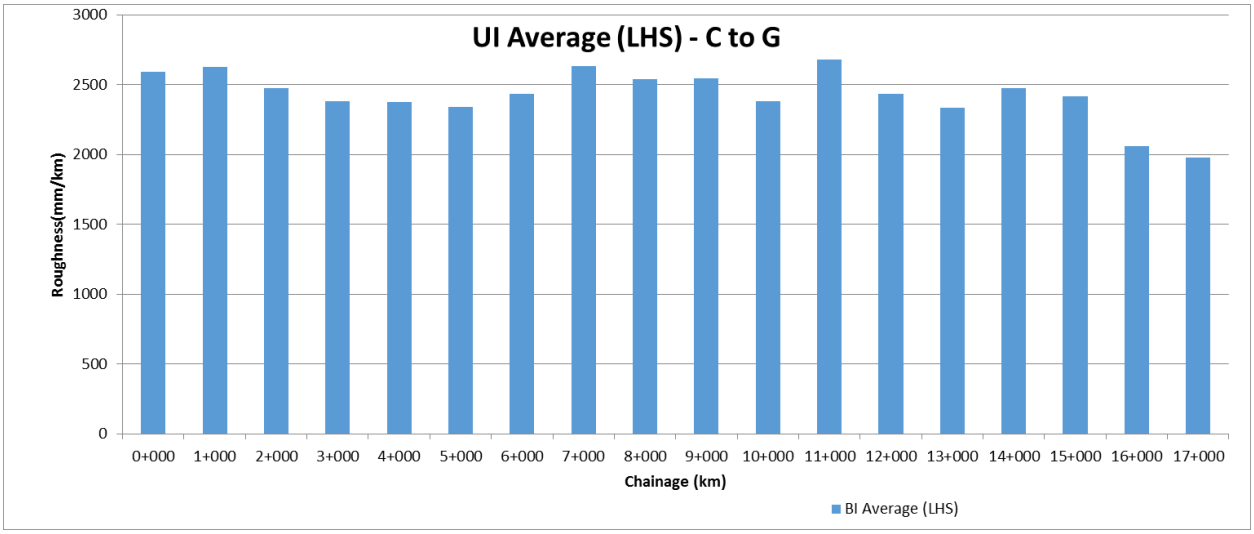
4.2 ROUGHNESS

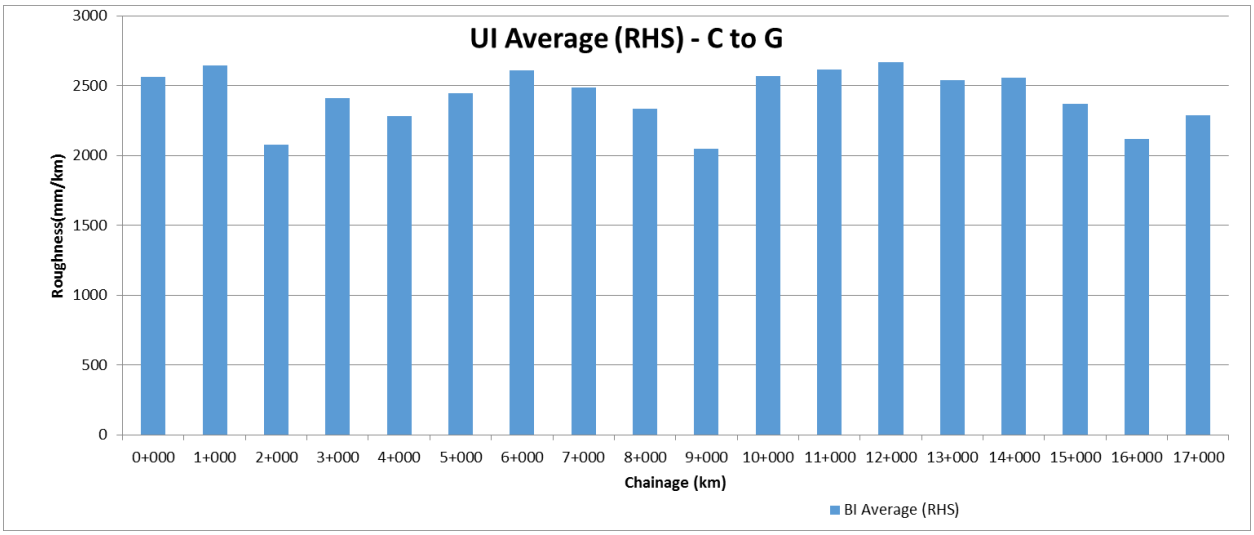
Almost entire project road is having Good to Fair riding quality. Bar diagrams showing the Kilometer wise roughness along the project road are presented below:





Note: R to G: Roorkee -Gagalehri section



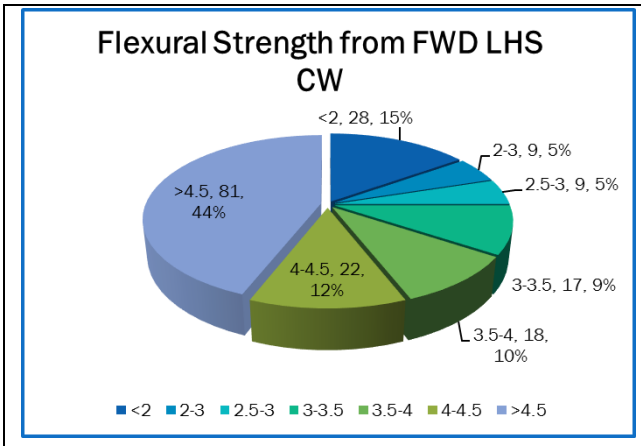


Note: C to G: Chutmalpur -Ganeshpur section

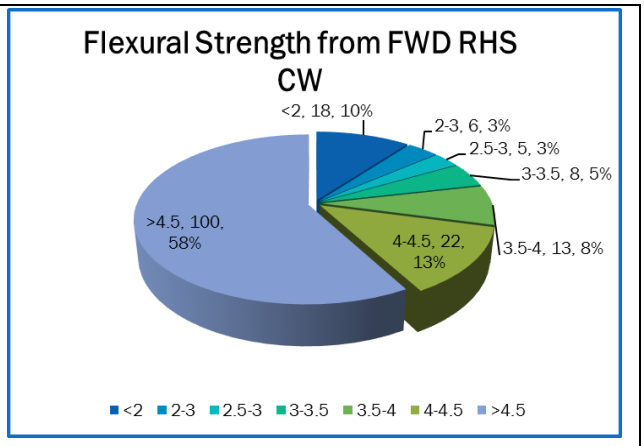
4.3 FWD ANALYSIS AND ASSESSMENT OF OVERLAY REQUIREMENT

4.3.1 Flexural strength of Concrete-Rigid Pavement

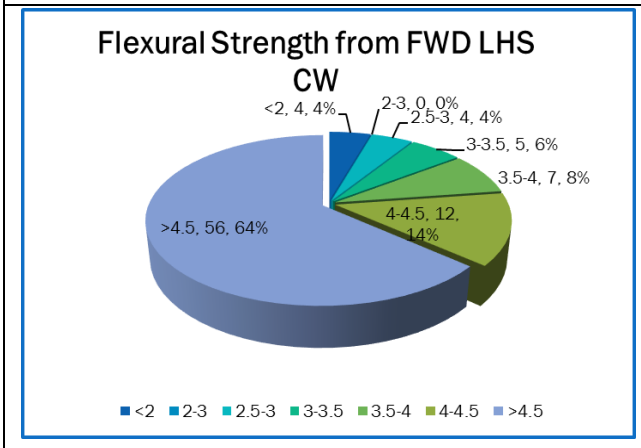
Pie charts showing the variation of the Flexural Strength estimated from FWD Surveys are presented below:



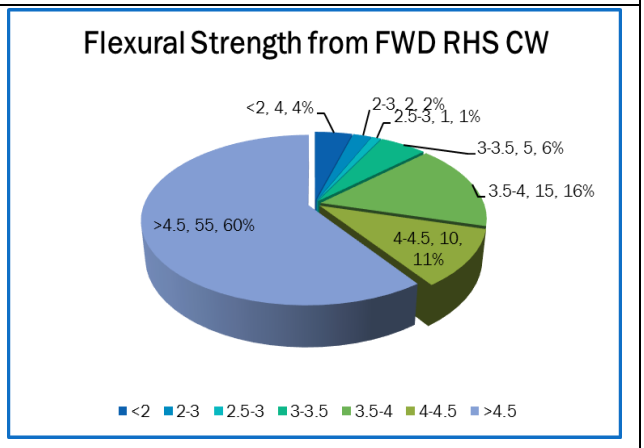
NH-73



NH-73



NH-72A



NH-72A

Flexural Strength of the PQC estimated from FWD Surveys indicates that

a) more than 44% of samples in LHS Carriageway and 58% of samples in RHS Carriageway are having values greater than 4.5 Mpa in NH-73 and in NH-72A
b) 64% of samples in LHS Carriageway and 60% of samples in RHS Carriageway are having values greater than 4.5 Mpa.
c) 12% of samples in LHS Carriageway and 13% of samples in RHS Carriageway are having values between 4 – 4.5 Mpa in NH-73 and in NH-72A
d) 14% of samples in LHS Carriageway and 11% of samples in RHS Carriageway are having values between 4.0 – 4.5 MPa.
e) 10% of samples in LHS Carriageway and 8% of samples in RHS Carriageway are having values between 3.5 – 4.0 Mpa in NH-73 and in NH-72A
f) 8% of samples in LHS Carriageway and 16% of samples in RHS Carriageway are having values between 3.5 – 4.0 MPa.
g) 9% of samples in LHS Carriageway and 8.5% of samples in RHS Carriageway are having values between 3.0 – 3.5 Mpa in NH-73 and in NH-72A
h) 6% of samples in LHS Carriageway and 6% of samples in RHS Carriageway are having values between 3.0 – 3.5 Mpa.
i) 9.5% of samples in LHS Carriageway and 5.3% of samples in RHS Carriageway are having values between 2.5 – 3.0 Mpa in NH-73 and in NH-72A

j) 4.4% of samples in LHS Carriageway and 1.1% of samples in RHS Carriageway are having values between 2.5 – 3.0 Mpa.

k) 9.5% of samples in LHS Carriageway and 6.3% of samples in RHS Carriageway are having values between 2.0 – 3.0 Mpa in NH-73 and in NH-72A

l) No samples in LHS Carriageway and 2.2% of samples in RHS Carriageway are having values between 2.0 – 3.0 Mpa.

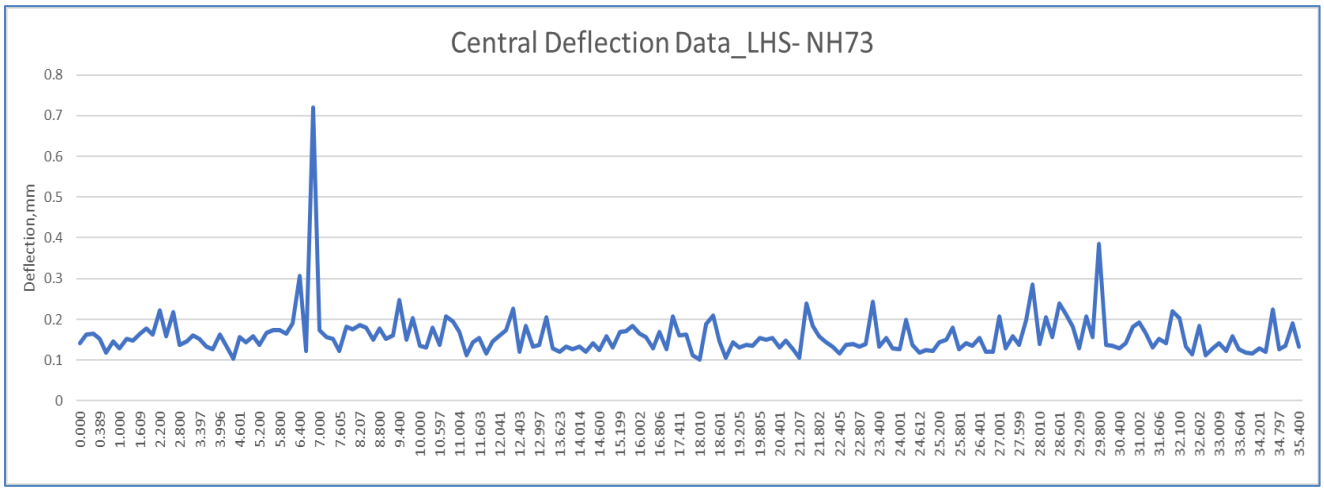
m) 28.15% of samples in LHS Carriageway and 18.10% of samples in RHS Carriageway are having values less than 2.0 Mpa in NH-73 and in NH-72A

n) 4.4% of samples in LHS & RHS Carriageway are having values less than 2.0 Mpa.

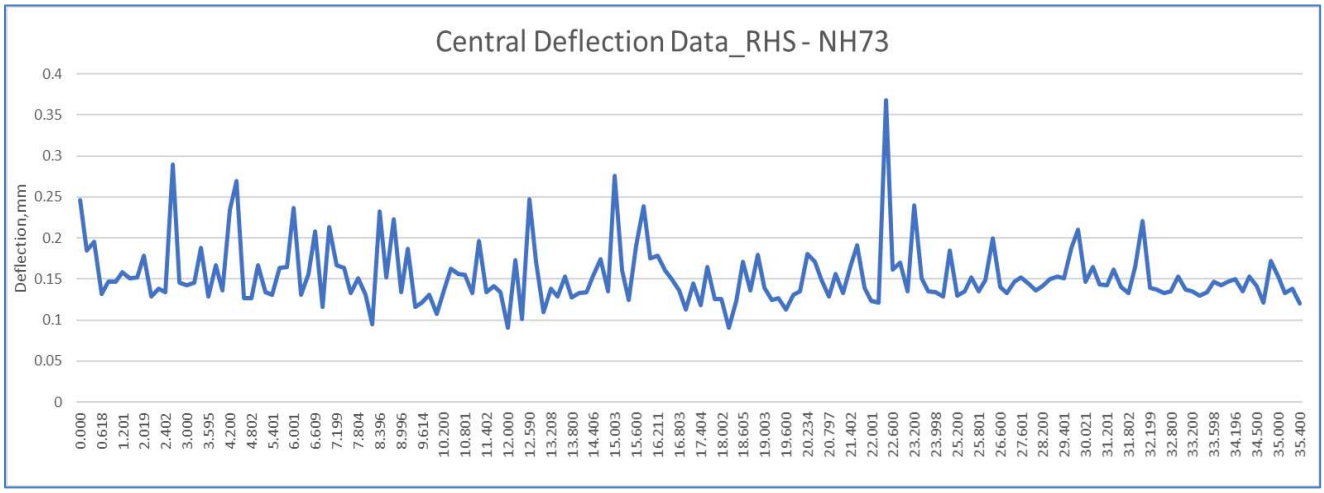
The PQC pavement was constructed and opened to traffic in 2020. Initial design period for the PQC slab is 30 years out of which 2 years is already consumed.

4.3.2 Detection of Voids underneath the Rigid Pavement

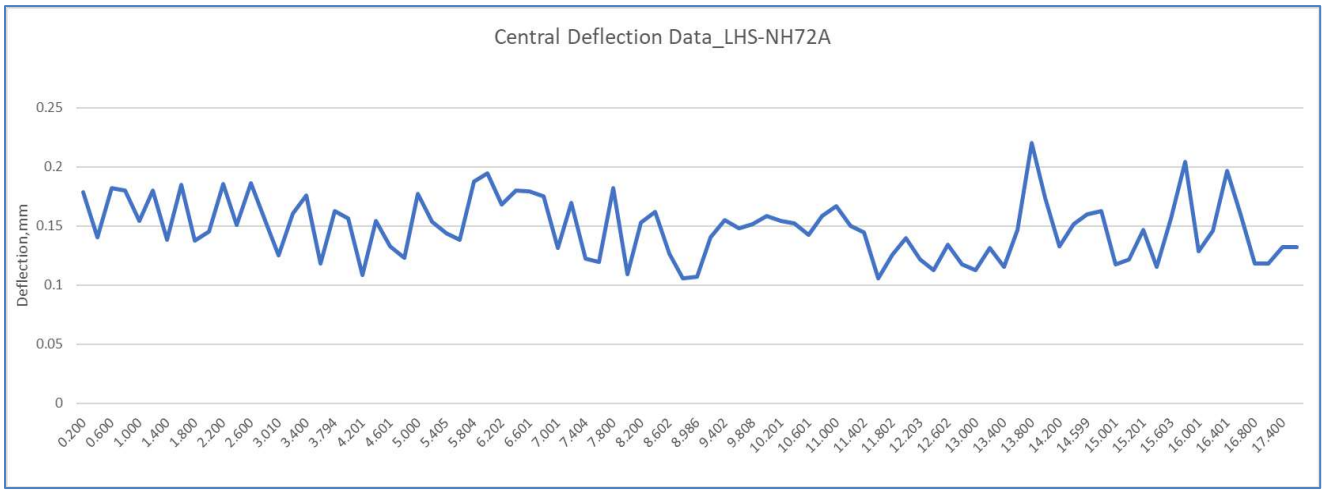
- Deflection of Voids below a pavement slab can be easily be done by a FWD. Deflections are measured along the wheel path and a plot of central deflections versus distance has to be made.
- The locations where the deflections are much higher than the normal may indicate presence of voids. Sample is shown in below



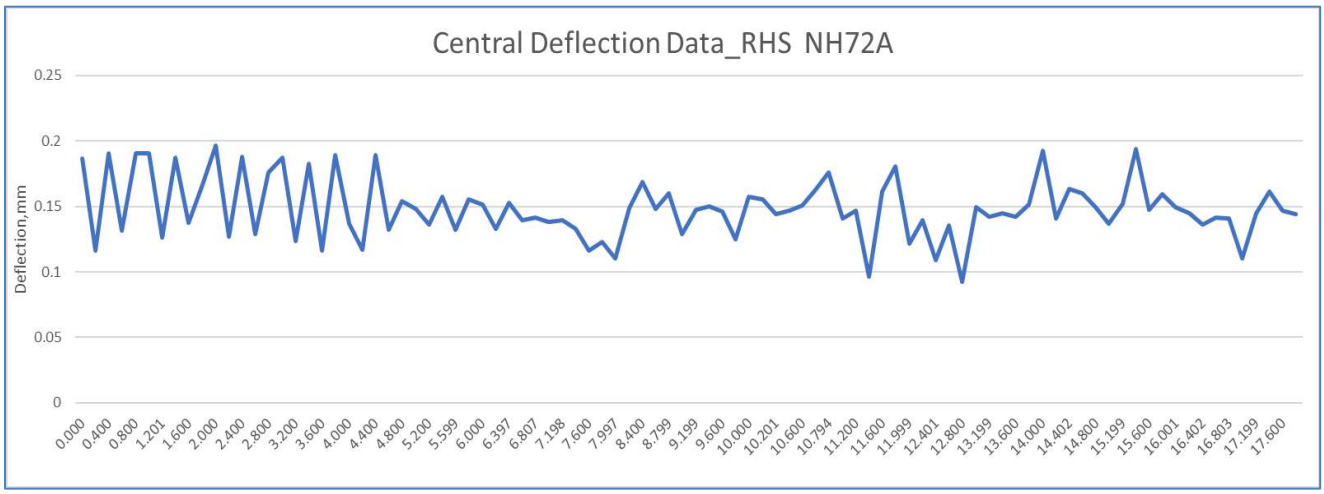
Central Deflection Data on LHS (NH-73)



Central Deflection Data on RHS(NH-73)



Central Deflection Data on LHS (NH-72A)



Central Deflection Data on RHS (NH-72A)

FWD Survey results indicates that there no much voids underneath the rigid pavement except between km6.6-km7.2 LHS, km22.2-km22.6 RHS on NH73. There were no much voids noticed on the NH-72A.

4.4 PAVEMENT COMPOSITION

As per Sch-B Clause 4.8 the minimum thicknesses of the PQC & DLC should be 300mm& 150mm respectively.

However, from the Chapter-2, Table:4: Pavement Composition of Existing Pavement, for the test pits dug at 12 locations along the main carriageway and 3 locations in service road reveal that there are no noticeable major discrepancies in terms of adopted crust thicknesses.

4.5 STRUCTURES

The structures along the corridor are constructed as per the standards and specifications. Presently, all structures appear new and seem to be in good condition without any major distress. Structure wise conditions along the project corridor are presented below:

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 23: Summary of Major Structures

S. No	Type of Str	No. of Str		Total No. of Str's	Total No. of Locations
		LHS	RHS		
1	ROB	1	1	2	1
2	MJB	3	3	6	3
3	MNB	11	11	22	11
4	FLYOVER	1	1	2	1
5	VUP	5	5	10	5
6	CUP	8	8	16	8
7	LVUP	9	9	18	9
8	PUP	1	1	2	1
9	Pipe Culverts	-	-	44	44
10	Box/ Slab Culverts	-	-	18	18

Chainage: 10+610 (NH-72A)
General Description
LHS

- Type of Structure : MJB - Old
- Span Arrangement : 4 x 30 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type Abutment & RCC Circular type Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier & Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Rubber sealant damaged on all piers (P1, P2, P3).
- ✓ Expansion joints partially filled with silt & debris.
- ✓ No major structural distress found on structure.

Chainage: 10+610 (NH-72A)
General Description
RHS

- Type of Structure : MJB
- Span Arrangement : 4 x 30 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type Abutment & RCC Circular type Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier & Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joints partially filled with silt & debris.
- ✓ Drainage spouts clogged at some locations.
- ✓ Segregation observed on cross girders of span 1 & 2.
- ✓ No major structural distress found on structure.

Chainage: 1+195 (NH-72A)
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 1 x 8 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant pitching partially damaged.
- ✓ No major distress observed on structure.

Chainage: 1+195 (NH-72A)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 1 x 8 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant pitching partially damaged.
- ✓ No major distress observed on structure.

Chainage: 1+917 (NH-72A)
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 2 x 8 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant protection works damaged.
- ✓ Segregation observed on LA-2 Abutment wall edge.
- ✓ No major distress found on structure.
- ✓ Segregation observed on median wall at some locations.

Chainage: 1+917 (NH-72A)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 2 x 8 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant protection works damaged.
- ✓ Segregation observed on outer face of Crash barrier at median side.

Chainage: 6+866 (NH-72A)
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 3 x 3 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on outside of parapet wall.
- ✓ Structure condition good.

Chainage: 6+866 (NH-72A)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 3 x 3 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on outside of parapet wall.
- ✓ Structure condition good.

Chainage: 8+044 (NH-72A)
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 1 x 7.0 m
- Total deck width of structure : MCW 12.5 m
  SR 10.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant protection works partially damaged.
- ✓ Structure condition good.

Chainage: 8+044 (NH-72A)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 1 x 7.0 m
- Total deck width of structure : MCW 12.5 m
  SR 10.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant pitching partially damaged.
- ✓ No major distress observed on structure.

Chainage: 8+146 (NH-72A)
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 3 x 2.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 8+146 (NH-72A)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 3 x 2.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 9+053 (NH-72A)
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 3 x 4 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant pitching partially damaged.
- ✓ Segregation observed outside of parapet wall.
- ✓ Structure condition good.

Chainage: 9+053 (NH-72A)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 3 x 4 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant pitching partially damaged.
- ✓ Segregation observed outside of parapet wall.
- ✓ Structure condition good.

Chainage: 11+882 (NH-72A)
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 1 x 8.3 m
- Total deck width of structure : MCW - 12.5 m
  SR - 10.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ No major distress found on structure.
- ✓ Segregation observed at some locations.

Chainage: 11+882 (NH-72A)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 1 x 8.3 m
- Total deck width of structure : MCW - 12.5 m
  SR - 10.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation observed at some locations.
- ✓ No major distress found on structure.

Chainage: 13+420 (NH-72A)
General Description
LHS

- Type of Structure : MNB - Old
- Span Arrangement : 3 x 6 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- No major distress found.
- Structure condition fair.

Chainage: 13+420 (NH-72A)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 3 x 6 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Quadrant protection works damaged.
- No structural distress found.

Chainage: 4+355 (NH-72A)
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual
- **Observations**

Visual Observations on condition of the structure are as below:

- ✓ Down take pipe not provided.

Chainage: 4+355 (NH-72A)
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12.185 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on Abutment walls & Soffit of deck slab.
- ✓ Slight bulging observed on RA-2 RE wall (4 no's) approach.
- ✓ Down take pipe not provided.

Chainage: 6+130 (NH-72A)
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on soffit of deck slab at some locations.
- ✓ Minor cracks observed on Abutment walls.

Chainage: 6+130 (NH-72A)
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on soffit of deck slab at some locations.
- ✓ No major distress found.

Chainage: 1+705 (NH-72A)
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Previous repair work done on LA-2 approach RE panels.
- ✓ Minor spalling & damage observed on LA2 outside of crash barrier location (Bottom).
- ✓ Down take pipes not provided.
- ✓ No structural distress observed.

Chainage: 1+705 (NH-72A)
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Down take pipes not provided.
- ✓ No structural distress observed.

Chainage: 3+270 (NH-72A)
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ LA-2 Quadrant pitching partially damaged.
- ✓ Soil nailing done on LA-2 approach, RE walls.
- ✓ Segregation observed on outside of crash barrier bottom at some locations.
- ✓ Crack observed on both abutment walls.

Chainage: 3+270 (NH-72A)
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on outside of crash barrier bottom at some locations.
- ✓ Crack observed on both abutment walls.

Chainage: 4+200 (NH-72A)
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 23 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Previous repair works done on structure.
- ✓ Quadrants partially damaged.
- ✓ slope protection damaged near structure.
- ✓ structure condition fair.

Chainage: 4+200 (NH-72A)
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 23 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

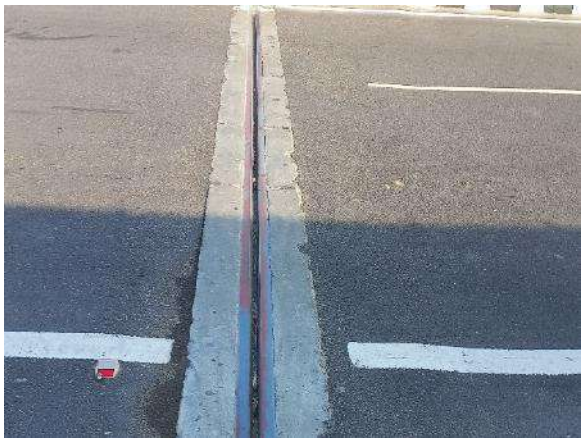
- ✓ Previous repair works done on structure.
- ✓ Segregation observed on soffit of deck slab on RHS edge.
- ✓ Approach settlement observed on RA-2 side.
- ✓ slope protection damaged near structure.

Chainage: 6+490 (NH-73)
General Description
LHS

- Type of Structure : ROB
- Span Arrangement : 2 x 40 + 1 x 37 + 2 x 40 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : RCC Girder & Steel Truss
- Type of Bearing : Elastomeric & Pot PTFE
- 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 at some locations.
- ✓ Expansion joints partially filled with silt & debris.
- ✓ Expansion joints rubber sealant partially damaged on LA-2.



Chainage: 6+490 (NH-73)
General Description
RHS

- Type of Structure : ROB
- Span Arrangement : 2 x 40 + 1 x 37 + 2 x 40 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : RCC Girder & Steel Truss
- Type of Bearing : Elastomeric & 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 rubber sealant partially damaged on RP-2, RP-3, RA-2.
- ✓ Minor spalling & reinforcement exposed at some locations on super structure.
- ✓ Down take pipes not provided.

Chainage: 0+845 (NH-73)
General Description
LHS

- Type of Structure : MJB
- Span Arrangement : 1 x 15 + 1 x 90 + 1 x 15 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC girder & Steel Truss
- Type of Bearing : Elastomeric, Pot PTFE & Pin
- 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 1 & 2.
- ✓ Honey combs & Reinforcement exposed on soffit of girder on Span 1 & 3.
- ✓ Rusting of bolts observed on steel structure at some locations.

Chainage: 0+845 (NH-73)
General Description
RHS

- Type of Structure : MJB
- Span Arrangement : 1 x 15 + 1 x 90 + 1 x 15 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC girder & Steel Truss
- Type of Bearing : Elastomeric, Pot PTFE & Pin
- 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 all Expansion joints.
- ✓ Reinforcement exposed & segregation observed on Soffit of RCC Girders.

Chainage: 2+598 (NH-73)
General Description
LHS

- Type of Structure : MJB
- Span Arrangement : 1 x 20 + 1 x 35 + 1 x 10 + 1 x 45 + 1 x 15 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC girder & PSC Girder
- Type of Bearing : Elastomeric & Pin
- Type of Railing / Crash Barrier : Crash barrier & Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Rubber sealant damaged on LP2 & LP3 remaining are partially filled with silt & debris.
- ✓ Segregation observed on soffit of girders at some locations.
- ✓ Reinforcement exposed on 4th span cross girders.

Chainage: 2+598 (NH-73)
General Description
RHS

- Type of Structure : MJB
- Span Arrangement : 1 x 20 + 1 x 35 + 1 x 10 + 1 x 45 + 1 x 15 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC girder & PSC Girder
- Type of Bearing : Elastomeric & Pin
- Type of Railing / Crash Barrier : Crash barrier & Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on extra pedestal bearing on pier P-1, 1st girder beside.
- ✓ Segregation observed on soffit of girders at some locations.
- ✓ Rubber sealant damaged on RA-1, RP-2, RP-3 remaining filled with silt & debris.

Chainage: 0+386 (NH-73)
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ No major distress observed on the structure.
- ✓ Quadrant pitching partially damaged.

Chainage: 0+386 (NH-73)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant pitching partially damaged.
- ✓ Minor cracks observed on crash barrier.
- ✓ No major distress observed on the structure.

Chainage: 0+600 (NH-73)
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 2 x 6 m
- Total deck width of structure : MCW-12.5 m
  SR -8.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 0+600 (NH-73)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 2 x 6 m
- Total deck width of structure : MCW-12.5 m
  SR -8.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 2+284 (NH-73)
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 1 x 8 m
- Total deck width of structure : MCW 10.5 m
  SR 10.875 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 2+284 (NH-73)
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 1 x 8 m
- Total deck width of structure : MCW 10.5 m
  SR 10.875 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 27+193 (NH-73)
General Description
LHS

- Type of Structure : Flyover
- Span Arrangement : 1 x 35 + 1 x 40 + 1 x 35 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Circular 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:

- ✓ Segregation observed on super structure at some locations of cross girder & pedestal.
- ✓ Drainage spout down take pipe not provided.
- ✓ RE panels repair works done on both side's approaches.
- ✓ Minor cracks observed on RE wall below the friction slab crash barrier.

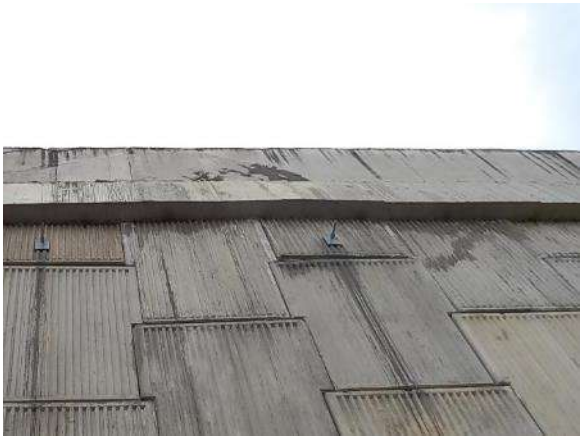
Chainage: 27+193 (NH-73)
General Description
RHS

- Type of Structure : Flyover
- Span Arrangement : 1 x 35 + 1 x 40 + 1 x 35 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Circular 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:

- ✓ Segregation observed on super structure at some locations of cross girder & pedestal.
- ✓ Drainage spout down take pipe not provided.
- ✓ RE panels repair works done on both side's approaches.
- ✓ Minor cracks observed on RE wall below the friction slab crash barrier.



Chainage: 12+930 (NH-73)
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 12+930 (NH-73)
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

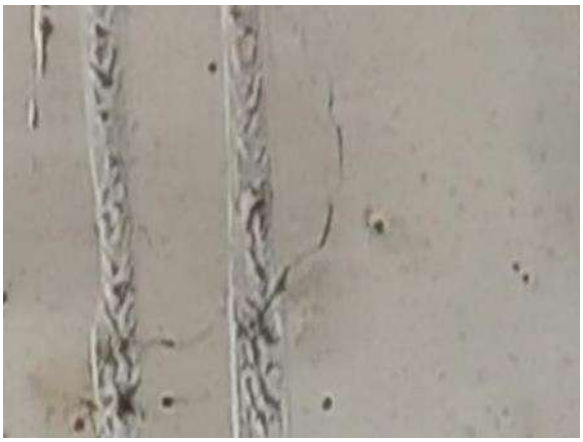
- ✓ Structure condition good.

Chainage: 16+674 (NH-73)
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks on abutment walls on A1 & A2.



Chainage: 16+674 (NH-73)
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Cracks on abutment walls on A1.

Chainage: 17+826 (NH-73)
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation on soffit of the deck slab.
- ✓ Structure condition fair.

Chainage: 17+826 (NH-73)
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation on Abutment walls.
- ✓ Crack on A2 Abutment wall.

Chainage: 1+900 (NH-73)
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 12.125 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Minor cracks on soffit of the deck & Abutment walls.

Chainage: 1+900 (NH-73)
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 12.125 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

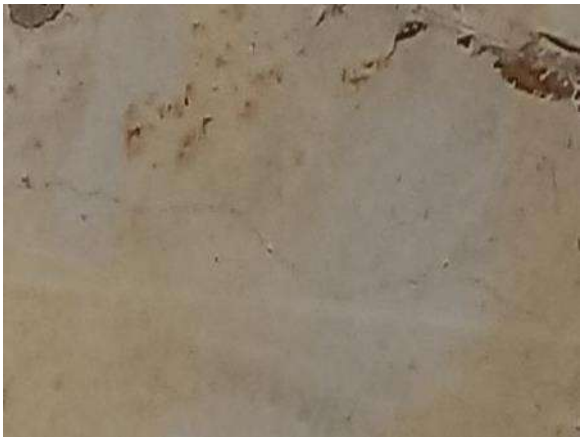
- ✓ Minor cracks on soffit of the deck & Abutment walls at many locations.
- ✓ Bulging observed on RE Walls on both A1 & A2 approaches.

Chainage: 5+825 (NH-73)
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 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 : Not applicable
- 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 the deck slab.
- ✓ Structure condition fair.



Chainage: 5+825 (NH-73)
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation & Minor cracks observed on soffit of the deck slab.
- ✓ Reinforcement exposed on top sab edge.

Chainage: 7+300 (NH-73)
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant pitching partially damaged on A1 side.
- ✓ Minor damage due to collision of vehicle on top slab edge.
- ✓ Structure condition good.

Chainage: 7+300 (NH-73)
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on soffit of the deck slab.
- ✓ Structure condition good.

Chainage: 9+265 (NH-73)
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Crash barrier damaged on A1 side on Approach.
- ✓ Cracks are observed on soffit of the deck slab.
- ✓ Segregation observed on outer side of crash barrier on Approach.

Chainage: 9+265 (NH-73)
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Crash barrier damaged on A1 side on Approach.
- ✓ Cracks observed on bottom of Top slab.

Chainage: 10+900 (NH-73)
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation on soffit of the deck slab.
- ✓ Structure condition fair.

Chainage: 10+900 (NH-73)
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

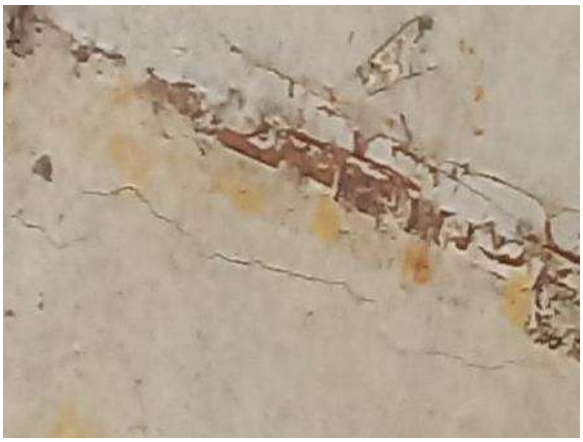
- ✓ Segregation on soffit of the deck slab.
- ✓ Structure condition good.

Chainage: 28+675 (NH-73)
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks on soffit of the deck slab & on abutment walls.
- ✓ Structure condition fair.



Chainage: 28+675 (NH-73)
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks on soffit of the deck slab & on abutment walls.
- ✓ Segregation & cracks observed on RE Wall & friction slab crash barrier on A1 side.

Chainage: 29+857 (NH-73)
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Minor cracks observed on soffit of the deck slab.
- ✓ Structure condition fair.

Chainage: 29+857 (NH-73)
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Minor cracks observed on soffit of the deck slab.
- ✓ Structure condition fair.

Chainage: 17+560 (NH-73)
General Description
LHS

- Type of Structure : PUP
- Span Arrangement : 1 x 3.0 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 : Not applicable
- 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 are done.
- ✓ Structure condition good.

Chainage: 17+560 (NH-73)
General Description
RHS

- Type of Structure : PUP
- Span Arrangement : 1 x 3.0 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 : Not applicable
- 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 are done.
- ✓ Structure condition good.

Chainage: 0+594 (NH-73)
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 0+594 (NH-73)
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure condition good.

Chainage: 2+264 (NH-73)
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 14.2 m
- Total deck width of structure : 10.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & haunch portion.
- ✓ Structure condition fair.

Chainage: 2+264 (NH-73)
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 14.2 m
- Total deck width of structure : 10.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Continuous cracks observed on soffit of deck slab.
- ✓ Structure condition fair.

Chainage: 2+284 (NH-73)
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair.

Chainage: 2+284 (NH-73)
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair.

Chainage: 4+642 (NH-73)
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair.

Chainage: 4+642 (NH-73)
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair.

Chainage: 8+204 (NH-73)
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair.

Chainage: 8+204 (NH-73)
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant pitching partially damaged on A2.
- ✓ Structure condition fair.

Chainage: 9+540 (NH-73)
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on Abutment walls & soffit of the deck slab.
- ✓ Structure condition fair.

Chainage: 9+540 (NH-73)
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 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 : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on Abutment walls & soffit of the deck slab.
- ✓ Structure condition fair.

Chainage: 28+108 (NH-73)
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks on soffit of the deck slab & on abutment walls.
- ✓ Structure condition fair.

Chainage: 28+108 (NH-73)
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks on soffit of the deck slab & on abutment walls.
- ✓ Structure condition fair.

Photos depicting the existing culvert are presented below

NH-72A (Chutmalpur-Ganeshpur Section)

Box Culvert at Km O+572

Pipe Culvert at Km 0+950

Pipe Culvert at Km 2+115

Pipe Culvert at Km 2+490

Pipe Culvert at Km 2+500

Pipe Culvert at Km 2+865

S No.	NH No.	Structure type as per site	P&P Chainage	Chainage as per site	Span as per P&P	Span as per site	Vertical Clearance (m)	Deck Width (m) As per Site	Floor Protection (Yes/No)	Quadrant Stone Pitching (Yes/No)		Observations
										LHS	RHS	
1	NH-72A	BC	0+527	0+527	1 x 5	1 x 5	3	27.00	NV	Wing Wall	Wing Wall	• Structure fair in condition
2	NH-72A	PC	0+950	0+950	1 x 1.2	1 x 1.2	1.2	30.00	NV	Wing Wall	Wing Wall	• Structure fair in condition
3	NH-72A	PC	1+320	1+340	1 x 1.2	1 x 1.2	1.2	-	NV	-	-	• Not found at the site
4	NH-72A	PC	2+115	2+115	1 x 1.2	1 x 1.2	1.2	37.50	NV	Wing Wall	Wing Wall	• RHS free slope provided • Structure fair in condition
5	NH-72A	PC	2+490	2+490	1 x 1.2	1 x 1.2	1.2	37.50	NV	Yes	Yes	• Structure fair in condition
6	NH-72A	PC	-	2+500	-	1 x 1.2	1.2	37.50	NV	Wing Wall	Wing Wall	• Structure fair in condition
7	NH-72A	PC	2+865	2+865	1 x 1.2	1 x 1.2	1.2	30.00	NV	Wing Wall	Wing Wall	• Vent way partially buried • Structure fair in condition
8	NH-72A	BC	-	3+290	-	1 x 2	2	32.50	NV	Wing Wall	Wing Wall	• Crack on LHS top slab • Structure fair in condition
9	NH-72A	PC	3+650	3+650	1 x 1.2	1 x 1.2	1.2	40.00	NV	Wing Wall	Wing Wall	• RHS buried • Structure fair in condition
10	NH-72A	PC	4+010	4+010	1 x 1.2	1 x 1.2	1.2	40.00	NV	Wing Wall	-	• RHS buried • Structure fair in condition
11	NH-72A	BC	4+724	4+739	1 x 6	1 x 6	2.5	66.75	NV	Wing Wall	Wing Wall	• Structure fair in condition
12	NH-72A	BC	-	4+950	-	1 x 2	2.2	32.75	NV	Wing Wall	Wing Wall	• Structure fair in condition
13	NH-72A	PC	5+120	5+120	1 x 1.2	1 x 1.2	1.2	30.00	NV	Wing Wall	Wing Wall	• Structure fair in condition
14	NH-72A	PC	5+460	5+460	-	1 x 1.2	-	-	NV	-	-	• Not found at the site
15	NH-72A	PC	5+800	5+800	1 x 1.2	1 x 1.2	1.2	55.00	NV	Wing Wall	Wing Wall	• Structure fair in condition
16	NH-72A	BC	8+547	8+554	2 x 2.3	2 x 2.3	2	27.50	NV	Wing Wall	Wing Wall	• Structure fair in condition
17	NH-72A	BC	13+603	13+609	1 x 6	1 x 6	3	27.50	NV	Wing Wall	Wing Wall	• LHS RCC Slab & RHS RCC Box • Structure fair in condition
18	NH-72A	PC	15+725	15+748	1 x 1.2	1 x 1.2	1.2	37.00	NV	NV	NV	• Culvert buried with domestic waste & fully covered with bushes • Culvert is in junction location
19	NH-72A	PC	16+095	16+095	1 x 1.2	1 x 1.2	1.2	38.50	NV	Wing Wall	Wing Wall	• Pipe edge damaged on LHS • Wing wall buried with mud on LHS • Structure is in fair condition
20	NH-72A	PC	16+306	16+395	1 x 1.2	1 x 1.2	1.2	40.00	NV	Wing Wall	Wing Wall	• Wing wall buried with mud on LHS • Structure is in fair condition
21	NH-72A	PC	16+615	16+615	1 x 1.2	1 x 1.2	1.2	30.00	NV	Yes	Yes	• Vent way partially buried with silt & debris • Structure is in fair condition
22	NH-72A	PC	16+945	16+945	1 x 1.2	1 x 1.2	1.2	30.00	NV	Yes	Yes	• Structure fair in condition
23	NH-72A	PC	17+265	17+265	1 x 1.2	1 x 1.2	1.2	30.00	NV	Yes	Yes	• Vent way partially buried with silt & debris • Structure is in fair condition
24	NH-72A	PC	17+685	17+685	1 x 1.2	1 x 1.2	1.2	27.50	NV	Yes	Yes	• Structure fair in condition
25	NH-73	BC	-	0+348	-	1 x 5.0	1.5	28.00	NV	Wing Wall	Wing Wall	• Structure fair in condition
26	NH-73	PC	-	1+355	-	1 x 1.2	1.2	35.00	NV	Yes	Yes	• Vent way partially buried with silt & debris • Structure is in fair condition
27	NH-73	PC	-	2+952	-	1 x 1.2	1.2	47.50	NV	Wing Wall	Wing Wall	• Partially buried on BHS • Structure is in fair condition
28	NH-73	BC	-	3+254	-	1 x 2.0	2	26.00	NV	Wing Wall	Wing Wall	• Structure fair in condition
29	NH-73	BC	-	3+752	-	1 x 2.0	2	26.00	NV	Wing Wall	Wing Wall	• Structure fair in condition
30	NH-73	BC	-	4+160	-	1 x 5.0	1.5	33.00	NV	Wing Wall	Wing Wall	• Structure fair in condition

S No.	NH No.	Structure type as per site	P&P Chainage	Chainage as per site	Span as per P&P	Span as per site	Vertical Clearance (m)	Deck Width (m) As per Site	Floor Protection (Yes/No)	Quadrant Stone Pitching (Yes/No)		Observations
										LHS	RHS	
31	NH-73	BC	-	4+800	-	1 x 2.0	2.5	48.00	NV	Wing Wall	Wing Wall	• Reinforcement exposed on LHS top slab • LSR culvert extended • Structure is in fair condition
32	NH-73	PC	-	5+220	-	1 x 1.2	-	40.00	NV	-	-	• Not found at site
33	NH-73	BC	-	5+550	-	1 x 3.0	2.5	48.75	NV	No	No	• Structure fair in condition
34	NH-73	BC	-	7+430	-	1 x 3.0	2.5	41.75	NV	Wing Wall	Wing Wall	• Structure fair in condition
35	NH-73	PC	-	7+760	-	1 x 1.2	1.2	33.75	NV	No	No	• RHS buried with mud • LHS Structure is in fair condition
36	NH-73	PC	-	8+400	-	1 x 1.2	1.2	33.75	NV	Wing Wall	Wing Wall	• Structure fair in condition
37	NH-73	PC	-	8+900	-	1 x 1.2	1.2	33.75	NV	Wing Wall	Wing Wall	• Structure fair in condition
38	NH-73	PC	-	9+650	-	1 x 1.2	1.2	33.75	NV	Wing Wall	Wing Wall	• Structure fair in condition
39	NH-73	PC	-	10+030	-	1 x 1.2	1.2	33.75	NV	Wing Wall	Wing Wall	• Structure fair in condition
40	NH-73	PC	-	10+410	-	1 x 1.2	1.2	33.75	NV	Wing Wall	Wing Wall	• Structure fair in condition
41	NH-73	PC	12+056	12+056	1 x 1.2	1 x 1.2	1.2	42.50	NV	-	-	• Culvert connected to drains
42	NH-73	SC	12+850	12+870	1 x 1.6	1 x 6	-	40.25	NV	NV	NV	• Buried on both sides
43	NH-73	PC	14+429	14+429	1 x 1.2	1 x 1.2	1.2	36.25	NV	NV	NV	• LHS SR partially covered with bushes & partially buried with debris • Structure is in fair condition
44	NH-73	PC	14+826	14+826	1 x 1.2	1 x 1.2	1.2	30.00	NV	NV	NV	• LHS SR partially covered with bushes & partially buried with debris • Structure is in fair condition
45	NH-73	BC	15+653	15+675	1 x 3.0	1 x 3.0	2.5	28.00	NV	No	No	• Vent way partially filled with mud & debris • Head wall not constructed reinforcement exposed • Structure fair in condition
46	NH-73	BC	16+955	16+977	1 x 1.5	1 x 3.0	2.5	40.00	NV	NV	NV	• Vent way partially buried with Vegetation, silt & debris • Structure is in fair condition
47	NH-73	PC	18+474	18+474	1 x 1.2	1 x 1.2	1.2	40.00	NV	No	No	• Buried with Silt & Debris on BHS • Culvert available on Service road
48	NH-73	PC	18+790	18+790	1 x 1.2	1 x 1.2	1.2	40.00	NV	NV	NV	• Not visible may be connected to drains
49	NH-73	PC	21+193	21+214	1 x 1.2	1 x 1.2	1.2	35.00	NV	Wing Wall	Wing Wall	• Structure fair in condition
50	NH-73	BC	22+651	22+672	1 x 4.4	1 x 4.4	2.5	26.50	NV	Wing Wall	Wing Wall	• Structure fair in condition
51	NH-73	PC	-	25+211	-	1 x 1.2	1.2	40.00	NV	-	-	• Not found at the site
52	NH-73	PC	27+675	27+675	1 x 1.2	1 x 1.2	-	60.00	NV	NV	Wing Wall	• LHS Not Visible • RHS Partially buried
53	NH-73	PC	-	29+090	-	1 x 1.2	1.2	37.50	NV	Wing Wall	Wing Wall	• Reinforcement exposed on the pipe & wing wall • Structure is in fair condition
54	NH-73	PC	29+086	29+095	1 x 1.2	1 x 1.2	1.2	37.50	NV	Wing Wall	Wing Wall	• Vent way partially buried with silt & debris • Structure is in fair condition
55	NH-73	PC	29+485	29+485	1 x 1.2	1 x 1.2	1.2	31.25	NV	Wing Wall	Wing Wall	• Structure fair in condition
56	NH-73	PC	30+205	30+205	1 x 1.2	1 x 1.2	1.2	30.00	NV	Wing Wall	Wing Wall	• Pipe damaged on LHS & buried on RHS

S No.	NH No.	Structure type as per site	P&P Chainage	Chainage as per site	Span as per P&P	Span as per site	Vertical Clearance (m)	Deck Width (m) As per Site	Floor Protection (Yes /No)	Quadrant Stone Pitching (Yes/No)		Observations
										LHS	RHS	
57	NH-73	PC	30+530	30+530	1 x 1.2	1 x 1.2	1.2	31.25	NV	Wing Wall	NV	• Both side covered with bushes
58	NH-73	PC	30+944	30+980	1 x 1.2	1 x 1.2	1.2	35.00	NV	NV	Wing Wall	• LHS side buried & RHS side partially buried
59	NH-73	BC	31+661	31+697	1 x 1.5	1 x 1.5	2.5	32.50	NV	Wing Wall	Wing Wall	• Vent way partially buried with silt & debris • Structure is in fair condition
60	NH-73	PC	31+674	31+709	1 x 1.2	1 x 1.2	-	-	NV	-	-	• Not found at site
61	NH-73	PC	31+975	32+015	1 x 1.2	1 x 1.2	-	-	NV	-	-	• Not found at site
62	NH-73	PC	33+418	33+454	1 x 1.2	1 x 1.2	1.2	38.50	NV	Wing Wall	Wing Wall	• Structure fair in condition

4.7 DRAINAGE AND SLOPE PROTECTION

- ✓ Lined Covered drains observed at Service Road Locations near Built-up areas along the corridor are in fair condition.

4.8 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.
- ✓ Pedestrian guard rails installed at Service Road separator locations appear to be in good condition
- ✓ street lighting and high mast lighting are all functioning well,

4.9 ROAD USER FACILITIES

- ✓ The Bus Bays and Bus Shelter, provided along the corridor appear to be good in condition.
- ✓ Truck Lay Bye cum Rest Areas, provided along the corridor appear to be good in condition.

5.1 DESIGN TRAFFIC LOADING

Design Traffic loading has been estimated by considering the latest traffic (given) and VDFs as estimated from the latest axle load survey data and with 5% growth rates for all types of vehicles for the design period of 5 years, 10 years and 15 years as below:

Table 24: Traffic Volume (AADT)

Vehicle/Mode	AADT at 16+000	AADT at 32+000
LCV	766	733
2A truck	1229	898
3A truck	449	514
MAV truck	191	275
BUS	969	771

***Note:** 50:50 directional distributions is to be considered

Table 25: Traffic Growth Rates (GR %)

Start year	Car/Van/Taxi	Bus	LCV	2-Axle	3-Axle	4 to 6 Axle	Period
Km 16+000							
2022	5.00%	5.00%	5.00%	5.00%	5.00%	5.30%	Up to 2023
2023	5.00%	5.00%	5.00%	5.00%	5.00%	5.30%	2023 -2027
2028	5.00%	5.00%	5.00%	5.00%	5.00%	5.10%	2028 – 2032
2033	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	2033 – 2037
2038	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	Beyond 2037
Km 32+000							
2022	5.00%	5.00%	5.00%	5.10%	5.00%	5.90%	Up to 2023
2023	5.00%	5.00%	5.00%	5.10%	5.00%	5.90%	2023 -2027
2028	5.00%	5.00%	5.00%	5.00%	5.00%	5.70%	2028 – 2032
2033	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	2033 – 2037
2038	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	Beyond 2037

Table 26: Estimated Design traffic loading

Year	Design Lane MSA on Existing Carriageway with 5% Growth rates			
	16+000 UP	16+000 DN	32+000 UP	32+000 DN
10th year from Now	14	8	12	9
15th year from Now	25	13	21	15
20th year from Now	38	21	33	24

The computation of traffic loadings is presented in **Appendix 8** of this Report. The traffic loading appears more or less same in both the direction.

Since this project entire project road is Rigid pavement only Flexible pavement is in service/slip road, design MSA will only be applicable to flexible pavement sections only. For rigid pavements, axle load spectrum is used in verification of rigid pavement crust for operation period.

5.2 PAVEMENT REHABILITATION AND STRENGTHENING

5.2.1 Rigid Pavement Strengthening

Based on the FWD survey and their results it appears that the majority of the flexural strength values ranges from 3.0 to more than 4.5 Mpa. The rigid pavement design period has been checked with various flexural strength values by considering the existing PQC & DLC thickness.

Number of axle load repetitions for each year of operation is estimated and cumulated for entire operation period of 30 years from now. Using IRC 58-2015 design charts, stress ratios corresponding each Flexural strength values ranging from 2.75-4.5 have been estimated and number repetitions that existing pavement serves is also established.

The summary of the Design period satisfies for various flexural strength values as given below:

Flexural Strength	Existing Rigid Pavement Thickness satisfies to the design period in Years			
	Km 16+000		Km.32+000	
Side	LHS	RHS	LHS	RHS
2.75	2 Years	2 Years	1 Years	2 Years
3.0	10 Year	9 Year	4 Years	10 Years
3.5	30 Years	30 Years	30 Years	30 Years
4.0	30 Years	30 Years	30 Years	30 Years
4.5	30 Years	30 Years	30 Years	30 Years

- From the FWD data analysis it is found that on NH-73, nearly 66% & 78% sample in LHS & RHS and on NH-72A, nearly 85% & 87% sample in LHS&RHS were having flexural strength values more than 3.5.

- Similarly, flexural strength values between 3mpa to 3.5mpa, on NH-73, nearly 9% & 5% sample in LHS & RHS and on NH-72A, nearly 6% & 5% sample in LHS&RHS. These are considered to be fair condition and requires minimal maintenance.

- For the balance samples having flexural strength less than 3mpa considered to be average to poor, and is estimated on NH-73 are nearly 25%& 17% samples on LHS& RHS and on NH-72A, nearly 9% & 8% samples on LHS& RHS of project road may require major rehabilitation measures during operation period.

Apart from Routine maintenance Suitable periodic maintenance strategies have been suggested looking at above data as below:

5.3 STRUCTURAL REHABILITATION

All the structure found to be in good condition except little minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- Repair/ Replacement of Existing Bearings
- Repair / Replacement of Existing Expansion Joints
- Repair / Replacement of Existing Wearing Coat
- Profile Correction for Existing Deck Slab by Cement Concrete
- Sealing of Cracks for Bridges by Epoxy Resin
- Replacement of Spalled Concrete of ECW by Epoxy Mortar
- Cement Grouting for Repair of Existing Bridges
- Guniting / Shotcreting for Repair of Existing Bridges
- Providing & Fixing of Drainage Spouts
- Repair of Substructure Component
- Repair / Replacement of Railing & Crash Barrier
- Epoxy Bonding between New and Old Concrete.

CHAPTER 6. OPERATION AND MAINTENANCE

6.1 INTRODUCTION

Looking at the contractual requirements of maintaining project road under specified level of roughness it is felt that roughness is the most important criterion for finalizing the O&M schedule for the project.

Accordingly, the methodology adopted by present consultants includes predicting the roughness year by year under the traffic using a well acknowledged HDM-4 model developed for developing countries like India after lot of research by World Bank. Since majority length of project road is of rigid in nature, roughness prediction using HDM is not done as appropriate calibration factors are not available. Thus, for rigid pavement, consultants consider various repair activities including diamond grinding to bring down the roughness to specified levels as given under CA.

6.2 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

- Schedule K of CA species that Roughness values exceeds 2750mm/km in a length of KM, needs to be corrected within 180 days.

6.3 RIGID PAVEMENT PERIODIC MAINTENANCE STRATEGY

Apart from the above requirements of Sch-K and maintaining the roughness and skid number for the rigid pavements, there are several other repair strategies included in Sch-K for rectification of defects in rigid pavement. These include following:

- Crack Seal
- Seal & Stitch
- Staple or Dowel Bar Retrofit
- Partial Depth Repair with Stapling
- Full Depth Repair: Dismantle and reconstruct affected Portion
- Diamond Grinding
- Joint Cleaning & Repair

Looking at the above requirements, it is felt necessary consider following activities as part of periodic maintenance cycle at every 6 years apart from routine maintenance activities:

		Unit	Rate	Quantity	Amount
Length of Rigid Pavement		Kms		106.600	
PQC Qty		Cum		335460	
Total Area		Sqm		1230435	
No of Transverse Joints		no		30381	
No of Panels		no		62498	
Length of Transverse Joints		m		273430	
Longitudinal Joint		m		328116	
Repair of Transverse Joint @ 7 years	75.0%	m	107.00	205073	21942758

Repair of Longitudinal Joint @ 7 years	75.0%	m	107.00	246087	26331309
Replacement of Transverse Joint@ 7years	2.0%	m	870	5469	4757682
Replacement of Longitudinal Joint@ 7years	2.0%	m	870	6562	5709218
Ravelling surface @7years	5.0%	Sqm	519	61522	31911332
Crack sealing Surface @ 7years	3.0%	m	445	12792	5687323
Repair of Panels @ 7years	1.00%	No	15942	625	9963844
Removal of Panels @ 7years	0.50%	No	8387	312	2616705
Relaying of Panels @ 7years	0.50%	No	52152	312	16271335
Regrinding @ 7years	30%	Sqm	160	369131	59060880
		7th Year	Crores	18.43	150/Sqmt

The above are in addition to routine maintenance activities which include following for every year:

Rigid Pavement		% per year
Longitudinal Cracks more than 1.5m	Lin.m	0.25%
Longitudinal Cracks less than 1.5m	Lin.m	0.75%
Transverse Cracks more than 1.5m	Lin.m	0.25%
Transverse Cracks less than 1.5m	Lin.m	0.75%
Longitudinal Crack full Depth	Cum	0.10%
Pop-outs (12nos of 1m x 1m per Km per direction)	Sqm	24.000
Corner Cracks	cum	0.10%
Condition of Joints	Lin.m	1%
Diagonal Cracking	Lin.m	0.5%
Raveling of panel	Sq.m	0.10%

6.4 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.
- 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.
- 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.
- All Metallic Bearings need to be taken up for servicing.

Wearing Coat:

Since there is a very weak component of the bridge structure which is subjected to severe deterioration due to Loading, Environment etc. It is necessary to replace the wearing coat at 15years frequency. As of now we have considered sealing of cracks by Fog Seal which is other does not show any distress than cracking by viz. Pot holes, abrading etc. based on this aspect BOQ is formed.

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:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 27: Summary of Major Material Rates excluding GST

Sl.no	Activities	Unit	Rate (Rs) per Unit	Remarks
1	BC	Cum	9371	VG-40
2	Tack Coat	Sqm	13	
3	DBM	Cum	8600	VG-40
4	PC	Sqm	36	
5	WMM	Cum	2524	
6	GSB	Cum	2141	
7	Embankment	Cum	215	
8	Subgrade	Cum	255	
9	Shoulder Filling	Cum	255	
10	Thermoplastic Paint	Sqm	452	
11	Road Studs	Nos	195	
12	DLC	Cum	5324	
13	PQC	Cum	10297	
14	RE panel	Sq.m	4121	
15	M-15	Cum	8642	
16	M-20	Cum	9175	
17	M-25	Cum	9794	
18	M-30	Cum	9811	
19	M-35	Cum	10845	

Sl.no	Activities	Unit	Rate (Rs) per Unit	Remarks
20	M-40	Cum	12286	
21	M-45	Cum	12577	
22	M-50	Cum	14423	
23	Reinforcement steel	MT	79760	
24	1.2m Dia pile	Rm	15085	
25	HT strands	MT	130523	

S.No	Type of Material	Units	Source	Average Lead in Kms	Market Rates (Rs) Adopted for Rate Analysis - including lead
1	**Aggregate**				
a)	40 mm	Cum	Crusher	37.75	1253
b)	20 mm	Cum	Crusher	37.75	1311
c)	12 mm	Cum	Crusher	37.75	1305
d)	6 mm	Cum	Crusher	37.75	1287
e)	Dust	Cum	Crusher	37.75	1301
2	Gravel/Murrum				
	Embankment	cum	Borrows for Embankment	4.30	20.26
	Subgrade	cum	Borrows for Subgrade	4.30	20.26
3	Other Major Material				
	Bitumen 60/70	tonne	Mathura	332.00	37324
	Bitumen 80/100	tonne	Mathura	332.00	37324
	CRMB	tonne	Mathura	332.00	37324
	Emulsion	tonne	Mathura	332.00	46324
	Steel	tonne	Outlet	95.00	57428
	HTS Strands	tonne	YAMUNANAGAR	95.00	70428
	Cement	tonne	YAMUNANAGAR	95.00	8028
	Structural Steel	tonne	YAMUNANAGAR	95.00	71328
	VG-40	tonne	Mathura	332.00	37324

7.2 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs are estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Items which are not executed as part of scope or in damaged condition have been considered for immediate costs as a part of 1-year capex. Following items are mainly considered for immediate costs:

- Scope which is not executed

- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

There is no immediate cost associated with this project.

7.3 ROUTINE MAINTENANCE & INCIDENT MANAGEMENT COSTS

Routine maintenance costs include general maintenance costs of road elements, bridge elements and road furniture and appurtenances. This can be mainly divided into two parts as:

- ✓ General Maintenance of Works
- ✓ Repairs to Highway & Bridge Elements

7.3.1 General Routine Maintenance

General Routine Maintenance of Roads generally include following items:

- Cleaning of Project facilities
- Structures cleaning,
- Cleaning of ROW
- Cleaning and Maintenance of Toll Plaza
- Unlined Drain Maintenance
- Lined Drain Maintenance
- Maintenance of Highway Lighting at Toll Plaza and other project locations
- Median Plantation maintenance & Avenue plantation maintenance:
- Maintenance of Road Furniture
- Maintenance of Road Safety Items

The above items are estimated by considering the detailed break-up of following items:

- Manpower including Managers/Labour etc
- Vehicles for Labour Transport/Water Tankers/Sweeping Machines Etc
- Resources/Equipment's such as grass cutters, tools, jet sprayers, hydraulic trimmers etc

7.3.2 Repairs to Highway & Bridge Works

Repairs to highway and bridge works have been estimated based on the assumed quantities (Percentage basis) of execution for every year.

These items include the following:

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 VG 40 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	Providing and laying apron/ stone pitching on slopes of guide bunds/ road embankment / other location
12	Providing and laying stone aggregate filter material (150 mm compacted thickness) underneath pitching
13	Unlined drain
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
	(iii) Diagonal Chevrons Markings
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

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
10. Carrying out 50 to 60 mm thick 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 Concrete

7.3.3 Incident Management Cost

Incident Management & Safety items include the following:

- ✓ ATMS control room operations,
- ✓ Regular patrolling & reaching accident/incident site,
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, 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

Following table includes the cost of Major Maintenance works for the project:

Table 28: Summary of Periodic Maintenance Costs

Financial Year	Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of ATMS @ every 7 Years	Replacement of TMS @ every 5 years	Structure specified repairs
2023	-	-			-
2024	160.08	-	-	-	-
2025	-	-	-	-	57.71
2026	-	-	-	-	-
2027	1,179.54	1,879.84	265.05	532.71	-
2028	-	-	-	-	-
2029	-	-	-	-	-
2030	160.08	-	-	-	-
2031	-	-	-	-	-
2032	-	-	-	532.71	-
2033	320.17	-	-	-	-

Financial Year	Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of ATMS @ every 7 Years	Replacement of TMS @ every 5 years	Structure specified repairs
2034	859.37	1,879.84	265.05	-	337.31
2035	-	-	-	-	-
2036	160.08	-	-	532.71	-
TOTAL	**2,839.33**	**3,759.67**	**530.10**	**1,598.13**	**395.01**

Note: The cost is inclusive of GST without escalation and the amount is in Lakhs.

7.5 OPERATIONS COSTS

Cost towards Operations include the following:

- Electricity Bill of lighting
- Toll Plaza Operation cost
- Operation and management costs of rest areas and lay byes
- SPV Costs
- Survey Costs
- Insurance
- IE Fee
- Administrative Cost

Following table depicts the cost of operations for the project:

Table 29: Summary of 1st year O&M Costs, FY2024(including GST)

S No	Description	Amount in Lakhs.
	SPV - Expenditure	
1	SPV staff	117.00
2	Highway lighting - Power Charges	163.00
3	Highway lighting - Maintenance charges	17.00
4	Tolling and HTMS AMC/ Spare Parts	64.56
5	Surveys & Investigations (BBD, Roughness)	5.03
6	IE fees	74.11
7	Insurance Charges	117.00
8	Audit Charges	40.00
9	LIE Fee	25.80
10	Admin cost - Board Meeting Expenses, valuation etc.	-
	Agency - Expenditure	-
11	Toll Operation - Agency	-
12	Route patrolling	218.60
13	Cost towards Periodic Vehicle replacement	-
14	TAP & MAP	46.96
15	Routine maintenance	255.22
16	Repair of Road - Boq Items	139.98
17	Repair of Structures	20.60
	1st year O&M Costs, FY2024(including GST)	**1,304.85**

Note: The cost is inclusive of GST without escalation and the amount is in Lakhss.

7.6 TOTAL OPERATION & MAINTENANCE COSTS

Year on year operation cost is summation of following:

- ✓ Immediate Costs
- ✓ Routine Maintenance & Incident Management
- ✓ Periodic Maintenance
- ✓ Operations Cost

Following table presents the summary of Operations & Maintenance cost for the project.

Table 30: Cost Abstract

Financial Year	SUMMARY OF VARIOUS EXPENSES in Rs. Lakhs				
	Immediate Repair's Cost	Toll Collection Expenses and Patrolling expenses	Routine Maintenance Expenses	Periodic Maintenance (Functional +Struc Overlay+ Toll collection system)	Total Cost
2023-2024	-	-	1,292.94	160.08	1,453.03
2024-2025	-	-	1,292.94	57.71	1,350.65
2025-2026		-	1,328.81	-	1,328.81
2026-2027		-	1,292.94	3,857.14	5,150.08
2027-2028		-	1,292.94	-	1,292.94
2028-2029		-	1,292.94	-	1,292.94
2029-2030		-	1,292.94	160.08	1,453.03
2030-2031		-	1,387.81	-	1,387.81
2031-2032		-	1,292.94	532.71	1,825.65
2032-2033		-	1,292.94	320.17	1,613.11
2033-2034		-	1,292.94	3,341.56	4,634.51
2034-2035		-	1,321.26	-	1,321.26
2035-2036		-	531.01	692.80	1,223.80
Total Cost:	**-**	**-**	**16,205.36**	**9,122.25**	**25,327.62**

Note: The cost is inclusive of GST without escalation and the amount is in Lakhs.

SIT/PJRP/2312188/060
22nd December 2023

To
M/S Actis Highway Infra Ltd
The Sponsor

Sub: Submission of Technical Reports for Walter Projects

K/A Mr. Rakshit Jain,

We are pleased to submit hereby the "Technical Report" in hard/soft copies for the following assets.

S. No	Project Title
1	Technical Diligence of Delhi-Meerut Expressway (Section from km 0.000 to UP Border) including 8 laning of NH-24 in the state of Delhi. (Design Length-8.716)
2	Technical Diligence for 4-Laning of Chutmalpur - Ganeshpur of NH-72A from Ch. 0.000 to Ch. 17.900 & Roorkee – Chutmalpur - Gagalehri of NH-73 from Ch. 0.000 to Ch. 35.400 in the state of Uttar Pradesh & Uttarakhand on Hybrid Annuity Basis (Pkg-1)
3	Technical Diligence for 4-Laning of Gagalheri–Saharapur–Yamunanagar (UP/Haryana Border) section of NH-73 from Km 35.400 to Km 86.855 in the State of Uttar Pradesh under NHDP-IV on Hybrid Annuity Mode (PKG-II)
✓ 4	Technical Diligence for Four Laning Chikhali – Tarsod (Package-IIA) Section of NH-6 from Km 360.000 to Km 422.700 in the State of Maharashtra to be executed on Hybrid Annuity pattern under NHDP Phase IV (CTHPL)
5	Technical Diligence of Two Lanning with paved shoulders Road on Package HAM-AM-2 in the State of Maharashtra under MRIP on Hybrid Annuity Mode
6	Technical Diligence for the 8 Laning of NH-1 from Mukarba Chowk at km 15.500 to km 86.000 in the State of Haryana on DBFOT Basis

Thanking you and assuring you best services all the time.

Yours faithfully,

For Samarth Infraengg Technocrats Pvt Ltd.,

SAMARTH INFRAENGG TECHNOCRATS PVT. LTD.

Authorized Signatory
Name: [Mr. Kalva Kiran Kumar]
Designation: [Director]

TECHNICAL REPORT

Technical Diligence for Four Laning Chikhali – Tarsod (Package-IIA) Section of NH-6 from Km 360.000 to Km 422.700 in the State of Maharashtra to be executed on Hybrid Annuity pattern under NHDP Phase IV (CTHPL)

SAMARTH INFRAENGG Technocrats Private Limited

SAMARTH
committed competence

DECEMBER 2023

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
BC	-Bituminous Concrete
BOQ	-Bill of Quantities
BOT	-Build, Operate & Transfer
CA	-Concession Agreement
CBR	-California Bearing Ratio
CCB	-Concrete Crash Barrier
CCR	-Cement Concrete Railing
COD	-Commercial Operation Date
COS	-Change of scope
CPI	-Consumer Price Index
CUP	-Cattle Under pass
CVC	-Classified Volume Count
CVPD	-Commercial Vehicles per Day
DBM	-Dense Bituminous Concrete
DPR	-Detailed Project Report
ECB	-Emergency Call Box
EPC	-Engineering, Procurement and Construction
ESI	- Employees' State Insurance
FDD	-Filed Dry Density
FOB	-Foot Over Bridge
FRL	-Finished Road Level
FSI	-Free Swell Index
FWD	-Falling Weight Deflectometer
FY	-Financial Year
GOI	- Government of India
GR	-Growth Rates
GS	-Grade Separated
GSB	-Granular Sub Base
GST	-Goods and Services Tax
HCPT	-Half-cell Potential Test
HPC	-Hume Pipe Culvert
HR	- Human Resources

HTMS	-Highway Traffic Management Systems
IE	-Independent Engineer
IRC	- Indian Roads Congress
IRC SP	- Indian Roads Congress Special Publications
IRI	-International Roughness Index
Km	-kilometer
LHS	-Left Hand Side
LL	-Liquid Limit
LS	-Lumpsum
m	-Meter
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 Underpass
R&R	-Repair and Rehabilitation
RCC	-Reinforced Cement Concrete
RE Wall	-Reinforced Earth Wall
RHS	-Right Hand Side

RHT	-Rebound Hammer Test
RM	-Routine Maintenance
ROB	-Road Over Bridge
RPO	-Route Patrol Officer
RUB	-Road Under Bridge
SDBC	-Semi-Dense Bituminous Concrete
SPV	-Special Purpose Vehicle
SR	-Service Road
SWB	-Static Weigh Bridge
TCS	-Typical cross Section
TDRT	-Transient Dynamic Response test
TMS	-Toll Management System
UI	-Unevenness Index
UPVT	-Ultra Pulse Velocity test
VDF	-Vehicle Damage Factor
VG	-Viscosity Grade
VUP	-Vehicular Underpass
WBM	-Water Bound Macadam
WMM	-Wet Mix Macadam
WPI	-Wholesale Price Index

CHAPTER 1. INTRODUCTION

1.1 INTRODUCTION

The Government of India had entrusted to the Authority (National Highways Authority of India, **NHAI**) the development, maintenance and management of National Highway No.6 including the section from km 360.000 to km 422.700 (approx. 62.700 km). The Authority had resolved to augment the existing road from km 359.310 to km 423 .680 on the Chikhali - Tarsod section of National Highway No.6 (hereinafter called the "NH 6") in the State of Maharashtra by Four-Laning thereof (the "Project") on design, build, operate and transfer (the "DBOT Annuity" or "Hybrid Annuity") basis under NHDP Phase IV, which shall be partly financed by the Concessionaire who shall recover its investment and costs through payments to be made by the Authority, in accordance with the terms and conditions to be set forth in a concession agreement.

The Authority had accordingly invited the bid proposals and upon the evaluation of received bids, the Authority has awarded the Project to M/s **Vishvaraj Environment Pvt Ltd**, Nagpur. Consequent to this, M/s Vishvaraj Environment Pvt Ltd, formed a Special Purpose Vehicle (SPV) in the name of M/s **Chikhali Tarsod Highways Pvt. Ltd, CTHPL** (Concessionaire) for implementation/execution of the project.

Concessionaire could not achieve the Financial Close within the stipulated time and has submitted a proposal for induction of **Welspun Enterprise Ltd** (Welspun") as a "Sponsor" of the project and subsequent to detailed deliberations, Authority approved for acquisition of 49% equity in the project company by Welspun.

The Concessionaire has achieved PCOD on 25th August 2021 for an average length of 59.885 Km. (LHS: 58.735km, RHS: 61.035) out of 62.700 km after delinking existing Fekri ROB toll-section from Km.396+140 to 398+840, ROB at Km 405+545 and its approaches on LHS, ROB at Km 414+842 and its approaches (COS) on LHS.

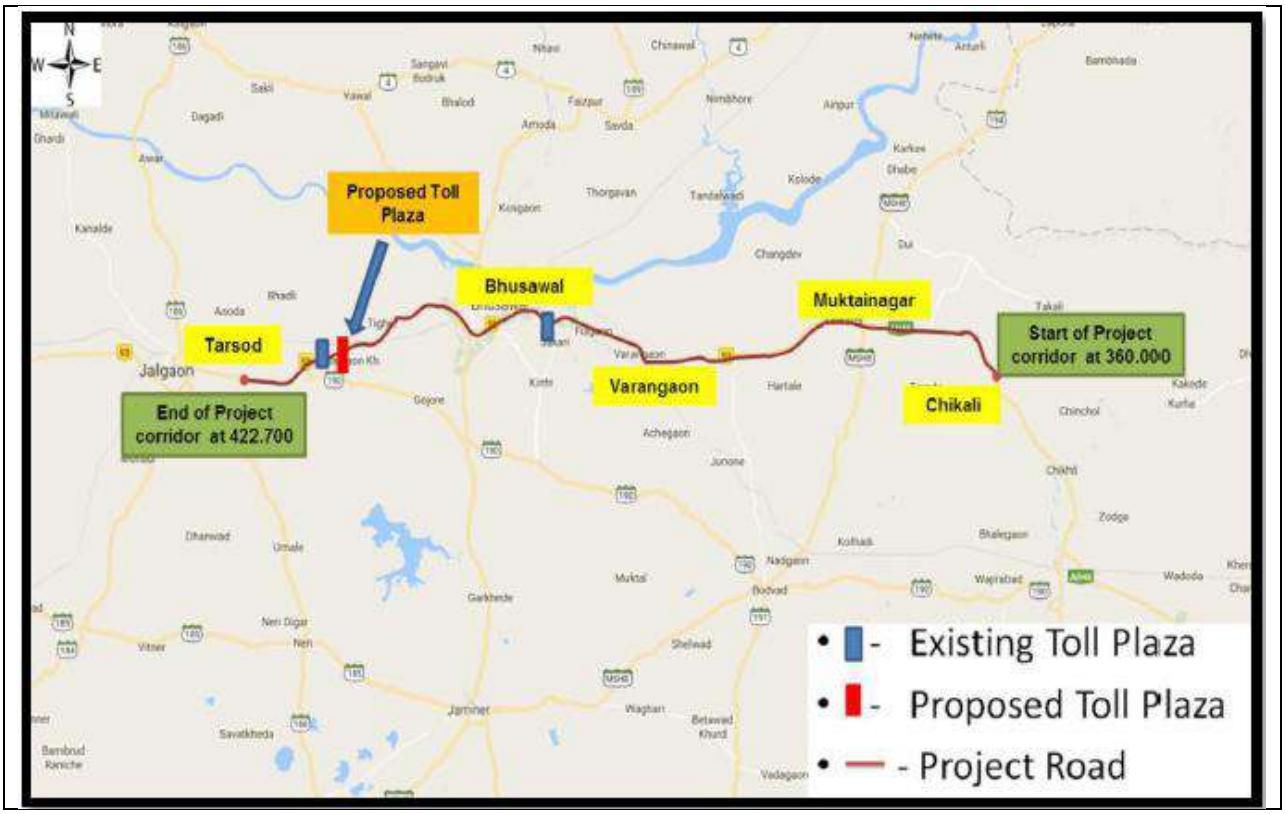
This project road is acquired by M/s Actis GP LLP and is presently under Operation and Maintenance phase.

Actis GP LLP Ltd has engaged M/s Samarth Infra-engg Technocrats to undertake due-diligence study for self-assessment and/or for its Concessioning Authority and/ or for InvIT purpose and/ or for its present/ future investors/ lenders whom this Report will be presented as Vendors Technical Due Diligence Report.

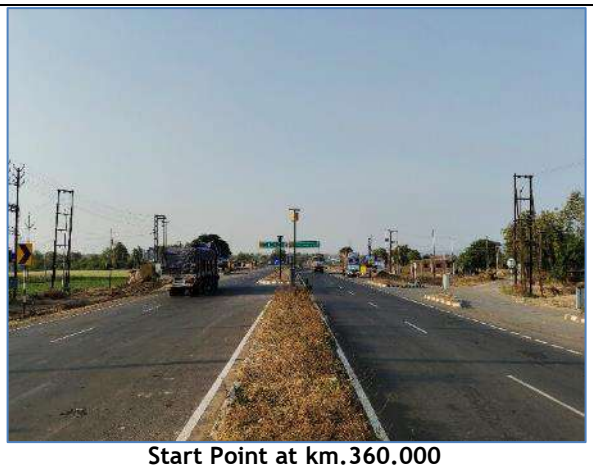
This report highlights about the project at a glance and to evaluate the asset condition and work out O&M Cost, Major Maintenance cost and additional facilities cost/improvement works of the project during the Concession period.

1.2 PROJECT AT GLANCE

The project is 4lane divided corridor passing through Pimprikaraut, Muktainagar, Varungaon, Bhusawal and Jalgaon khurd villages. Varungaon Ordinance Factory and Bhusawal Thermal Power Station exists at km 386 and km 397. Most length of project road runs through plain terrain and with intermittent locations in rolling terrain. The existing NH-16 numbering has be changed with new NH-53.



Photographs showing the various corridors of the project road are presented below:

	
Start Point at km.360.000	**End Point at km. 422.700**

Following Table highlights the total project at a glance:

SI No.	Description	Date
1.	Date of Signing the Concession Agreement	3rd Apr 2017
2.	Appointment Date	16th Jan 2019
3.	Scheduled Project completion	13th July 2021
4.	Scheduled End of Concession	15 years from COD
5.	Date of issue of Provisional Completion Certificate, COD	25th Aug 2021
7.	Date of Issue of Final Completion Certificate	Not received yet

1.3 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 due diligence for said project.

The scope of services as defined in the "terms of reference" for consultants is as below:

1. Review of Contractual documents

- ✓ Review of CA/ Schedules pertaining to scope of work
- ✓ Collection of relevant records and documents and review of same
- ✓ Review correspondences with NHAI/IE on technical issues
- ✓ Review of EPC contracts/Maintenance Contracts
- ✓ Review of As-built drawings & Detailed Project Reports and Designs
- ✓ Review of COS works if any
- ✓ Review the technical approvals from IE or another agency required under the CA

2. Field Investigations

- ✓ Review and Update of Field investigations survey data done during Technical Due Diligence time.

3. Major Maintenance

- ✓ Review of current maintenance system.
- ✓ Updating of Maintenance costs to be incurred over the period of the concession keeping in mind the maintenance requirements of the Concession Agreement.

4. Operations cost

- ✓ Updating of O&M cost for the concession period.

5. BOQ and Cost Estimates

- ✓ Updating of BOQ & Cost for Immediate works (1st year Capex)
- ✓ Updating of BOQ and Costs for Major Maintenance
- ✓ Updating of BOQ and cost for Routine maintenance, Route Patrolling
- ✓ Updating of BOQ and Cost for Operations
- ✓ Updating of year-by-year O&M cost
- ✓ The costs would be updated till the end of the concession period including any expected extension of Concession periods as informed to us.

6. Reports & Presentation

- ✓ Draft O&M cost
- ✓ Final Reports along with Final BoQ

1.4 REVIEW OF CONCESSION AGREEMENT

1. Concession Parties and date of execution of Agreement: NHAI referred as "Authority" entered in to Agreement with M/s Chikhali-Tarsod Highways Pvt. Ltd (CTHPL) referred as "Concessionaire" on 03.04.2017
2. Appointed Date, Commercial Operation Date (Article 3 & 4, Article 12): As the Concession Agreement was signed on 03 Apr, 2017, with the settlement agreement made on 08th Jan 2019. With no penalties on either party, appointed date issued by Authority on 16 Jan 2019. Accordingly, construction period is 910 days from Appointed date, and Concession period is 15 years from COD.
3. Concession Period (Clause 3): This includes Construction Period of 910 days and Operation Period of 15 years commencing from COD. As the Appointed Date is declared on 16.01.2019, considering 910days as Construction period, the scheduled construction completion date is 13.07.2021. as EOT received for 90days, it has extended to 11.10.2021. However, PCOD achieved prior to this date, i.e., on 25.08.2021. Accordingly, 15yrs from COD, end of concession period is 24.08.2036 (scheduled date 12.07.2036)
4. Obligations of Concessionaire & Authority (Article 5 & 6): The Concessionaire and Authority have fulfilled most of the obligations.
5. Representation and warranties (Article 7): The Concessionaire shall at no time undertake any change of ownership except in accordance with Clause 5.3. Concessionaire has submitted a proposal for induction of Welspun Enterprise Ltd (Welspun") as a sponsor of the project and subsequent to detailed deliberations, Authority approved for acquisition of 49% equity in the project company by Welspun.

6. Release of Performance Security (Article-9.3): The performance security bank guarantee (PSBG) is Rs 52.41 Cr. However, Authority released back the Performance guarantee to the Concessionaire on 10th Dec 2019.
7. Right of Way (Article 10): If the Authority is unable to provide the remaining site within 180 days from the Appointed Date, the remaining Site of the Project Highway shall be removed from the scope of the work under the provision of Change of Scope. Right of Way is granted within 180 (one hundred and eighty) days of the Appointed Date shall be completed on or before the Scheduled Completion Date.
8. Construction of the Project (Schedule-G, Article12): Construction period 910 days from the appointed date i.e., schedule date of completion is on 13th July 2021. As EOT granted for 90days due to COVID outbreak, the revised schedule date of completion is on 11th OCT'2021.But, PCOD achieved prior to this date, i.e., on 25th Aug 2021.

Milestone	Completion days	Schedule date	Actual achieved	Delay/(early) days	% Total Capital Cost (TCC) / Physical progress in %
MS-I	290	01/11/2019	24/06/2019	(129)	20% of TCC / 20% Physical Progress
MS-II	430	20/03/2020	31/10/2019	(140)	35% of TCC / 35% Physical Progress
MS-III	690	06/12/2020 EOT-90days, 16/03/2021	29/01/2021	54 days	75% of TCC / 75% Physical Progress
MS-IV	910	13/07/2021 EOT-90days, 11/10/2021	25/08/2021	-	100% of TCC /100% Physical Progress

9. Monitoring of Construction (Article 13): The Concessionaire shall, perform all the tests as per Schedule-I, with the instructions of the Independent Engineer. Half of the costs incurred on such tests, and to the extent certified by the Independent Engineer as reasonable, shall be reimbursed by Authority the to the Concessionaire.
10. Completion Certificate/ Provisional Certificate (Article-14): Independent Engineer may, upon request of Concessionaire, issue a provisional certificate for completion of 100% construction site, which made available to the Concessionaire up to 182days from Appointed Date. Provisional certificate should have list of outstanding items in the punch list. These shall be completed within 90 days from issue of Provisional certificate. Authority shall recover damages for any delay in completion as per clause 14.4.1.

Side	Scope, Km	Offered length for PCOD (Km)	Exclusion for PCOD
LHS	62.700	58.735	1. km 396.250-km 397.540 (1.29 km)- Punch list-A 2. km 398.250-km 398.625(0.375 km) - Punch list-B 3. km 405.000-km 406.090(1.09 km) - Punch list-A 4. km 414.200-km 415.410(1.21 km) - Punch list-B
RHS	62.700	61.035	1. km 396.250-km 397.540(1.29 km) - Punch list-A 2. km 398.250-km 398.625(0.375 km) - Punch list-B

Note: Exclusion for PCOD: S.no 1 & 2: MoRTH has undertaken ROB@396/827 construction works with M/s Fekri Infrastructure Ltd including its O&M with ROB approaches of 2lane configuration on BOT basis i.e., from Km396.140 to km398.840, length of 2.700km. Concession period for this expires on 03.10.2022. Presently, M/S Fekri is collecting Toll in this stretch. As NHAI's buy-back proposal was not materialized, NHAI decided to de-scope until the end of its concession period.

Later, this proposal also not finalized with view that both (existing & newly proposed) toll plazas would be operational simultaneously. Hence, Concessionaire advised to complete the works within Scheduled Completion date, accordingly, S. No 1 works were progressed and in advance stage which are kept in Punch list-A, while S.no2 is the existing operational toll plaza location, kept in Punch list-B and shall be completed within reasonable time after handover of the same.

S.No.3: LHS: km 405.000-km 406.090(1.09 km) - Punch list-A, delayed launching scheme approval from railways for ROB at Km 405+545. However, at site RE-wall approaches are completed on either side, in structure portion, Concrete Barrier construction and installation of Expansion Joint works are in progress.

S.No.4: LHS: km 414.200-km 415.410(1.09 km) - Punch list-B, ROB@ Km414+842, is to be retained (1x37.5m span) as Schedule-B. But COS has been approved to re-construct with span arrangement of (1x10m+1x25m+1x37.5m+1x10m). Methodology and GAD approval pending from Railway. Present status is to be ascertained from Concessionaire. However, at site approach construction with RE wall are under progress.

11. The Company has applied the Provisional Completion Certificate vide their letter no.2117 dated 06.03.2021. (Delink for PCOD Fekri from Km.396+140 to 398+840, ROB at Km 405+545 and its approaches on LHS, ROB at Km 414+842 and its approaches (COS) On LHS.

    IE has issued the Provisional Certificate for an average length of 59.885 Km. out of 62.700 Km. on 25th August 2021.

12. Change of Scope (Article 16): Any additional works and services which are not included in scope of project shall be addressed in Change of Scope Notice. The costs thereof shall be expended by concessionaire and reimbursed by Authority with an advance payment of 20% of agreed COS cost.

13. Reduction of Scope (Article 16.6): if Concessionaire fails to complete the construction works on Force Majeure or for reasons attributable to Authority or under right-of-way clause 10.3.1. On direction of Authority, IE shall assess the civil cost for reduced scope as per Clause 16.6.1. Thus, revised Bid Project Cost shall be calculated. Accordingly, O&M cost shall be reduced or increase in proportion to reduction or increase in the length of the Project Highway.

14. Operation & Maintenance (Article 17): Concessionaire to maintain project road as per Schedule-K requirements. The roughness value exceeding 2750mm/km in a stretch of 1km should be rectified with 180days.

15. Safety requirements (Article 18): All costs and expenses arising related to safety requirement shall be borne by Concessionaire as per scope of the project. If any not forming the scope shall be as per Article 16, change of scope.

16. Renumeration to Independent Engineer (Article 21.3): As per Schedule-M, one- half of remuneration towards the cost and expenses of the Independent Engineer during the development and construction period shall be borne by Concessionaire by do not exceeding 3% of the BPC. Payment in excess of 3% shall borne entirely by Authority. All the payments made to independent Engineer during O&M period shall be borne equally by Authority and Concessionaire.

17. Financial Close (Article 22.1): Concessionaire to achieve Financial close within 150 days from date of the agreement. In the event of delay, further extension not exceeding 120days, subject to payment of damages to the Authority in the sum calculated at a rate of 0.05% of Performance security for each day of delay. Beyond this further 95 days shall be allowed with 0.1% of Performance security for each day of delay.

Financial Close in this project happened on 27.03.2018, i.e., 7 days before first anniversary, without imposing any penalties, and declared appointed date on 16.01.2019 by Authority with signing the settlement agreement.

18. Bid Project Cost (Article-23): The cost of construction of the project (BPC) is is Rs.1048.1 Cr. and will be adjusted for the price index multiple. 40% of this Cost shall be payable to Concessionaire during Construction period in 5 installments of 8% each with adjusted price index multiple. Clarification sought from the Concessionaire about the total amount received against the receivable amount in the consolidated format.

    The remaining 60% of Bid Project Cost, adjusted for Price Index multiple, shall be payable in 30 biannual installments commencing from 180th day of COD with the percentage payments as suggested in the table 23.6.3 along with the interest as per 23.6.4.

    Expenses in excess of O&M payments shall be borne by Concessionaire. O&M payments due payable to the Concessionaire shall be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.

19. Mobilization Advance (Article 23.8): Upon request from Concessionaire, 10% of Bid Project Cost shall be paid by Authority. This shall be repaid by Concessionaire with Bank interest compounded annually in 4 equal installments from each payment made by Authority to Concessionaire.

20. Insurance (Article 26): The Concessionaire has been fulfilling this obligation.

21. Force Majeure (Article 28): As per Clause 28.6.2, at any time after the Appointed Date, if any Force Majeure Event occurs) before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; or (b) after COD, the Concessionaire shall be entitled to receive Annuity payments plus interest due and payable under this Agreement.

22. Compensation for Breach of Agreement (Article 29): The Concessionaire has made no correspondence on this.

23. Change in Law (Article 35): As a result of Change in Law, if Concessionaire suffers an increase in cost or reduction in the net after-tax return subject to higher of 1.82 Cr or 2% of Total Annuity payments in any accounting year, Concessionaire may notify Authority to amend the agreement so as to place Concessionaire in same financial position as before the Change in Law.

24. Dispute resolution (Article 38): Any dispute not resolved amicably by conciliation, arbitration shall be held in accordance with rules of Society for Affordable Redressal of Disputes (SAROD), New Delhi or such other rules in-line with Arbitration and Conciliation Act,1996. Place of such arbitration shall be the Delhi and the language of arbitration proceedings shall be English. There are no disputes referred so far under the article 38.

1.5 REVIEW OF CORRESPONDENCES WITH NHAI/IE ON TECHNICAL ISSUES

There are several correspondences which are reviewed. Following are the some of the major correspondences that are reviewed for ready reference:

1) Concession Agreement with NHAI, Govt. of India, dated 03.04.2017,
2) EPC Agreement with Welspun Enterprises Limited, dated 23.02.2018
3) IE has issued PCOD on 25th August 2021 for an average length of 59.885 Km. (LHS: 58.735km, RHS: 61.035) out of 62.700 Km. vide their letter ref: AA/HW/NHAI/2098/21-22/3198 dated 01.09.2021
4) IE has approved PP drawings, TCS drawings, Structural drawings, service road drawings and were made available in technical correspondence No.TDD-16 & 52

5) Mix design approval are made available in technical correspondence No.TDD-17
6) The Concessionaire has submitted various letters related to Pavement Design and Geotechnical Investigations
7) The Concessionaire has notified the Authority about the outbreak of Corona pandemic under Non-political Force Majeure event pursuant to Article 28 of CA and requested for EOT of 128 days. Accordingly, Competent Authority, RO, NHAI, Nagpur has conveyed approval of EOT for a period of 90 days only.

   Concessionaire further requested for grant of extension to complete Punch list-A items by 5th May 2022. No correspondence available of approval of the same.
8) Concessionaire submitted tests on completion as per Schedule-I.
9) Monthly Inspection Reports of the Independent Engineer (MPR)
10) Monthly Inspection Reports of the Concessionaire (MPR)

1.6 REVIEW OF EPC/ MAINTENANCE CONTRACTS

(A) EPC CONTRACT:

1) Concession Parties and date of execution of Agreement: M/s Chikhali-Tarsod Highways Pvt. Ltd (CTHPL) (Concessionaire) and Welspun Enterprises Ltd (Contractor) entered into the EPC Agreement on 23th Feb 2018.
2) Appointment of Contractor, Effective Date and Term (Clause 2): The Concessionaire appointed Welspun Enterprises Limited as the Contractor to execute the EPC Works. The effective date of the Project is 23.02.2018. The EPC contract will be valid and subsisting from the effective date until the termination date.
3) Scope of Contractor's works (Clause 3): The Contractor shall construct the Project Highway on the Site set forth in Schedule A, B, C & D of the Concession Agreement and shall include the scope of work as set out in Annexure A Part II of EPC Agreement.
4) Obligations and Undertakings (Clause 4): The Contractor and concessionaire shall at their own cost and expense observe, undertake, comply with and perform his obligations as set out in EPC Contract.
5) Contract Price and Terms of Payment (Clause 5): The Contract Price payable by the Concessionaire to the Contractor shall be 930 Cr (Annexure -B Part I) and the terms of payment shall be as specified in Annexure -B Part II. Contractor shall provide performance security in the form of corporate bond for an amount equal to Rs.48.105 Cr.

   As amendment to EPC contract, clause 5.3.1, mobilization advance of 10% of contract price shall be paid by Concessionaire within 60days from effective date. And shall start recovery from RA bills from completion of 20% of contract price on proportionate percentage basis.
6) Change in Law (Clause 6): Under this clause, if the Authority make any payment to the Concessionaire, the concessionaire is liable to make over such amounts (less Statutory deductions) to the Contractor.
7) Guarantees, Liabilities, Liens and Indemnities (Clause 8): The Contractor acknowledges that the failure to meet the completion of each of Milestone set out in Annexure-D of EPC and to complete the EPC works on or prior to the Scheduled Completion date shall constitute a Material Breach of Contractor. If the contractor fails to achieve the completion Milestones and Scheduled Construction Completion date as in Annexure-D, he shall pay the damages to Concessionaire at a rate of 0.005% and 0.011% of Contract Price per day respectively until such Milestone/Completion date is achieved

subject to a maximum of 10% of Contract Price. During, Construction DLP period (commence from date of issue of PCOD or COD and ending on expiry of 24 months from Completion Certificate), if any defect, damage of any EPC works thereof being non-operational by reason of such shall be borne by Contractor.

8) Change of Scope (Clause 9): All payments for execution of COS shall be made within 15 days from the date of receipt of the same from the Authority in accordance with clause 16.3 of Concession Agreement. In case of reduction in scope of works, the Contract Price shall stand decreased to the of such reduction. If Article-38(Dispute Resolution) is evoked, all risk, cost, expenses incurred by Concessionaire towards such procedure shall be borne by Contractor

9) Force Majeure (Clause 11): Upon review of the EPC Contract, the "Force Majeure" has the same meaning given to such term in the Concession Agreement

10) Suspension and Termination (Clause 12): The Concessionaire may, without prejudice to any of its other rights under the Contract, issue "Preliminary Notice" to the Contractor stating the nature of default. If the Contractor fails to remedy or to take effective steps, to remedy the same to the satisfaction of the Concessionaire within 15 days of receipt of the Preliminary Notice, then the Concessionaire shall be entitled to terminate the Contract forthwith, by issuing a Termination Notice to the Contractor. However, no such clause has been invoked on the Contractor.

1.7 RIVEW OF SCHEDULES

The following table depicts the project scope as given in schedules at a glance:

Table 1: Salient Features of Project Corridor

S. No	Description	Unit	As per CA
1	Start Chainage (km)	km.	360.000
2	End chainage (km)	km.	422.700
3	Length of the Project Corridor	km	62.700
4	Service Road / Slip Road	km	62.796
5	Toll Plaza	Nos.	2 No. (1 New +1 Existing) (Existing Fekri Toll Plaza to dismantled)
6	No. of Lanes	Nos.	As per IRC SP 84-2014
7	**ROBs**	**Nos.**	**4**
8	ROBs-Reconstruction	Nos.	-
9	ROBs-Rehabilitation	Nos.	2
10	ROBs-Widening	Nos.	-
11	ROBs-New	Nos.	2
12	VUPs	Nos.	09
13	LVUP's	Nos.	01
14	PUP's	Nos.	16
15	**Major Bridges**	**Nos.**	**03**
16	Major Bridges-Reconstruction	Nos.	
17	Major Bridges-Rehabilitation	Nos.	01
18	Major Bridges-Widening	Nos.	
19	Major Bridges-New	Nos.	02
20	**Minor Bridges**	**Nos.**	**22+ under COS: 3 N0s.**
21	Minor Bridges-Reconstruction	Nos.	10
22	Minor Bridges-Rehabilitation	Nos.	07
23	Minor Bridges-Widening	Nos.	-
24	Minor Bridges- Retained	Nos.	07
25	Minor Bridges-New	Nos.	**01**
26	**Culverts (Pipe)**		
27	Culverts-Reconstruction	Nos.	21
28	Culverts-Rehabilitation	Nos.	-

S. No	Description	Unit	As per CA
29	Culverts-Widening	Nos.	39
30	Culverts-New	Nos.	5
31	**Culvert (Slab/Box)**	**Nos.**	
32	Culverts-Reconstruction	Nos.	25
33	Culverts-Rehabilitation	Nos.	-
34	Culverts-Widening	Nos.	17
35	Culverts-New	Nos.	Box-04
36	Street Lights	Kms	As per Manual (IRC-SP84-2014)
37	High Mast Lights	Nos.	As per Manual (IRC-SP84-2014)
38	Solar Blinkers	Nos.	As per Manual (IRC-SP84-2014)
39	Covered Drain cum Foot path	km	-
40	Median Opening	Nos.	-
41	Major Junctions	Nos.	06
42	Minor junctions	Nos.	67
43	W-Beam Safety Barriers	km	As per manual (IRC SP: 84-2014)
44	Rigid Concrete Barrier	km	As per manual (IRC SP: 84-2014)
45	Guard Posts	Nos	-
46	Pedestrian Guard Rails	km	As per manual (IRC SP: 84-2014)
47	Road Markings	km	As per Sch-C to be provided in Consultation with IE
48	Gantry Sign Boards	Nos.	As per Sch-C to be provided in Consultation with IE
49	Cantilever Sign Boards	Nos.	As per Sch-C to be provided in Consultation with IE
50	No of Truck Layby	Nos.	01
51	No of Bus Bays with Shelter	Nos.	13 -Both
52	Double Arm Lightings	No's	As per manual (IRC SP: 84-2014)
53	Three Arm Lightings	No's	As per manual (IRC SP: 84-2014)
54	Single Arm Lightings	No's	As per manual (IRC SP: 84-2014)

1.8 REVIEW OF PAVEMENT DESIGN

1.8.1 Manual of Specification and Standards

The Schedule-D, Annex-I states that "Four-laning of the Project Highway shall conform to the Manual for Specifications and Standards for Four Laning of Highways Through Public Private Partnership" published by Indian Road Congress (IRC: SP:84-2014)

1.8.2 Review of CA stipulations for Pavement Design

Clause 5.4.1 (i) of IRC SP: 84-2014 stipulates that the flexible pavement shall be designed for a minimum design period of 15 years or operation period, whichever is more. Stage construction is permissible subject to the requirements specified in para (ii) of Clause 5.4.1

Clause 5.4.1 (ii) of IRC SP: 84-2014 specifies that "Alternative strategies or combination of initial design, strengthening and maintenance can be developed by the Concessionaire to provide the specified level of pavement performance over the operation period subject to satisfying the following minimum design requirements".

(a) Indicates that, the thickness of sub-base and base of pavement section is designed for a minimum design period of 15 years and the initial bituminous surfacing for a minimum design period of 10 years.

(b) Indicates the pavement shall be strengthened by bituminous overlay as and when required to extend the pavement life to full operation period. The thickness of bituminous overlay shall be determined on the basis of relevant IRC codes.

Clause 5.9.6 (ii) of the same manual also stipulates that the initial strengthening shall be done for a minimum design period of 10 years.

Clause 5.9.6 (iv) of the same manual also stipulates that the for bituminous overlay for pavement strengthening shall not be less than 50mm bituminous concrete.

Clause 5.4.2 states that rigid pavement shall be designed for a minimum design period of 30 years.

1.8.3 Concessionaire's Pavement Design

The Project involved construction of flexible pavement for Main carriageway and Rigid Pavement at Toll Plaza location. Design of New Flexible pavement construction was carried out in accordance with IRC 37-2012. The pavement layers for new construction have been designed for 15-year design traffic both for the Bituminous layers and base and sub base layers.

1.8.4 Base year Commercial Traffic

Traffic surveys were conducted during September 2017. Base year commercial traffic from this survey is presented as below

Table 2: AADT from Concessionaire Report

Section No.	Homogeneous section	BUS	LCV	2A Truck	3A truck	MAV
	Main Carriageway: Chikhali- Tarsod					
HS-I	Km 365	141	317	346	683	1192
HS-II	Km 399	215	169	332	359	878
HS-III	Km 417	229	324	335	383	863
	Main Carriageway: Tarsod- Chikhali					
HS-I	Km 365	146	325	404	658	1377
HS-II	Km 399	216	154	377	398	983
HS-III	Km 417	202	301	332	415	905

1.8.5 Vehicle Damage Factor

Axle load surveys were conducted during the month of April 2017 and the VDF's thus arrived are presented in the following:

Table 3: VDF from Concessionaire Report

Vehicle	Chikhali - Tarsod direction	Tarsod - Chikhali direction
LCV	1.22	0.82
2A Bus	0.41	0.36
2A Truck	2.42	0.82
3A Truck	2.92	2.57
MAV	4.45	6.69

1.8.6 Design Traffic

Depending upon traffic pattern, 3 homogeneous sections were made and 15-year msa has been presented and considered for design as below.

Table 4: VDF from Concessionaire Report

Section No.	Homogeneous section	AADT location	Design Traffic, MSA(for 15 yrs)	
			Chikkhali - Tarsod direction	Tarsod - Chikkhali direction
HS-I	Km 360.000-Km 371.619	Km 365+000	84	107
HS-II	Km 371.619-Km 401.580	Km 399+000	59	76
HS-III	Km 401.580- Km 422.700	Km 417+000	59	75

1.8.7 Design CBR

As per the submitted Pavement design report, the Effective CBR value for the design of Pavement is considered as 15%.

1.8.8 Pavement Crust Main carriageway

Design of New construction & at Widening portion is carried out in accordance with IRC 37-2012. The pavement layer for new construction / Widening portion has been designed for 15-year design traffic load for the Bituminous layers.

The Pavement layer thickness for various design loading as given below

Table 5: Crust thickness from Concessionaire Report

Section No.	Homogeneous section	15yrs MSA	Effective CBR	Design Traffic, MSA			
				BC	DBM	WMM	GSB
	Maiin Carriageway: Chikkali- Tarsod						
HS-I	Km 360.000-Km 371.619	84	15%	50	105	250	200
HS-II	Km 371.619-Km 401.580	59	15%	50	90	250	200
HS-III	Km 401.580- Km 422.700	59	15%	50	90	250	200
	Maiin Carriageway: Tarsod- Chikkali						
HS-I	Km 360.000-Km 371.619	107	15%	50	120	250	200
HS-II	Km 371.619-Km 401.580	76	15%	50	100	250	200
HS-III	Km 401.580- Km 422.700	75	15%	50	100	250	200

The volumetric parameters used in the design are Va-4.5% and Vb-11.5%

The above submitted thicknesses were reviewed by Authority Engineer and recommended thicknesses are as suggested below:

Table 6: Crust thickness as recommended by Authority Engineer

Section No.	Homogeneous section	Effective CBR	Design Traffic, MSA			
			BC	DBM	WMM	GSB
Main Carriageway: Chikkali- Tarsod						
HS-I	Km 360.000-Km 371.619	15%	50	100	250	200
HS-II	Km 371.619-Km 401.580	15%	50	85	250	200
HS-III	Km 401.580- Km 422.700	15%	50	85	250	200
Main Carriageway: Tarsod- Chikkali						
HS-I	Km 360.000-Km 371.619	15%	50	115	250	200
HS-II	Km 371.619-Km 401.580	15%	50	95	250	200
HS-III	Km 401.580- Km 422.700	15%	50	95	250	200

1.8.9 Service Road Design

The Service Road has to be designed for design traffic of 10 MSA as per Cl. 5.5.5 of IRC SP 84-2014.

As per submitted Pavement Design Report the service road has been designed for 10 MSA & 15% CBR. The Pavement layer adopted for service road as given below:

- BC -30 mm
- DBM -50 mm
- WMM -250 mm
- GSB -200 mm

1.8.10 Overlay Design

Based on the deflection values overlay has been proposed for 10-year design traffic. Strengthening of flexible pavements was based on the pavement rebound deflections obtained from the deflection survey conducted by the Falling Weight Deflectometer (FWD) testing equipment following the guidelines of IRC: 115-2014. Overlay is calculated is in the range of 50mm – 95mm.

1.8.11 Flexible Pavement for Bus Bay, Truck Lay Bye & Parking Areas

Flexible pavement, same as main carriageway composition is proposed for bus bay, truck lay bye locations, whereas the parking areas at Toll Plaza is composed with the BC as the wearing course layer with the design traffic as 5msa, and the crust composition is as follow

- BC -30 mm
- DBM -50 mm
- WMM -150 mm
- GSB -150 mm

1.8.12 Rigid Pavement Design

As per submitted Pavement Design Report, Rigid Pavement design at Toll Plaza location the proposed crust as given below:

- PQC -270 mm
- DLC -150 mm
- GSB -150 mm
- Subgrade -500 mm (15% effective CBR)

1.9 Review of COS works

The list of compiled COS work orders related to the project are presented below for the amount in million rupees:

COS number	Description	Amount	Work done	Work pending to be done	Amount received	Amount pending to be received	Samarth Observations - Physical status of Work
CTHPL-COS-I	Box culverts	47	44	4	29	15	Work completed
CTHPL-COS-II	MNB	9	6	3	-	6	Work completed
CTHPL-COS-III	PUP and VUP	171	166	5	-	166	A) 396+502- PUP: 1. LHS old bridge and RHS New bridge not in same line and purpose will not serve and recommended for reconstruction but as per CA R&R proposed. 2. LHS approaches under construction. B) 414+628- PUP: 1. Widening of the structure is pending on LHS. 2. Approaches under construction on LHS.
CTHPL-COS-IV	ROB	114	-	114	-	-	Work yet to start LHS Old bridge is to be reconstructed with span arrangement of 1x10+1x25+1x37.5+1x10 under COS as per letter no:858 dated 13.05.2021
CTHPL-COS-V	ROB	60	13	47	-	13	**Work in progress** 01.Construction of ROB (variation in Appr vs Tender GAD) @ 396+827 a) Structure is Under construction. b.) Construction up to Abutment cap level completed. c.) Super structure, crash barriers, expansion joints, bearings and wearing coat are pending. d. Launching platform preparing at site. e. Open wing steel girder assembling and fabrication is progress at site.
COS	Implementation of hybrid ETC system	13	13	-	-	13	Completed
COS 8 & 9	Increase in formation width of 3 Minor bridges	7	7	-	-	7	Completed
COS	Arrangement of Internet connecti vity	0	0	-	-	0	Arrangement of Internet connectivity @ Toll Plaza noticed

COS	Construction of Oxygen Plant	2	2	-	2	-	
Total in Millions		**491**	**253**	**238**	**31**	**222**	

1.10 HEAD OF TERMS

A. Key terms of Concession Agreement

Particulars	**Description**
Date of Agreement **Settlement Agreement** **Appointed Date**	03-APR-2017 08-Jan -2019 16-Jan-2019
Employer	NHAI, Government of India
Concessionaire	CTHPL, Chikhali Tarsod Highways Pvt. Ltd,
Concession Period	15 Years from COD
Length of the Project, **Total project Cost**	62.7 Km Rs.1048.1Cr Bid project Cost, Rs 4.01Cr Bid O&M cost
Achievement of Project Mile Stones	Mile Stone-I: Achieved on 24.06.2019 (As per CA Sch-G, Scheduled Completion Date is 01.11.2019 i.e., 290th day from Appointed Date) Mile Stone-II: Achieved on 31.10.2019 (As per CA Sch-G, Scheduled Completion Date is 20.03.2020 i.e., 430th day from Appointed Date) Mile Stone-III: Achieved on 29.01.2021 (As per CA Sch-G, Scheduled Completion Date is 06.12.2020 i.e., 690th day from Appointed Date+ EOT 90days, dt.06.03.2021) Mile Stone-IV: Achieved on 25.08.2021 (As per CA Sch-G, Scheduled Completion Date is 13.07.2021 i.e., 910th day from Appointed Date+ EOT 90days, dt 11.10.2021)
Construction Period/ **Scheduled completion date**	910 days from the Appointed Date/ 13.07.2021
Annuity	First Year O&M Cost-RS 4.01 Crore, to be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.
Extension of Time **COD** **PCOD** **FCOD**	Authority granted 1st interim EOT recommendations for 90 days on 02th Jun 2020 in view of COVID-19 pandemic. Accordingly, scheduled completion date 13th July 2021 has been revised to 11th Oct 2021. Further extension of 146 days Construction period request from Concessionaire has been returned back on 11.12.2021 stating that project is deemed to be complete upon issuance provisional certificate (PCOD). PCOD achieved on 25.08.2021 Final completion certificate is yet to be received.
Respective rights and obligations **of the Parties**	Article 4, 9, 10, 23, 34, 42

Change in Ownership	The Concessionaire shall take prior approval of the Authority for any change in ownership in accordance with the article 5.3 of CA
Dispute Resolution	1.At first instance by mediation by the Independent Engineer 2.Amicable settlement by conciliation by the Chairman of the Authority & Chairman of the board of directors of the Concessionaire 3. Finally by Arbitration in accordance with Arbitration and Conciliation Act 1996
Governing Law and Jurisdiction	Courts New Delhi shall have exclusive jurisdiction over matters arising out of or relating to this Agreement

B. Key terms of EPC Agreement

Particulars	Description
Date of Agreement **Appointed Date**	23-Feb-2018 16-Jan-2019
Concessionaire	CTHPL (Chikhali-Tarsod Highways Private Limited)
Contractor	Welspun Enterprises Limited
Commencement Date **Construction Period**	16-Jan-2019 Beginning from the commencement Date and ending on the completion of EPC Works
Length of the Project, **Contract Price**	62.7 Km Base price Rs 930 Cr + GST as per clause 5 of EPC agreement, + Price Index Multiple as per CA, Article 23
Achievement of Project Mile Stones	Mile Stone-I: Achieved on 24.06.2019 (As per Annexure-D of EPC Contract, Scheduled Completion Date is 01.11.2019 i.e., 290th day from Appointed Date) Mile Stone-II: Achieved on 31.10.2019 (As per Annexure-D of EPC Contract, Scheduled Completion Date is 20.03.2020 i.e., 430th day from Appointed Date) Mile Stone-III: Achieved on 29.01.2021 (As per Annexure-D of EPC Contract, Scheduled Completion Date is 06.12.2020 i.e., 690th day from Appointed Date+ EOT 90days, dt.06.03.2021) Mile Stone-IV: Achieved on 25.08.2021 (As per Annexure-D of EPC Contract, Scheduled Completion Date is 13.07.2021 i.e., 910th day from Appointed Date+ EOT 90days, dt 11.10.2021)
Extension of Time **COD** **PCOD** **FCOD** **DLP**	Authority granted 1st interim EOT recommendations for 90 days on 02th Jun 2020 in view of COVID-19 pandemic. Accordingly, scheduled completion date 13th July 2021 has been revised to 11th Oct 2021. Further extension of 146 days Construction period request from Concessionaire has been returned back on 11.12.2021 stating that project is deemed to be complete upon issuance provisional certificate (PCOD). PCOD achieved on 25.08.2021 Final completion certificate is yet to be received. Expiry of DLP period is 24 months from Completion Certificate.
Liquidated Damages for Delay	If the Contractor fails to achieve any completions Project Milestones, the following delay damages, on demand, be paid to the Concessionaire not exceeding 10% of Contract Price 1) Milestone-I, II & III: 0.005% of the Contract Price per day until completion of such milestone 3) Milestone-IV: 0.011% of the Contract Price per day for each package until EPC works are completed
Monthly Progress Report	The Contractor shall prepare a monthly report on the progress of the works and submit to the Concessionaire
Retention Money	-
Dispute Resolution	1. Amicable Resolution, 2. Three Member Arbitration in accordance with Arbitration & Conciliation Act 1996

1.11 MAINTENANCE REQUIREMENTS:

Concessionaire shall undertake maintenance requirements as per Schedule-K of CA, below is the requirement

S. No	Description	Length (Km)	Lanes	Applicable Schedule for O&M	Maximum Roughness Allowed
1	CTHPL	62.7	4LPS	Schedule-K	2750 mm/Km

As per Manual, IRC SP:84-2014:

S. No	Description	Length (Km)	Lanes	Maximum allowable deflection	Frequency of Roughness Test	Frequency of FWD Test
1	CTHPL	62.7	4LPS	1.2mm	Twice a Year	In every 5 Years

- No specific Handing Over (Divestment) requirements are mentioned under CA. It shall be same as Schedule-K

1.12 SITE OBSERVATIONS:

1. Project road is in compliance to CA provisions.
2. The overall pavement condition of Project Road is good, except, minor cracking and raveling observed at few locations
3. Unlined V-notch Drain between MCW& SR road.
4. Overall Pavement condition is good to fair.
5. There are 4 nos of ROBs in the project road
6. As per Punch list-B, new proposal (not in Sch-B), From km 389/200 to km 389/500 LHS for 300m length Service Road Construction is pending. Plan & Profile in design stage. This location is entry/exit approach to PUP@ 389+350.
7. The NHAI has started the toll collection form 15th September 2021 (M/s Coral Associates, Udaipur, and Rajasthan).
8. Presently, Existing Fakhri ROB toll-section from Km.396+140 to 398+840 for a length of 2.7km. Concession period for this expires on 03.10.2022.
9. km 405.000-km 406.090(1.09 km) LHS: at site RE-wall approaches are completed on either side, in structure portion, Concrete Barrier construction and installation of Expansion Joint works are in progress.
10. Km 414.200- Km 415.410(1.09 km) LHS - Punch list-B, ROB@ Km414+842, is to be retained (1x37.5m span) as Schedule-B. But COS has been approved to re-construct with span arrangement of (1x10m+1x25m+1x37.5m+1x10m). Methodology and GAD approval pending from Railway. Present status is to be ascertained from Concessionaire. However, at site approach construction with RE wall are under progress.

CHAPTER 2. SURVEYS AND INVESTIGATIONS

2.1 INTRODUCTION

The main objective of undertaking Surveys and Investigations is to appreciate the existing engineering features along the project corridor and to understand the present condition of the various elements of the project road and to prepare required inputs for various rehabilitation and maintenance strategies.

Following Survey and Investigations have been undertaken as a part of study with an objective to understand the present condition of the road and there by access the quality of construction and as well to prepare requisite rehabilitation/corrective designs where necessary.

- Road Inventory Surveys
- Visual Pavement Condition
- FWD Surveys
- Roughness Surveys using 5th Wheel BI
- Pavement Composition surveys (Test Pits)
- Subgrade Investigations & Laboratory testing
- Material Investigations
- Axle Load Survey
- Structure Inventory and Condition Surveys

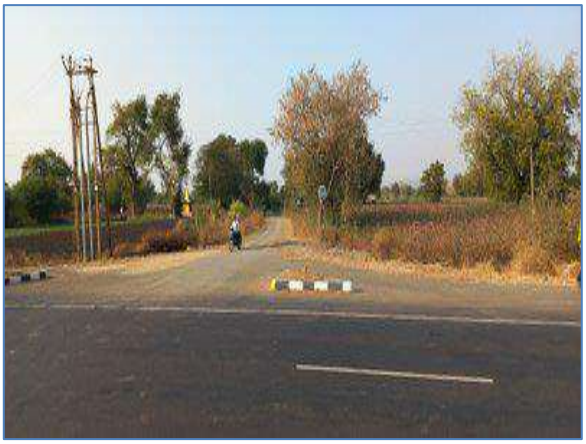
2.2 ROAD INVENTORY

The Project Road has flexible pavement over the entire length (except at Toll Plaza) with paved carriageway of 13.5m/9.0m wide including paved shoulder. The project corridor generally runs in Plain terrain. The land use along the project road is mostly built-up areas. It passes through villages like Chikhali, Varungaon, Bhusawal, and Nasirabad etc. In general, road embankments are in the range of 0.5m-2.0m height. Embankments higher than 2.0m are observed mainly in the approaches of CD structures and Underpass locations.

The view of project road at different locations is shown in the following photographs:

 A view of the Project Road with 6-Lane Approach having Lighting, MCB & CCB at Km 381.000-RHS	 **A view of the Project Road with Median Drain at Km 397.200**
 A view of the Project Road with Median 1.5m wide & MCB at Km 408.000	 **A view of the Project Road with median 4m wide at km 412.000**
 A view of the Project Road on Structure approach with Highway Lighting, CCB & MCB at Km 419.000	 **A view of the Project Road with PGR in SR Separator & MCB on Median at Km 420.000-RHS**

The Project Road has 06 Major junctions and 68 Minor junctions. Photographs showing junctions locations are presented below:



Minor Junction @ km 368.157 RHS

Major Junction @ km 372.420 RHS

Major Junction @ km 387.240 LHS

Minor Junction @ km 418.900 LHS

About 12 numbers of High mast lighting is observed along the project road. Mostly they are located at Junctions and Toll Plaza locations. Few photos showing High mast lighting are presented below:

A view of High mast lighting @ km 404.010 LHS

A view of High mast lighting @ km 415.950

All together the Project Road has about 06 Bus Bay with Bus Shelters and 19 Bus shelters on MCW and Service Road. Few photos taken at the Bus Bays and Bus Shelter are presented below:

Bus Shelter near km 360.050 LHS

Bus Shelter near km 372.250 RHS

Bus Shelter near km 409.150 LHS

The Project Road has one Truck lay-bye along the Project Highway.

Truck Lay Bye @ Km 417.420 LHS

Truck Lay Bye Toilet Block @ Km 417.420 LHS

The Project Road has one existing old Toll Plaza at Fekri, Ch398+450. This was constructed to collect toll for 2-lane ROB section between km 396+140 to km 398+840 until 03.10.2022. This has to be dismantled and developed to standard 4-lane road.

Fekri Toll Plaza at km398+450

Fekri Toll Plaza at km398+450

The Project Road has one New Toll Plaza at km 416+050-LHS & km 415+800-RHS. Rigid pavement exists at the toll plaza and in tapering portions both toll plazas. It has Ten (5+5) ETC lanes at Toll Plaza. Five high mast lights on either ends of the toll plaza are provided.

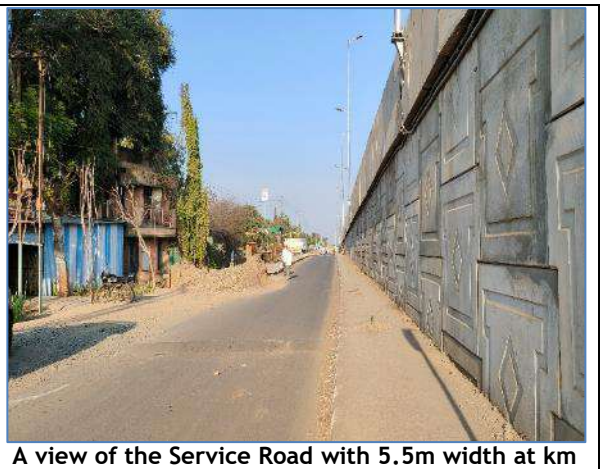
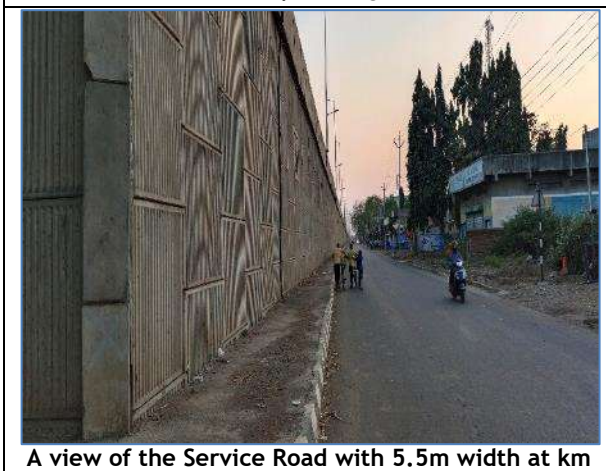
A view of the Toll Plaza near km 416+050-LHS

A view of the Toll Plaza near km 415+800-RHS

Admin Building

Toilets Blocks

Service road/slip roads of varying carriageway width of 7m to 12m have been observed along the Project Corridor. Service road/slip roads have been constructed for most of the length of the project corridor except at few locations. Photos depicting the service road pavement surface type, Condition and the other associated features like drain, pedestrian guard rails and metal Beam crash barriers on the separator are presented below. Few photographs taken at service road locations are presented below:

A view of the Service Road with 5.5m width at km 360.800 LHS	 **A view of the Service Road with 5.5m width at km 403.400 LHS**
 **A view of the Service Road with 5.5m width at km 419.550 RHS**	**A view of the Service Road with 7.25m width at km 422.000 RHS**

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.3 PAVEMENT CONDITION SURVEYS

The Pavement condition has been accessed from March, 2022 data. For entire length of pavement condition is fair and in few locations minor ravelling and rutting observed. Pavement distress captured at an interval of 200m on both the carriageways. The Pavement Condition report showing the data collected for each km length in each direction is presented in **Appendix 2** of this Report. The visual inspection of the pavement condition appears to be fair and the riding quality is satisfactory.

The photographs showing the pavement condition of the Project Road is presented below.

Rutting at km 383.000-LHS	Fair condition of pavement at km 398.000-LHS	Fair Condition km 407.000-RHS
Wheel Path at km 411.000-RHS	Fair Condition at km 414.000-LHS	Wheel Path at km 422.000-RHS

2.4 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

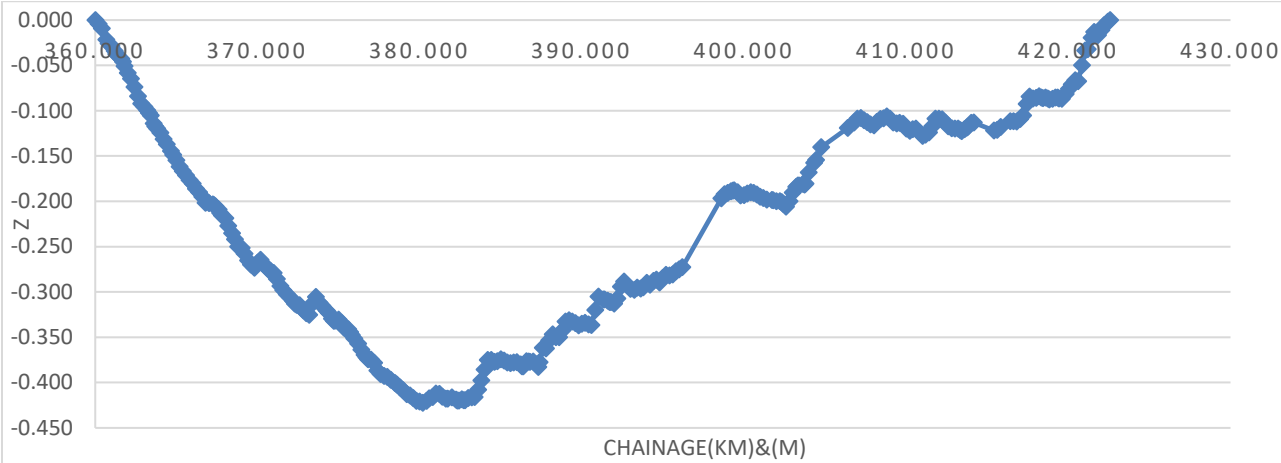
Falling Weight Deflectometer Survey

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.

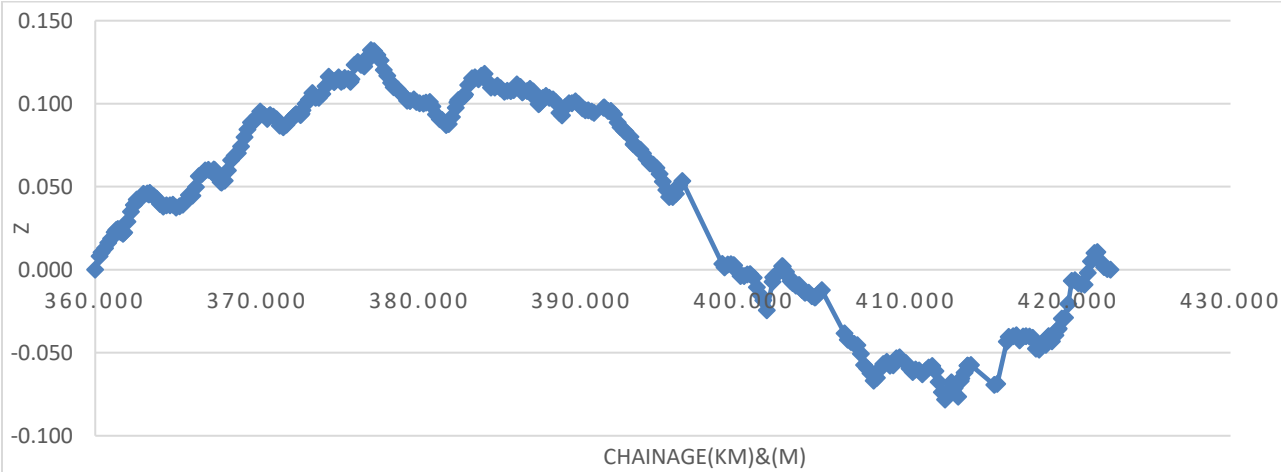
Few photos taken during the progress of FWD Surveys are presented below:

Deflection Measurement in progress	Deflection Measurement in progress

The homogenous sections in each direction of traffic (i.e., LHS & RHS) for the project stretch have been identified from graphical representation and followed by table of the same.



Delineation of Homogeneous Section - LHS



Delineation of Homogeneous Section - RHS

Table 7: FWD Data - Summary of Homogenous Section - LHS & RHS

S.No	From (km)	To (km)	Length (km)	Side
LHS				
1	360.01	361.82	1.8	LHS
2	361.82	364.22	2.4	LHS
3	364.22	366.81	2.6	LHS
4	366.81	369.82	3.0	LHS
5	369.82	372.60	2.8	LHS
6	372.60	374.72	2.1	LHS
7	374.72	377.20	2.5	LHS
8	377.20	379.61	2.4	LHS

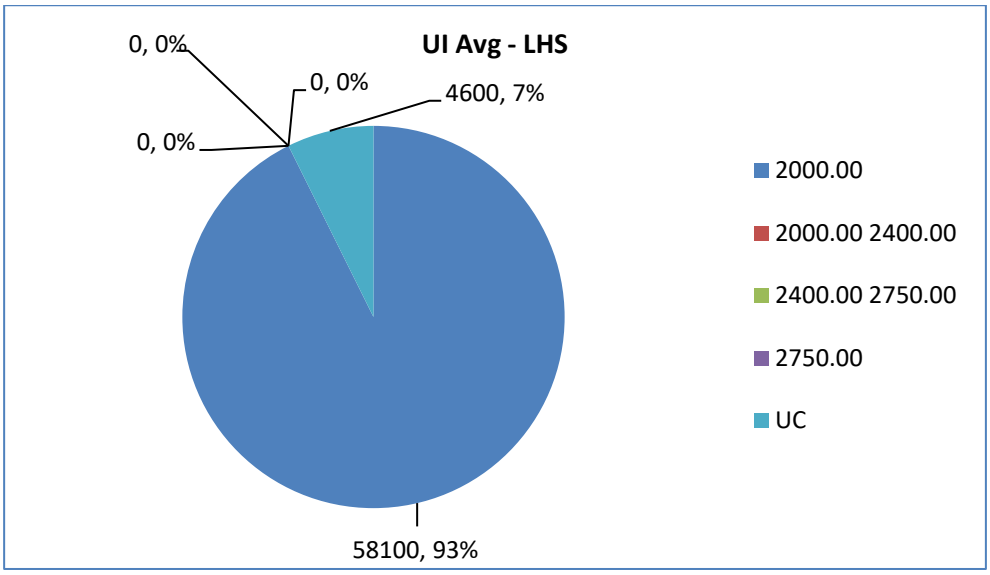
S.No	From (km)	To (km)	Length (km)	Side
9	379.61	382.42	2.8	LHS
10	382.42	384.61	2.2	LHS
11	384.61	387.00	2.4	LHS
12	387.00	390.00	3.0	LHS
13	390.00	392.41	2.4	LHS
14	392.41	396.20	3.8	LHS
15	396.20	398.60	2.4	LHS
16	398.60	402.41	3.8	LHS
17	402.41	404.76	2.4	LHS
18	404.76	406.40	1.6	LHS
19	406.40	411.02	4.6	LHS
20	411.02	414.18	3.2	LHS
21	414.18	415.42	1.2	LHS
22	415.42	418.03	2.6	LHS
23	418.03	420.21	2.2	LHS
24	420.21	422.58	2.4	LHS
RHS				
1	360.00	363.20	3.2	RHS
2	363.20	366.59	3.4	RHS
3	366.59	369.99	3.4	RHS
4	369.99	372.98	3.0	RHS
5	372.98	376.80	3.8	RHS
6	376.80	379.24	2.4	RHS
7	379.24	381.63	2.4	RHS
8	381.63	383.63	2.0	RHS
9	383.63	387.22	3.6	RHS
10	387.22	391.35	4.1	RHS
11	391.35	393.40	2.1	RHS
12	393.40	396.20	2.8	RHS
13	396.20	398.66	2.5	RHS
14	398.66	401.40	2.7	RHS
15	401.40	404.80	3.4	RHS
16	404.80	406.20	1.4	RHS
17	406.20	408.80	2.6	RHS
18	408.80	411.40	2.6	RHS
19	411.40	414.00	2.6	RHS
20	414.00	415.44	1.4	RHS
21	415.44	418.00	2.6	RHS
22	418.00	420.21	2.2	RHS
23	420.21	422.61	2.4	RHS

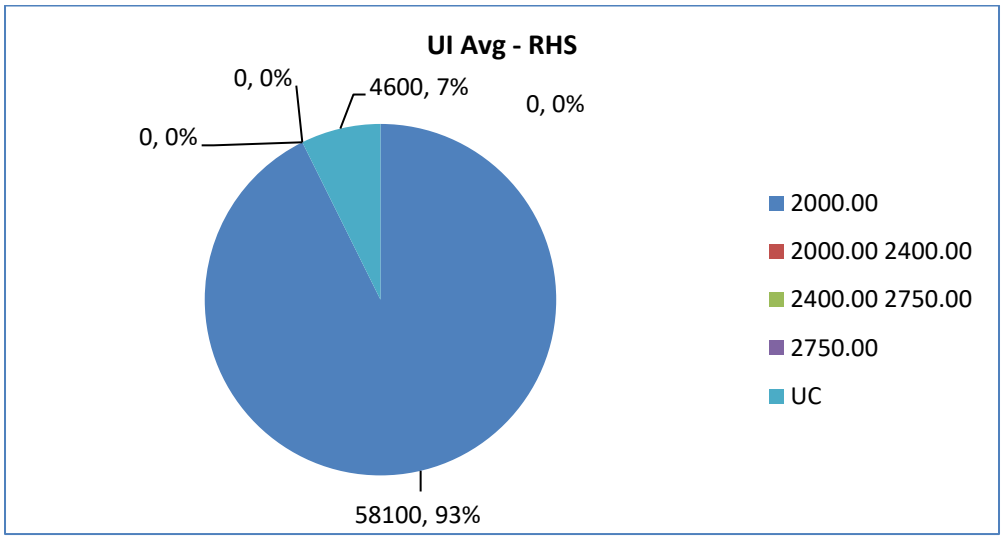
2.5 ROUGHNESS SURVEYS

The Roughness data has been collected using 5th Wheel Bump Indicator and analyzed in terms of International Roughness Index (IRI) in the month of March 2022, 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-K, the acceptable level of roughness is less than 2750 mm/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 93% of the length of the Project Road has good riding quality (UI<2000 mm/km) on left and right carriageways respectively. 7.0% of the project length is under construction on Both Carriageways.

2.6 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys conducted in the month of March 2022. Test pits have been undertaken at an interval of 10 km in each carriageway along the project road. A total of sixteen (16 no's) pits have been dug along the corridor and the data on composition of pavement has been noted. 13 out of 16 pits done on Main Carriageway edge and remaining 2 test pits done on edge of Service Road and 1 test pit on Truck lay bye. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few photographs are presented below:

Km 404.250 RHS (CT-TP-1)	Km 395.000 RHS (CT-TP-2)
Km 385.000 RHS (CT-TP-3)	Km 373.450 RHS (CT-TP-4)

Km 365.000 RHS (CT-TP-5)	Km 360.150 LHS (CT-TP-6)
Km 369.900 LHS (CT-TP-7)	Km 380.000 LHS (CT-TP-8)
Km 390.000 LHS (CT-TP-09)	Km 400.900 LHS (CT-TP-10)

Km 410.250 LHS (CT-TP-11)

Km 421.200 LHS (CT-TP-12)

Km 414.000 RHS (CT-TP-13)

Km 395.900 RHS-SR (CT-SR-TP-01)

Km 410.150 LHS (CT-SR-TP-02)

Km 417.420 RHS-SR (CT-Truck lay bye-TP-01)

Results of the test pit survey showing average thickness of pavement layers are presented in the Table below.

Table 8: Pavement Composition of Existing Pavement along Project Road

S. No	Test Pit No	Existing Chainage (km)	Direction	BT (mm)	WMM (mm)	GSB (mm)	WBM (mm)	Total (mm)
1	CT-TP-1	404+250	RHS	150	220	200	-	**570**
2	CT-TP-2	395+000	RHS	200	250	200	-	**650**
3	CT-TP-3	385+000	RHS	150	240	220	-	**610**
4	CT-TP-4	373+450	RHS	150	240	190	-	**580**
5	CT-TP-5	365+000	RHS	185	230	200	-	**615**
6	CT-TP-6	360+150	LHS	140	220	130	260	**750**
7	CT-TP-7	369+900	LHS	195	200	215	-	**610**
8	CT-TP-8	380+000	LHS	170	240	200	-	**610**
9	CT-TP-9	390+000	LHS	160	250	200	-	**610**
10	CT-TP-10	400+900	LHS	140	230	200	-	**570**
11	CT-TP-11	410+250	LHS	140	250	200	-	**590**
12	CT-TP-12	421+200	LHS	170	250	150	-	**570**
13	CT-TP-13	414+000	RHS	170	250	200	-	**620**
14	CT-SR-TP-1	395+000	RHS	100	270	200	-	**570**
15	CT-SR-TP-2	410+150	LHS	110	220	210	-	**540**
16	CT-TRUCK-LAY-BY-TP-1	417+420	LHS	160	230	200	-	**590**

Total average crust thickness of the MCW pavement is 603mm. The average thickness of bituminous layer is about 155mm. Pavement is mainly composed of a BT layer, WMM & GSB base over subgrade.

2.7 SUBGRADE INVESTIGATIONS & LABORATORY TESTING

Sub-grade Investigations have been carried out in the month of March 2022 to examine the subgrade soil characteristics along the project road. A total number of 16 test pits have been carefully dug from the pavement surface up to sub-grade level. 13 out of 16 pits done on Main Carriage way edge and remaining 02 test pits done on Service Road edge and 01 test on Truck lay bye. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

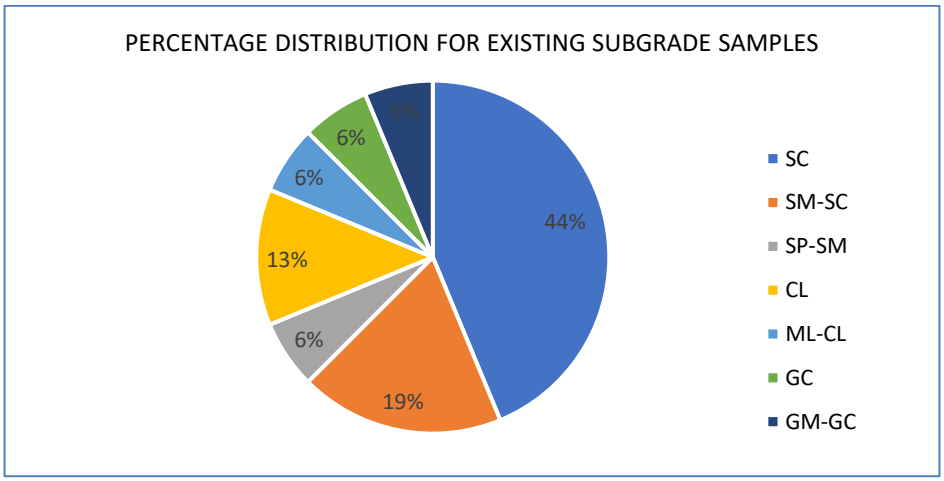
The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978. Laboratory test results indicate that all the Subgrade soil samples collected belongs to Silty

Clay Soils. About 7 Numbers belongs to SC type, 3Numbers belongs to SM-SC, 2 Numbers belongs to CL and each sample belongs to SP-SM, ML-CL, GC, GM-GC types.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



The details of borrow areas along with its offset distance from the project chainage and its quantity, rate, location details etc. are as presented below.

Table 9: Borrow Area Details

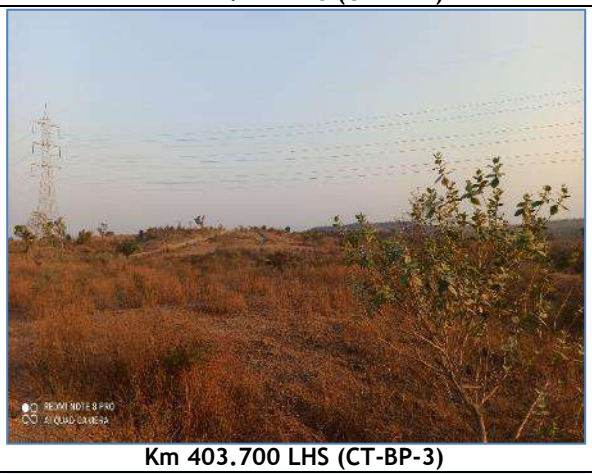
Sl. No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Quantity	Rate	Remarks	Co-ordinate
1	CT-BP-1	422+700	LHS	4.1 Kms	Vill-Mangarkheda Name-Jaidosh mob no-9923145699	5 Acres* 10 feet	Rs 500/Dumper	Pvt. Land	20.992741 75.612386
2	CT-BP-2	418+700	LHS	7.5 kms	Vill- Belvai Name-Ramesh koli Sunil koli mob no-9764128357, 9834047751	10Acres* 6 feet	Not told	Pvt. Land	20.982362 75.695484
3	CT-BP-3	403+700	LHS	9 kms	Vill- kurapal Name-Sachin Jadhav	16 Acres* 15 feet	Rs 100/100 cft	Pvt. Land	20.947838 75.762612
4	CT-BP-4	409+250	LHS	5 kms	Vill- Gombi	Plenty	Only royalty	River bank	21.010867 75.721019
5	CT-BP-5	386+960	LHS	5.9 kms	Vill- Varungaon	Plenty	Only royalty	Govt. Land	21.005268 75.894628
6	CT-BP-6	372+600	LHS	6 kms	Vill- Satod Name-Deepak salunki 8391906416	8 Acres* 20 feet	Rs 500/Dumper	Pvt. Land	21.101131 76.073493

7	CT-BP-7	360+100	LHS	1.5 kms	Vill- Ramthan	Plenty	Only royalty	Govt. Land	20.93030 76.147691

Sample photos of borrow area locations are as presented below.

Km 422.700 LHS (CT-BP-1)

Km 418.700 LHS (CT-BP-2)



Km 403.700 LHS (CT-BP-3)

Km 409.250 LHS (CT-BP-4)

Km 386.960 LHS (CT-BP-5)

Km 372.600 LHS (CT-BP-6)

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 10: Aggregate Samples Details

sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
CT-AQ-1	418+700	LHS	Sunasgaon	Sant. Gulab baba Stone Crusher Village Name: Sunasgaon Name: Vikas patil 9325445859	6.5 kms	Plenty	40 mm-1500/- per Brass20mm-Rs 2100/- per Brass 10mm-Rs 2100/- per Brass Including Royalty	Extra: GST 5%	20.990805 75.695744
CT-AQ-2	409+200	LHS	Sakegaon	Sruti Stone Crusher Village Name: Sakegaon Name: Ashis Agarwal 9422276228	600m	Plenty	40 mm-1400/- per Brass 20mm-Rs 1900/- per Brass 10mm-Rs 1500/- per Brass 6mm-Rs 1500/- per Brass Dust-Rs 1500/- per Brass M-Sand-Rs 6000/- Brass	Extra: GST 5% and Royalty	21.032372 75.741639
CT-AQ-3	403+700	LHS	Kurapad (Bhusawal)	Asta Lakshmi Stone Crusher Village Name: Kurapad (Bhusawal) Name: Sachin Jadhav 9767359755 9022005155	9.0 kms	Plenty	40 mm-1400/- per Brass 20mm-Rs 1800/- per Brass 10mm-Rs 1800/- per Brass 6mm-Rs 1450/- per Brass Dust-Rs 1500/- per Brass GSB- Rs 350/- per tonne	Extra: GST 5% and Royalty	20.947838 75.762612
CT-AQ-4	409+250	LHS	Gombi	Ayush Procon Pvt. Ltd (Own Crusher) Village Name: Gombi	5.0 kms	Plenty	Not told	-	21.010867 75.721019
CT-AQ-5	360+100	LHS	Ramthan	Jai Bholey Baba Stone Crusher Village Name: Ramthan Name: Arjun Patel 9890590571	500 m	Plenty	40 mm-1400/- per Brass 20mm-Rs 1800/- per Brass 10mm-Rs 1850/- per Brass 6mm-Rs 1400/- per Brass Dust-Rs 1500/- per Brass	Extra: GST 5% and Royalty	20.997467 76.153500
CT-AQ-6	372+307	LHS	Muktainagar	Jai Bholey Baba Stone Crusher Village Name: Muktainagar Name: Vinod Nam deve sonewer 9890590571	2.5 kms	Plenty	60 mm-1800/- per Brass 40mm-Rs 1800/- per Brass 20mm-Rs 2200/- per Brass	Extra: GST 5% and Royalty	21.022279 76.068516

Sample photos of aggregate quarry locations are as presented below

CT-AQ-1	CT-AQ-2
CT-AQ-03	CT-AQ-04
CT-AQ-05	CT-AQ-06

Sand quarries are identified at 2 nos. of locations and its details are as shown below.

Table 11: Sand Samples Details

Sand Source	Village & Name	Name of river	Chainage	side	Offset	Rate	Co-ordinate
CT-SQ-1	Ayush Procon Pvt. Ltd (Own Crusher) Village Name: Gombi	Crush Sand	409+250	LHS	5 kms	Rs 4500/ 100 cft	21.010867 75.721019
CT-SQ-2	Vill- Takarkhede (Jalagaon)	Girna River	422+700	LHS	15.0 kms	Not told	20.990981 75.514053

CT-SQ-1

CT-SQ-2

2.8 AXLE LOAD SURVEYS

Traffic loading has a significant impact on pavement performance and design. The damage that vehicles create to a road depends very strongly on the axle loads of the vehicles.

Axle load study has been conducted using portable axle load pads. Surveys have been conducted on the Project Road at one location one at Km 416+300. The survey was started on 10.02.2022 and 11.02.2022 at Km 416.300 respectively. 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

Details of Standard Axles Used

Axle Configuration	Standard Axle load (Tonnes)*	Remarks
Single Wheel, Single Axle	6.60	As per IRC 37-2018
Dual Wheel, Single Axle	8.16	As per IRC 37-2018
Dual Wheel, Tandem Axle group	15.10	As per IRC 37-2018
Dual Wheel, Tridem Axle group	22.90	As per IRC 37-2018

Few photographs illustrating the survey locations and axle load measurements are presented below.

Survey in Progress at Toll Plaza Location

Survey in Progress at Toll Plaza Location

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 12: VDF Values Estimated at the Toll Plaza Location (Near Chainage km 416+300)

Mode Type	UP	DN
LCV	1.11	1.27
2 Axle Truck	1.54	2.10
3 Axle Truck	3.22	4.59
MAV (4-6 Axle)	6.49	8.98
Buses	0.91	0.40

CHAPTER 3. VALIDATION OF EXECUTED WORKS

3.1 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground. As a part of the validation, the available as-built drawings and the inventory data received from the Concessionaire were also referred. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the executed works on ground.

Table 13: Details of Executed works

S. No.	Particulars	Length/ Nos.	As per Site
1	Start Chainage (Km)	Km.	360.000
2	End chainage (Km)	Km.	422.700
3	Length of the Project Corridor	Kms	62.700
4	Service Road / Slip Road	Kms	70.725
5	Bypass Length	Kms	3.600
6	Toll Plaza	Nr.	1
7	No. of Lanes (Both side)	Nr.	10
8	ROBs	Nr.	4
9	VUPs	Nr.	9
10	LVUP's	Nr.	1
11	PUP's/CUP's	Nr.	16
12	Major Bridges	Nr.	3
13	Minor Bridges	Nr.	22
14	Culverts (Pipe)	Nr.	68
15	Culvert (Slab/Box)	Nr.	46
16	Major Junctions	Nr.	6
17	Minor junctions	Nr.	68
18	Stone Pitching	Sqm	5175
19	Grouting	Sqm	1910
20	RE Blocks/PANELS	Kms	30.245
21	Bus Bays with Shelter	Nr.	6
22	Bus Shelters	Nr.	19
23	Truck Lay bye	Nr.	1
24	High Mast Lights	Nr.	12
25	Single Arm Lightings	Nr.	309
26	Double Arm Lightings	Nr.	1102
27	Lightings at Underpass	Nr.	117
28	Solar Blinkers	Nr.	35
29	RCC Cover Drain	Kms	60.76
30	Median drain	Kms	10.127
31	Median Cuts	Nr.	710
32	Median Opening	Nr.	14
33	Median Kerb Damages	m	18

S. No.	Particulars	Length/ Nos.	As per Site
34	Median Plantation Functional	Kms	43.245
35	Median Plantation_ Non-Functional	Kms	8.195
36	Road Markings	Sqm	55260
37	W-Beam Safety Barriers	Kms	31.000
38	Anti-Glare	km	4.230
39	Rigid Concrete Barriers	Kms	35.930
40	Concrete Railing	Kms	1.050
41	Pedestrian Guard Rails	Kms	7.268
42	Delineators	Nr.	152
43	Kilometer Stones	Nr.	118
44	Hectometer Stones	Nr.	307
45	Road Signs	Nr.	1129
46	Gantry Sign Boards	Nr.	18
47	V-Notch Drain	Kms	10.090

In the project stretch, the Service/Slip Roads with an overall both side length of km 70.725 have been observed. Location wise details of service roads and slip roads presented in **Appendix 6** of this report.

Lined Covered drains in a length of 60.760 km are provided at total length and Median Drains, V-Notch Drain are provided in a length of 10.127 Km and 10.090 Km respectively along the Project corridor, the location and condition of the same are presented in **Appendix 6**. The summary of the same is tabulated below

Table 14: Summary of Drain along Project Road

S. No	Length	RCC Cover Drain	Median Drain	V-Notch Drain
1	LHS (km)	30.205		4.700
2	Median (km)	-	10.127	
3	RHS (km)	30.555		5.390
4	Under Construction (Km)	0.860		
Total length (km)		60.760	10.127	10.090

RE walls & RCC walls are provided in approaches of under passes are observed along the Project Corridor. Summary of the embankment slope details are given below

Table 15: Summary of Type of Slope Details

Approach Type	Length
Stone Pitching	1.150
Grouting	1.910
RE Wall	30.245
Total	**33.305**

Median width of 1.5m to 4.0m was generally adopted along the project road. Median openings are provided at 14 no. of locations.

Solar Blinkers are provided at 35 nos. of locations in the median locations.

Safety barriers have been provided along the project road at high embankment, sharp curve locations and on the approaches of grade separated and cross drainage structures. The summary of safety barriers provided along the corridor are presented in the following table and the location wise details are presented in **Appendix 6:**

Table 16: Summary of Safety Barriers along Project Road

S. No	Safety Barrier	Length (km)
1	Metal Beam Crash Barrier	31.000
2	Concrete Crash Barrier	35.930
3	Pedestrians Guard Rail	7.268
4	Concrete Railing	1.050
5	Anti-glare	4.230

There are 06 major and 68 Minor Junction along the Project Corridor. Summary of Junctions are presented in table below and the location wise details are presented in **Appendix 6**

Table 17: List of Junctions along Project Road

S. No	Type	No's
1	Major junctions	06
2	Minor Junctions	68

Road furniture in the form of Signboards (Information, Gantry, Cantilever signs and Toll Boards) Pavement Markings, Delineators, Guard Posts and Highway Lighting have been provided along the project road. The Tables below depict the particular details of the Road Furniture.

Table 18: Details of Road Signs along Project Road

Description	LHS (Nos.)	RHS (Nos.)	Total (Nos.)
Octagonal	0	0	0
Circular	93	91	184
Triangular	72	84	156
Rectangular	98	107	205
Facility informatory	0	0	0
Chevron	130	160	290
Hazard	84	69	153
Route Marker	3	2	5
Safety Boards	0	0	0
Toll Boards	2	3	5
Cantilever Gantry	0	0	0
Over Head Gantry	8	10	18
Variable Message Sign	0	0	0
Project Descriptive	0	0	0
Junctions			113
Total	**490**	**526**	**1129**

High mast lighting is provided at 12 locations mainly at intersections and Toll Plaza locations. Highway Lighting is provided on Median and on service road. Lighting with 1102 No's of Double arm poles and 309 No's of Single arm poles. The location wise details of high mast and highway lighting are presented in **Appendix 6** of this report.

The Project Road has about 06 Nos. Bus Bay with Bus Shelters and 19 Nos. Bus Shelters on Main Carriageway and Service Road. The details of the same are presented in **Appendix 6** of this report.

The Project Road has one Truck lay-bye.

3.2 STRUCTURES

List of structures found during the inventory surveys along the corridor are as follows:

Table 19: Details of Major CD & Other Structures along Project Road

Sl No.	Design chainage	Type of Str	Side	Str on	Age of Str	Span Arrangement (No x Length)	Deck width
1	360+649	MJB	LHS	MCW	OLD	7x9	8.5
2	360+649	MJB	RHS	MCW	NEW	2x18+1x27	12
3	361+017	PUP	LHS	MCW	NEW	1X7x3.5	14.5
4	361+017	PUP	RHS	MCW	NEW	1X7x3.5	14.5
5	361+970	MNB	LHS	MCW	NEW	2X7.0	12
6	361+970	MNB	RHS	MCW	NEW	2X7.0	12
7	363+300	PUP	LHS	MCW	NEW	1X7x3.5	14.5
8	363+300	PUP	RHS	MCW	NEW	1X7x3.5	14.5
9	364+772	MNB	LHS	MCW	OLD	2x8.5	8.5
10	364+772	MNB	RHS	MCW	NEW	2x8.5	12
11	365+767	MNB	LHS	MCW	NEW	2x6.9	12
12	365+767	MNB	RHS	MCW	NEW	2x6.9	12
13	367+377	VUP	LHS	MCW	NEW	1x25	14.5
14	367+377	VUP	RHS	MCW	NEW	1x25	14.5
15	367+700	MNB	LHS	SR	NEW	3x9.8	12
16	367+700	MNB	LHS	MCW	NEW	3x9.8	15
17	367+700	MNB	RHS	MCW	NEW	3x9.8	15
18	367+700	MNB	RHS	SR	NEW	3x9.8	12
19	370+750	PUP	LHS	MCW	NEW	1X7x3.5	14.5
20	370+750	PUP	RHS	MCW	NEW	1X7x3.5	14.5
21	371+197	MNB	LHS	MCW	NEW	1x9.2	15
22	371+197	MNB	RHS	MCW	NEW	1x9.2	15
23	371+257	MNB	LHS	MCW	NEW	1x10	15
24	371+257	MNB	RHS	MCW	NEW	1x10	15

Sl No.	Design chainage	Type of Str	Side	Str on	Age of Str	Span Arrangement (No x Length)	Deck width
25	372+325	VUP	LHS	MCW	NEW	1x25	14.5
26	372+325	VUP	RHS	MCW	NEW	1x25	14.5
27	372+912	MNB	LHS	MCW	NEW	1x9.0	12
28	372+912	MNB	RHS	MCW	NEW	1x9.0	12
29	373+599	MNB	LHS	MCW	NEW	1x6.2	12
30	373+599	MNB	RHS	MCW	NEW	1x6.2	12
31	374+253	MNB	LHS	MCW	OLD	3x8.8	9
32	374+253	MNB	RHS	MCW	NEW	3x8.8	12
33	375+165	VUP	LHS	MCW	NEW	1x25	14.5
34	375+165	VUP	RHS	MCW	NEW	1x25	14.5
35	376+833	LVUP	LHS	MCW	NEW	1x10.5x4.5	14.5
36	376+833	LVUP	RHS	MCW	NEW	1x10.5x4.5	14.5
37	382+337	PUP	LHS	MCW	NEW	1x10.5x4.5	14.5
38	382+337	PUP	RHS	MCW	NEW	1x10.5x4.5	14.5
39	383+347	MNB	LHS	MCW	NEW	2x12	12
40	383+347	MNB	RHS	MCW	NEW	2x12	12
41	385+891	MNB	LHS	MCW	NEW	2x9	12
42	385+891	MNB	RHS	MCW	NEW	2x9	12
43	386+979	VUP	LHS	MCW	NEW	1x15	14.5
44	386+979	VUP	RHS	MCW	NEW	1x15	14.5
45	387+729	MNB	LHS	MCW	NEW	1x12	12
46	387+729	MNB	RHS	MCW	NEW	1x12	12
47	389+000	PUP	LHS	MCW	NEW	1X7x3.5	14.5
48	389+000	PUP	RHS	MCW	NEW	1X7x3.5	14.5
49	389+368	PUP	LHS	MCW	NEW	1x10.5x4.5	14.5
50	389+368	PUP	RHS	MCW	NEW	1x10.5x4.5	14.5
51	390+366	MJB	LHS	MCW	NEW	5x20	12
52	390+366	MJB	RHS	MCW	NEW	5x20	12
53	390+745	PUP	LHS	MCW	NEW	1X7x4.0	14.5
54	390+745	PUP	RHS	MCW	NEW	1X7x4.0	14.5
55	391+206	ROB	LHS	MCW	NEW	11x32+2x26.15+3x31.45	16
56	391+206	ROB	RHS	MCW	NEW	11x32+2x26.15+3x31.45	16
57	392+019	MNB	LHS	MCW	NEW	1x11	12
58	392+019	MNB	RHS	MCW	NEW	1x11	12
59	393+592	MNB	LHS	MCW	NEW	5x8.8	12
60	393+592	MNB	RHS	MCW	OLD	5x8.8	8.5
61	395+798	MNB	LHS	SR	NEW	3x5.5	11
62	395+798	MNB	LHS	MCW	NEW	3x5.5	15

Sl No.	Design chainage	Type of Str	Side	Str on	Age of Str	Span Arrangement (No x Length)	Deck width
63	395+798	MNB	RHS	MCW	NEW	3x5.5	15
64	395+798	MNB	RHS	SR	NEW	3x5.5	11
65	396+502	PUP	LHS	MCW	OLD	1X5x3.5	12
66	396+502	PUP	RHS	MCW	NEW	1X5x3.5	16
67	396+752	MNB	LHS	MCW	NEW	1x8	15
68	396+752	MNB	RHS	MCW	NEW	1x8	15
69	396+825	ROB	LHS	MCW	OLD	1x36.7	12
70	396+825	ROB	RHS	MCW	NEW	1x59.2	-
71	397+259	PUP	LHS	MCW	OLD	1X6x5.0	14.5
72	397+259	PUP	RHS	MCW	NEW	1X6x5.0	14.5
73	399+272	PUP	LHS	MCW	NEW	1X7x3.5	14.5
74	399+272	PUP	RHS	MCW	NEW	1X7x3.5	14.5
75	400+425	VUP	LHS	MCW	NEW	1x15	14.5
76	400+425	VUP	RHS	MCW	NEW	1x15	14.5
77	400+616	MNB	LHS	SR	NEW	3x8.8	12
78	400+616	MNB	LHS	MCW	NEW	3x8.8	15
79	400+616	MNB	RHS	MCW	NEW	3x8.8	15
80	400+616	MNB	RHS	SR	NEW	3x8.8	12
81	402+052	VUP	LHS	MCW	NEW	1x15	14.5
82	402+052	VUP	RHS	MCW	NEW	1x15	14.5
83	402+940	MNB	LHS	SR	NEW	1x8	11
84	402+940	MNB	LHS	MCW	NEW	1x8	15
85	402+940	MNB	RHS	MCW	NEW	1x8	15
86	402+940	MNB	RHS	SR	NEW	1x8	11
87	403+280	PUP	LHS	MCW	NEW	1X7x3.5	14.5
88	403+280	PUP	RHS	MCW	NEW	1X7x3.5	14.5
89	404+012	VUP	LHS	MCW	NEW	1x25	14.5
90	404+012	VUP	RHS	MCW	NEW	1x25	14.5
91	405+545	ROB	LHS	MCW	NEW	2x19.6+1x37.6	12
92	405+545	ROB	RHS	MCW	NEW	2x19.6+1x37.6	12
93	406+542	VUP	LHS	MCW	NEW	1x25	14.5
94	406+542	VUP	RHS	MCW	NEW	1x25	14.5
95	408+860	MNB	LHS	SR	NEW	3x7.5	11
96	408+860	MNB	LHS	MCW	NEW	3x7.5	15
97	408+860	MNB	RHS	MCW	NEW	3x7.5	15
98	408+860	MNB	RHS	SR	NEW	3x7.5	11
99	409+261	PUP	LHS	MCW	NEW	1X7x3.5	14.5
100	409+261	PUP	RHS	MCW	NEW	1X7x3.5	14.5

Sl No.	Design chainage	Type of Str	Side	Str on	Age of Str	Span Arrangement (No x Length)	Deck width
101	409+763	MJB	LHS	MCW	NEW	7x27.6	12
102	409+763	MJB	LHS	MCW	NEW	7x27.6	12
103	413+366	PUP	LHS	MCW	NEW	1x10.5x5.5	14.5
104	413+366	PUP	RHS	MCW	NEW	1x10.5x5.5	14.5
105	414+628	PUP	LHS	MCW	OLD	1X6x5.0	12
106	414+628	PUP	RHS	MCW	NEW	1X6x5.0	16
107	414+845	ROB	LHS	MCW	OLD	1x32.5	12
108	414+845	ROB	RHS	MCW	NEW	2x10+1x37.2+1x25	12
109	414+905 (Descope)	PUP	LHS	MCW	OLD	1X6x5.0	20
110	416+640	MNB	LHS	SR	NEW	3x5.0	11
111	416+640	MNB	LHS	MCW	NEW	3x5.0	15
112	416+640	MNB	RHS	MCW	NEW	3x5.0	15
113	416+640	MNB	RHS	SR	NEW	3x5.0	11
114	418+434	MNB	LHS	SR	NEW	1x9.6	11
115	418+434	MNB	LHS	MCW	NEW	1x9.6	15
116	418+434	MNB	RHS	MCW	NEW	1x9.6	15
117	418+434	MNB	RHS	SR	NEW	1x9.6	11
118	418+920	VUP	LHS	MCW	NEW	1x25	14.5
119	418+920	VUP	RHS	MCW	NEW	1x25	14.5
120	419+520	PUP	LHS	MCW	NEW	1X7x4.0	14.5
121	419+520	PUP	RHS	MCW	NEW	1X7x4.0	14.5
122	422+259	MNB	LHS	SR	NEW	3x8.9	11
123	422+259	MNB	LHS	MCW	NEW	3x8.9	15
124	422+259	MNB	RHS	MCW	NEW	3x8.9	15
125	422+259	MNB	RHS	SR	NEW	3x8.9	11

3.3 PENDING & MISSING WORKS

1. 396+825 ROB RHS Str is under Construction.
2. 396+502-PUP LHS old reconstruction pending, approaches under construction.
3. 396+825 ROB Approaches under Construction on LHS.
4. 397+259-PUP RHS approach under construction and crash barrier pending.
5. 398+450 Existing Toll Plaza dismantle and construction of 4lane
6. 405+545 ROB Structure on LHS under Construction only Crash barrier Expansion joints is pending.
7. 414+628-PUP Widening of the structure is pending on LHS.
8. 414+800 Approaches under Construction on LHS.
9. 414+905-PUP Structure is in Descope Dismantling yet not Done at site.

4.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. There are 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. 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 Twelve locations. Results of Subgrade CBR are as follows:

Table 20: 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 (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
CT-TP-1	404+250	RHS	81.20	48.97	39.72	18.8	41.48	39	26	13	SC	2.01	11.20	13.44			22.73
CT-TP-2	395+000	RHS	66.41	23.95	15.82	33.59	50.59	32	26	6	SM-SC	1.89	13.20	11.32	1.70	90%	9.09
CT-TP-3	385+000	RHS	72.04	32.94	24.02	27.96	48.02	31	21	10	SC	2.06	11.00	29.36	1.775	86%	23.81
CT-TP-4	373+450	RHS	72.07	42.08	30.86	27.93	41.21	37	22	15	SC	2.05	12.20	27.06	1.881	92%	13.04
CT-TP-5	365+000	RHS	78.50	14.02	9.98	21.50	68.52	-	NP	NP	SP-SM	2.09	9.20	24.76	1.96	94%	10.00
CT-TP-6	360+150	LHS	74.4	46.49	34.6	25.6	39.8	57	30	27	SC	1.95	10.20	12.69	1.649	85%	9.52
CT-TP-7	369+900	LHS	75.77	36.19	25.93	24.23	49.84	33	24	9	SC	1.87	14.80	5.16	1.643	88%	14.29
CT-TP-8	380+000	LHS	65.20	26.57	20.76	34.8	44.44	40	31	9	SC	1.95	12.20	13.34			13.64
CT-TP-9	390+000	LHS	87.21	68.66	57.22	12.79	29.99	39	31	8	CL	1.88	14.00	9.25	1.598	85%	9.09
CT-TP-10	400+900	LHS	57.83	22.37	16.51	42.17	41.32	25	18	7	GM-GC	2.26	8.00	42.81			10.00
CT-TP-11	410+250	LHS	89.16	54.85	36.95	10.84	52.21	38	25	13	SC	2.01	10.80	20.87	1.714	85%	13.04
CT-TP-12	421+200	LHS	59.95	21.10	14.60	40.05	45.35	28	23	5	SM-SC	1.78	15.00	11.32	1.543	87%	17.39
CT-TP-13	414+000	RHS	90.45	68.52	55.94	9.55	34.51	34	19	15	CL	1.86	14.80	9.25	1.779	965	17.39

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD	% Compaction	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
CT-SR-TP-1	395+000	RHS	82.69	59.37	53.75	17.31	28.94	30	23	7	ML-CL	2.01	13.00	9.73			8.33
CT-SR-TP-2	410+150	LHS	77.92	48.4	35.15	22.08	42.77	32	27	5	SM-SC	2.08	13.40	16.98	1.865	90%	14.29
CT-TRUCK-LAY-BY-TP-1	417+420	LHS	62.78	35.24	28.86	37.22	33.92	40	21	19	GC	2.05	11.20	23.44	1.876	91%	17.39

List of the FDD test results carried out existing subgrade are presented in the following table.

Table 21: Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	LHS/RHS				
CT-TP-1	404+250	RHS	SC	2.01		
CT-TP-2	395+000	RHS	SM-SC	1.89	1.70	90%
CT-TP-3	385+000	RHS	SC	2.06	1.78	86%
CT-TP-4	373+450	RHS	SC	2.05	1.88	92%
CT-TP-5	365+000	RHS	SP-SM	2.09	1.96	94%
CT-TP-6	360+150	LHS	SC	1.95	1.65	85%
CT-TP-7	369+900	LHS	SC	1.87	1.64	88%
CT-TP-8	380+000	LHS	SC	1.95		
CT-TP-9	390+000	LHS	CL	1.88	1.60	85%
CT-TP-10	400+900	LHS	GM-GC	2.26		
CT-TP-11	410+250	LHS	SC	2.01	1.71	85%
CT-TP-12	421+200	LHS	SM-SC	1.78	1.54	87%
CT-TP-13	414+000	RHS	CL	1.86	1.78	965
CT-SR-TP-1	395+000	RHS	ML-CL	2.01		
CT-SR-TP-2	410+150	LHS	SM-SC	2.08	1.87	90%
CT-TRUCK-LAYBYE-TP-1	417+420	LHS	GC	2.05	1.88	91%

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 1.78 gm/cc and 2.26 gm/cc. Out of 16 samples 16 samples satisfying the MDD criterion (MDD>=1.75 gm/cc)
- OMC for existing subgrade samples varies between 8% to 15%.
- Free Swelling Index for existing subgrade samples varies between 8 to 23.8. All the 16 samples are satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in fair condition.

The test results and photographs are presented at **Appendix 7** of this report.

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 22: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	Up/Dn	A.I.V (%)	Water Absorption (%)	Specific Gravity
1	CT-AQ-1	418+700	LHS	14.26	0.42	2.74
2	CT-AQ-2	409+200	LHS	8.96	0.41	2.69
3	CT-AQ-3	403+700	LHS	8.46	0.33	2.69
4	CT-AQ-4	409+250	LHS	8.2	0.42	2.72
5	CT-AQ-5	360+100	LHS	9.16	0.36	2.74
6	CT-AQ-6	372+307	LHS	11.03	0.39	2.77

Table 23: Test Results of Sand Samples Details

S. No	Sample No	Chainage	SIDE	10 mm Passing %	4.75 mm Passing %	2.36 mm Passing %	1.18 mm Passing %	600 mic Passing %	300 mic Passing %	150 mic Passing %	FM	ZONE
1	CT-SQ-1	409+250	LHS	100	91	72	36	16	5	2	3.78	ZONE-I
2	CT-SQ-2	422+700	LHS	100	99	78	40	22	9	5	3.47	ZONE-I

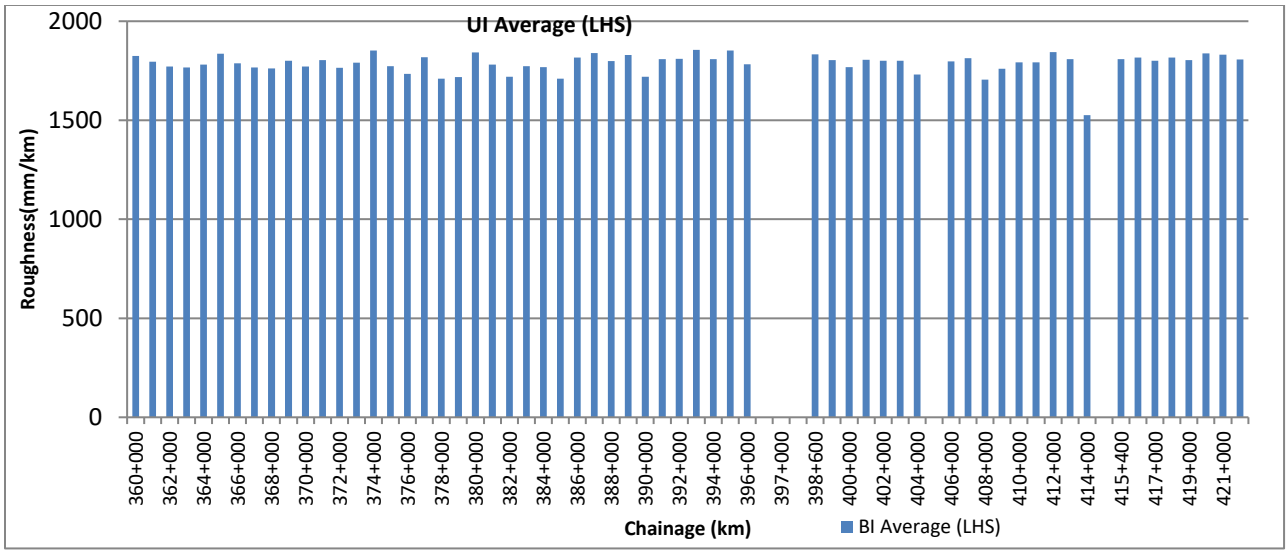
4.2 PAVEMENT CONDITION

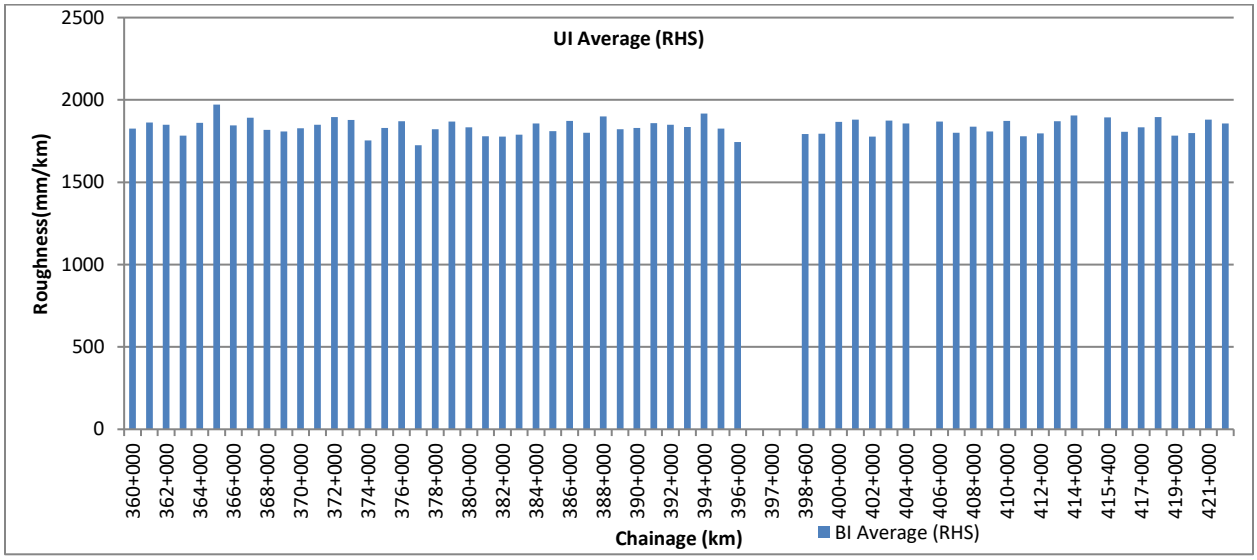
The distresses in bituminous surface havebeen captured on the project corridor for each lane separately by visual observations. Pavement Condition report covering the data collection for each km length in each direction has been presented in the **Appendix-2**.

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. Presently, the construction work in progress over existing main carriageway & service road, about 90% length has been completed and surface appears to be intact without any major distresses. However, minor raveling and minor rutting is observed.

4.3 ROUGHNESS

Almost entire project road is having good riding quality. From the above charts, overlay not required on LHS & RHS carriageway unevenness Index (UI) is less than 2000mm/km. Bar diagrams showing the Kilometer wise roughness along the project road are presented below:





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 24: Summary of Design Moduli of different layers - LHS

Sl. No	Chainage(km)		Length(km)	15th Percentile MR values		
	From	To		MR for BT	MR for Granular	MR for Subgrade
1	360.01	361.82	1.8	3139	392	86
2	361.82	364.22	2.4	3138	393	87
3	364.22	366.81	2.6	3117	391	87
4	366.81	369.82	3.0	3089	389	87
5	369.82	372.60	2.8	3007	388	87

Sl. No	Chainage(km)		Length(km)	15th Percentile MR values		
	From	To		MR for BT	MR for Granular	MR for Subgrade
6	372.60	374.72	2.1	2784	388	86
7	374.72	377.20	2.5	3124	389	87
8	377.20	379.61	2.4	2985	277	87
9	379.61	382.42	2.8	2616	221	87
10	382.42	384.61	2.2	3203	290	87
11	384.61	387.00	2.4	3395	344	87
12	387.00	390.00	3.0	2808	293	87
13	390.00	392.41	2.4	3117	330	87
14	392.41	396.20	3.8	3136	307	87
15	396.20	398.60	2.4	Under Construction		
16	398.60	402.41	3.8	3826	323	87
17	402.41	404.76	2.4	2944	324	86
18	404.76	406.40	1.6	Under Construction		
19	406.40	411.02	4.6	3161	321	87
20	411.02	414.18	3.2	3859	322	87
21	414.18	415.42	1.2	Under Construction		
22	415.42	418.03	2.6	1973	347	87
23	418.03	420.21	2.2	1961	328	87
24	420.21	422.58	2.4	2128	390	87

Table 25: Summary of Design Moduli of different layers – RHS

Sl. No	Chainage(km)		Length(km)	15th Percentile MR values		
	From	To		MR for BT	MR for Granular	MR for Subgrade
1	360.00	363.20	3.2	2148	308	87
2	363.20	366.59	3.4	2002	382	87
3	366.59	369.99	3.4	2077	359	87
4	369.99	372.98	3.0	2298	391	87
5	372.98	376.80	3.8	2287	386	87
6	376.80	379.24	2.4	2290	391	86
7	379.24	381.63	2.4	2263	341	86
8	381.63	383.63	2.0	2286	392	87
9	383.63	387.22	3.6	2344	388	86
10	387.22	391.35	4.1	1512	346	87
11	391.35	393.40	2.1	1510	352	87
12	393.40	396.20	2.8	1500	364	87
13	396.20	398.66	2.5	Under Construction		
14	398.66	401.40	2.7	1483	351	87
15	401.40	404.80	3.4	1517	364	87
16	404.80	406.20	1.4	Under Construction		
17	406.20	408.80	2.6	2472	376	86
18	408.80	411.40	2.6	2293	278	86
19	411.40	414.00	2.6	2308	331	86
20	414.00	415.44	1.4	Under Construction		
21	415.44	418.00	2.6	2294	388	87
22	418.00	420.21	2.2	2286	288	87
23	420.21	422.61	2.4	2280	288	87

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 1961 Mpa to 3859 Mpa in LHS & 1483 Mpa to

2472 Mpa in RHS Carriageway. The MR value for Granular Layers is 221 Mpa to 393 Mpa in LHS & 278 Mpa to 392 Mpa in RHS Carriageway. Similarly, the MR value for Subgrade Layer is 86 Mpa to 87 Mpa in LHS carriageway & 86 Mpa to 87 Mpa in RHS Carriageway.

4.5 PAVEMENT COMPOSITION

As per Pavement Design Report crust composition of **Main carriageway** is as below:

Layers	Crust Thickness in mm (LHS)			Crust Thickness in mm (RHS)		
	HS-1	HS-2	HS-3	HS-1	HS-2	HS-3
BC	50	50	50	50	50	50
DBM	100	85	85	115	95	95
WMM	250	250	250	250	250	250
GSB	200	200	200	200	200	200
Total(mm)	**600**	**585**	**585**	**615**	**595**	**595**

For Service Road Crust

Layers	Crust Thickness in mm
BC	30
DBM	50
WMM	250
GSB	200
Total(mm)	530

However, from Chapter-2, the "obtained crust thicknesses" from the test pits dug at 13 locations along the main carriageway and 2 locations in service road and 1 location on Truck-layby reveal that there are no noticeable major discrepancies in terms of obtained crust thicknesses.

4.6 STRUCTURES

The structures along the corridor are constructed as per the standards and specifications prevailing during execution. Presently, all structures are in good condition without any major distress. Structure wise conditions along the project corridor are presented below:

List of Major structures found during the inventory surveys along the corridor are as follows

Table 26: Summary of Major Structures

	Type of Structure	Schedule-B	As per Site
(a)	No. of Major Bridges	3	3
(b)	No. of Minor Bridges	19+3(COS)	22
(c)	No. of ROB	04	04
(d)	No. of Vehicular Underpasses	09	09
(e)	No. of Light Vehicular Underpasses	01	01
(f)	No. of Pedestrian Under passes	13+3 (COS)	16

Table 27: Summary of Culverts

	Type of Structure	Schedule	As per Site
(a)	No. of Pipe Culverts	65	68
(b)	No. of Box / Slab Culverts	46/-	46/-

Chainage: 391+206
General Description
BHS

- Type of Structure : **ROB**
- Span Arrangement : 11 x 32 + 2 x 26.15 + 3 x 31.45m
- Total deck width of structure : 2 x 16.0m
- Type of Foundation : Not visible
- Type of Substructure : RCC wall type Abutment & RCC Column and RCC wall type Pier
- Type of Superstructure : Steel & PSC Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in Fair condition.

Chainage: 396+825
General Description
LHS-Old

- Type of Structure : **ROB**
- Span Arrangement : 1 x 36.7m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Column 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 is in fair condition.

Chainage: 396+825
General Description
RHS

- Type of Structure : **ROB**
- Span Arrangement : 1 x 59.2m
- Total deck width of structure : NA
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : Open wing steel Girder (Under fabrication)
- Type of Bearing : NA
- Type of Railing / Crash Barrier : NA
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is Under construction.
- Construction up to Abutment cap level completed.
- Super structure, crash barriers, expansion joints, bearings and wearing coat are pending.
- Launching platform preparing at site.
- Open wing steel girder assembling and fabrication is progress at site.

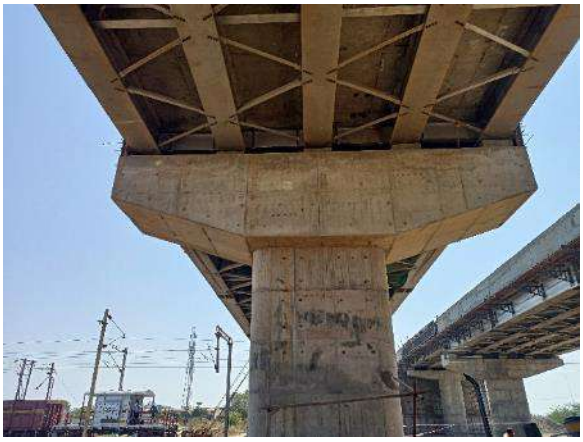
Chainage: 405+545
General Description
BHS

- Type of Structure : **ROB**
- Span Arrangement : 2 x 19.6 + 1 x 37.6m
- Total deck width of structure : 2 x 12.0m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : Steel Girder
- 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:

- Structure is Under construction on LHS.
- Crash barrier of length around 30m, expansion joints, and wearing coat are pending.
- Structure on RHS is in fair condition.



Chainage: 414+845
General Description
LHS - Old

- Type of Structure : **ROB**
- Span Arrangement : 1 x 32.5m
- Total deck width of structure : 12.0 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:

- Honey combing observed on cross girders.
- Expansion joints buried under wearing coat.
- Drainage spouts down take pipes not provided.
- Traffic is allowing on this structure and approaches under construction.

Chainage: 414+845
General Description
RHS

- Type of Structure : **ROB**
- Span Arrangement : 2 x 10 + 1 x 37.2 + 1 x 25m
- Total deck width of structure : 12.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : PSC Girder, Steel plate Girder & 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:

- Reinforcement exposed on slab at pier P1 location.
- Crash barrier damaged.

Chainage: 360+649
General Description
LHS - Old

- Type of Structure : MJB
- Span Arrangement : 7 x 9.0m
- Total deck width of structure : 8.5 m
- Type of Foundation : Not visible
- Type of Substructure : Stone masonry wall type Abutment & Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- All repairs are done.
- Structure is in Fair condition.

Chainage: 360+649
General Description
RHS

- Type of Structure : MJB
- Span Arrangement : 2 x 18 + 1 x 27m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & RCC Column Pier
- Type of Superstructure : PSC & RCC Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Quadrant pitching damaged on RHS-A1 Side.
- Expansion joints cleaning required.
- Structure is in Fair condition.

Chainage: 390+366
General Description
BHS

- Type of Structure : MJB
- Span Arrangement : 5 x 20m
- Total deck width of structure : 2 x 12.5m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & RCC Column Pier
- Type of Superstructure : RCC Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in Fair condition.

Chainage: 409+763
General Description
BHS

- Type of Structure : MJB
- Span Arrangement : 7 x 27.6m
- Total deck width of structure : 2 x 12.5m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

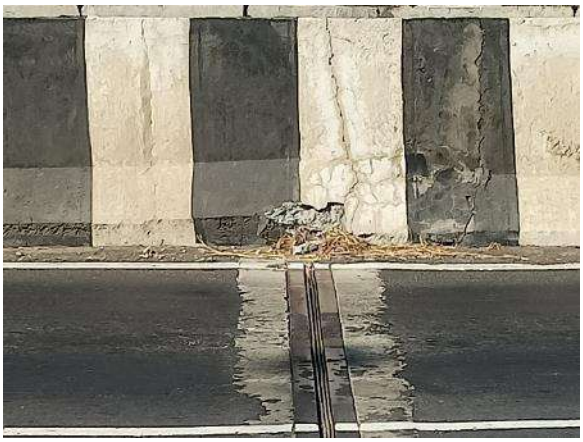
- Honeycombing observed on soffit of the girders.
- Structure is in Fair condition.

Chainage: 367+377
General Description
BHS

- Type of Structure : **VUP**
- Span Arrangement : 1 x 25m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Not visible
- Type of Substructure : RCC Column 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:

- Crash barrier damaged on LHS.
- Drainage spouts clogged due to debris.
- Structure is in fair condition.



Chainage: 372+325
General Description
BHS

- Type of Structure : **VUP**
- Span Arrangement : 1 x 25m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Not visible
- Type of Substructure : RCC Column 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:

- Expansion joint (EJ-1) damaged on LHS.
- Structure is in fair condition.

Chainage: 375+165
General Description
BHS

- Type of Structure : **VUP**
- Span Arrangement : 1 x 25m
- Total deck width of structure : 2 x 2 x 14.5m
- Type of Foundation : Not visible
- Type of Substructure : RCC Column 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:

- Drainage spouts clogged due to debris.
- Structure is in fair condition.

Chainage: 386+979
General Description
BHS

- Type of Structure : **VUP**
- Span Arrangement : 1 x 15m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 400+425
General Description
BHS

- Type of Structure : **VUP**
- Span Arrangement : 1 x 15m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 402+052
General Description
BHS

- Type of Structure : **VUP**
- Span Arrangement : 1 x 15m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 404+012
General Description
BHS

- Type of Structure : **VUP**
- Span Arrangement : 1 x 25m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Not visible
- Type of Substructure : RCC Column 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 is in fair condition.

Chainage: 406+542
General Description
BHS

- Type of Structure : **VUP**
- Span Arrangement : 1 x 25 m
- Total deck width of structure : 2 x 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Column 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:

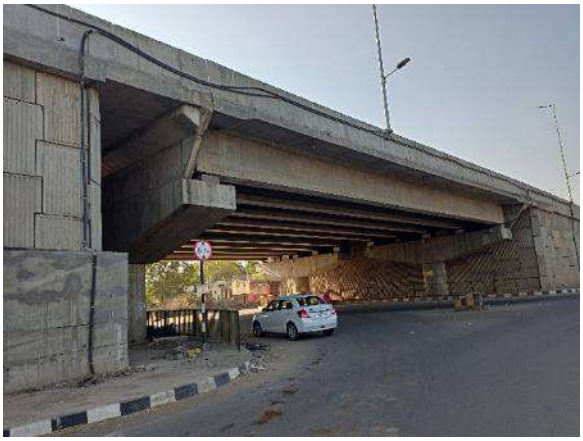
- Structure is in fair condition.

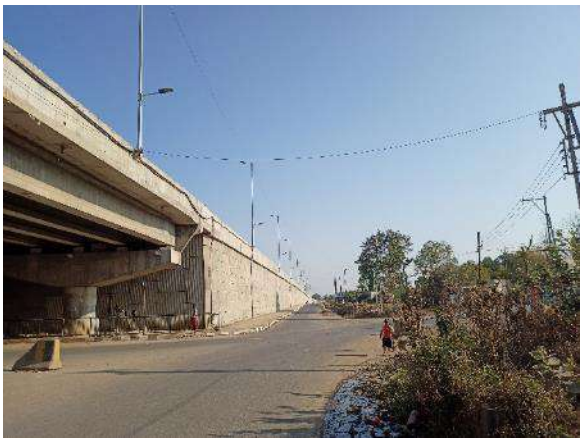
Chainage: 418+920
General Description
BHS

- Type of Structure : **VUP**
- Span Arrangement : 1 x 25 m
- Total deck width of structure : 2 x 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Column 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 is in fair condition.





Chainage: 361+017
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 7 x 3.5m
- Total deck width of structure : 2 x 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Drainage spouts down take pipes missing.
- Structure is in fair condition.

Chainage: 363+300
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 7 x 3.5m
- Total deck width of structure : 2 x 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 370+750
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 7 x 3.5m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 382+337
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 10.5 x 4.5m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 389+000
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 7 x 3.5m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 389+368
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 10.5 x 4.5m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 390+754
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 7.0 x 4.0m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

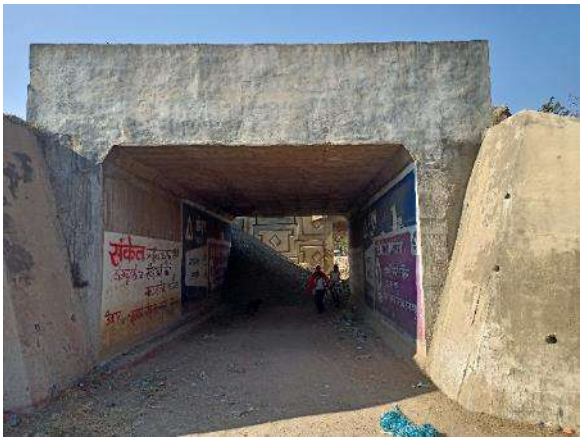
- Structure is in fair condition.

Chainage: 396+502
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 5.0 x 3.5m
- Total deck width of structure : LHS 12.0m
  RHS 16.0m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- LHS old reconstruction pending.
- LHS approaches under construction.
- Structure is in fair condition.



Chainage: 397+259
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 6.0 x 5.0m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- RHS approach under construction and crash barrier pending.
- Structure is in fair condition.

Chainage: 399+272
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 7 x 3.5 m
- Total deck width of structure : 2 x 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 403+280
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 7 x 3.5m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 409+261
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 7 x 3.5 m
- Total deck width of structure : 2 x 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 413+366
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 10.5 x 4.5m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Honeycombing observed on Median wall.
- Structure is in fair condition.

Chainage: 414+628
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 6.0 x 5.0m
- Total deck width of structure : LHS 12.0m
  RHS 16.0m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Widening of the structure is pending on LHS.
- Approaches under construction on LHS.
- Structure is in fair condition.

Chainage: 414+905 (Descoped)
General Description
LHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 6.0 x 5.0 m
- Total deck width of structure : 20.0 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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 Descope as per Letter No: AA/HW/CTC/TL/2098/2020/1041 dated 20.10.2020.
- Dismantling yet not done at site.

Chainage: 419+520
General Description
BHS

- Type of Structure : **PUP**
- Span Arrangement : 1 x 7.0 x 3.0m
- Total deck width of structure : 2 x 14.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 376+833
General Description
BHS

- Type of Structure : **LVUP**
- Span Arrangement : 1 x 10.5 x 4.5m
- Total deck width of structure : 2 x 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 361+970
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 2 x 7.1m
- Total deck width of structure : 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 364+772
General Description
LHS Old

- Type of Structure : **MNB**
- Span Arrangement : 2 x 8.5m
- Total deck width of structure : 8.5m
- Type of Foundation : Raft
- Type of Substructure : Stone masonry Wall Type Abutment & Pier
- Type of Superstructure : RCC Solid slab
- Type of Bearing : NA
- 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: 364+772
General Description
RHS

- Type of Structure : **MNB**
- Span Arrangement : 2 x 8.5m
- Total deck width of structure : 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 365+767
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 2 x 6.9m
- Total deck width of structure : 2 x 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 367+700
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 3 x 9.8 m
- Total deck width of structure : MCW – 2 x 15.0 m
  SR – 2 x 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Honeycombing observed on retaining walls and side walls.
- Quadrant pitching not provided on LHS-A2 side.
- Structure is in fair condition.

Chainage: 371+197
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 9.2m
- Total deck width of structure : 2 x 15.0m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Honeycombing observed on retaining wall, crash barrier and face of solid slab.
- Structure is in fair condition.

Chainage: 371+257
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 10m
- Total deck width of structure : 2 x 15.0m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Honeycombing observed on retaining walls.
- Structure is in fair condition.

Chainage: 372+912
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 9.0m
- Total deck width of structure : 2 x 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Honey combing observed on retaining wall, crash barrier and face of solid slab.
- Structure is in fair condition.

Chainage: 373+599
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 6.2m
- Total deck width of structure : 2 x 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 374+253
General Description
LHS

- Type of Structure : **MNB**
- Span Arrangement : 3 x 8.8m
- Total deck width of structure : 9.0m
- Type of Foundation : Raft
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid slab
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Retaining wall damaged.
- Reinforcement exposed at soffit of the slab at pier P1 location.
- Cracks observed on pier cap P2 & wing walls.
- Structure is in fair condition.

Chainage: 374+253
General Description
RHS

- Type of Structure : **MNB**
- Span Arrangement : 3 x 8.8m
- Total deck width of structure : 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Reinforcement exposed on retaining wall.
- Structure is in fair condition.

Chainage: 383+347
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 2 x 12.0m
- Total deck width of structure : 2 x 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 385+891
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 2 x 9m
- Total deck width of structure : 2 x 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 387+729
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 12m
- Total deck width of structure : 2 x 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 392+019
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 11.0m
- Total deck width of structure : 2 x 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Hand railing damaged on LHS.
- Structure is in fair condition.

Chainage: 393+592
General Description
LHS

- Type of Structure : **MNB**
- Span Arrangement : 5 x 8.8m
- Total deck width of structure : 12.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 393+592
General Description
RHS-Old

- Type of Structure : **MNB**
- Span Arrangement : 5 x 8.8m
- Total deck width of structure : 8.5m
- Type of Foundation : Raft
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid slab
- Type of Bearing : NA
- 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: 395+798
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 3 x 5.5m
- Total deck width of structure : MCW - 2 x 15.0m
  SR - 2 x 11.0m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Pipe conduits passing through the structure.
- Structure is in fair condition.

Chainage: 396+752
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 8.0m
- Total deck width of structure : 2 x 15.0m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- 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: 400+616
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 3 x 8.8m
- Total deck width of structure : MCW - 2 x 15.0m
  SR - 2 x 12.0m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 402+940
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 8.0m
- Total deck width of structure : MCW - 2 x 15.0m
  SR - 2 x 11.0 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 408+860
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 3 x 7.5 m
- Total deck width of structure : MCW - 2 x 15.0 m
  SR - 2 x 11.0 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Chainage: 416+640
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 3 x 5.0m
- Total deck width of structure : MCW - 2 x 15.0m
  SR - 2 x 11.0m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Vent way covered with Vegetation & Bushes.
- Structure is in fair condition.

Chainage: 418+434
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 1 x 9.6 m
- Total deck width of structure : MCW - 2 x 15.0 m
  SR - 2 x 11.0 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- This structure located on irrigation canal.
- Structure is in fair condition.

Chainage: 422+259
General Description
BHS

- Type of Structure : **MNB**
- Span Arrangement : 3 x 8.9 m
- Total deck width of structure : MCW - 2 x 15.0 m
  SR - 2 x 11.0 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Crash Barrier cum Hand railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure is in fair condition.

Details of Culverts

S. No.	Chainage as Per P&P	Type of Structure	Side	Structure on	Age of Structure	Span (No x Length (m))	Total width (m)	Site observations
1	361+143	Pipe	BHS	MCW & SR	New	2 x 1.2	48	> Pipe is in fair condition.
2	361+568	Pipe	BHS	MCW	New	2 x 1.2	40	> Pipe is partially buried with debris and vegetation
3	362+317	Pipe	BHS	MCW	New	1 x 1.2	40	> Pipe is in fair condition.
4	363+132	Pipe	BHS	MCW & SR	New	1 x 1.2	40	> Pipe is partially buried.
5	363+452	Pipe	BHS	MCW & SR	New	1 x 1	40	> Pipe is in fair condition.
6	363+827	Pipe	BHS	MCW	New	2 x 0.9	50	> Pipe is in fair condition.
7	364+040	Pipe	BHS	MCW	New	1 x 1.2	40	> Pipe is in fair condition.
8	365+138	Box/Slab	BHS	MCW	New	1 x 4	28	> Structure is in fair condition.
9	365+502	Box/Slab	BHS	MCW	New	1 x 4	24	> Structure is in fair condition.
10	366+541	Pipe	BHS	MCW	New	1 x 1.2	34	> Pipe is in fair condition.
11	366+654	Pipe	BHS	MCW	New	1 x 1.2	34	> Pipe is in fair condition. > Quadrant pitching partially damaged at RHS.
12	366+917	Box/Slab	BHS	MCW & SR	New	1 x 3	52	> Structure is in fair condition. > Quadrant pitching partially damaged at RHS.
13	367+083	Pipe	BHS	MCW & SR	New	2 x 1.2	52	> Pipe is in fair condition. at RHS > LHS fully buried with mud > Segregation of concrete observed on headwall
14	368+315	Box/Slab	BHS	MCW	New	1 x 6	28	> Structure is in fair condition. > Irrigation culvert. > A2 side QP not provided.
15	368+466	Pipe	BHS	MCW	New	1 x 1.2	28	> Pipe is in fair condition.
16	368+788	Box/Slab	BHS	MCW	New	1 x 5	26	> Structure is in fair condition.
17	369+102	Pipe	BHS	MCW	New	1 x 1.2	32	> Pipe is in fair condition. > Vegetation and debris are partially filled in vent way.
18	369+310	Pipe	BHS	MCW	New	1 x 1.2	32	> Pipe is in fair condition.
19	369+852	Box/Slab	BHS	MCW	New	1 x 3	26	> Structure is in fair condition.
20	370+599	Box/Slab	BHS	MCW & SR	New	1 x 3.1	56	> Structure is in fair condition. > Drain vents provided are not properly finished. > QP is not provided at RHS.
21	371+649	Box/Slab	BHS	MCW & SR	New	1 x 4	44	> Structure is in fair condition.
22	371+963	Pipe	BHS	MCW & SR	New	1 x 1.2	52	> Pipe is fully buried at RHS. > LHS is in fair condition.
23	372+220	Pipe	BHS	MCW & SR	New	1 x 1.2	52	> Pipe is fully buried at BHS
24	372+633	Pipe	BHS	MCW & SR	New	1 x 1.2	52	> Pipe is fully buried at BHS
25	373+142	Pipe	BHS	MCW	New	1 x 1.2	34	> Pipe is fully buried at RHS. > LHS is in fair condition.
26	373+924	Pipe	BHS	MCW	New	1 x 1.2	44	> Vegetation observes in vent way. > RHS protection works partially

S. No.	Chainage as Per P&P	Type of Structure	Side	Structure on	Age of Structure	Span (No x Length (m))	Total width (m)	Site observations
								damaged.
27	374+067	Box/Slab	BHS	MCW	New	1 x 5	45	> Structure is in fair condition.
28	374+529	Pipe	BHS	MCW & SR	New	1 x 1.2	52	> Pipe is in fair condition. . RHS partially buried.
29	375+307	Pipe	BHS	MCW & SR	New	2 x 1.2	60	> Vegetation observe in vent way.
30	375+961	Box/Slab	BHS	MCW	New	1 x 2	32	> Structure is in fair condition.
31	376+632	Box/Slab	BHS	MCW & SR	New	1 x 2.5	52	> Structure is in fair condition.
32	376+935	Box/Slab	BHS	MCW & SR	New	1 x 5.3	52	> Structure is in fair condition.
33	378+267	Box/Slab	BHS	MCW	New	1 x 2	32	> RHS sub structure is stone masonry wall. > LHS is RCC Box type structure. > Structure is in fair condition.
34	378+882	Box/Slab	BHS	MCW	New	1 x 3.0	28	> Structure is in fair condition.
35	379+244	Pipe	BHS	MCW	New	1 x 1.2	28	> Cracks observed inside pipe at RHS. > LHS is in fair condition.
36	379+693	Box/Slab	BHS	MCW	New	1 x 4.1	28	> Structure is in fair condition.
37	380+069	Pipe	BHS	MCW	New	1 x 1.2	32	> Pipe is in fair condition.
38	381+202	Pipe	BHS	MCW	New	6 x 1.2	32	> Pipe is in fair condition.
39	381+504	Box/Slab	BHS	MCW	New	1 x 1.3	28	> Structure is in fair condition.
40	381+619	Pipe	BHS	MCW	New	3 x 1.2	28	> Pipe is in fair condition.
41	382+335	Box/Slab	BHS	MCW & SR	New	1 x 2	50	> Structure is in fair condition.
42	382+671	Box/Slab	BHS	MCW & SR	New	1 x 3.8	50	> Structure is in fair condition.
43	383+728	Pipe	BHS	MCW	New	1 x 1.2	32	> Pipe is in fair condition. > Vegetation and silt observed in vent way.
44	383+993	Pipe	BHS	MCW	New	1 x 1.2	32	> Pipe is in fair condition. > Vegetation and silt observed in vent way.
45	385+344	Pipe	BHS	MCW	New	1 x 1.2	32	> Pipe is in fair condition. > Vegetation and silt observed in vent way.
46	386+079	Pipe	BHS	MCW	New	2 x 1.2	32	> Pipe is in fair condition. > RHS partially filled with silt.
47	386+396	Box/Slab	BHS	MCW & SR	New	1 x 3.00	52	> Structure is in fair condition.
48	386+568	Pipe	BHS	MCW & SR	New	1 x 1.2	52	> Pipe is in fair condition.
49	387+024	Pipe	BHS	MCW & SR	New	2 x 1.2	52	> Pipe is buried at BHS.
50	387+420	Pipe	BHS	MCW & SR	New	1 x 1.2	62	> Pipe is in fair condition.
51	388+020	Box/Slab	BHS	MCW	New	1 x 3	26	> Structure is in fair condition.
52	388+350	Box/Slab	BHS	MCW	New	2 x 3	26	> Structure is in fair condition.
53	388+831	Box/Slab	BHS	MCW	New	2 x 3	30	> Structure is in fair condition.
54	389+100	Pipe	BHS	MCW	New	1 x 1.2	32	> QP is covered by mud. > Vent way partially covered with silt at BHS.
55	389+390	Box/Slab	BHS	MCW	New	1 x 3	38	> Vent way partially filled with silt and debris. > Segregation observed on the wing wall.

S. No.	Chainage as Per P&P	Type of Structure	Side	Structure on	Age of Structure	Span (No x Length (m))	Total width (m)	Site observations
56	389+950	Box/Slab	BHS	MCW	New	1 x 4.5	28	> Structure is in fair condition.
57	390+594	Pipe	BHS	MCW & SR	New	1 x 1.2	52	> Protection works are in progress. > Pipe is provided at BHS service road loops only. > Pipe is in fair condition.
58	390+664	Pipe	BHS	MCW & SR	New	1 x 1.2	90	> Pipe is in fair condition. > Protection works are in progress.
59	391+624	Pipe	BHS	MCW & SR	New	2 x 1.2	52	> Pipe is in fair condition.
60	392+817	Box/Slab	BHS	MCW	New	1 x 2	28	> Structure is in fair condition.
61	393+375	Pipe	BHS	MCW	New	1 x 1.2	36	> Pipe is in fair condition. > Vegetation observed in vent way surroundings.
62	394+748	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Work in progress @ BHS SR. > Existing culvert is widened in SR.
63	395+438	Box/Slab	BHS	MCW & SR	New	1 x 1.8	50	> LHS parapet wall is not constructed.
64	396+969	Pipe	BHS	MCW	New	3 x 1.2	55	> Pipe is in fair condition.
65	397+343	Pipe	BHS	MCW	New	3 x 1.2	55	> Pipe is in fair condition.
66	397+730	Pipe	BHS	MCW & SR	New	3 x 1.2	50	> Pipe is in fair condition.
67	398+201	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition. > Buried by mud at LHS
68	399+200	Box/Slab	BHS	MCW & SR	New	1 x 2	50	> Structure is in fair condition. > RHS is back filled.
69	399+435	Box/Slab	BHS	MCW & SR	New	1 x 2	50	> Structure is in fair condition.
70	400+473	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Structure is in fair condition. > RHS is back filled.
71	400+959	Box/Slab	BHS	MCW & SR	New	1 x 5	60	> Structure is in fair condition.
72	401+117	Pipe	BHS	MCW & SR	New	2 x 1.2	50	> Pipe is in fair condition. > LHS is back filled.
73	401+606	Box/Slab	BHS	MCW & SR	New	1 x 4.5	50	> Structure is in fair condition.
74	402+070	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition. > RHS partially filled with silt. > LHS totally buried
75	402+547	Pipe	BHS	MCW & SR	New	2 x 0.9	50	> Pipe is in fair condition.
76	403+249	Pipe	BHS	MCW & SR	New	2 x 1.2	55	> Pipe is in fair condition. > Protection works are not completed.
77	403+662	Box/Slab	BHS	MCW & SR	New	1 x 3.6	50	> Structure is in fair condition. > Vent surroundings partially covered with debris.
78	403+807	Box/Slab	BHS	MCW & SR	New	1 x 2	50	> Structure is in fair condition. > Vent surroundings partially covered with mud.
79	404+050	Box/Slab	BHS	MCW & SR	New	1 x 2	55	> Structure is in fair condition. > Vent surroundings partially covered with mud.
80	404+248	Pipe	BHS	MCW & SR	New	1 x 1.2	65	> Pipe is in fair condition.
81	404+260	Box/Slab	BHS	MCW	New	1 x 6	32	> The culvert at this location is

S. No.	Chainage as Per P&P	Type of Structure	Side	Structure on	Age of Structure	Span (No x Length (m))	Total width (m)	Site observations
								used as PUP. > Present on MCW only. > Structure is in fair condition.
82	404+469	Pipe	BHS	MCW & SR	New	1 x 1.2	56	> Pipe is in fair condition. > RHS is back filled.
83	404+867	Box/Slab	BHS	MCW & SR	New	1 x 6	49.1	> Structure is in fair condition.
84	404+898	Box/Slab	BHS	MCW & SR	New	1 x 4	50	> Structure is in fair condition.
85	405+014	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Vegetation observed at BHS.
86	405+185	Pipe	BHS	MCW	New	1 x 1.2	50	> Pipe is in fair condition.
87	405+495	Box/Slab	BHS	MCW	New	1 x 5	50	> Structure is in fair condition. > Structure is under construction.
88	405+559	Pipe	-	-	-	-	-	> Descope (str at ROB)
89	405+793	Pipe	BHS	MCW	New	1 x 1.2	54	> Pipe is in fair condition. > RHS SR pipe is under construction.
90	406+010	Box/Slab	BHS	MCW	New	1 x 5	44	> Structure is in fair condition.
91	406+036	Pipe	BHS	MCW	New	1 x 1.2	44	> Pipe is in fair condition. > Vent way is partially buried.
92	406+875	Box/Slab	BHS	MCW & SR	New	1 x 2	50	> Structure is in fair condition. > QP is covered by mud.
93	407+055	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
94	407+875	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
95	408+170	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
96	408+500	Pipe	BHS	MCW & SR	New	-	50	> Pipe is in fair condition.
97	409+326	Box/Slab	BHS	MCW & SR	New	1 x 6	50	> Structure is in fair condition.
98	410+625	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
99	410+664	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
100	411+112	Pipe	BHS	MCW & SR	New	2 x 1.2	50	> Pipe is in fair condition. > Vegetation observed in the vent way surroundings.
101	412+690	Box/Slab	BHS	MCW & SR	New	1 x 1.6	50	> Structure is in fair condition.
102	413+144	Box/Slab	BHS	MCW & SR	New	1 x 4	50	> Structure is in fair condition.
103	413+546	Box/Slab	BHS	MCW & SR	New	1 x 3.8	50	> Structure is in fair condition.
104	415+450	Pipe	BHS	MCW	New	1 x 1.2	50	> Pipe is in fair condition.
105	416+879	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
106	417+427	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
107	417+796	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
108	417+828	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition. > Vegetation observed in vent way surroundings.
109	418+187	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
110	419+546	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
111	419+926	Box/Slab	BHS	MCW & SR	New	1 x 3.5	50	> Structure is in fair condition.
112	420+570	Pipe	BHS	MCW & SR	New	1 x 0.9	50	> Pipe is in fair condition.
113	421+094	Box/Slab	BHS	MCW & SR	New	1 x 5	50	> Structure is in fair condition.
114	421+783	Pipe	BHS	MCW & SR	New	1 x 1.2	50	> Pipe is in fair condition.
115	422+519	Box/Slab	BHS	MCW & SR	New	1 x 3.6	50	> Structure is in fair condition.

Few Culverts Location

Pipe Culvert at Km 366+541

Pipe Culvert at Km 366+654

Pipe Culvert at Km 372+220

Pipe Culvert at Km 373+924

Pipe Culvert at Km 381+202

Pipe Culvert at Km 383+728

Pipe Culvert at Km 386+079	Pipe Culvert at Km 389+100
Pipe Culvert at Km 393+375	Pipe Culvert at Km 396+969
Pipe Culvert at Km 398+201	Pipe Culvert at Km 402+070

Pipe Culvert at Km 386+079

Pipe Culvert at Km 389+100

Pipe Culvert at Km 393+375

Pipe Culvert at Km 396+969

Pipe Culvert at Km 398+201

Pipe Culvert at Km 402+070

Pipe Culvert at Km 404+469	Pipe Culvert at Km 408+500
Pipe Culvert at Km 410+625	Pipe Culvert at Km 415+430
Pipe Culvert at Km 417+837	Pipe Culvert at Km 421+783

Box Culvert at Km 365+505	**Box Culvert at Km 368+315**
Box Culvert at Km 370+599	**Box Culvert at Km 374+067**
Box Culvert at Km 376+632	**Box Culvert at Km 381+504**

Box Culvert at Km 386+396	Box Culvert at Km 388+831
Box Culvert at Km 395+438	Box Culvert at Km 401+606
Box Culvert at Km 412+690	Box Culvert at Km 422+519

4.7 DRAINAGE AND SLOPE PROTECTION

- ✓ Lined Covered drains observed at Service Road Separator and service road Locations along the corridor.

4.8 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided along the project road appear to be intact over entire length.
- ✓ Pedestrian guard rails installed at Service Road separator locations appear to be in good condition

Traffic blinkers established in some locations and street lighting and high mast lighting are all functioning well.

4.9 ROAD USER FACILITIES

The Bus Shelter, provided along the corridor appear to be good condition.

CHAPTER 5. REHABILITATION PLANS AND DESIGNS

5.1 DESIGN TRAFFIC LOADING

Design Traffic loading has been estimated by considering the traffic and VDFs as estimated from the axle load survey data and with 5% growth rates for 10 years, 15 years and 20 years design period as below:

Table 28: Traffic Volume (AADT)

TS-1	HS-1: Km 360.000-Km 371.619		HS-2: Km 371.619-Km 401.580		HS-3: Km 401.580-Km 422.700	
	LHS	RHS	LHS	RHS	LHS	RHS
Bus	141	146	215	216	229	202
LCV	317	325	169	154	324	301
Truck / 2A	346	404	332	377	335	332
3A	683	658	359	398	383	415
MAV	1192	1377	878	983	863	905

Table 29: Estimated Design traffic loading (MSA)

10th year from Now	Design MSA with 5% Growth rates	
	km 415+980 UP	km 415+980 DN
HS-1: Km 360.000-Km 371.619	48	73
HS-2: Km 371.619-Km 401.580	34	52
HS-3: Km 401.580-Km 422.700	35	49

The computation of traffic loadings is presented in **Appendix 8** of this Report. Design traffic corresponding to 10 years period has been considered for overlay design.

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 30: 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	Critical Life
LHS																
HS-1: Km 360.000-Km 371.619, MSA: 48																
1	360.01	361.82	1.80	3139	392	86	140	610	140	750	3000	160	138	80	2310	80
2	361.82	364.22	2.40	3138	393	87	140	610	140	750	3000	159	137	80	2383	80
3	364.22	366.81	2.60	3117	391	87	178	475	178	653	3000	183	113	170	1230	170
4	366.81	369.82	3.00	3089	389	87	195	415	195	610	3000	195	106	221	927	221
5	369.82	372.60	2.80	3007	388	87	195	415	195	610	3000	195	106	220	923	220
HS-2: Km 371.619-Km 401.580, MSA 34																
6	372.60	374.72	2.10	2784	388	86	195	415	195	610	2784	200	110	205	830	205
7	374.72	377.20	2.50	3124	389	87	172	438	172	610	3000	205	118	145	742	145
8	377.20	379.61	2.40	2985	277	87	170	440	170	610	2985	227	142	71	467	71
9	379.61	382.42	2.80	2616	221	87	170	440	170	610	2616	246	168	41	324	41
10	382.42	384.61	2.20	3203	290	87	170	440	170	610	3000	224	139	78	494	78
11	384.61	387.00	2.40	3395	344	87	161	449	161	610	3000	218	133	91	558	91
12	387.00	390.00	3.00	2808	293	87	160	450	160	610	2808	233	150	61	420	61
13	390.00	392.41	2.40	3117	330	87	160	450	160	610	3000	222	137	82	522	82
14	392.41	396.20	3.80	3136	307	87	156	446	156	602	3000	233	145	65	416	65
15	396.20	398.60	2.40	Under Construction												
HS-3: Km 401.580-Km 422.700, MSA: 35																
16	398.60	402.41	3.80	3826	323	87	140	430	140	570	3000	257	157	49	265	49
17	402.41	404.76	2.40	2944	324	86	140	430	140	570	2944	260	158	48	255	48
18	404.76	406.40	1.60	Under Construction												
19	406.40	411.02	4.60	3161	321	87	140	450	140	590	3000	246	156	49	327	49
20	411.02	414.18	3.20	3859	322	87	142	448	142	590	3000	244	155	51	336	51
21	414.18	415.42	1.20	Under Construction												

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	Critical Life
22	415.42	418.03	2.60	1973	347	87	160	430	160	590	1973	248	159	65	314	65
23	418.03	420.21	2.20	1961	328	87	164	417	164	581	1961	256	162	61	269	61
24	420.21	422.58	2.40	2128	390	87	170	400	170	570	2128	243	138	107	344	107

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	Critical Life
RHS																
HS-1: Km 360.000-Km 371.619, MSA: 73																
1	360.00	363.20	3.20	2148	308	87	185	430	185	615	308	227	145	86	467	86
2	363.20	366.59	3.39	2002	382	87	185	430	185	615	382	216	132	132	585	132
3	366.59	369.99	3.40	2077	359	87	178	430	178	608	359	225	140	103	486	103
4	369.99	372.98	2.99	2298	391	87	150	430	150	580	391	242	148	75	353	75
HS-2: Km 371.619-Km 401.580, MSA 52																
5	372.98	376.80	3.82	2287	386	87	150	430	150	580	386	243	150	73	344	73
6	376.80	379.24	2.44	2290	391	86	150	433	150	583	391	241	148	75	355	75
7	379.24	381.63	2.39	2263	341	86	150	460	150	610	341	237	161	55	383	55
8	381.63	383.63	2.00	2286	392	87	150	460	150	610	392	224	148	77	496	77
9	383.63	387.22	3.59	2344	388	86	150	460	150	610	388	225	147	77	484	77
10	387.22	391.35	4.13	1512	346	87	165	457	165	622	346	238	170	63	377	63
11	391.35	393.40	2.05	1510	352	87	200	450	200	650	352	211	143	123	646	123
12	393.40	396.20	2.80	1500	364	87	200	450	200	650	364	209	141	133	674	133
13	396.20	398.66	2.46	Under Construction												
14	398.66	401.40	2.74	1483	351	87	172	433	172	605	351	246	164	73	327	73
HS-3: Km 401.580-Km 422.700, MSA: 49																
15	401.40	404.80	3.40	1517	364	87	150	420	150	570	364	272	180	50	205	50
16	404.80	406.20	1.40	Under Construction												
17	406.20	408.80	2.60	2472	376	86	150	420	150	570	376	249	148	72	305	72
18	408.80	411.40	2.59	2293	278	86	168	448	168	616	278	240	162	53	366	53
19	411.40	414.00	2.60	2308	331	86	170	450	170	620	331	224	145	81	493	81
20	414.00	415.44	1.44	Under Construction												
21	415.44	418.00	2.56	2294	388	87	170	450	170	620	388	212	133	116	636	116
22	418.00	420.21	2.20	2286	288	87	170	450	170	620	288	233	158	60	417	60
23	420.21	422.61	2.40	2280	288	87	170	450	170	620	288	233	158	60	416	60

From the three homogenous sections considered for LHS, required MSA are 48MSA/ 34MSA/ 35MSA respectively. Upon the FWD analysis, obtained MSA are more than 80MSA/ 41MSA/ 48MSA respectively. As obtained MSAs are more than the required MSAs, there is no necessity for immediate overlay requirement.

From the three homogenous sections considered for RHS, required MSA are 73MSA/ 52MSA/ 49MSA respectively. Upon the FWD analysis, obtained MSA are more than 75MSA/ 55MSA/ 50MSA respectively. As obtained MSAs are more than the required MSAs, there is no necessity for immediate overlay requirement.

However, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Appendix 9** of this Report.

5.3 STRUCTURAL REHABILITATION

All the structure found to be in good condition except minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- Repair/ Replacement of Existing Bearings
- Repair / Replacement of Existing Expansion Joints
- Repair / Replacement of Existing Wearing Coat
- Profile Correction for Existing Deck Slab by Cement Concrete
- Sealing of Cracks for Bridges by Epoxy Resin
- Replacement of Spalled Concrete of ECW by Epoxy Mortar
- Cement Grouting for Repair of Existing Bridges
- Guniting / Shotcreting for Repair of Existing Bridges
- Providing & Fixing of Drainage Spouts
- Repair of Substructure Component
- Repair / Replacement of Railing & Crash Barrier
- Epoxy Bonding between New and Old Concrete.

CHAPTER 6. OPERATION AND MAINTENANCE

6.1 INTRODUCTION

Looking at the contractual requirements of maintaining project road under specified level of roughness it is felt that roughness is the most important criterion for finalizing the O&M schedule for the project. Accordingly, the methodology adopted by present consultants includes predicting the roughness year by year under the traffic using a well acknowledged HDH-4 model developed for developing countries like India after lot of research by World Bank. The said model is widely prescribed by MORTH and NHAI during the preparation of detailed project reports for several projects in doing economic analysis for the projects. The economic analysis mainly consists of two parts:

1. Predicting the road deterioration and estimating VOC
2. Estimating Benefits

Considering its importance and present use in India, consultants felt prudent to use the first part, i.e., estimating road deterioration and predicting roughness in HDM 4 model to finalize the O&M schedule for the project. This approach is more scientific as it does not assume hypothetical deflection values at 10th and 20th year and includes main criterion of maintaining roughness at 2750mm/Km as per Schedule K.

6.2 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

- Schedule K of CA species that Roughness values exceeds 2750mm/km in a length of KM, needs to be corrected within 180 days.
- manual specifies max. allowable deflection (BBD) measurement is 1.2mm and test to be performed in every five years.

6.3 INPUTS FOR MM SCHEDULE

Since roughness is the main criterion for major maintenance, Project Corridor has been sub divided in to various Cases depending the present roughness values:

- Case 1: Roughness value <2000 mm/Km
- Case 2: Roughness values >=2000<2400 mm/Km
- Case 3: Roughness>=2400<2750 mm/Km
- Case 4: Roughness>=2750 mm/KM

6.3.1 TRAFFIC (AADT)

The following traffic data has been used in the analysis is as below:

TS-1	HS-1 Km 360.000-Km 371.619		HS-2 Km 371.619-Km 401.580		HS-3 Km 401.580-Km 422.700	
	LHS	RHS	LHS	RHS	LHS	RHS
Bus	141	146	215	216	229	202
LCV	317	325	169	154	324	301
Truck / 2A	346	404	332	377	335	332

3A	683	658	359	398	383	415
MAV	1192	1377	878	983	863	905

6.3.2 VEHICLE DAMAGE FACTORS (VDF)

VDF values as obtained from axle load surveys are used for various sections are as given below:

Mode Type	UP	DOWN
LCV	1.11	1.27
2 Axle Truck	1.54	2.10
3 Axle Truck	3.22	4.59
MAV (4-6 Axle)	6.49	8.98
Buses	0.91	0.40

6.3.3 HDM INPUTS

FWD and Roughness values considered are from surveys and investigations are as below:

LHS: -

Ranges	<2000	>=2000 and <2400	>=2400 and <2750mm	>=2750
Case	case-1	case-2	case-3	case-4
Side	LHS			
Length	58100	-	-	-
Roughness	1788	-	-	-
IRI	2.54	-	-	-
Deflection	0.39	-	-	-
Cracking	0.00%	-	-	-
Ravelling	2.12%	-	-	-
Patching	0.00%	-	-	-
Rut Depth	0	-	-	-
BT Crust	161	-	-	-

RHS: -

Ranges	<2000	>=2000 and <2400	>=2400 and <2750mm	>=2750
Case	case-1	case-2	case-3	case-4
Side	RHS			
Length	58100	-	-	-
Roughness	1837	-	-	-
IRI	2.60	-	-	-
Deflection	0.33	-	-	-
Cracking	0.00%	-	-	-
Ravelling	1.43%	-	-	-
Patching	0.00%	-	-	-
Rut Depth	0.10	-	-	-
BT Crust	167	-	-	-

6.3.4 OPTIONS FOR MM SCHEDULES

Based on the requirements of CA, various options have been considered to be used as responsive overlays triggered at specified level of roughness of 2750 mm/km. Micro surfacing has also been considered to examine its feasibility for major maintenance.

In LHS direction following options were considered in the analysis:

- ✓ Base Case: MCS at Roughness of 2750mm/Km with regular maintenance
- ✓ Opt-1: Responsive Overlay of 30mm mill and OL BC whenever roughness is >2750mm/KM with regular maintenance
- ✓ Opt-2: Responsive Overlay of 40mm mill and OL BC whenever roughness is >2750mm/KM with regular maintenance

In RHS direction following options were considered in the analysis:

- ✓ Base Case: MCS at Roughness of 2750mm/Km with regular maintenance
- ✓ Opt-1: Responsive Overlay of 30mm mill and OL BC whenever roughness is >2750mm/KM with regular maintenance
- ✓ Opt-2: Responsive Overlay of 40mm mill and OL BC whenever roughness is >2750mm/KM 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:

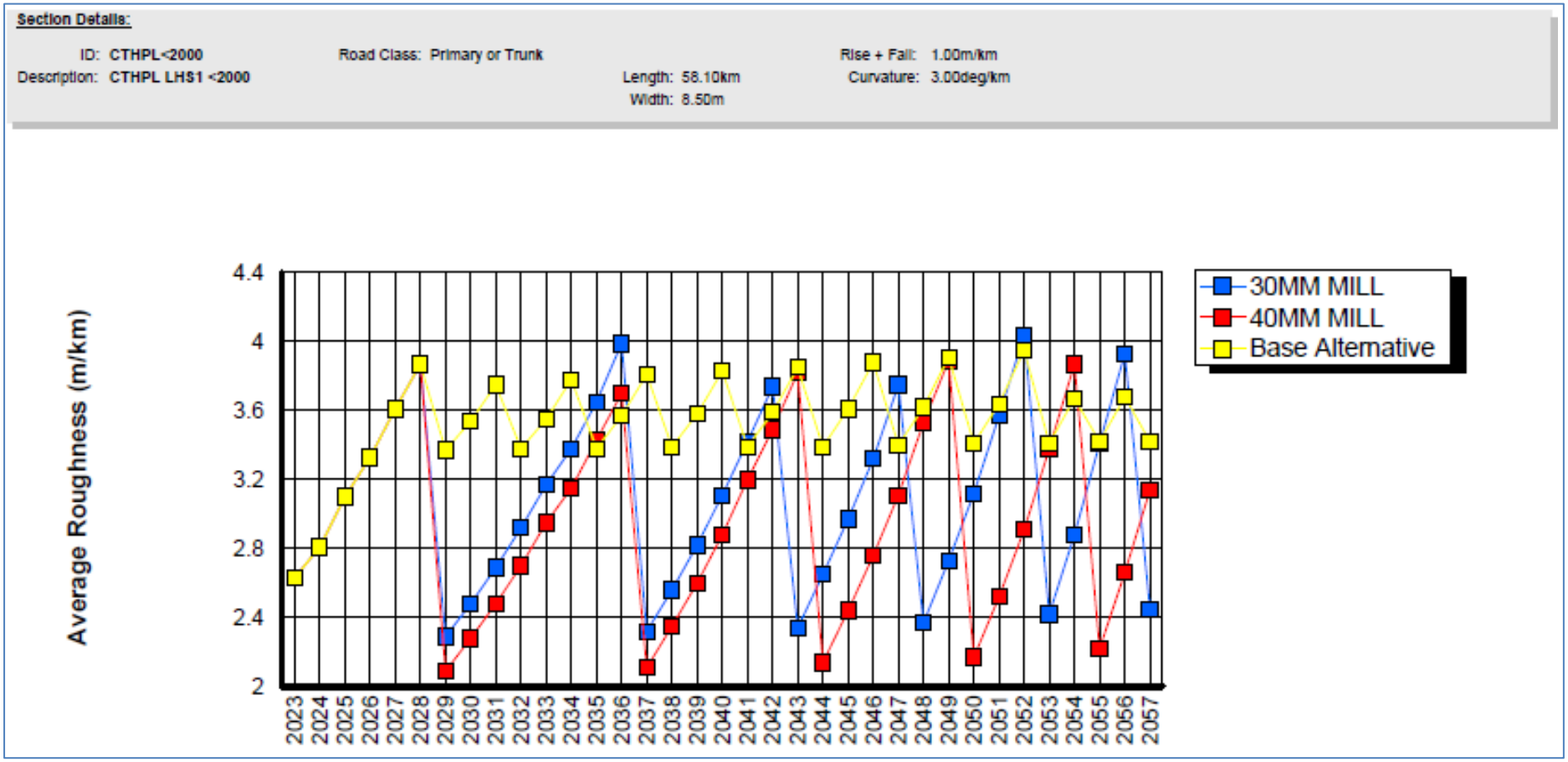


Figure 1: Average Roughness in LHS (UP) Carriageway (Case-1<2000 mm/Km)

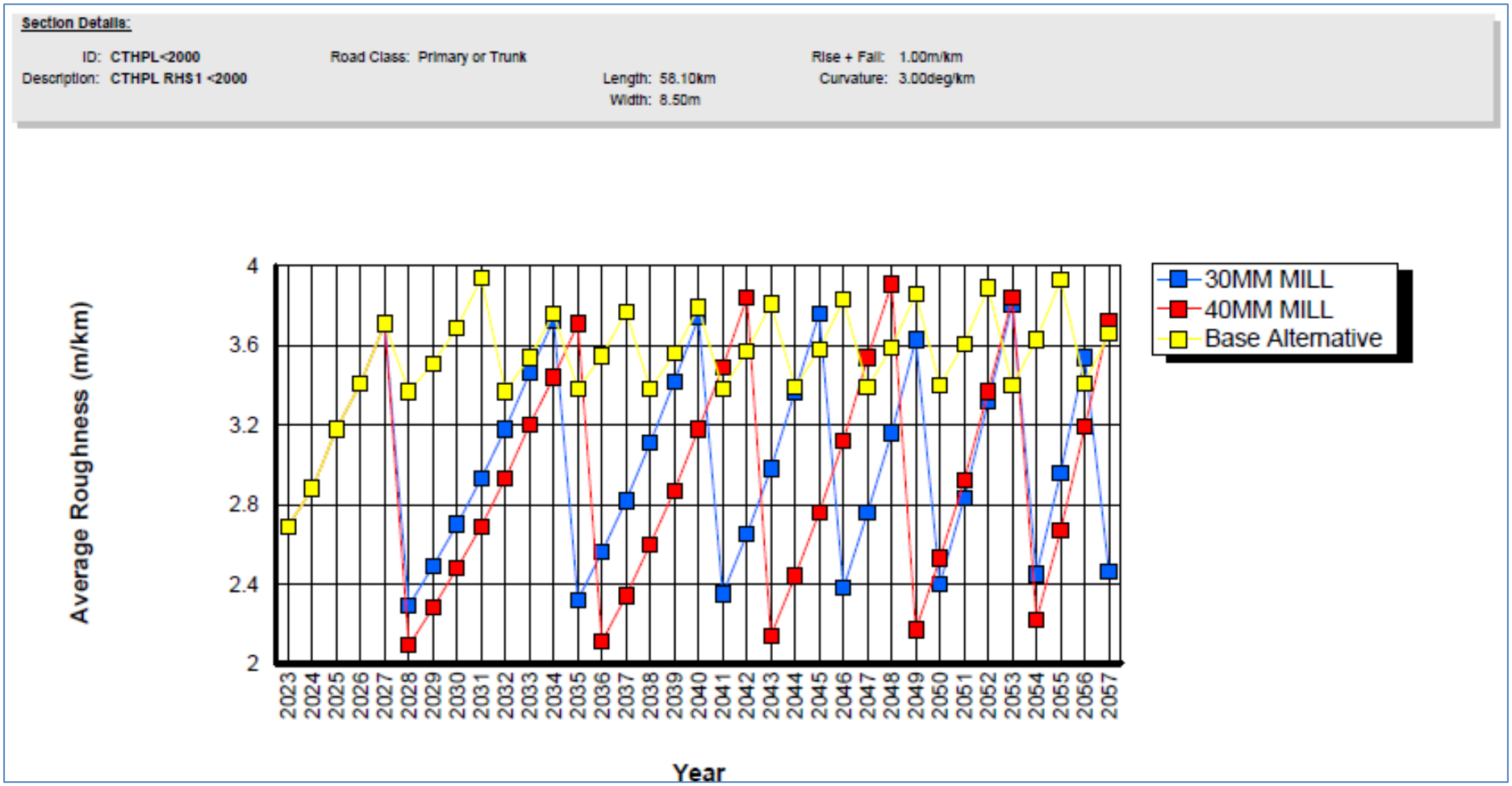


Figure 2: Average Roughness in RHS (DN) Carriageway (Case-1<2000 mm/Km)

6.5 M&M SCHEDULE

Looking at the present condition and progression of roughness, it is felt prudent to consider the 40mm mill & OL as the preferred option. Adopted MM schedule for the project is as below:

Table 31: Adopted MM Schedule for Project Road

LHS Section - MM Schedule						
Obtained					Adjusted	
Base Year	Option-1 (40mm Mill and OL)				Option-1 (40mm Mill and OL)	
	Criteria:	IRI<2000	Remarks		IRI<2000	Remarks
	Length:	58100			58100	
	Year	Case-1			Case-1	
0	2022					
1	2023					
2	2024					
3	2025					
4	2026					
5	2027					
6	2028	40			40	
7	2029					
8	2030					
9	2031					
10	2032					
11	2033					
12	2034					
13	2035					
14	2036	40			30	
15	2037					
16	2038					

RHS Section - MM Schedule						
Obtained					Adjusted	
Base Year	Option-1 (40mm Mill and OL)				Option-1 (40mm Mill and OL)	
	Criteria:	IRI<2000	Remarks		IRI<2000	Remarks
	Length:	58100			58100	
	Year	Case-1			Case-1	
0	2022					
1	2023					
2	2024					
3	2025					
4	2026					
5	2027	40			40	
6	2028					
7	2029					
8	2030					
9	2031					
10	2032					
11	2033					
12	2034					
13	2035	40			30	
14	2036					
15	2037					
16	2038					

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.
- 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.
- 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.
- All Metallic Bearings need to be taken up for servicing.

Wearing Coat:

Since there is a very weak component of the bridge structure which is subjected to severe deterioration due to Loading, Environment etc. It is necessary to replace the wearing coat at 15years frequency. As of now we have considered sealing of cracks by Fog Seal which does not show any distress than cracking by viz. Pot holes, abrading etc. based on this aspect BOQ is formed.

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:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 32: Summary of Unit Rates

S. No	Type of Material	Units	Source	Average Lead in Kms	Market Rates (Rs) Adopted for Rate Analysis - Sitpl
1	**Aggregate**				
a)	40 mm	Cum	Crusher	11.21	612.76
b)	20 mm	Cum	Crusher	11.21	843.76
c)	12 mm	Cum	Crusher	11.21	720.76
d)	6 mm	Cum	Crusher	11.21	623.76
e)	Dust	Cum	Crusher	11.21	642.76
2	Gravel/Murrum				
	Embankment	cum	Borrows for Embankment	8.90	30.45
	Subgrade	cum	Borrows for Subgrade	8.90	30.45
3	Other Major Material				
	Bitumen 60/70	ton	Mumbai	440.00	38080.00
	Bitumen 80/100	ton	Mumbai	440.00	38080.00
	CRMB	ton	Mumbai	440.00	38080.00
	Emulsion	ton	Mumbai	440.00	47080.00
	Steel	ton	Outlet	59.00	55265.50
	HTS Strands	ton	Buldhana	59.00	70265.50
	Cement	ton	Buldhana	59.00	7665.50
	Structural Steel	ton	Buldhana	59.00	71165.50
	VG-40	ton	Mumbai	440.00	38080.00

Table 33: Summary of Major material Rates

S.no	Activities	Unit	Rate (Rs) per Unit -	Remarks
1	BC	Cum	8647	VG-40
2	Tack Coat	Sqm	13	
3	DBM	Cum	7870	VG-40
4	PC	Sqm	36	
5	WMM	Cum	1770	
6	GSB	Cum	1381	
7	Embankment	Cum	451	
8	Subgrade	Cum	495	
9	Shoulder Filling	Cum	495	
10	Thermoplastic Paint	Sqm	452	
11	Road Studs	Nos	195	
12	DLC	Cum	3738	
13	PQC	Cum	8585	
14	RE panel	Sqm	3843	
15	M-15	Cum	6805	
16	M-20	Cum	7231	
17	M-25	Cum	7826	
18	M-30	Cum	7845	
19	M-35	Cum	8703	
20	M-40	Cum	9936	
21	M-45	Cum	10244	
22	M-50	Cum	11804	
23	Reinforcement steel	MT	77013	
24	1.2m Dia pile	Rm	12821	
25	HT strands	MT	130397	

7.2 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs shall be estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Following items required are mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

There is no immediate cost associated with this project.

7.3 ROUTINE MAINTENANCE & INCIDENT MANAGEMENT COSTS

Routine maintenance costs include general maintenance costs of road elements, bridge elements and road furniture and appurtenances. This can be mainly divided into two parts as:

- ✓ General Maintenance of Works
- ✓ Repairs to Highway & Bridge Elements

7.3.1 General Routine Maintenance

General Routine Maintenance of Roads generally include following items:

- Cleaning of Project facilities
- Structures cleaning,
- Cleaning of ROW
- Cleaning and Maintenance of Toll Plaza
- Unlined Drain Maintenance
- Lined Drain Maintenance
- Maintenance of Highway Lighting at Toll Plaza and other project locations
- Median Plantation maintenance & Avenue plantation maintenance:
- Maintenance of Road Furniture
- Maintenance of Road Safety Items

The above items are estimated by considering the detailed break-up of following items:

- Manpower including Managers/Labour etc
- Vehicles for Labour Transport/Water Tankers/Sweeping Machines Etc
- Resources/Equipment's such as grass cutters, tools, jet sprayers, hydraulic trimmers etc

7.3.2 Repairs to Highway & Bridge Works

Repairs to highway and bridge works have been estimated based on the assumed quantities (Percentage basis) of execution for every year.

These items include the following:

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 VG 40 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	Providing and laying apron/ stone pitching on slopes of guide bunds/ road embankment / other location
12	Providing and laying stone aggregate filter material (150 mm compacted thickness) underneath pitching
13	Unlined drain
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
	(iii) Diagonal Chevrons Markings
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

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
10. Carrying out 50 to 60 mm thick 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 Concrete

7.3.3 Incident Management Cost

Incident Management & Safety items include the following:

- ✓ ATMS control room operations,
- ✓ Regular patrolling & reaching accident/incident site,
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, 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 ATMS and TMS

Following table includes the cost of Major Maintenance works for the project:

Table 34: Summary of Periodic Maintenance Costs

Financial Year	Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of TMS @ every 5 years	Structure specified repairs
2023	-	-		
2024	-	-		
2025	144.26	-	-	-
2026	-	-	-	15.79
2027	4,327.42	31.50	214.74	-
2028	4,251.33	-	-	-
2029	-	-	-	-
2030	-	-	-	-

Financial Year	Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of TMS @ every 5 years	Structure specified repairs
2031	72.95	-	-	-
2032	71.31	-	214.74	-
2033	-	31.50	-	-
2034	-	-	-	-
2035	3,521.54	-	-	-
2036	3,463.48	-	-	620.55
2037	-	-	214.74	-
	15,852.29	**62.99**	**644.21**	**636.34**

Note: The cost is in Lakhs including GST without escalation.

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
- IE for O&M period
- Administrative Cost
- Electricity Bill of lighting

Following table depicts the cost of operations for the project:

Table 35: Summary of O&M Costs

S No	Description	Amount in Lakhs (including GST)
	SPV - Expenditure	
1	SPV staff	100.20
2	Highway lighting - Power Charges	289.00
3	Highway lighting - Maintenance charges	17.00
4	Tolling and HTMS AMC/ Spare Parts	15.34
5	Surveys & Investigations (BBD, Roughness)	5.92
6	IE fees	78.45
7	Insurance Charges	91.50
8	Audit Charges	40.00
9	LIE Fee	29.00
10	Admin cost - Board Meeting Expenses, valuation etc.	
	Agency - Expenditure	
11	Toll Operation - Agency	-

S No	Description	Amount in Lakhs (including GST)
12	Route patrolling	135.24
13	Cost towards Periodic Vehicle replacement	
14	TAP & MAP	68.79
15	Routine maintenance	271.55
16	Repair of Road - Boq Items	159.86
17	Repair of Structures	24.66
	1st year O&M Cost for FY2024 in Lakhs	**1,326.50**

Note: The cost is in lakhs including GST without escalation.

7.6 TOTAL OPERATION & MAINTENANCE COSTS

Year on year operation cost is summation of following:

- ✓ Immediate Costs
- ✓ Routine Maintenance & Incident Management
- ✓ Periodic Maintenance
- ✓ Operations Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 36: Summary of Total Cost

Financial Year	SUMMARY OF VARIOUS EXPENSES in Rs. Lakhs				
	Immediate Repair's Cost	Operation expenses	Routine Maintenance Expenses	Periodic Maintenance (Functional +Struc Overlay+ Toll collection system)	Total Cost
2022-2023	-	-			
2023-2024	-	-	1,331.50	-	1,331.50
2024-2025	-	-	1,317.34	144.26	1,461.60
2025-2026		-	1,340.38	15.79	1,356.17
2026-2027		-	1,317.34	4,573.65	5,891.00
2027-2028		-	1,331.50	4,251.33	5,582.83
2028-2029		-	1,317.34	-	1,317.34
2029-2030		-	1,361.00	-	1,361.00
2030-2031		-	1,326.22	72.95	1,399.17
2031-2032		-	1,331.50	286.05	1,617.55
2032-2033		-	1,317.34	31.50	1,348.84
2033-2034		-	1,331.50	-	1,331.50
2034-2035		-	1,317.34	3,521.54	4,838.88
2035-2036		-	1,340.38	4,084.04	5,424.42
2036-2037		-	616.38	214.74	831.11
Total Cost:	**-**	**-**	**17,897.10**	**17,195.83**	**35,092.94**

Note: The cost is in Lakhs including GST without escalation.

SIT/PJRP/2312188/060
22nd December 2023

To
M/S Actis Highway Infra Ltd
The Sponsor

Sub: Submission of Technical Reports for Walter Projects

K/A Mr. Rakshit Jain,

We are pleased to submit hereby the "Technical Report" in hard/soft copies for the following assets.

S. No	Project Title
✓ 1	Technical Diligence of Delhi-Meerut Expressway (Section from km 0.000 to UP Border) including 8 laning of NH-24 in the state of Delhi. (Design Length-8.716)
2	Technical Diligence for 4-Laning of Chutmalpur - Ganeshpur of NH-72A from Ch. 0.000 to Ch. 17.900 & Roorkee – Chutmalpur - Gagalehri of NH-73 from Ch. 0.000 to Ch. 35.400 in the state of Uttar Pradesh & Uttarakhand on Hybrid Annuity Basis (Pkg-1)
3	Technical Diligence for 4-Laning of Gagalheri–Saharapur–Yamunanagar (UP/Haryana Border) section of NH-73 from Km 35.400 to Km 86.855 in the State of Uttar Pradesh under NHDP-IV on Hybrid Annuity Mode (PKG-II)
4	Technical Diligence for Four Laning Chikhali – Tarsod (Package-IIA) Section of NH-6 from Km 360.000 to Km 422.700 in the State of Maharashtra to be executed on Hybrid Annuity pattern under NHDP Phase IV (CTHPL)
5	Technical Diligence of Two Lanning with paved shoulders Road on Package HAM-AM-2 in the State of Maharashtra under MRIP on Hybrid Annuity Mode
6	Technical Diligence for the 8 Laning of NH-1 from Mukarba Chowk at km 15.500 to km 86.000 in the State of Haryana on DBFOT Basis

Thanking you and assuring you best services all the time.

Yours faithfully,

For Samarth Infraengg Technocrats Pvt Ltd.,

SAMARTH INFRAENGG TECHNOCRATS PVT. LTD.

Authorized Signatory
Name: [Mr. Kalva Kiran Kumar]
Designation: [Director]

TECHNICAL REPORT

Technical Diligence of Delhi-Meerut Expressway (Section from km 0.000 to UP Border) including 8 laning of NH-24 in the state of Delhi. (Design Length-8.716) under Hybrid Annuity mode

SAMARTH INFRAENGG Technocrats Private Limited

SAMARTH
committed competence

DECEMBER 2023

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
BC	-Bituminous Concrete
BOQ	-Bill of Quantities
BOT	-Build, Operate & Transfer
CA	-Concession Agreement
CBR	-California Bearing Ratio
CCB	-Concrete Crash Barrier
CCR	-Cement Concrete Railing
COD	-Commercial Operation Date
COS	-Change of scope
CPI	-Consumer Price Index
CUP	-Cattle Under pass
CVC	-Classified Volume Count
CVPD	-Commercial Vehicles per Day
DBM	-Dense Bituminous Concrete
DPR	-Detailed Project Report
ECB	-Emergency Call Box
EPC	-Engineering, Procurement and Construction
ESI	- Employees' State Insurance
FDD	-Filed Dry Density

FOB	-Foot Over Bridge
FRL	-Finished Road Level
FSI	-Free Swell Index
FWD	-Falling Weight Deflectometer
FY	-Financial Year
GOI	- Government of India
GR	-Growth Rates
GS	-Grade Separated
GSB	-Granular Sub Base
GST	-Goods and Services Tax
HCPT	-Half cell Potential Test
HPC	-Hume Pipe Culvert
HR	- Human Resources
HTMS	-Highway Traffic Management Systems
IE	-Independent Engineer
IRC	- Indian Roads Congress
IRC SP	- Indian Roads Congress Special Publications
IRI	-International Roughness Index
Km	-kilometer
LHS	-Left Hand Side
LL	-Liquid Limit
LS	-Lumpsum
m	-Meter
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
MPRDCL	-Madhya Pradesh Road Development Corporation Ltd.
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 Underpass
R&R	-Repair and Rehabilitation
RCC	-Reinforced Cement Concrete
RE Wall	-Reinforced Earth Wall
RHS	-Right Hand Side
RHT	-Rebound Hammer Test
RM	-Routine Maintenance
ROB	-Road Over Bridge
RPO	-Route Patrol Officer
RUB	-Road Under Bridge
SDBC	-Semi-Dense Bituminous Concrete
SPV	-Special Purpose Vehicle
SR	-Service Road
SWB	-Static Weigh Bridge
TCS	-Typical cross Section
TDRT	-Transient Dynamic Response test
TMS	-Toll Management System
UI	-Unevenness Index
UPVT	-Ultra Pulse Velocity test
VDF	-Vehicle Damage Factor
VG	-Viscosity Grade
VUP	-Vehicular Underpass
WBM	-Water Bound Macadam
WMM	-Wet Mix Macadam
WPI	-Wholesale Price Index

CHAPTER 1. INTRODUCTION

1.1 INTRODUCTION

The Government of India had entrusted to the Authority (National Highways Authority of India, **NHAI**) the development, maintenance and management of National Highway No.24 including the section from km 0.000 to existing km 8.360 (approx. 8.716 km). The Authority had resolved to augment the existing road from km 0.000 to existing km 8.360(approx. 8.716 km) on the Delhi UP Border section of National Highway No.24 (hereinafter called the "NH 24") in the State of Delhi by Six-Laning and four laning either side of the Expressway thereof (the "Project") on design, build, operate and transfer (the "DBOT Annuity" or "Hybrid Annuity"), which shall be partly financed by the Concessionaire who shall recover its investment and costs through payments to be made by the Authority, in accordance with the terms and conditions to be set forth in a concession agreement.

The Authority had accordingly invited the bid proposals and upon the evaluation of received bids, the Authority has awarded the Project to M/s **Welspun Enterprise Ltd** (Welspun"), Baroda. Consequent to this, M/s Welspun Enterprise Ltd, formed a Special Purpose Vehicle (SPV) in the name of M/s **Welspun Delhi Meerut Expressway Pvt. Ltd,** DME (Concessionaire) for implementation/execution of the project.

The Concessionaire has achieved PCOD on 28th June 2018 and COD on 26th Sept 2018 for the full project length of 8.716 Km by delinking non-availability of land under punch list.

This project road is acquired by **M/s Actis GP LLP** and is presently under Operation and Maintenance phase.

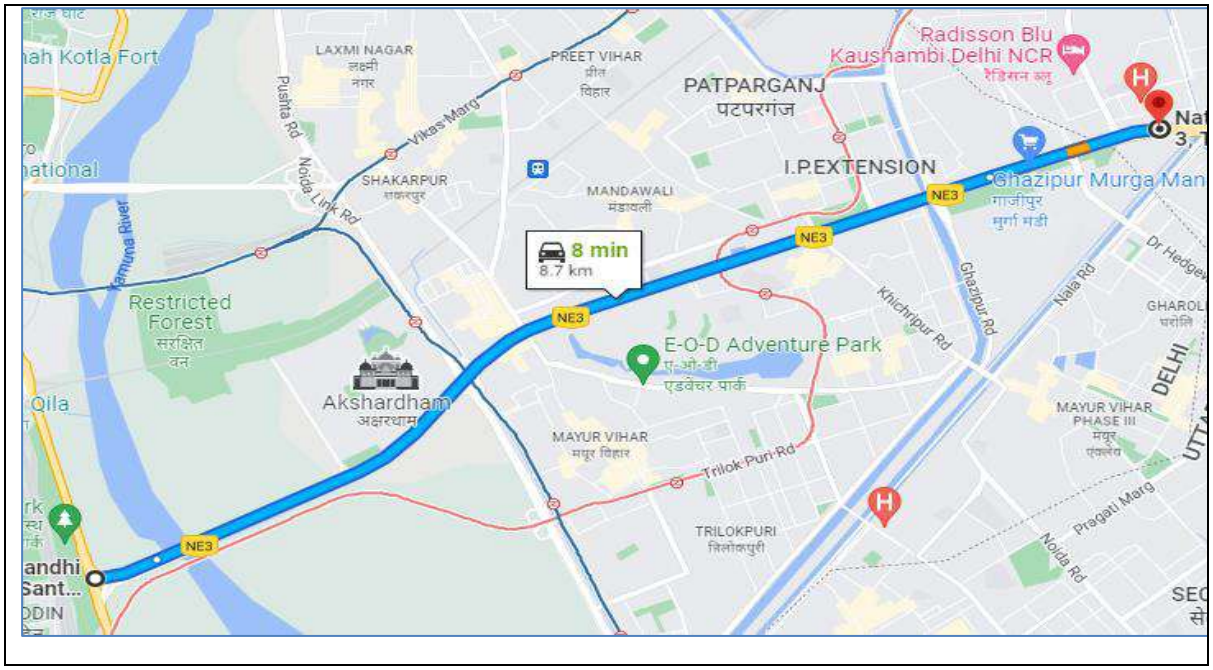
Actis GP LLP Ltd has engaged **M/s Samarth Infra-Engg Technocrats** to undertake due-diligence study for self-assessment and/or for its Concessioning Authority and/ or for InvIT purpose and/ or for its present/ future investors/ lenders whom this Report will be presented as Vendors Technical Due Diligence Report.

This report highlights about the project at a glance and to evaluate the asset condition and work out O&M Cost, Major Maintenance cost and additional facilities cost/improvement works of the project during the Concession period.

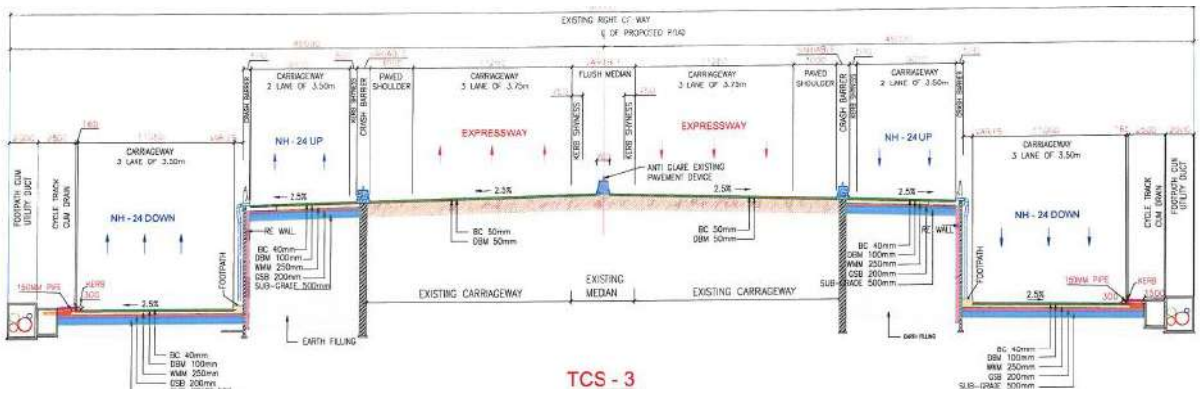
1.2 PROJECT AT GLANCE

The project road consists of elevated 6-lane expressway corridor and is attached with NH24-UP(3-lane) and NH-24-DN(2-lane) on either side of Expressway. The Project Corridor starts nearby Indraprastha park at km 0+000 of (NE-3&NH-9) ends at UP border at Km 8.716 of (NE-3& NH-9).

	From (km)	To (km)	Length (Km)
CA Design Chainage	0.000	8.716	8.716
As per Site	0.000	8.716	8.716

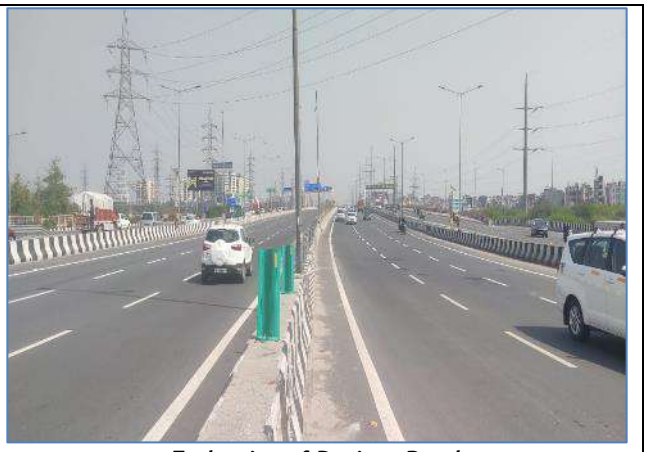


Typical Cross section of Expressway attached to NH-24 UP & DN on either direction as given below.



Photographs showing the various corridors of the project road are presented below:

Start point of Project Road



End point of Project Road

Project Corridor with 0.75m CCB, at Km 1.750

Project Corridor with 0.75m CCB width, at Km 5.200

Project Corridor with 0.5m CCB (Median) at Km 7.000

Project Corridor with CCB BHS & Overhead gantry, at Km 7.900

Following Table highlights the total project at a glance:

Sl No.	Description	Date
1.	Date of Signing the Concession Agreement	04.03.2016
2.	Appointment Date	28.09.2016
3.	Scheduled Project completion	27.06.2019
4.	Scheduled End of Concession	15 years from COD
5.	Date of issue of Provisional Completion Certificate, COD	28.06.2018
7.	Date of Issue of Final Completion Certificate	28.09.2018

1.3 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 due diligence for said project.

The scope of services as defined in the "terms of reference" for consultants is as below:

1. Review of Contractual documents

- ✓ Review of CA/ Schedules pertaining to scope of work
- ✓ Collection of relevant records and documents and review of same
- ✓ Review correspondences with NHAI/IE on technical issues
- ✓ Review of EPC contracts/Maintenance Contracts
- ✓ Review of As-built drawings & Detailed Project Reports and Designs
- ✓ Review of COS works if any
- ✓ Review the technical approvals from IE or another agency required under the CA

2. Field Investigations

- ✓ Review and Update of Field investigations survey data done during Technical Due Diligence time.

3. Major Maintenance

- ✓ Review of current maintenance system.
- ✓ Updating of Maintenance costs to be incurred over the period of the concession keeping in mind the maintenance requirements of the Concession Agreement.

4. Operations cost

- ✓ Updating of O&M cost for the concession period.

5. BOQ and Cost Estimates

- ✓ Updating of BOQ & Cost for Immediate works (1st year Capex)
- ✓ Updating of BOQ and Costs for Major Maintenance
- ✓ Updating of BOQ and cost for Routine maintenance, Route Patrolling
- ✓ Updating of BOQ and Cost for Operations
- ✓ Updating of year-by-year O&M cost

- ✓ The costs would be updated till the end of the concession period including any expected extension of Concession periods as informed to us.

6. Reports & Presentation

- ✓ Draft O&M cost
- ✓ Final Reports along with Final BoQ

1.4 REVIEW OF CONCESSION AGREEMENT

1. Concession Parties and date of execution of Agreement: NHAI referred as "Authority" entered in to Agreement with M/s Welspun Delhi Meerut Expressway Pvt. Ltd (DME) referred as "Concessionaire" on 04.03.2016
2. Appointed Date, Commercial Operation Date (Article 3 & 4, Article 12): As the Concession Agreement was signed on 04 Mar, 2016, and appointed date issued by Authority on 28 Nov 2016. Accordingly, construction period is 30 months from Appointed date, and Concession period is 15 years from COD.
3. Concession Period (Clause 3): This includes Construction Period of 910 days and Operation Period of 15 years commencing from COD. As the Appointed Date is declared on 28.11.2016, considering 910days as Construction period, the scheduled construction completion date is 27.05.2019. However, PCOD achieved prior to this date, i.e., on 28.06.2018. Accordingly, 15yrs from COD, end of concession period is 27.06.2033 (scheduled date 26.05.2034)
4. Obligations of Concessionaire & Authority (Article 5 & 6): The Concessionaire and Authority have fulfilled most of the obligations.

   Due to early completion of the project, NHAI has released BONUS and the payment made on 06.06.2019 as per clause 23.5 of CA for the amount Rs 26.28Cr.
5. Representation and warranties (Article 7): The Concessionaire shall at no time undertake any change of ownership except in accordance with Clause 5.3.
6. Release of Performance Security (Article-9.3): The performance security bank guarantee (PSBG) is Rs 42.08 Cr. However, Authority released back the Performance guarantee to the Concessionaire on 20th July 2017.
7. Right of Way (Article 10): If the Authority is unable to provide the remaining site within 180 days from the Appointed Date, the remaining Site of the Project Highway shall be removed from the scope of the work under the provision of Change of Scope. Right of Way is granted within 180 (one hundred and eighty) days of the Appointed Date shall be completed on or before the Scheduled Completion Date.
8. Construction of the Project (Schedule-G, Article12): Construction period 910 days from the appointed date i.e., schedule date of completion is on 27th May 2019. And PCOD achieved earlier to this date i.e., on 28.06.2018

Milestone	Completion days	Schedule date	Actual achieved	Delay/(early) days	% Total Capital Cost (TCC) / Physical progress in %
MS-I	180	27/05/2017	28/02/2017	92 days	10% of TCC / 10% Physical Progress
MS-II	400	02/01/2018	30/04/2017	247 days	30% of TCC / 30% Physical Progress
MS-III	650	09/09/2018	07/02/2018	214 days	70% of TCC / 75% Physical Progress
MS-IV	910	27/05/2019	28/06/2018	No delay	100% of TCC /100% Physical Progress

9. Monitoring of Construction (Article 13): The Concessionaire shall, perform all the tests as per Schedule-I, with the instructions of the Independent Engineer. Half of the costs incurred on such tests, and to the extent certified by the Independent Engineer as reasonable, shall be reimbursed by Authority the to the Concessionaire.
10. Completion Certificate/ Provisional Certificate (Article-14): Independent Engineer may, upon request of Concessionaire, issue a provisional certificate for completion of 100% construction site, which made available to the Concessionaire up to 182days from Appointed Date. Provisional certificate should have list of outstanding items in the punch list. These shall be completed within 90 days from issue of Provisional certificate. Authority shall recover damages for any delay in completion as per clause 14.4.1.

Note: Concessionaire to undertake the Junction development @ Ch 5+075RHS and Junction development @ 6+100 RHS (Which are delinked and undertaking taken from the concessioner that works will complete without any further claim during the O&M period)

11. Change of Scope (Article 16): Any additional works and services which are not included in scope of project shall be addressed in Change of Scope Notice. The costs thereof shall be expended by concessionaire and reimbursed by Authority with an advance payment of 20% of agreed COS cost.
12. Reduction of Scope (Article 16.6): if Concessionaire fails to complete the construction works on Force Majeure or for reasons attributable to Authority or under right-of-way clause 10.3.1. On direction of Authority, IE shall assess the civil cost for reduced scope as per Clause 16.6.1. Thus, revised Bid Project Cost shall be calculated. Accordingly, O&M cost shall be reduced or increase in proportion to reduction or increase in the length of the Project Highway.
13. Operation & Maintenance (Article 17): Concessionaire to maintain project road as per Schedule-K requirements. The roughness value exceeding 2750mm/km in a stretch of 1km should be rectified with 180days.
14. Safety requirements (Article 18): All costs and expenses arising related to safety requirement shall be borne by Concessionaire as per scope of the project. If any not forming the scope shall be as per Article 16, change of scope.
15. Renumeration to Independent Engineer (Article 21.3): As per Schedule-M, one- half of remuneration towards the cost and expenses of the Independent Engineer during the development and construction period shall be borne by Concessionaire by do not exceeding 3% of the BPC. Payment in excess of 3% shall borne entirely by Authority. All the payments made to independent Engineer during O&M period shall be borne equally by Authority and Concessionaire.
16. Financial Close (Article 22.1): Concessionaire to achieve Financial close within 150 days from date of the agreement. In the event of delay, further extension not exceeding 120days, subject to payment of damages to the Authority in the sum calculated at a rate of 0.05% of Performance security for each day of delay. Beyond this further 95 days shall be allowed with 0.1% of Performance security for each day of delay.

    Financial Close in this project happened on 29.12.2016 with a delay of 42days. Any penalty imposed due to this delay is to be ascertained.
17. Bid Project Cost (Article-23): The cost of construction of the project (BPC) is Rs.841.50 Cr. and will be adjusted for the price index multiple. 40% of this Cost shall be payable to Concessionaire during Construction period in 5 installments of 8% each with adjusted price index multiple. Clarification sought from the Concessionaire about the total amount received against the receivable amount in the consolidated format.

The remaining 60% of Bid Project Cost, adjusted for Price Index multiple, shall be payable in 30 biannual installments commencing from 180th day of COD with the percentage payments as suggested in the table 23.6.3 along with the interest as per Article 23.6.4.

Bid O&M cost is Rs 3.95 Cr per annum. Any expenses in excess of O&M payments shall be borne by Concessionaire. O&M payments due payable to the Concessionaire shall be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.

18. Mobilization Advance (Article 23.8): Upon request from Concessionaire, 10% of Bid Project Cost shall be paid by Authority. This shall be repaid by Concessionaire with Bank interest compounded annually in 4 equal installments from each payment made by Authority to Concessionaire.
19. Insurance (Article 26): The Concessionaire has been fulfilling this obligation.
20. Force Majeure (Article 28): As per Clause 28.6.2, at any time after the Appointed Date, if any Force Majeure Event occurs) before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; or (b) after COD, the Concessionaire shall be entitled to receive Annuity payments plus interest due and payable under this Agreement.
21. Change in Law (Article 35): As a result of Change in Law, if Concessionaire suffers an increase in cost or reduction in the net after-tax return subject to higher of 1.82 Cr or 2% of Total Annuity payments in any accounting year, Concessionaire may notify Authority to amend the agreement so as to place Concessionaire in same financial position as before the Change in Law.

    Concessionaire has claimed Rs7.14 Cr.) due to implementation of GST
22. Dispute resolution (Article 38): Any dispute not resolved amicably by conciliation, arbitration shall be held in accordance with rules of Society for Affordable Redressal of Disputes (SAROD), New Delhi or such other rules in-line with Arbitration and Conciliation Act,1996. Place of such arbitration shall be the Delhi and the language of arbitration proceedings shall be English. There are no disputes referred so far under the article 38.

1.5 REVIEW OF CORRESPONDENCES WITH NHAI/IE ON TECHNICAL ISSUES

There are several correspondences which are reviewed. Following are the some of the major correspondences that are reviewed for ready reference:

1) Concession Agreement with NHAI, Govt. of India, dated 04.03.2016,
    a. EPC Agreement with Welspun Enterprises Limited, dated 10.11.2016
2) IE has issued PCOD on 28.06.2018 and COD on 26.09.2018
3) IE has approved/As-built PP drawings, TCS drawings, Structural drawings, service road drawings and were made available in technical correspondence No.TDD-16
4) Mix design approval are made available in technical correspondence No.TDD-17
5) The Concessionaire has submitted various letters related to Pavement Design and Geotechnical Investigations
6) Concessionaire got the bonus for earlier completion.
7) Concessionaire submitted tests on completion as per Schedule-I.
8) Monthly Inspection Reports of the Independent Engineer (MPR)

1.6 REVIEW OF EPC

1) Concession Parties and date of execution of Agreement: M/s Welspun Delhi Meerut Expressway Pvt. Ltd (DME) (Concessionaire) and Welspun Enterprises Ltd (Contractor) entered into the EPC Agreement on 10th Sept 2016.

2) Appointment of Contractor, Effective Date and Term (Clause 2): The Concessionaire appointed Welspun Enterprises Limited as the Contractor to execute the EPC Works. The effective date of the Project is 10.09.2016. The EPC contract will be valid and subsisting from the effective date until the termination date.

3) Scope of Contractor's works (Clause 3): The Contractor shall construct the Project Highway on the Site set forth in Schedule A, B, C & D of the Concession Agreement and shall include the scope of work as set out in Annexure A Part II of EPC Agreement.

4) Obligations and Undertakings (Clause 4): The Contractor and concessionaire shall at their own cost and expense observe, undertake, comply with and perform his obligations as set out in EPC Contract.

5) Contract Price and Terms of Payment (Clause 5): The Contract Price payable by the Concessionaire to the Contractor shall be 772 Cr (Annexure -B Part I) and the terms of payment shall be as specified in Annexure -B Part II. Contractor shall provide performance security (5.6% of contract price) in the form of corporate bond.

   EPC contract, clause 5.3.1, mobilization advance of 10% of contract price shall be paid by Concessionaire within 60days from effective date. And shall start recovery from RA bills from completion of 15% of contract price on proportionate percentage basis.

6) Change in Law (Clause 6): Under this clause, if the Authority make any payment to the Concessionaire, the concessionaire is liable to make over such amounts (less Statutory deductions) to the Contractor.

7) Guarantees, Liabilities, Liens and Indemnities (Clause 8): The Contractor acknowledges that the failure to meet the completion of each of Milestone set out in Annexure-D of EPC and to complete the EPC works on or prior to the Scheduled Completion date shall constitute a Material Breach of Contractor. If the contractor fails to achieve the completion Milestones and Scheduled Construction Completion date as in Annexure-D, he shall pay the damages to Concessionaire at a rate of 0.005% and 0.011% of Contract Price per day respectively until such Milestone/Completion date is achieved subject to a maximum of 10% of Contract Price. During, Construction DLP period (commence from date of issue of PCOD or COD and ending on expiry of 24 months from Completion Certificate), if any defect, damage of any EPC works thereof being non-operational by reason of such shall be borne by Contractor.

8) Change of Scope (Clause 9): All payments for execution of COS shall be made within 15 days from the date of receipt of the same from the Authority in accordance with clause 16.3 of Concession Agreement. In case of reduction in scope of works, the Contract Price shall stand decreased to the of such reduction. If Article-38(Dispute Resolution) is evoked, all risk, cost, expenses incurred by Concessionaire towards such procedure shall be borne by Contractor

9) Force Majeure (Clause 11): Upon review of the EPC Contract, the "Force Majeure" has the same meaning given to such term in the Concession Agreement

10) Suspension and Termination (Clause 12): The Concessionaire may, without prejudice to any of its other rights under the Contract, issue "Preliminary Notice" to the Contractor stating the nature of default. If the Contractor fails to remedy or to take effective steps, to remedy the same to the satisfaction of the Concessionaire within 15 days of receipt of the Preliminary Notice, then the Concessionaire shall be entitled to terminate the Contract forthwith, by issuing a Termination Notice to the Contractor. However, no such clause has been invoked on the Contractor.

1.7 REVIEW OF SCHEDULES

The following table depicts the project scope as given in schedules at a glance:

Table 1: Salient Features of Project Corridor

S.No.	Particulars	Length/ Nos.	As per Schedule-B
1	Start Chainage (Km)	Km	0
2	End chainage (Km)	Km	8.716
3	Length of the Project Corridor	Kms	8.716
4	Cycle Track Length	Kms	17.432
5	Flyovers	Nos.	5
6	VUPs	Nos.	4
7	FOBs	Nos.	4
8	Major Bridges	Nos.	1
9	Minor Bridges	Nos.	2
10	Major Junctions	Nos.	23
11	Full Height RE Wall	Kms	8.064
12	W-Beam Safety Barriers	Kms	3.156
13	Rigid Concrete Barriers	Kms	26.826

1.8 REVIEW OF PAVEMENT DESIGN

1.8.1 Manual of Specification and Standards

The Schedule B silent on pavement design and type to be considered for the Project. However, Schedule D suggests that Six-Laning of the Project Highway shall conform to Manual of Specifications and Standards through PPP (IRC: SP: 87-2013). Whereas, for the Expressway of the Delhi-Meerut Highway shall confirm to Manual of Specifications & Standards for Expressways through PPP (IRC: SP: 99-2013)

1.8.2 Review of CA stipulations for Pavement Design

a) National Highways

Clause 5.4.1 (i) of IRC SP: 87-2013 stipulates that the flexible pavement shall be designed for a minimum design period of 15 years or operation period, whichever is more. Stage construction is permissible subject to the requirements specified in para (ii) of Clause 5.4.1

Clause 5.4.1 (ii) of IRC SP: 87-2013 specifies that "Alternative strategies or combination of initial design, strengthening and maintenance can be developed by the Concessionaire to provide the specified level of pavement performance over the operation period subject to satisfying the following minimum design requirements".

(a) Indicates that, the thickness of sub-base and base of pavement section is designed for a minimum design period of 15 years and the initial bituminous surfacing for a minimum design period of 10 years.

(b) Indicates the pavement shall be strengthened by bituminous overlay as and when required to extend the pavement life to full operation period. The thickness of bituminous overlay shall be determined on the basis of relevant IRC codes.

Clause 5.9.6 (ii) of the same manual also stipulates that the initial strengthening shall be done for a minimum design period of 10 years.

Clause 5.9.6 (iv) of the same manual also stipulates that the for bituminous overlay for pavement strengthening shall not be less than 50mm bituminous concrete.

Clause 5.4.2 states that rigid pavement shall be designed for a minimum design period of 30 years.

b) Expressways

Clause 5.4.1 (i) of IRC SP: 99-2013 stipulates that the flexible pavement shall be designed for a minimum design period of 20 years or operation period, whichever is more.

Clause 5.4.1 (ii) of IRC SP: 99-2013 specifies that "Alternative strategies or combination of initial design, strengthening and maintenance can be developed by the Concessionaire to provide the specified level of pavement performance over the operation period subject to satisfying the following minimum design requirements".

(a) Indicates that, the pavement shall be designed to resist specific distresses in each layer and the choice of materials and mixes shall be such that the pavement remains structurally serviceable throughout the operation period without requiring any major structural strengthening. The requirement and frequency of resurfacing should not be closer than 10 years. A longer period will be desirable. The resurfacing process will be milling the existing layer to the depth of distress and replacing the same by the material that meets the characteristics of the original surface.

(b) Indicates the pavement strengthening when required shall incorporate the consideration of i) strength of existing layers as evaluated using deflection test by FWD, ii) Design period for strengthening to extend five years beyond the period of concession and iii)n specified performance requirements.

Clause 5.7.5 (ii) of the same manual also stipulates that the initial strengthening shall be done as per 5.4.1 Section.

Clause 5.7.6 (iv) of the same manual also stipulates that the for bituminous overlay for pavement strengthening shall not be less than 50mm bituminous concrete.

Clause 5.4.2 states that rigid pavement shall be designed for a minimum design period of 30 years.

1.8.3 Concessionaire's Pavement Design

Design Considerations

The Project involves the flexible pavement for Main carriageway. Design of new flexible pavement construction was carried out in accordance with IRC 37-2012. The overlay design has been carried out in accordance with clause 7.4 as per IRC 81:1997. Overlay design is also done by IRC 115-2014, Falling Weight Deflectometer test are conducted on site and data is reviewed for analysis of Overlay Design.

Design Period

A design life of 20 years for new Pavement has been considered for the design purpose of the project and for strengthening done for 10 years

Traffic Growth Rate

The traffic Growth rate of 5% has been considered for different categories of commercial vehicles as stipulated in clause 5.5.4 of IRC: SP: 87:2013

Design Traffic Considerations

For the calculation of Base year Traffic, CVC survey and Axle load survey was carried out at Km 1+500 and at Km 6+500.

- ✓ **For Expressway:**

  According to the IRC: 37-2012, Thickness of carriageway of Flexible Pavement in New Construction Portion Design CBR Value of 9% and traffic MSA 120, The Pavement layer thicknesses are presented below:

Sr. No.	Traffic MSA 20 Years	Effective Soil CBR	Flexible Pavement As per IRC 37 :2012	Adopted
1	120	9%	BC = 50 mm, DBM = 116 mm, WMM = 250mm, GSB = 200 mm	BC = 50 mm, DBM = 120 mm, WMM = 250mm, GSB = 200 mm

✓ **For NH-24:**

Design of New Flexible Pavement for NH-UP & NH-DOWN as per IRC: 37-2012

Sr. No.	Location	Traffic MSA 20 Years	Effective Soil CBR	Flexible Pavement As per IRC 37:2012
1	Flexible Pavement for NH-UP & NH-DOWN	60	9%	BC = 40 mm, DGBM = 100 mm, WMM = 250mm, GSB = 200 mm

A) Strengthening of Existing Pavement

It has been done as per IRC: 115-2015 guidelines. The Concessionaire carried out the FWD tests along the existing Project Road and determined the strengthening requirements for each homogenous section for 10 years of design life according to "IRC:115-2015, Section 5.3 &IRC SP 99-2013, Section 5.4.1". The Computed Overlay thickness are presented below:

✓ For Expressway

As per calculations, an overlay of required along various sections of project road. LHS SIDE

S.No	Stretch		Adopted Overlay Thickness			Note
	From	To	BC	DBM	Total	
1	0+000	0+500	50	50	100	
2	1+100	1+300	50	50	100	
3	1+300	1+670	50	-	50	
4	1+670	3+080	-	-	-	When FWD test was carried out, Overlay had already been laid in km. 1+670 to km. 3+080
5	3+200	3+500	50	-	50	
6	4+100	4+300	50	50	100	
7	5+300	5+750	50	-	50	
8	6+300	7+900	50	-	50	

As per calculations, an overlay of required along various sections of project road. RHS SIDE

S.No	Stretch		Adopted Overlay Thickness			Note
	From	To	BC	DBM	Total	
1	7+900	6+300	50	50	100	
2	5+750	5+300	50	-	50	
3	4+300	4+100	50	-	50	
4	3+500	3+080	50	-	50	
5	3+080	1+670	-	-	-	When FWD test was carried out, Overlay had already been laid in km. 3+080 to km. 1+670
6	1+670	1+300	50	-	50	
7	1+300	1+100	50	-	100	
8	0+500	0+000	50	50	100	

- ✓ For NH-24

Recommendations Design of Overlay

Sr. No.	Location	Thickness of Pavement layers DBM (mm)	Thickness of Pavement layers BC (mm)	Total Overlay thickness
1	Km. 0.000 to Km. 1.900 (L.H.S)	50	40	90
2	Km. 1.900 to Km. 2.950 (L.H.S)	50	40	90
3	Km. 2.950 to Km. 8.716 (L.H.S)	-	40	40
4	Km. 0.000 to Km. 1.900 (R.H.S)	50	40	90
5	Km. 1.900 to Km. 2.500 (R.H.S)	50	40	90
6	Km. 2.500 to Km. 4.600 (R.H.S)	50	40	90
7	Km. 4.600 to Km. 6.900 (R.H.S)	-	40	40
8	Km. 6.900 to Km. 8.716 (R.H.S)	80	40	120

*Important note

1.9 REVIEW OF COS WORKS

The list of compiled COS work orders related to the project are presented below for the amount in million rupees:

COS number	Description	Amount	Work done	Work pending to be done	Amount received	Amount pending to be received	Samarth Comments
COS-1	Construction of Flyover and VUP.	435	426	8	426	-	Work completed
COS-2	To construct a ramp for integrating Hindon elevated down ramp to the NH-24 UP	-	-	-	-	-	Work completed
COS-3	Painting and artwork of structures, repairs and maintenance works on Yamuna Bridge.	197	116	80	116	-	Work completed
COS-4	Authority has issued Change of Scope Notice -4	83	62	21	62	-	Work completed
COS-5	Implementation of automatic number plate recognition (ANPR)	45	25	20	25	-	Work completed
Total in Million Rupees		**759**	**629**	**130**	**629**	**-**	

1.10 HEAD OF TERMS

A) Key terms of Concession Agreement

Particulars	Description
Date of Agreement **Appointed Date**	04-MAR-2016 28-Nov-2016
Employer	NHAI, Government of India
Concessionaire	DME, Welspun Delhi Meerut Expressway Pvt. Ltd
Concession Period	15 Years from COD
Length of the Project, **Total project Cost**	8.36 Km Rs.841.5 Cr Bid project Cost, Rs 3.95 Cr Bid O&M cost
Achievement of Project Mile Stones	Mile Stone-I: Achieved on 28.02.2017 (As per CA Sch-G, Scheduled Completion Date is 25.05.2017 i.e., 180th day from Appointed Date) Mile Stone-II: Achieved on 30.04.2017 (As per CA Sch-G, Scheduled Completion Date is 02.01.2018 i.e., 400th day from Appointed Date) Mile Stone-III: Achieved on 07.02.2018 (As per CA Sch-G, Scheduled Completion Date is 09.09.2018 i.e., 650th day from Appointed) Mile Stone-IV: Achieved on 28.06.2018 (As per CA Sch-G, Scheduled Completion Date is 09.09.2018 i.e., 910th day from Appointed Date, Achieved Bonus due to early completion)
Construction Period/ **Scheduled completion date**	910 days from the Appointed Date/ 09.09.2018 (Achieved Bonus due to early completion)
Annuity	First Year O&M Cost-RS 3.95 Crore, to be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.
Extension of Time **COD** **PCOD** **FCOD**	EOT is Not Application due to early completion PCOD achieved on 28.06.2018 Final completion certificate 26.09.2018
Respective rights and obligations **of the Parties**	Article 4, 9, 10, 23, 34, 42
Change in Ownership	The Concessionaire shall take prior approval of the Authority for any change in ownership in accordance with the article 5.3 of CA
Dispute Resolution	1.At first instance by mediation by the Independent Engineer 2.Amicable settlement by conciliation by the Chairman of the Authority & Chairman of the board of directors of the Concessionaire 3. Finally by Arbitration in accordance with Arbitration and Conciliation Act 1996
Governing Law and Jurisdiction	Courts New Delhi shall have exclusive jurisdiction over matters arising out of or relating to this Agreement

B) Key terms of EPC Agreement

Particulars	Description
Date of Agreement **Appointed Date**	16-09-2016 16-09-2016
Concessionaire	DME, Welspun Delhi Meerut Expressway Pvt. Ltd
Contractor	Welspun Enterprises Limited

Commencement Date **Construction Period**	16-09-2016 Beginning from the commencement Date and ending on the completion of EPC Works
Length of the Project, **Contract Price**	8.716 Km Base price Rs 772 Cr + GST as per clause 5 of EPC agreement, + Price Index Multiple as per CA, Article 23
Mobilization Advance **Performance Security**	10% of Contract Price 5.6% of Contract Price
Extension of Time **PCOD/ COD** **Final Completion** **DLP**	EOT is Not Application due to early completion PCOD achieved on 28.06.2018 Final completion certificate 26.09.2018 18 months from completion certificate/ Latent defects up to expiry of 5yrs from COD
Liquidated Damages for Delay	If the Contractor fails to achieve any completions Project Milestones, the following delay damages, on demand, be paid to the Concessionaire not exceeding 10% of Contract Price 1) Milestone-I, II & III: 0.005% of the Contract Price per day until completion of such milestone 3) Milestone-IV: 0.011% of the Contract Price per day for each package until EPC works are completed
Monthly Progress Report	The Contractor shall prepare a monthly report on the progress of the works and submit to the Concessionaire
Retention Money	-
Dispute Resolution	1. Amicable Resolution, 2. Three Member Arbitration in accordance with Arbitration & Conciliation Act 1996

1.11 MAINTENANCE REQUIREMENTS:

Concessionaire shall undertake maintenance requirements as per Schedule-K of CA, below is the requirement

- ✓ **For Expressway**

S. No	Description	Length (Km)	Lanes	Test	Applicable Schedule for O&M/ Manual	Allowed value/ Testing Frequency
1	**DME Expressway**	**8.716**	6Lane	Roughness	Schedule-K / **IRC: SP:99-2013**	2750 mm/Km/ Twice a Year
				FWD	Schedule-K / **IRC: SP:99-2013**	Not Applicable/ Once in 3 years

- ✓ **For NH-24**

S. No	Description	Length (Km)	Lanes	Test	Applicable Schedule for O&M/ Manual	Allowed value/ Testing Frequency
1	**NH-24 (New NH-9)**	**8.716**	8Lane	Roughness	Schedule-K / **IRC: SP:87-2013**	2750 mm/Km/ Twice a Year
				FWD	Schedule-K / **IRC: SP:87-2013**	Not Applicable/ Once in 5 years

- No specific Handing Over (Divestment) requirements are mentioned under CA. It shall be same as Schedule-K

1.12 SITE OBSERVATIONS:

1. Project road is in compliance to CA provisions.
2. The overall pavement condition of Project Road is good, except, minor cracking and raveling observed at few locations
3. The structures in Project Road have different varieties of sub structure such as Trestle type, RCC Wall Type, RCC Circular, RCC Square Column & RCC Square Twin column.
4. LVUP 2 Nos. were Constructed Under COS @ 6+040 km & 6+140 km.
5. Flyover 1 Nos. was Constructed Under COS @ 0+000 km. (Towards ITO)
6. Super structure of Major bridge has PSC Girder, and for sub structures, RCC wall and RCC Circular for Abutment and Pier.
7. Minor bridges are RCC Box type, PSC Girder, Integrated Solid Slab, RCC Solid Slab, RCC Girder for super structures and RCC wall and RCC Box for sub structures.
8. Flyovers are PSC Girder, Steel Truss, PSC Box, Steel Girder, RCC Girder for super structures and Trestle Type, RCC Wall, RCC Circular, RCC Square Column, RCC Square Twin Column for sub structures.
9. Debris observed on Abutment & pier cap at couple of locations, cleaning of expansion joints, drainage spouts need to be done regularly.
10. Total no. of old existing structures (LHS+RHS) is 17 nos. i.e.,
    a. PUP 02 Nos.
    b. VUP 01 Nos.
    c. Major bridges 2 Nos.
    d. Minor bridges 6 Nos.
    e. Flyovers 6 Nos.
11. All the new structures appear to be in good condition. Most of the old structures are observed to be in fair condition.
12. External pre-stressing has been done to Existing Major bridge @ km 0+805 on Yamuna River prior to handing over it to the current concessionaire.

CHAPTER 2. SURVEYS AND INVESTIGATIONS

2.1 INTRODUCTION

The main objective of undertaking Surveys and Investigations is to appreciate the existing engineering features along the project corridor and to understand the present condition of the various elements of the project road and to prepare required inputs for various rehabilitation and maintenance strategies.

Following Survey and Investigations have been undertaken in the month of March 2022 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 5th Wheel BI
- 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 Road has 6-lane divided carriageway with flexible pavement over the entire length (except at Toll Plaza) having Expressway carriageway width of 14.75m including 3m wide paved shoulder in each direction. The project corridor generally runs in Plain terrain. The land use along the project road is mostly built-up areas. It passes through towns like CWG Village, Rajpath ITO, Vinod Nagar west, and Ghazipur Road etc. In general, approaches are in the range of 3.5m-5.5m height.

The view of project road at different locations is shown in the following photographs:

A view of the Project Road with 6-Lane Expressway having Lighting, & CCB at Km 6.000-LHS

A view of the Project Road CCBR between NH and NE at Km 7.100

A view of the Project Road with CCB 0.7m wide & Hectometer stone at Km 8.400 RHS

A view of the Project Road with Wired rope at median @ km 0.010-NE

A view of the Project Road flyover approach with Highway Lighting, & CCB at Km 1.900

A view of the Project Road with ECB on CCB & FOB at Km 3.100-LHS

The Project Road has 11 Major junctions and 11 Minor junctions. Photographs showing junctions locations are presented below:

Major Junction @ km 2.000 LHS

Major Junction @ km 4.790 RHS

Minor Junction @ km 3.685 LHS	**Minor Junction @ km 7.320 LHS**

About 16 numbers of High mast lighting is observed along the project road. Mostly they are located at Junctions. Few photos showing High mast lighting are presented below:

A view of High mast lighting @ km 5.090 RHS	**A view of High mast lighting @ km 1.700 LHS**

All together the Project Road has about 14 no's Bus Shelters on NH-Down and sample photos taken at the Bus Shelter are presented below:

Bus Shelter near km 4.900 RHS

Bus Shelter near km 5.550 LRHS

Bus Shelter near km 7.490 LHS

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.3 PAVEMENT CONDITION SURVEYS

The present Pavement condition has been accessed from March, 2022 data. Majority length is in Fair condition and at some locations minor raveling, cracking, patching and Bleeding etc. are observed. The Pavement Condition report showing the data collected for each km length in each direction is presented in **Appendix 2** of this Report. The visual inspection of the pavement condition appears to be fair and the riding quality is satisfactory.

The photographs showing the pavement condition of the Project Road is presented below.

Patch works at km 8.375-NE LHS	Cracks of pavement at km 3.520-LHS	Fair Condition km 4.300-LHS
Cracking with Bleeding at km 8.340-NH(RHS)	Fair Condition at km 5.960-NH(RHS)	Fair Condition at km 8.400-NH-DN(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 in line with IRC: 115-2014.

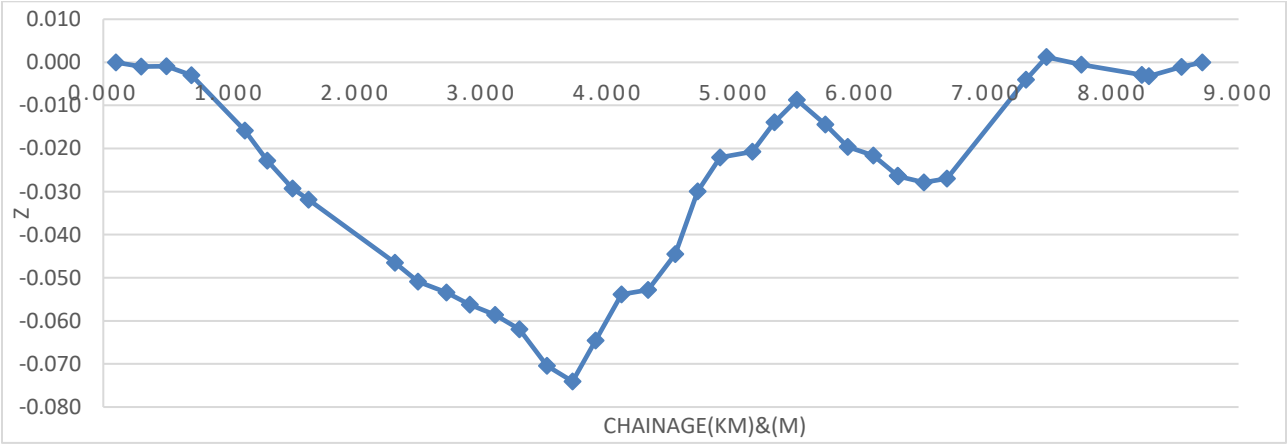
The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

Few photos taken during the progress of FWD Surveys are presented below:

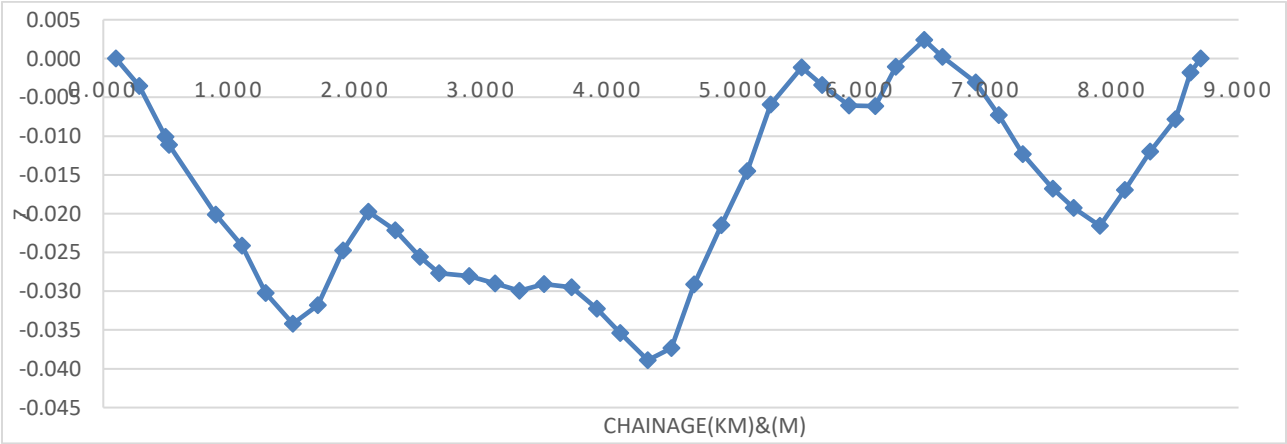
Deflection Measurement in progress	**Deflection Measurement in progress**

The homogenous sections in each direction of traffic (i.e., LHS & RHS) for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

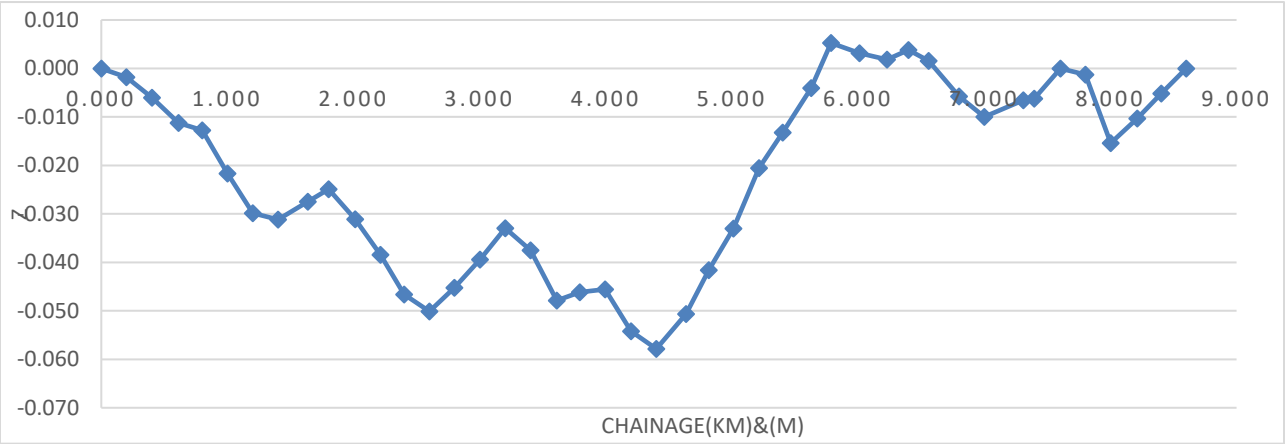
Delineation of Homogeneous Section -NE(LHS)



Delineation of Homogeneous Section - NE(RHS)



Delineation of Homogeneous Section - NH(LHS)



Delineation of Homogeneous Section - NH(RHS)

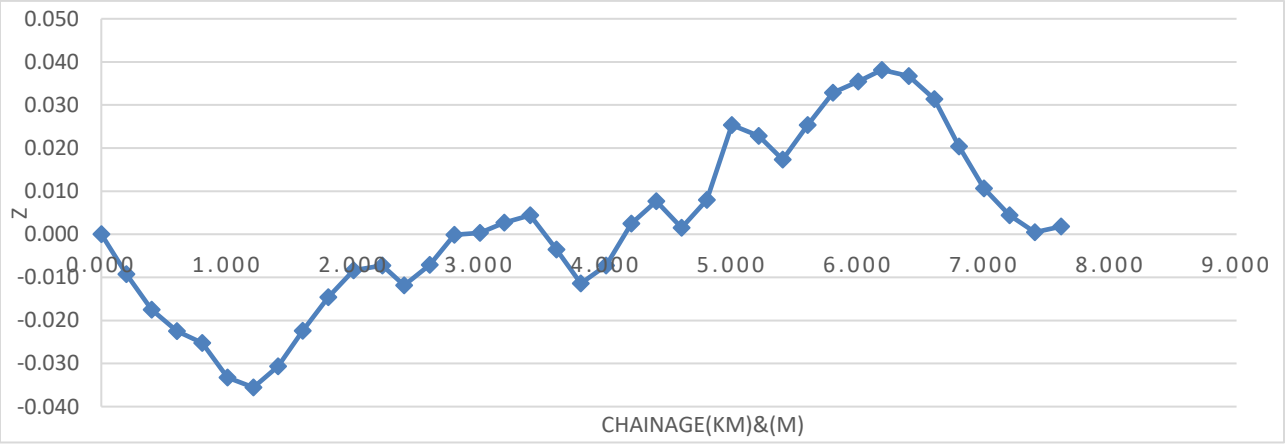


Table 2: FWD Data - Summary of Homogenous Section - LHS & RHS

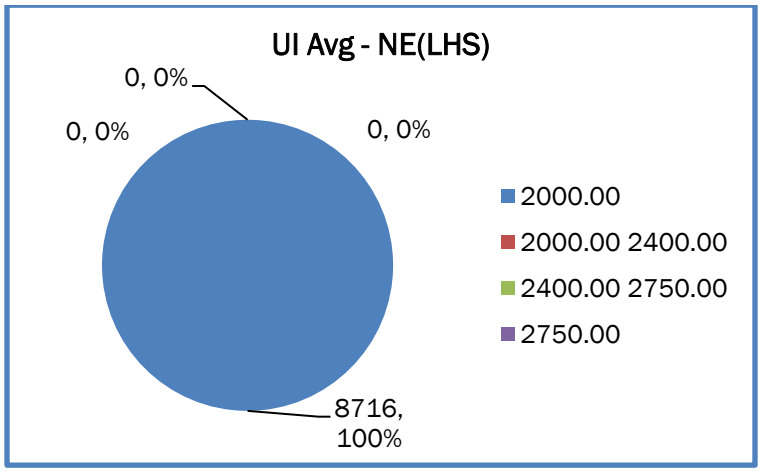
S.no	From	To	Length (km)	Side
NE(LHS)				
1	0.10	3.72	3.6	LHS
2	3.72	8.71	5.0	LHS
NE(RHS)				
1	0.10	4.32	4.2	RHS
2	4.32	8.70	4.4	RHS
NH(LHS)				
1	0.00	2.21	2.2	LHS
2	2.21	5.78	3.6	LHS
3	5.78	8.60	2.8	LHS
NH(RHS)				
1	0	2.4	2.4	RHS
2	2.4	5.4	3.0	RHS
3	5.4	8.70	3.3	RHS

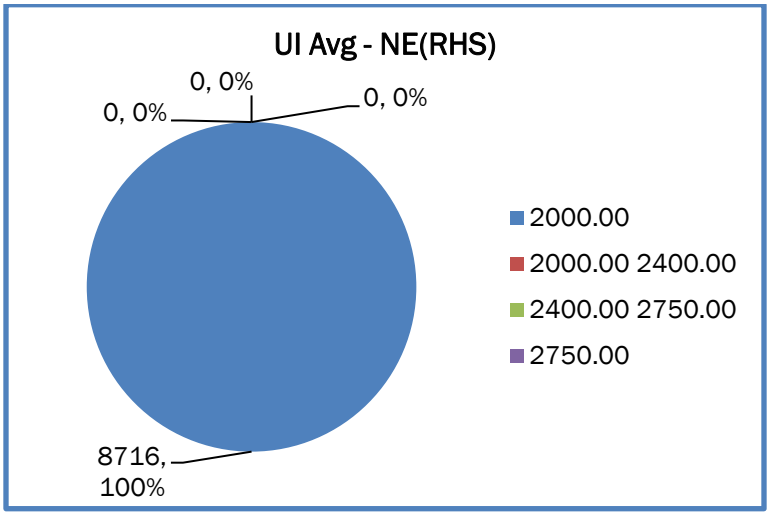
2.5 ROUGHNESS SURVEYS

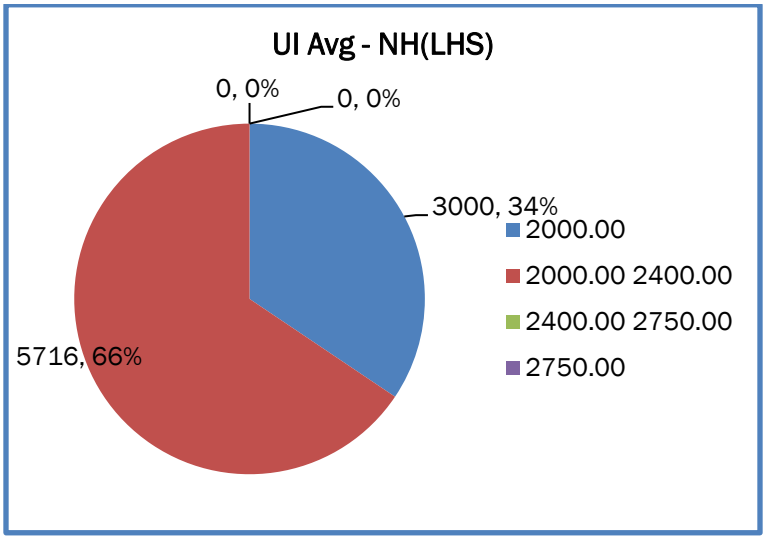
The Roughness data has been collected using **5th Wheel Bump Indicator** and analyzed in terms of International Roughness Index (IRI) in the month of March 2022, separately for each lane, for both direction of travel. Pavement Roughness report covering the data collection and methodology, computation of IRI for each km length in each direction is presented in **Appendix 4** of this Report.

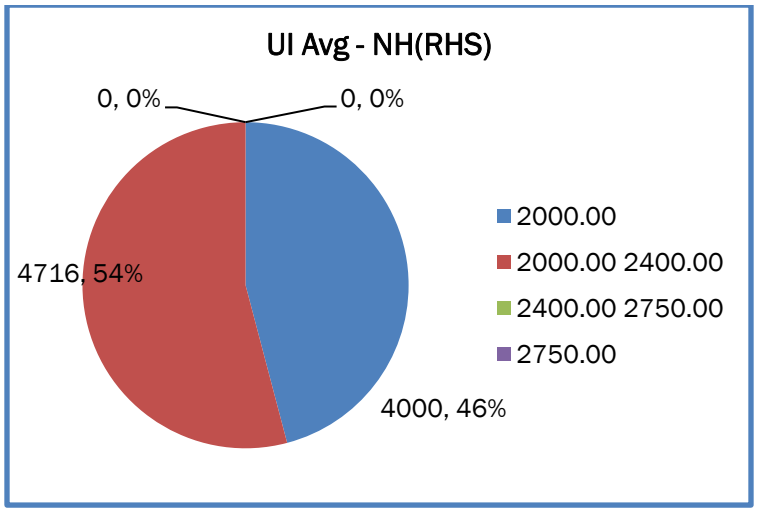
As per Schedule-K, the acceptable level of roughness is less than 2750 mm/km.

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; the total length of the National Expressway Road has good riding quality (UI<2000 mm/km) on both carriageways. Whereas in National Highway, it has good rideability observed for 34% and 46% length of the project road and balance length has fair riding quality (UI>2000 mm/km) on left and right carriageways respectively.

2.6 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The same pavement composition as suggested in the pavement design report has been considered.

Layers	Crust Thickness in mm
BC	40
DBM	100
WMM	250
GSB	200
SG	500
Total(mm)	1090

2.7 AXLE LOAD SURVEYS

Traffic loading has a significant impact on pavement performance and design. The damage that vehicles create to a road depends on the axle loads of the vehicles.

Axle load studies were not conducted in the project road and adopted the VDFs from the Pavement Design Report (PDR).

Table 3: VDF Values adopted from Pavement design report

Vehicle Type	PDR VDF'2017
BUS	1.040
LCV	1.040
2-Axle	6.850
3-Axle	8.440
MAV	12.380

CHAPTER 3. VALIDATION OF EXECUTED WORKS

3.1 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground. As a part of the validation, the available as-built drawings and the inventory data received from the Concessionaire were also referred. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the executed works on ground

Table 4: Details of Executed works

Sl. No.	Particulars	Length/ Nos.	Total for O&M Estimation
1	Start Chainage (Km)	Km	0.000
2	End chainage (Km)	Km	8.716
3	Length of the Project Corridor	Kms	8.716
4	Service Road / Slip Road	Kms	-
5	Flyovers	Nos.	5
6	VUPs	Nos.	4
7	LVUP's	Nos.	2
8	PUP's/CUP's	Nos.	1
9	FOBs	Nos.	4
10	Major Bridges	Nos.	1
11	Minor Bridges	Nos.	2
12	Major Junctions	Nos.	11
13	Minor junctions	Nos.	11
14	Full Height RE Wall	Kms	7.200
15	Bus Bays with Shelter	Nos.	-
16	Bus Shelters	Nos.	14
17	Truck Lay bye	Nos.	-
18	Rest Areas	Nos.	-
19	High Mast Lights	Nos.	16
20	Highway Lighting (length only)	Kms	35.768
21	Single Arm Lightings	Nos.	174
22	Double Arm Lightings	Nos.	794
23	Antiglare	Kms	5.976
24	Road Markings	Kms	8.716
25	W-Beam Safety Barriers	Kms	1.830
26	Double faced W-Beam Safety Barriers	Kms	0.000
27	Rigid Concrete Barriers	Kms	34.934
28	Wire Rope Barriers	Kms	1.500
29	Concrete Railing	Kms	16.080
30	Pedestrian Guard Rails	Kms	14.051
31	Chain Link Fencing	Kms	0.000
32	Delineators	Nos.	436
33	Kilometer Stones	Nos.	18
34	Hectometer Stones	Nos.	70
35	Road Signs	Nos.	329
36	Gantry Sign Boards	Nos.	13
37	Cantilever Sign Boards	Nos.	12
38	Varying Message Signs (VMS)	Nos.	4
39	Emergency Call Box	Nos.	16

Sl. No.	Particulars	Length/ Nos.	Total for O&M Estimation
40	Advanced Traffic Management System (ATMS)	Nos.	-
41	Footpath cum Utility	Kms	12.186
42	Cycle Track	Kms	16.372
43	Traffic Signals	Nos.	49

Lined Covered drains in a length of 1.54 km are provided in the project and the details are presented in **Appendix 5** of this report. The summary of the same is tabulated below.

Table 5: Summary of Drain along Project Road

S. No.	Existing Km		Length (km)	Side	Type of drain	Damage(m)	Remark
	From	To					
1	0.520	1.100	0.580	LHS Median	RCC Covered Drain		NE
2	0.520	1.240	0.720	LHS Shoulder	RCC Covered Drain		NE
3	1.320	1.080	0.240	NH Down-RHS	RCC Covered Drain		NE
Total Length (km)			**1.540**			**-**	

RE walls approaches of underpasses are observed in 7.2 km length along the Project Corridor.

Initial 700m length of the project road has 20m wide median from km0.000 to km 0.700. There are no median openings present in the project corridor.

Traffic signals are provided in 49 nos. of locations at junctions and location-wise details are presented in the **Appendix 5** of this report.

Safety barriers have been provided along the project road at high embankment, sharp curve locations and on the approaches of grade separated and cross drainage structures. The summary of safety barriers provided along the corridor are presented in the following table and the location wise details are presented in **Appendix 5:**

Table 6: Summary of Safety Barriers along Project Road

S. No	Safety Barrier	Length (km)
1	Metal Beam Crash Barrier	1.830
2	Concrete Crash Barrier	34.934
3	Pedestrians Guard Rail	14.051
4	Concrete Railing	16.080
5	Antiglare	5.976

There are 11 major and 11 Minor Junction along the Project Corridor. Summary of Junctions are presented in table below and the location wise details are presented in **Appendix 5**

Table 7: List of Junctions along Project Road

S. No	Type	No's
1	Major junctions	11
2	Minor Junctions	11

Road furniture in the form of Signboards (Information, Gantry, Cantilever signs and Toll Boards) Pavement Markings, Delineators, Guard Posts and Highway Lighting have been provided along the project road. The Tables below depict the particular details of the Road Furniture.

Table 8: Details of Road Signs along Project Road

Sign Description	LHS (Nos.)	RHS (Nos.)	Total (Nos.)
Octagonal	0	0	0
Circular	50	50	100
Triangular	26	21	47
Rectangular	54	67	121
Facility informatory	6	6	12
Chevron	17	3	20
Hazard	84	69	153
Route Marker	0	0	0
Safety Boards	0	0	0
Toll Boards	0	0	0
Cantilever Gantry	8	4	12
Over Head Gantry	5	8	13
Variable Message Sign	2	2	4
Project Descriptive	0	0	0
Junctions	0	0	0
Total	**168**	**161**	**329**

High mast lighting is provided at 16 Nos. of locations mainly at intersections. Highway Lighting is provided on Median and on NH(DN). Lighting with 794 Nos. of Double arm poles and 174 Nos. of Single arm poles. The location wise details of high mast and highway lighting are presented in **Appendix 5** of this report

The Project Road has about 14 No's Bus Shelters on NH(DN) in either direction. The details of the same are presented in **Appendix 5** of this report. There are no Truck Lay-Byes provided in the Project Road.

3.2 STRUCTURES

List of Structures found during the inventory surveys along the corridor are as follows:

Table 9: Details of Major Structures along Project Road

Sl No	Design chainage	Type of Str	Side	Structure on	Age of Structure	Span Arrangement (No x Length)	Deck width	Remarks
1	0+000	Flyover	LHS	MCW	New	30+80+24.3+25+25+25+25+25+25+25+25+43.1+47.5+30+26+20+30+28+15+25+45+30+45	14.17	-
2	0+000	Flyover	LHS	MCW	New	25+25+25+25+25+25+25+28.6+21.4+30+30+25	12.5	COS
3	0+805	MJB	LHS	MCW	New	13 x 42.4	20.50	-
4	0+805	MJB	LHS	MCW	Old	13 x 42.4	19.10	-
5	0+805	MJB	RHS	MCW	Old	13 x 42.4	22.80	-
6	0+805	MJB	RHS	MCW	New	13 x 42.4	20.50	-
7	2+050	Flyover	LHS	MCW	New	25+30+25+25+30+25+25+30+25+25+30+25	10.5	-
8	2+050	Flyover	LHS	MCW	Old	25+30+25+25+30+25+25+30+25+25+30+25	14.5	-
9	2+050	Flyover	RHS	MCW	Old	25+30+25+25+30+25+25+30+25+25+30+25	14.5	-
10	2+050	Flyover	RHS	MCW	New	25+30+25+25+30+25+25+30+25+25+30+25	10.5	-
11	3+050	FOB	BHS	MCW	New	1 x 94.7	3.20	-
12	3+288	MNB	LHS	MCW	New	3 x 5.5	25.43	-
13	3+288	MNB	LHS	MCW	Old	3 x 5.5	25.58	-
14	3+288	MNB	RHS	MCW	Old	3 x 5.5	25.58	-
15	3+288	MNB	RHS	MCW	New	3 x 5.5	23.43	-
16	3+500	FOB	BHS	MCW	New	1 x 83.5	2.75	-
17	3+823	VUP	LHS	MCW	New	2 x 12.6	12.15	-
18	3+823	VUP	LHS	MCW	New	2 x 12.6	16.10	-
19	3+823	VUP	RHS	MCW	New	2 x 12.6	11.25	-
20	3+823	VUP	RHS	MCW	Old	2 x 12.6	17.00	-
21	4+600	VUP	LHS	MCW	New	2 x 15	12.15	-
22	4+600	VUP	LHS	MCW	New	2 x 15	16.10	-
23	4+600	VUP	RHS	MCW	New	2 x 15	16.10	-
24	4+600	VUP	RHS	MCW	New	2 x 15	12.15	-
25	4+890	PUP	LHS	MCW	New	1 x 10	12.05	-

Sl No	Design chainage	Type of Str	Side	Structure on	Age of Structure	Span Arrangement (No x Length)	Deck width	Remarks
26	4+890	PUP	LHS	MCW	Old	1 x 10	16.10	-
27	4+890	PUP	RHS	MCW	Old	1 x 10	16.10	-
28	4+890	PUP	RHS	MCW	New	1 x 10	12.05	-
29	5+175	VUP	LHS	MCW	New	2 x 15	12.15	-
30	5+175	VUP	LHS	MCW	New	2 x 15	16.10	-
31	5+175	VUP	RHS	MCW	New	2 x 15	16.10	-
32	5+175	VUP	RHS	MCW	New	2 x 15	12.15	-
33	6+040	LVUP	LHS	MCW	New	1 x 15	12.15	COS
34	6+040	LVUP	LHS	MCW	New	1 x 15	16.10	COS
35	6+040	LVUP	RHS	MCW	New	1 x 15	16.10	COS
36	6+040	LVUP	RHS	MCW	New	1 x 15	12.15	COS
37	6+075	VUP	LHS	MCW	New	2 x 14.925	12.15	-
38	6+075	VUP	LHS	MCW	New	2 x 14.925	16.10	-
39	6+075	VUP	RHS	MCW	New	2 x 14.925	16.10	-
40	6+075	VUP	RHS	MCW	New	2 x 14.925	12.15	-
41	6+140	LVUP	LHS	MCW	New	1 x 15	12.15	COS
42	6+140	LVUP	LHS	MCW	New	1 x 15	16.10	COS
43	6+140	LVUP	RHS	MCW	New	1 x 15	16.10	COS
44	6+140	LVUP	RHS	MCW	New	1 x 15	12.15	COS
45	6+500	FOB	BHS	MCW	New	1 x 88.976	3.10	-
46	6+930	MNB	LHS	MCW	New	35 + 26.775 + 6.5 + 6.5	17.00	-
47	6+930	MNB	LHS	MCW	Old	2 x 24	10.50	-
48	6+930	MNB	LHS	MCW	Old	4 x 12	16.38	-
49	6+930	MNB	RHS	MCW	Old	4 x 12	16.73	-
50	6+930	MNB	RHS	MCW	Old	2 x 24	10.50	-
51	6+930	MNB	RHS	MCW	New	26.775 + 10 + 10	17.00	-
52	7+000	Flyover	LHS	MCW	New	50+75+50+30	10.5	-
53	7+000	Flyover	LHS	MCW	Old	40+50+75+50+30+40 +30	14.5	-
54	7+000	Flyover	RHS	MCW	Old	40+50+75+50+30+40 +30	14.5	-
55	7+000	Flyover	RHS	MCW	New	50+75+50+30	10.5	-
56	7+350	FOB	BHS	MCW	New	1 x 89.635	3.10	-
57	8+047	Flyover	LHS	MCW	New	26.25+25.75+25.75+ 26.25+26.25+25.75+ 26.25+26.25+25.75+ 25.75+26.25	10.5	-

Sl No	Design chainage	Type of Str	Side	Structure on	Age of Structure	Span Arrangement (No x Length)	Deck width	Remarks
58	8+047	Flyover	LHS	MCW	Old	26.25+25.75+25.75+ 26.25+26.25+25.75+ 26.25+26.25+25.75+ 25.75+26.25	14.25	-
59	8+047	Flyover	RHS	MCW	Old	26.25+25.75+25.75+ 26.25+26.25+25.75+ 26.25+26.25+25.75+ 25.75+26.25	14.25	-
60	8+047	Flyover	RHS	MCW	New	26.25+25.75+25.75+ 26.25+26.25+25.75+ 26.25+26.25+25.75+ 25.75+26.25	10.5	-
61	8+408	Flyover	LHS	MCW	New	2 x 27.45	11.9	-
62	8+408	Flyover	LHS	MCW	New	2 x 27.45	16.15	-
63	8+408	Flyover	RHS	MCW	New	2 x 27.45	16.15	-
64	8+408	Flyover	RHS	MCW	New	2 x 27.45	10.5	-

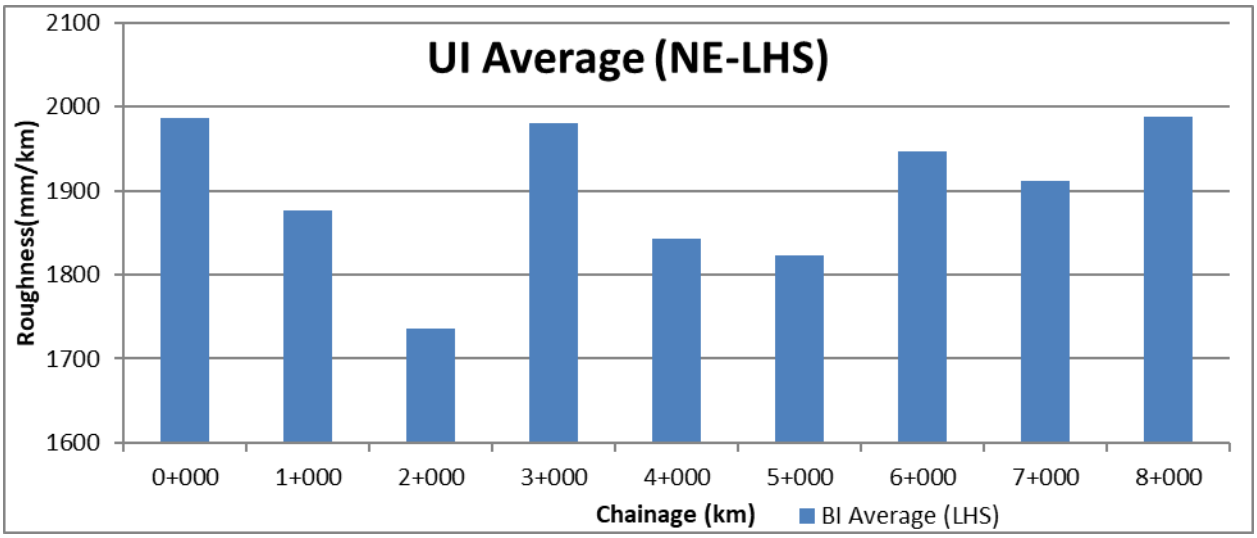
4.1 PAVEMENT CONDITION

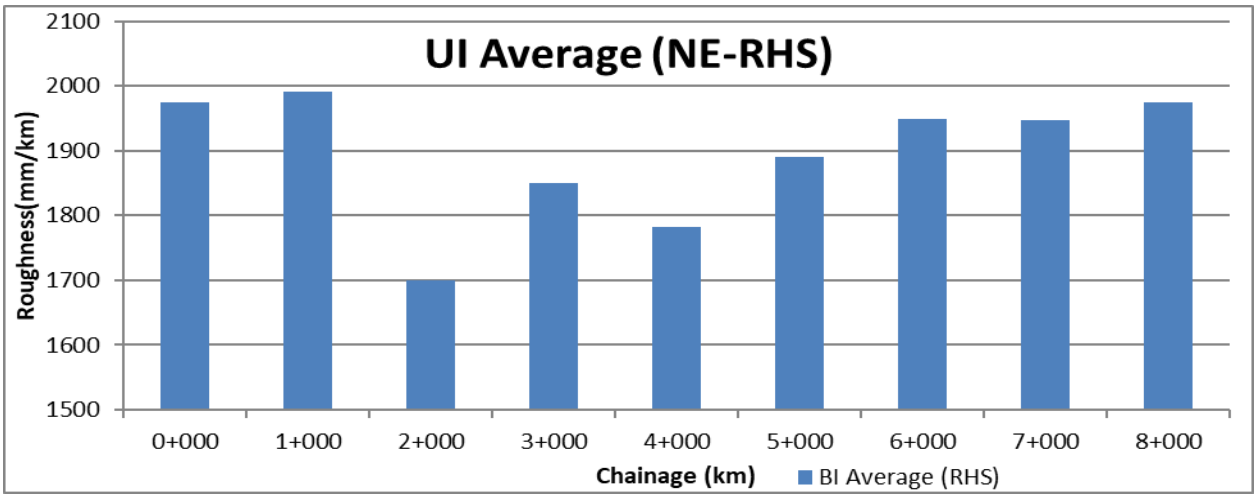
The distresses in bituminous surface have been considered from March 2022 surveys. Pavement Condition report covering the data collection for each km length in each direction has been presented in the **Appendix-2** of this report.

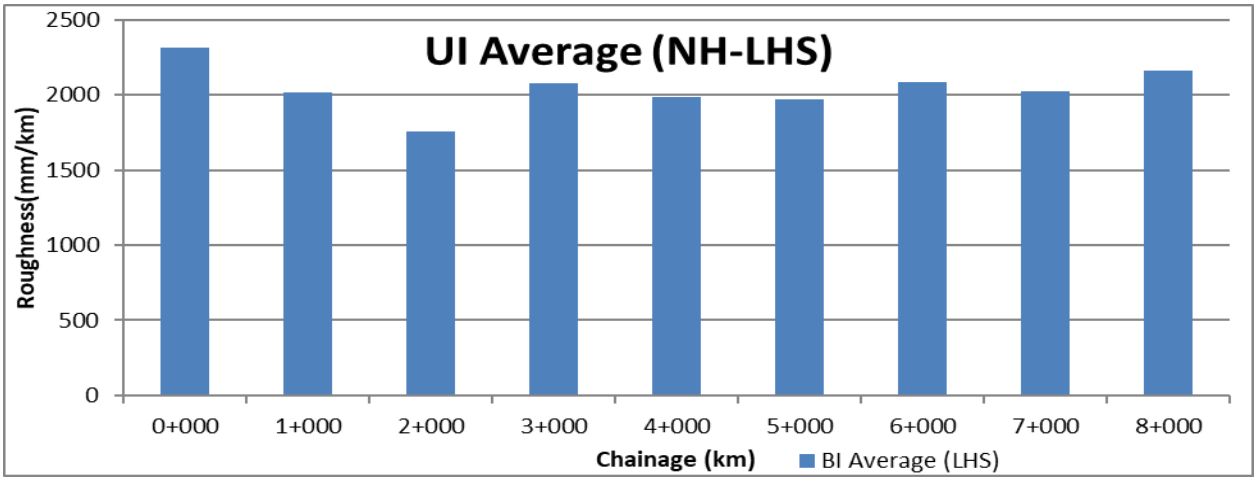
The project corridor has been provided with flexible pavement for the entire length in main-carriageway and service roads. Surface appears to be intact without any major distresses. However, minor raveling and minor cracking is observed.

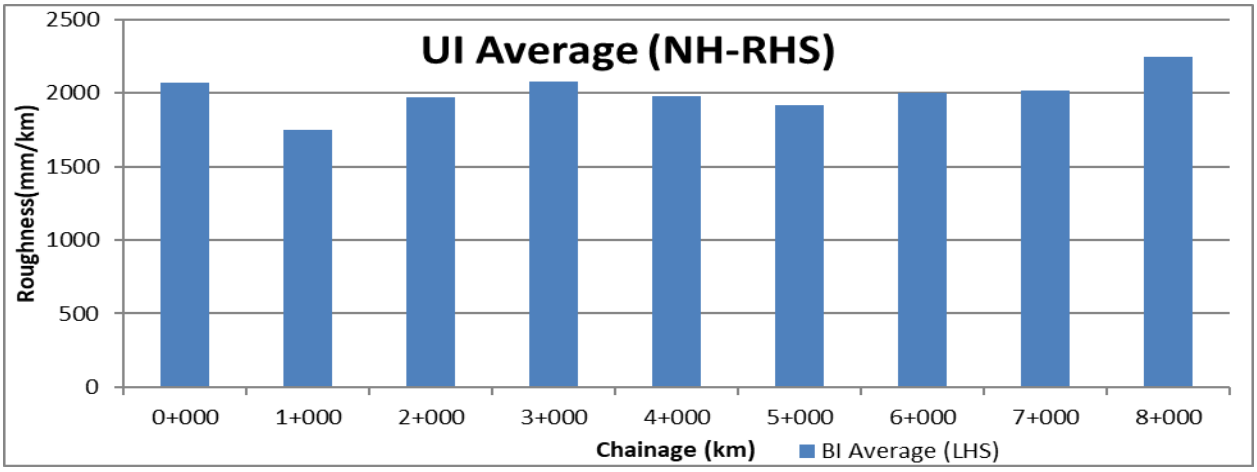
4.2 ROUGHNESS

Almost entire project road is having Good to Fair riding quality. From the below charts for both NH & NE, it can be noted that unevenness Index (UI) is less than 2750mm/km and hence no overlay warranted on LHS & RHS carriageway. Bar diagrams showing the Kilometer wise roughness along the project road are presented below:




UI Average (NE-RHS)
Roughness(mm/km)
2100
2000
1900
1800
1700
1600
1500
0+000
1+000
2+000
3+000
4+000
5+000
6+000
7+000
8+000
Chainage (km)
BI Average (RHS)


UI Average (NH-LHS)
Roughness(mm/km)
2500
2000
1500
1000
500
0
0+000
1+000
2+000
3+000
4+000
5+000
6+000
7+000
8+000
Chainage (km)
BI Average (LHS)


UI Average (NH-RHS)
Roughness(mm/km)
2500
2000
1500
1000
500
0
0+000
1+000
2+000
3+000
4+000
5+000
6+000
7+000
8+000
Chainage (km)
BI Average (LHS)

4.3 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 10: Summary of Design Moduli of different layers – NE

S. No	Chainage(km)		Length(km)	15th Percentile MR values		
	From	To		MR for BT	MR for Granular	MR for Subgrade
LHS						
1	0.10	3.72	3.6	2415	392	86
2	3.72	8.71	5.0	2412	317	87
RHS						
1	0.10	4.32	4.2	2402	393	86
2	4.32	8.70	4.4	2395	354	87

Table 11: Summary of Design Moduli of different layers – NH-24

S. No	Chainage(km)		Length(km)	15th Percentile MR values		
	From	To		MR for BT	MR for Granular	MR for Subgrade
LHS						
1	0.00	2.21	2.2	2223	302	86
2	2.21	5.78	3.6	2250	298	87
3	5.78	8.6	2.8	2403	312	87
RHS						
1	0.00	2.40	2.4	2222	391	87
2	2.40	5.40	3.0	2232	278	87
3	5.40	8.70	3.3	2249	389	87

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 2412 Mpa to 2415 Mpa in LHS-NE, 2223 Mpa to 2403 Mpa in LHS-NH 24, 2395 Mpa to 2402 Mpa in NE-RHS 2222 to 2249 Mpa in RHS-NH-24 Carriageway. The MR value for Granular Layers is 317 Mpa to 392 Mpa in NE-LHS, 298 Mpa to 312 Mpa in LHS-NH-24 & 354 Mpa to 393 Mpa in NE-RHS, 278 Mpa to 391 Mpa in NH-RHS-24 Carriageway. Similarly, the MR value for Subgrade Layer is 87 Mpa to 86 Mpa in NE-LHS, 86 Mpa to 87 Mpa in NH-LHS carriageway & 86 Mpa to 87 Mpa in NE-RHS, 87 Mpa in NH-RHS Carriageway.

4.4 PAVEMENT COMPOSITION

As per Pavement Design Report crust composition of NH-24 **Main carriageway** is as below:

Layers	Crust Thickness in mm	
	Expressway (NE)	NH-24
MSA/CBR	120 MSA/CBR-9%	60 MSA/CBR-9%
BC	50	40
DBM	120	100
WMM	250	250
GSB	200	200
SG	500	500
Total(mm)	1120	1090

4.5 STRUCTURES

The structures along the corridor are constructed as per the relevant standards and specifications. Presently, all structures are in good to fair condition without any major distress.

List of Structuress found during the inventory surveys along the corridor are as follows:

Table 12: Summary of Major Structures

S. No	Type of Structure	Schedule-B	As per Site
(a)	No. of Major Bridges	1	1
(b)	No. of Minor Bridges	2	2
(c)	No. of Flyover	5	5
(d)	No. of Vehicular Underpasses	4	4
(e)	No. of Light Vehicular Underpasses	2(COS)	-
(f)	No. of Pedestrian Under passes	-	1
(g)	No. of FOB	4	4

Table 13: Summary of Culverts

S. No	Type of Structure	Schedule	As per Site
(a)	No. of Pipe Culverts	-	6 (COS)
(b)	No. of Box / Slab Culverts	1(Descope)/-	-

Detailed inventory and Structure-wise condition along the project corridor are presented below:

Chainage: 0+805 (CA Ch: 0+620)
General Description
LHS 2(MCW)- Expressway (DME)

- Type of Structure : MJB(Yamuna River)
- Span Arrangement : 13 x 42.4 m
- Total deck width of structure : 19.1 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Steel Hand Rail
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- External prestressing done for girders.
- Vegetation growth on pier cap.
- All drainage spouts are clogged.
- Expansion joints are filled with silt and dust.

Chainage: 0+805 (CA Ch: 0+620)
General Description
RHS 2 (MCW)- Expressway (DME)

- Type of Structure : MJB (Yamuna River)
- Span Arrangement : 13 x 42.4 m
- Total deck width of structure : 22.8 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Steel Hand Rail
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- The structure having deck continuity.
- Vegetation growth on super structure.
- All drainage spouts are clogged.
- Expansion joints are filled with silt and dust.
- Rubber sealant damaged at 3 locations.
- Hair line cracks observed on pier cap P1.
- Crash barrier damaged and reinforcement exposed.

NOTE ON EXPRESSWAY MAJOR BRIDGE ACROSS YAMUNA RIVER@ CH 0.805

➢ BACKGROUND

Old Nizamuddin Bridge, presently existing on Expressway was constructed during year 1964 to 1968. During the course of time, excessive deterioration in footpath slabs and beams etc., were noted and accordingly, repair and rehabilitation works for this bridge were carried out during year 1992 to 1993 including external pre-stressing works.

Further, due to continued increase in heavy traffic in recent past along with usual aging effects, this bridge once again started showing visible signs of deterioration, distresses and damages which includes cracking and spalling of concrete from the girders, deck slab and piers, deterioration in metallic bearings, damages and deterioration in external pre-stressing, deterioration in expansion joints, damages in wearing coats etc. Keeping in view of importance of the bridge and the recent deterioration, again PWD, Govt of Delhi has initiated detailed investigations during year 2013-14 and appropriate rehabilitation measures as suggested for repair and strengthening of various elements and durability make up measures were proposed. Few distresses noted were related to external prestressing cables, and the PVC pipe on PSC cables were damaged at few locations, strands were corroded at some locations and some wires snapped in some cables.

➢ PRESENT ASSESSMENT

Recent visual inspection shows much improved condition and it appears that major repairs were already done. This observation is based on some simple quick checks to determine whether any repairs were undertaken after 2014.

ITEM	CONDITION IN	
	2014	**2022**
PVC Pipe for cable duct	Damaged at some locations	No damages seen
Expansion Joints	Damaged	Debris Observed
Bearing	Corroded	Replaced by Elastomeric
Soffit of girder	Distress as spalling, exposed reinforcement, etc., seen	No damages seen
Protective coating	None	Provided

From the above sample comparison, it may note that all remedial measures for durability makeup and strength were undertaken. Sample photos from the Year 2014 and Year-2022 are as presented below.

A) Condition of the Bridge in the Year-2014

B) Photographs (year 2022) showing the present condition which is much better than gathered for 2014 Condition.

Chainage: 0+805 (CA Ch: 0+620)
General Description
LHS 1: Service Road (NH-24)

- Type of Structure : MJB (Yamuna River)
- Span Arrangement : 13 x 42.4 m
- Total deck width of structure : 20.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type Abutment & Circular Type Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Steel Hand Rail
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Honey combing observed on soffit of girders in 1st & 2nd span.
- Honey combing observed on cross girders and pier P1.
- Cracks observed on RE Panels at A2.
- The structure having deck continuity.
- All drainage spouts are clogged.
- Expansion joints are filled with silt and dust.
- Quadrant pitching partially damaged at A1.
- Debris observed on abutment cap.

Chainage: 0+805 (CA Ch: 0+620)
General Description
RHS 1(Service Road) -NH-24

- Type of Structure : MJB (Yamuna River)
- Span Arrangement : 13 x 42.4 m
- Total deck width of structure : 20.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type Abutment & Circular Type Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Steel Hand Rail
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- The structure having deck continuity.
- All drainage spouts are clogged.
- Expansion joints are filled with silt and dust.
- Debris observed on abutment cap.
- Minor honey combing observed on pier cap.

Chainage: 3+288 (CA Ch: 2+992)
General Description
LHS 1

- Type of Structure : MNB
- Span Arrangement : 3 x 5.5 m
- Total deck width of structure : 25.433 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.
- MS pipe missing on crash barrier.
- Debris observed in vent area.
- Drainage spouts are not provided.

Chainage: 3+288 (CA Ch: 2+992)
General Description
LHS 2 & RHS 2

- Type of Structure : MNB
- Span Arrangement : 3 x 5.5 m
- Total deck width of structure : 2 x 25.575 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:

- Quadrant pitching damage at shoulder side.
- Drainage spouts are not provided.
- Debris observed in vent area.

Chainage: 3+288 (CA Ch: 2+992)
General Description
RHS 1

- Type of Structure : MNB
- Span Arrangement : 3 x 5.5 m
- Total deck width of structure : 23.43 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:

- Debris observed in vent area.
- Drainage spouts are not provided.
- MS pipe missing on crash barrier.

Chainage: 6+930 (CA Ch: 7+085)
General Description
LHS 1

- Type of Structure : MNB
- Span Arrangement : 35 + 26.775 + 2 x 6.5 m
- Total deck width of structure : 17.0 + 11.825m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : PSC Girder & Integrated Solid Slab & 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:

- Debris observed on abutment cap and pier cap.
- Debris observed in vent area.
- Structure **11.85m** Widened on LHS.

Chainage: 6+930 (CA Ch: 7+085)
General Description
LHS 2 & RHS 2

- Type of Structure : MNB
- Span Arrangement : 4 x 12.0 m
- Total deck width of structure : LHS = 16.375 & RHS = 16.725 m
- Type of Foundation : Not visible
- Type of Substructure : Trestle Type Abutment & Pier
- Type of Superstructure : RCC Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

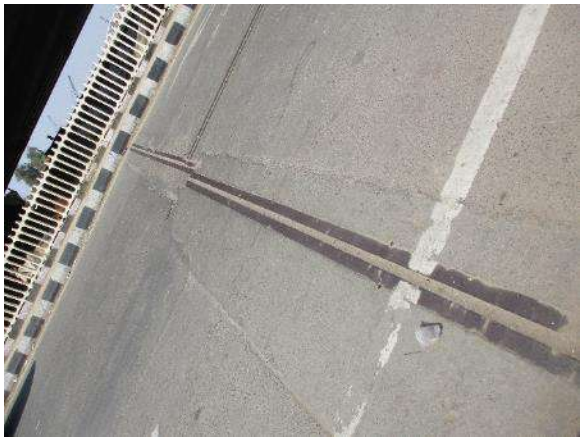
- Debris observed on abutment cap and pier cap.
- Debris observed in vent area.
- Structure is in fair condition.

Chainage: 6+930 (CA Ch: 7+085)
General Description
RHS 1

- Type of Structure : MNB
- Span Arrangement : 26.775 + 2 x 10.0 m
- Total deck width of structure : 17.0 + 11.525 m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : PSC Girder & Integrated Solid Slab & 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:

- Structure **11.4m** Widened on RHS.
- Debris observed on abutment cap and pier cap.
- All drainage spouts are clogged.
- Expansion joints are filled with silt and dust.
- Debris observed in vent area.



Chainage: 0+000 (CA Ch: 0+000)
General Description
LHS

- Type of Structure : **Flyover**
- Span Arrangement : 80 + 43.1 + 47.5 + 26 + 20 + 24.3 + 28 + 15 + 9 x 25 + 4 x 30 + 2 x 45
- Total deck width of structure : 16 m (A1 to P11) & 12.5 m (P12 to A2)
- Type of Foundation : Not visible
- Type of Substructure : Trestle Type Abutment & Pier
- Type of Superstructure : PSC, RCC Girders & Steel Truss
- 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 silt and dust.
- Expansion joint rubber sealant damage on Pier P3.
- All drainage spouts are clogged.
- Reinforcement left on pier cap in some locations.
- Soil nailing done for RE panels at LHS A1.

Chainage: 0+000 (CA Ch: 0+000)
General Description
LHS 2

- Type of Structure : **Flyover (COS)**
- Span Arrangement : 28.6 + 21.4 + 2 x 30 + 8 x 25 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : Circular Type Abutment & Pier
- 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:

- Expansion joints are filled with silt and dust.
- All drainage spouts are clogged.

Chainage: 2+050 (CA Ch: 1+735)
General Description
LHS 1

- Type of Structure : **Flyover**
- Span Arrangement : 4 x 30 + 8 x 25 m
- Total deck width of structure : 10.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type Abutment & Pier
- 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:

- The structure having deck continuity.
- All drainage spouts are clogged.
- Expansion joints are filled with silt and dust.

Chainage: 2+050 (CA Ch: 1+735)
General Description
LHS 2

- Type of Structure : **Flyover**
- Span Arrangement : 4 x 30 + 8 x 25 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type Abutment & Pier
- 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:

- The structure having deck continuity.
- All drainage spouts are clogged.
- Expansion joints are filled with silt and dust.

Chainage: 2+050 (CA Ch: 1+735)
General Description
RHS 2

- Type of Structure : **Flyover**
- Span Arrangement : 4 x 30 + 8 x 25 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type Abutment & Pier
- 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:

- The structure having deck continuity.
- All drainage spouts are clogged.
- Expansion joints are filled with silt and dust.

Chainage: 2+050 (CA Ch: 1+735)
General Description
RHS 1

- Type of Structure : **Flyover**
- Span Arrangement : 4 x 30 + 8 x 25 m
- Total deck width of structure : 10.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type Abutment & Pier
- 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:

- The structure having deck continuity.
- All drainage spouts are clogged.
- Expansion joints are filled with silt and dust.
-

Chainage: 7+000 (CA Ch: 7+155)
General Description
LHS 1

- Type of Structure : **Flyover**
- Span Arrangement : 50 + 75 + 50 + 30 m
- Total deck width of structure : 10.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Circular Type Abutment & Pier
- Type of Superstructure : PSC, 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:

- Soil nailing done for RE panels at LHS A1 and A2.
- Rusting observed on bottom of steel girder in 1st span.
- Honey combing observed on cross girders.
- The structure having deck continuity.

Chainage: 7+000 (CA Ch: 7+155)
General Description
LHS 2

- Type of Structure : **Flyover**
- Span Arrangement : 2 x 40 + 2 x 50 + 2 x 30 + 75 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : PSC Box
- 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:

- All drainage spouts are clogged.
- Previous repairs done for super structure.
- The structure having deck continuity.

Chainage: 7+000 (CA Ch: 7+155)
General Description
RHS 2

- Type of Structure : **Flyover**
- Span Arrangement : 2 x 40 + 2 x 50 + 2 x 30 + 75 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type Abutment & Pier
- Type of Superstructure : PSC Box
- 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:

- All drainage spouts are clogged.
- Previous repairs done for super structure.
- The structure having deck continuity.

Chainage: 7+000 (CA Ch: 7+155)
General Description
RHS 1

- Type of Structure : **Flyover**
- Span Arrangement : 50 + 75 + 50 + 30 m
- Total deck width of structure : 10.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Circular Type Abutment & Pier
- Type of Superstructure : PSC, 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:

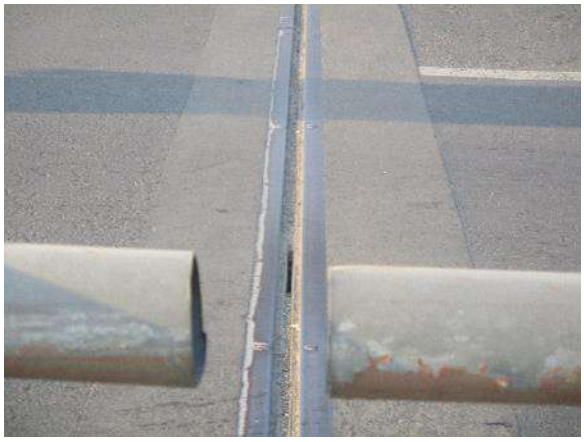
- All drainage spouts are clogged.
- Expansion joints are filled with silt and dust.
- The structure having deck continuity.

Chainage: 8+047 (CA Ch: 7+697)
General Description
LHS 1

- Type of Structure : **Flyover**
- Span Arrangement : 5 x 25.75 + 6 x 26.25m
- Total deck width of structure : 10.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Square Column Abutment & Pier
- 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:

- Expansion joints are filled with silt and dust.
- All drainage spouts are clogged.
- The structure having deck continuity.



Chainage: 8+047 (CA Ch: 7+697)
General Description
LHS 2

- Type of Structure : **Flyover**
- Span Arrangement : 5 x 25.75 + 6 x 26.25 m
- Total deck width of structure : 14.25 m
- Type of Foundation : Pile
- Type of Substructure : RCC Circular Type Abutment & Pier
- 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:

- All drainage spouts are clogged.
- Debris observed on Abutment caps.
- The structure having deck continuity.

Chainage: 8+047 (CA Ch: 7+697)
General Description
RHS 2

- Type of Structure : **Flyover**
- Span Arrangement : 5 x 25.75 + 6 x 26.25 m
- Total deck width of structure : 14.25 m
- Type of Foundation : Pile
- Type of Substructure : RCC Circular Type Abutment & Pier
- 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:

- Honey combing observed on bottom of girder.
- All drainage spouts are clogged.
- Debris observed on Abutment caps.
- The structure having deck continuity.

Chainage: 8+047 (CA Ch: 7+697)
General Description
RHS 1

- Type of Structure : **Flyover**
- Span Arrangement : 5 x 25.75 + 6 x 26.25 m
- Total deck width of structure : 10.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Square Column Abutment & Pier
- 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:

- Honey combing observed on bottom of top slab.
- Expansion joints are filled with silt and dust.
- Spalling observed on crash barrier at A2.
- All drainage spouts are clogged.
- Debris observed on Abutment caps.
- The structure having deck continuity.

Chainage: 8+408 (CA Ch: 8+050)
General Description
LHS 1

- Type of Structure : **Flyover**
- Span Arrangement : 2 x 27.45 m
- Total deck width of structure : 11.9 m
- Type of Foundation : Pile
- Type of Substructure : RCC Square Column Abutment & Pier
- 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:

- Expansion joints are filled with silt and dust.
- All drainage spouts are clogged.
- Cracks observed on RE Panels at A2.

Chainage: 8+408 (CA Ch: 8+050)
General Description
LHS 2

- Type of Structure : **Flyover**
- Span Arrangement : 2 x 27.45 m
- Total deck width of structure : 16.15 m
- Type of Foundation : Pile
- Type of Substructure : RCC Square Twin Column Abutment & Pier
- 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:

- Expansion joints are filled with silt and dust.
- All drainage spouts are clogged.

Chainage: 8+408 (CA Ch: 8+050)
General Description
RHS 2

- Type of Structure : **Flyover**
- Span Arrangement : 2 x 27.45 m
- Total deck width of structure : 16.15 m
- Type of Foundation : Pile
- Type of Substructure : RCC Square Twin Column Abutment & Pier
- 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:

- Expansion joints are filled with silt and dust.
- All drainage spouts are clogged.

Chainage: 8+408 (CA Ch: 8+050)
General Description
RHS 1

- Type of Structure : **Flyover**
- Span Arrangement : 2 x 27.45 m
- Total deck width of structure : 10.5 m
- Type of Foundation : Pile
- Type of Substructure : RCC Square Column Abutment & Pier
- 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:

- Expansion joints are filled with silt and dust.
- All drainage spouts are clogged.
- Soil nailing done for RE Panel at RHS A2.

Chainage: 3+823 (CA Ch: 3+958)
General Description
LHS 1

- Type of Structure : **VUP**
- Span Arrangement : 2 x 12.6 m
- Total deck width of structure : 12.15 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:

- Soil nailing done for RE panels at LHS A1 & A2.
- Structure is in fair condition.
- All drainage spouts are clogged.

Chainage: 3+823 (CA Ch: 3+958)
General Description
LHS 2

- Type of Structure : **VUP**
- Span Arrangement : 2 x 12.6 m
- Total deck width of structure : 16.1 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: 3+823 (CA Ch: 3+958)
General Description
RHS 2

- Type of Structure : **VUP**
- Span Arrangement : 2 x 12.6 m
- Total deck width of structure : 11.25 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: 3+823 (CA Ch: 3+958)
General Description
RHS 1

- Type of Structure : **VUP**
- Span Arrangement : 2 x 12.6 m
- Total deck width of structure : 17.0 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Pier
- 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:

- Debris observed on pier cap and abutment cap.
- Expansion joints are filled with silt and dust.
- All drainage spouts are clogged.

Chainage: 4+600 (CA Ch: 4+956)
General Description
LHS 1

- Type of Structure : **VUP**
- Span Arrangement : 2 x 15.0 m
- Total deck width of structure : 12.15 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.
- All drainage spouts are clogged.

Chainage: 4+600 (CA Ch: 4+956)
General Description
LHS 2

- Type of Structure : **VUP**
- Span Arrangement : 2 x 15.0 m
- Total deck width of structure : 16.1 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: 4+600 (CA Ch: 4+956)
General Description
RHS 2

- Type of Structure : **VUP**
- Span Arrangement : 2 x 15.0 m
- Total deck width of structure : 16.1 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: 4+600 (CA Ch: 4+956)
General Description
RHS 1

- Type of Structure : **VUP**
- Span Arrangement : 2 x 15.0 m
- Total deck width of structure : 12.15 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.
- All drainage spouts are clogged.

Chainage: 5+175 (CA Ch: 5+260)
General Description
LHS 1

- Type of Structure : **VUP**
- Span Arrangement : 2 x 15.0 m
- Total deck width of structure : 12.15 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: 5+175 (CA Ch: 5+260)
General Description
LHS 2

- Type of Structure : **VUP**
- Span Arrangement : 2 x 15.0 m
- Total deck width of structure : 16.1 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: 5+175 (CA Ch: 5+260)
General Description
RHS 2

- Type of Structure : **VUP**
- Span Arrangement : 2 x 15.0 m
- Total deck width of structure : 16.1 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: 5+175 (CA Ch: 5+260)
General Description
RHS 1

- Type of Structure : **VUP**
- Span Arrangement : 2 x 15.0 m
- Total deck width of structure : 12.15 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: 6+075 (CA Ch: 6+233)
General Description
LHS 1

- Type of Structure : **VUP**
- Span Arrangement : 2 x 14.925 m
- Total deck width of structure : 12.15 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:

- All drainage spouts are clogged.
- Structure is in fair condition.

Chainage: 6+075 (CA Ch: 6+233)
General Description
LHS 2

- Type of Structure : **VUP**
- Span Arrangement : 2 x 14.925 m
- Total deck width of structure : 16.1 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: 6+075 (CA Ch: 6+233)
General Description
RHS 2

- Type of Structure : **VUP**
- Span Arrangement : 2 x 14.925 m
- Total deck width of structure : 16.1 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: 6+075 (CA Ch: 6+233)
General Description
RHS 1

- Type of Structure : **VUP**
- Span Arrangement : 2 x 14.925 m
- Total deck width of structure : 12.15 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:

- All drainage spouts are clogged.
- Structure is in fair condition.

Chainage: 6+040
General Description
LHS 1

- Type of Structure : **LVUP**
- Span Arrangement : 1 x 15.0 m
- Total deck width of structure : 12.15 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: 6+040
General Description
LHS 2

- Type of Structure : **LVUP**
- Span Arrangement : 1 x 15.0 m
- Total deck width of structure : 16.1 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: 6+040
General Description
RHS 2

- Type of Structure : **LVUP**
- Span Arrangement : 1 x 15.0 m
- Total deck width of structure : 16.1 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: 6+040
General Description
RHS 1

- Type of Structure : **LVUP**
- Span Arrangement : 1 x 15.0 m
- Total deck width of structure : 12.15 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: 6+140
General Description
LHS 1

- Type of Structure : **LVUP**
- Span Arrangement : 1 x 15.0 m
- Total deck width of structure : 12.15 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: 6+140
General Description
LHS 2

- Type of Structure : **LVUP**
- Span Arrangement : 1 x 15.0 m
- Total deck width of structure : 16.1 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: 6+140
General Description
RHS 2

- Type of Structure : **LVUP**
- Span Arrangement : 1 x 15.0 m
- Total deck width of structure : 16.1 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: 6+140
General Description
RHS 1

- Type of Structure : **LVUP**
- Span Arrangement : 1 x 15.0 m
- Total deck width of structure : 12.15 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: 4+890 (CA Ch: 5+046)
General Description
LHS 1

- Type of Structure : **PUP**
- Span Arrangement : 1 x 10.0 m
- Total deck width of structure : 12.05 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: 4+890 (CA Ch: 5+046)
General Description
LHS 2

- Type of Structure : **PUP**
- Span Arrangement : 1 x 10.0 m
- Total deck width of structure : 16.1 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: 4+890 (CA Ch: 5+046)
General Description
RHS 2

- Type of Structure : **PUP**
- Span Arrangement : 1 x 10.0 m
- Total deck width of structure : 16.1 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 observed on soffit of top slab.
- Structure is in fair condition.

Chainage: 4+890 (CA Ch: 5+046)
General Description
RHS 1

- Type of Structure : **PUP**
- Span Arrangement : 1 x 10.0 m
- Total deck width of structure : 12.05 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: 3+050
General Description
BHS

- Type of Structure : **FOB**
- Span Arrangement : 1 x 94.7 m
- Total deck width of structure : 3.2 m
- Type of Foundation : Open
- Type of Substructure : Steel Girder Column
- Type of Superstructure : Steel Plate Girder
- 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: 3+500
General Description
BHS

- Type of Structure : **FOB**
- Span Arrangement : 1 x 83.05 m
- Total deck width of structure : 2.75 m
- Type of Foundation : Open
- Type of Substructure : Steel Girder Column
- Type of Superstructure : Steel Plate Girder
- 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: 6+500
General Description
BHS

- Type of Structure : **FOB**
- Span Arrangement : 1 x 88.976 m
- Total deck width of structure : 3.1 m
- Type of Foundation : Open
- Type of Substructure : Steel Girder Column
- Type of Superstructure : Steel Plate Girder
- 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: 7+350
General Description
BHS

- Type of Structure : **FOB**
- Span Arrangement : 1 x 89.635 m
- Total deck width of structure : 3.1 m
- Type of Foundation : Open
- Type of Substructure : Steel Girder Column
- Type of Superstructure : Steel Plate Girder
- 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.

Details of Culverts

S No.	Chainage (Km) As per Site	Type of Culvert As per Site	Proposed location	Proposed Span (m) As per Site	Deck Width (m) As per Site	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
						LHS	RHS	LHS	RHS	
1	0+400	Pipe Culvert	BHS	4 x 1.2	110.00	No	No	No	No	> Culvert fully covered with bushes on both sides.
2	1+250	Pipe Culvert	BHS	4 x 1.2	110.00	No	No	No	No	> Culvert partially buried.
3	1+300	Pipe Culvert	BHS	1 x 1.2	110.00	No	No	No	No	> Culvert partially buried.
4	1+350	Pipe Culvert	BHS	1 x 1.2	110.00	No	No	No	No	> Culvert partially buried.
5	1+420	Pipe Culvert	BHS	1 x 1.2	110.00	No	No	No	No	> Culvert partially buried.
6	1+500	Pipe Culvert	BHS	1 x 1.2	110.00	No	No	No	No	> Culvert partially buried.

Culvert Photos as On Site

Pipe Culvert at Km 1+250

Pipe Culvert at Km 1+300

Pipe Culvert at Km 1+350

Pipe Culvert at Km 1+420

4.6 DRAINAGE AND SLOPE PROTECTION

- ✓ Lined Covered drains observed at national Expressway in Road Separator and median locations along the corridor and are in fair condition

4.7 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided are in fair condition.
- ✓ Pedestrian guard rails installed at NH-down at the footpath cum utility locations appear to be in good condition and in few locations.
- ✓ Traffic signals provided in junction locations and street lighting and high mast lighting are functioning well.

4.8 ROAD USER FACILITIES

The Bus Shelters (14 Nos) are provided in NH-Down are in fair condition.

CHAPTER 5. REHABILITATION PLANS AND DESIGNS

5.1 DESIGN TRAFFIC LOADING

Design Traffic loading has been estimated by considering the projected traffic from Pavement Design report with 5% growth, up to FY2022) and VDFs as taken from pavement design report and with 5% growth rates for 10 years, 15 years and 20 years design period as below:

Table 14: Traffic Volume (AADT)

Vehicle/Mode	AADT at 1+500, FY22E (Vehicles)		AADT at 6+500, FY22E (Vehicles)	
	LHS	RHS	LHS	RHS
Bus	3395	2899	1983	1892
LCV	7690	8161	4496	4781
Truck / 2A	1126	1497	1398	1449
3A	872	439	796	841
MAV	401	204	341	297

50:50 directional distributions are considered

Table 15: Estimated Design traffic loading (MSA)

Year	Design MSA with 5% Growth rates-NE			
	km 1+500 UP	km 1+500 DN	km 6+500 UP	km 6+500 DN
10th year from Now	55	49	47	48

Year	Design MSA with 5% Growth rates-NH-24			
	km 1+500 UP	km 1+500 DN	km 6+500 UP	km 6+500 DN
10th year from Now	27	24	24	24

The computation of traffic loadings is presented in **Appendix 6** of this Report. Design traffic corresponding to 10 years period has been considered for overlay design.

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 16: 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	Critical Life
NE-LHS, for MSA 55																
1	0.10	3.72	3.6	2415	392	86	170	450	170	620	2415	210.50	129.4	122	658	122
2	3.72	8.71	5.0	2412	317	87	170	450	170	620	2412	224.1	146.2	76	496	76
NE-RHS, for MSA 49																
1	0.10	4.32	4.2	2402	393	86	170	450	170	620	2402	209.4	129.5	122	674	122
2	4.32	8.70	4.4	2395	354	87	170	450	170	620	2395	216.9	137.8	96	575	96
NH-LHS for MSA 27																
1	0.00	2.21	2.2	2223	302	86	140	450	140	590	2223	265.2	184.7	33	231	33
2	2.21	5.78	3.6	2250	298	87	140	450	140	590	2250	264.3	185.0	32	235	32
3	5.78	8.60	2.8	2403	312	87	140	450	140	590	2403	257.6	175.4	38	264	38
NH-RHS for MSA 24																
1	0.00	2.40	2.4	2222	391	87	140	450	140	590	2222	240.9	158.2	60	357	60
2	2.40	5.40	3.0	2232	278	87	140	450	140	590	2232	270.4	192.9	28	212	28
3	5.40	8.70	3.3	2249	389	87	140	450	140	590	2249	240.9	158.0	60	357	60

It can be seen from the above table, that for Expressway, the required msa on LHS:55msa, RHS:49 and for NH-24, required msa is LHS:27msa, RHS:24. From the analysis, remaining life of existing pavement is observed to be more than 76MSA & 96MSA for LHS & RHS of Expressway. Whereas, for NH-24 it is obtained 32MSA & 28MSA on LHS& RHS, which is more than required Msa. Hence, there is no requirement of strength of the existing pavement.

Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Appendix 7** of this Report.

5.3 STRUCTURAL REHABILITATION

All the structure found to be in good condition except minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- Repair/Replacement of Existing Bearings
- Repair/Replacement of Existing Expansion Joints
- Repair/Replacement of Existing Wearing Coat
- Profile Correction for Existing Deck Slab by Cement Concrete
- Sealing of Cracks for Bridges by Epoxy Resin
- Replacement of Spalled Concrete of ECW by Epoxy Mortar
- Cement Grouting for Repair of Existing Bridges
- Guniting/Shotcrete for Repair of Existing Bridges
- Providing & Fixing of Drainage Spouts
- Repair of Substructure Component
- Repair / Replacement of Railing & Crash Barrier
- Epoxy Bonding between New and Old Concrete.

CHAPTER 6. OPERATION AND MAINTENANCE

6.1 INTRODUCTION

Looking at the contractual requirements of maintaining project road under specified level of roughness it is felt that roughness is the most important criterion for finalizing the O&M schedule for the project. Accordingly, the methodology adopted by present consultants includes predicting the roughness year by year under the traffic using a well acknowledged HDH-4 model developed for developing countries like India after lot of research by World Bank. The said model is widely prescribed by MORTH and NHAI during the preparation of detailed project reports for several projects in doing economic analysis for the projects. The economic analysis mainly consists of two parts:

1. Predicting the road deterioration and estimating VOC
2. Estimating Benefits

Considering its importance and present use in India, consultants felt prudent to use the first part, i.e., estimating road deterioration and predicting roughness in HDM 4 model to finalize the O&M schedule for the project. This approach is more scientific as it does not assume hypothetical deflection values at 10th and 20th year and includes main criterion of maintaining roughness at 2750mm/Km as per Schedule K.

6.2 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

- Schedule K of CA species that Roughness values exceeds 2750mm/km in a length of KM, needs to be corrected within 180 days.
- No specific requirement with respect to deflection (BBD) measurement

6.3 INPUTS FOR MM SCHEDULE

6.3.1 PROJECT SECTIONS

The project corridor is mainly divided into two major sections depending on the applicability of toll plaza lengths and major intersections as:

- ✓ Section-1: Expressway (NE)
- ✓ Section-2: National highway (NH-24)

Since roughness is the main criterion for major maintenance, Project Corridor has been sub divided in to various Cases depending the present roughness values:

- Case 1: Roughness value <2000 mm/Km
- Case 2: Roughness values >=2000<2400 mm/Km
- Case 3: Roughness>=2400<2750 mm/Km
- Case 4: Roughness>=2750 mm/KM

6.3.2 TRAFFIC (AADT)

The following traffic data has been used in the analysis is as below:

Vehicle/Mode	AADT at 1+500, FY22E (Vehicles)		AADT at 6+500, FY22E (Vehicles)	
	LHS	RHS	LHS	RHS
Bus	3395	2899	1983	1892
LCV	7690	8161	4496	4781
Truck / 2A	1126	1497	1398	1449
3A	872	439	796	841
MAV	401	204	341	297

Note: 50:50 directional distributions are considered.

6.3.3 VEHICLE DAMAGE FACTORS (VDF)

VDF values as obtained from axle load surveys are used for various sections are as given below:

Mode Type	PDR VDF'2017
BUS	1.04
2-Axle	6.85
3-Axle	8.44
M Axle	12.38
LCV	1.04

6.3.4 HDM INPUTS

FWD and Roughness values considered are from surveys and investigations are as below:

Express way Section: -

Express way Section-LHS	Case-1	Case-2	Case-3	Case-4
	<2000	>=2000 & <2400	>=2400 & <2750	>=2750
Length	7000	1716	-	-
Roughness	1865	2038	-	-
IRI	2.64	2.85	-	-
Deflection	0.22	0.26	-	-
Cracking	5.26%	3.67%	-	-
Raveling	8.91%	13.50%	-	-
Patching	2.54%	-	-	-
Rut Depth	0.06	-	-	-
BT Crust	170	170	-	-
Granular Crust	450	450	-	-

Express way Section-RHS	Case-1	Case-2	Case-3	Case-4
	<2000	>=2000 & <2400	>=2400 & <2750	>=2750
Length	8716	-	-	-
Roughness	1888	-	-	-
IRI	2.66	-	-	-
Deflection	0.21	-	-	-
Cracking	1.62%	-	-	-
Raveling	18.52%	-	-	-

Express way Section-RHS	Case-1	Case-2	Case-3	Case-4
	<2000	>=2000 & <2400	>=2400 & <2750	>=2750
Patching	4.52%	-	-	-
Rut Depth	0.00	-	-	-
BT Crust	170	-	-	-
Granular Crust	450	-	-	-

National Highway Section: -

National Highway Section-LHS	Case-1	Case-2	Case-3	Case-4
	<2000	>=2000 & <2400	>=2400 & <2750	>=2750
Length	2000	6716	-	-
Roughness	1898	2130	-	-
IRI	2.68	2.97	-	-
Deflection	0.38	0.35	-	-
Cracking	1.70%	2.15%	-	-
Raveling	2.00%	1.65%	-	-
Patching	4.30%	0.86%	-	-
Rut Depth	-	-	-	-
BT Crust	140	140	-	-
Granular Crust	450	450	-	-

National Highway Section-RHS	Case-1	Case-2	Case-3	Case-4
	<2000	>=2000 & <2400	>=2400 & <2750	>=2750
Length	4000	4716	-	-
Roughness	1904	2077	-	-
IRI	2.68	2.90	-	-
Deflection	0.37	0.30	-	-
Cracking	0.60%	0.76%	-	-
Raveling	2.55%	0.93%	-	-
Patching	2.70%	3.20%	-	-
Rut Depth	-	-	-	-
BT Crust	140	140	-	-
Granular Crust	450	450	-	-

6.3.5 OPTIONS FOR MM SCHEDULES

Based on the requirements of CA, various options have been considered to be used as responsive overlays triggered at specified level of roughness of 2750 mm/km. Micro surfacing has also been considered to examine its feasibility for major maintenance.

In LHS & RHS direction following options were considered in the analysis:

- ✓ Base Case: MCS at Roughness of 2750mm/Km with regular maintenance
- ✓ Opt-1: Responsive Overlay of 30mm mill and OL BC whenever roughness is >2750mm/KM with regular maintenance
- ✓ Opt-2: Responsive Overlay of 40mm mill and OL BC whenever roughness is >2750mm/KM 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:

HDM-4
HIGHWAY DEVELOPMENT & MANAGEMENT

Average Roughness by Section (Graph)

Study Name: DME LHS
Run Date: 14-03-2022

Section Details:

ID: DME LHS<2000
Description: DME LHS<2000
Road Class: Primary or Trunk
Length: 7.00km
Width: 14.30m
Rise + Fall: 1.00m/km
Curvature: 3.00deg/km

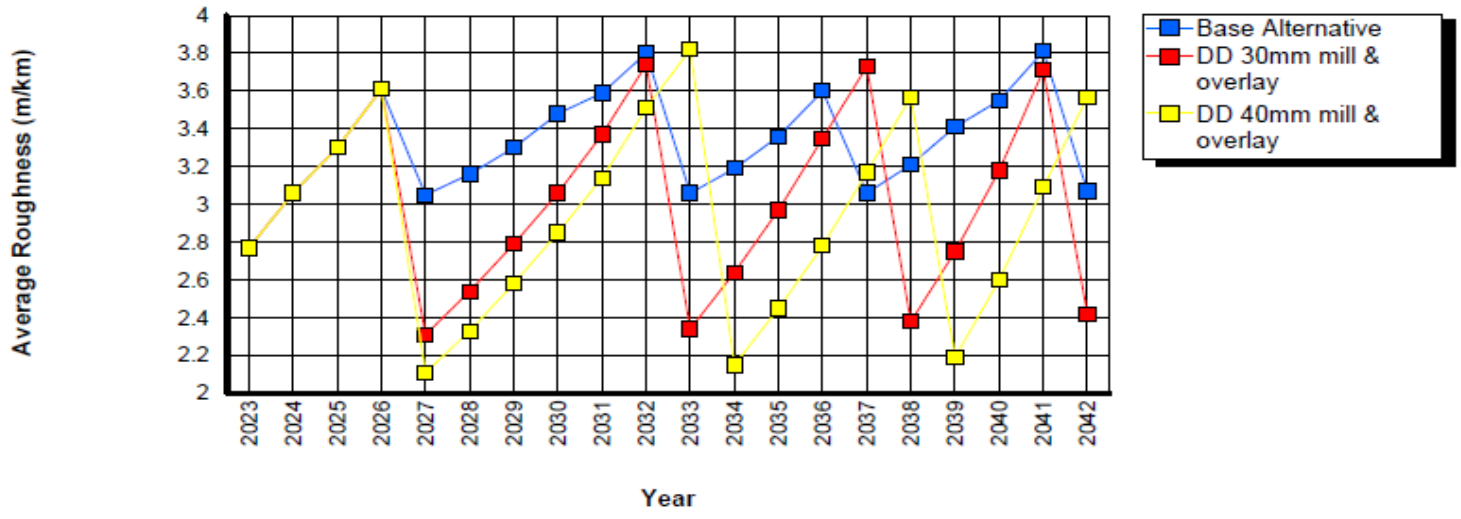


Figure 1: Average Roughness in NE-LHS (UP) Carriageway (Case-1 <2000mm/Km)

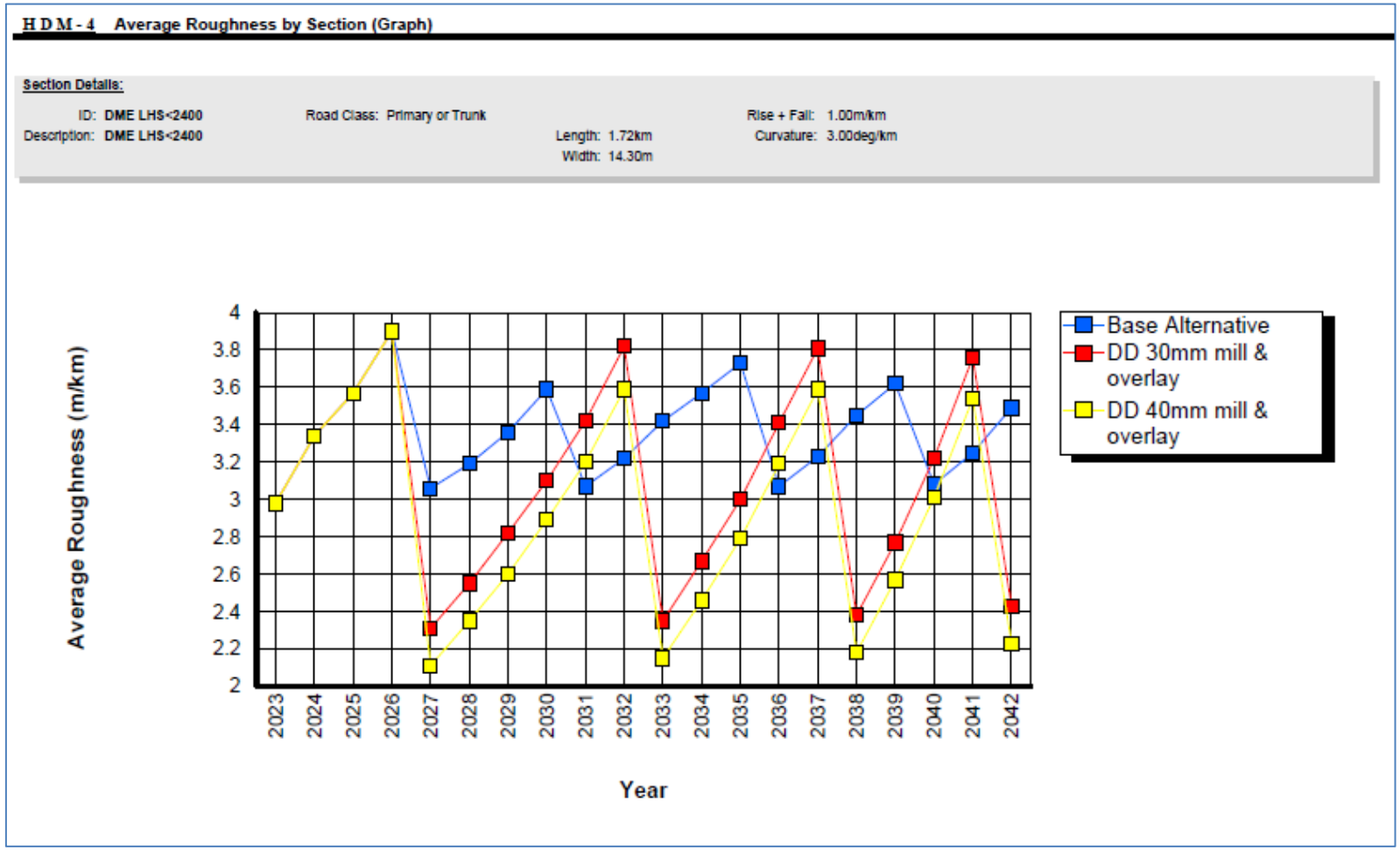


Figure 2: Average Roughness in NE-LHS (UP) Carriageway (Case-2 <2400mm/Km)

HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT

Average Roughness by Section (Graph)

Study Name: DME RHS
Run Date: 14-03-2022

Section Details:

ID: DMERHS<2000
Description: DME RHS<2000
Road Class: Primary or Trunk
Length: 8.72km
Width: 14.30m
Rise + Fall: 1.00m/km
Curvature: 3.00deg/km

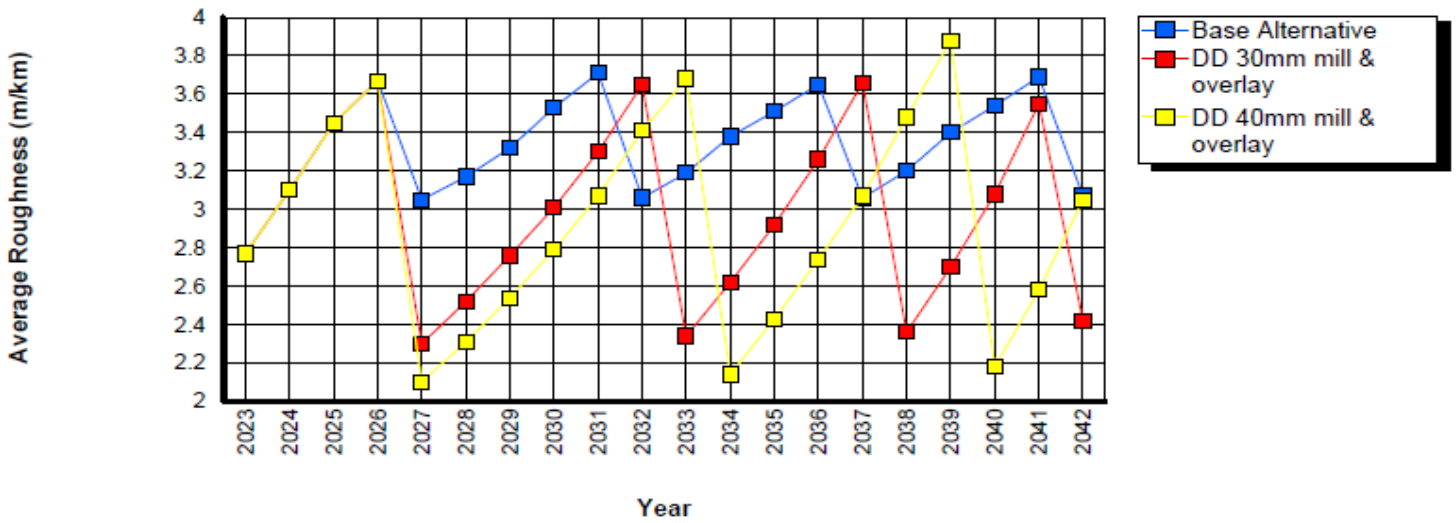


Figure 3: Average Roughness in NE-RHS (DN) Carriageway (Case-1 <2000mm/Km)

HDM-4
HIGHWAY DEVELOPMENT & MANAGEMENT

Average Roughness by Section (Graph)

Study Name: DME NH24 LHS
Run Date: 14-03-2022

Section Details:

ID: DME NH24 LHS<2000
Description: DME NH24 LHS<2000
Road Class: Primary or Trunk
Length: 2.00km
Width: 14.30m
Rise + Fall: 1.00m/km
Curvature: 3.00deg/km

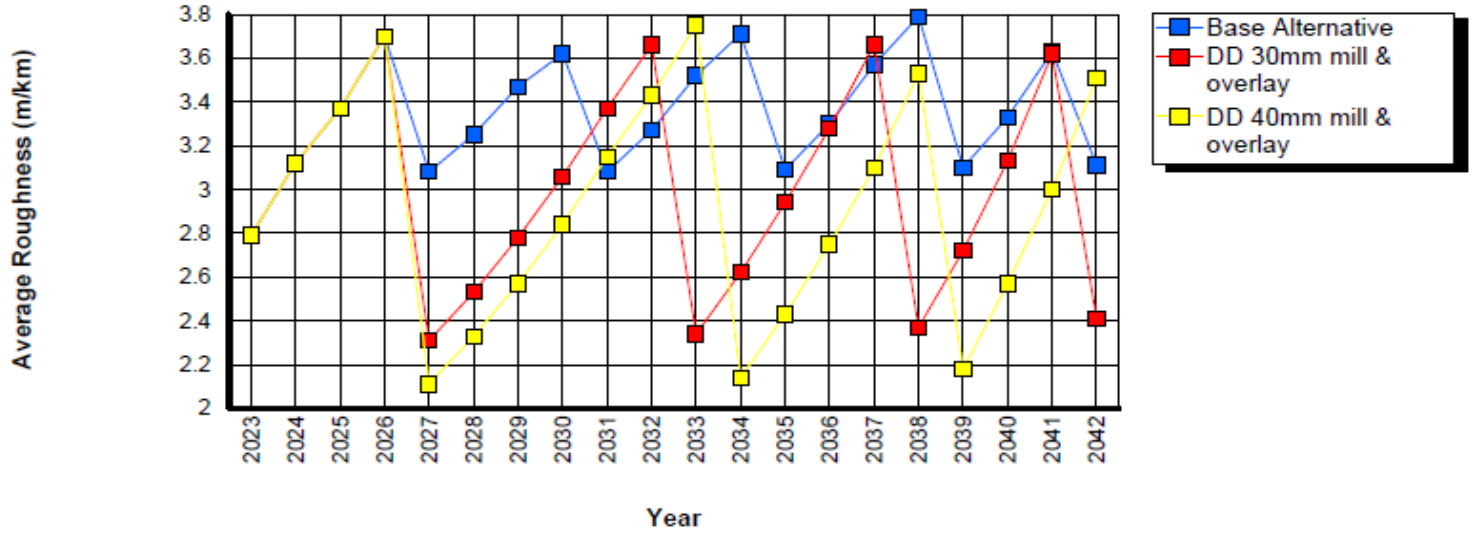


Figure 4: Average Roughness in NH-LHS (UP) Carriageway (Case-1 <2000mm/Km)

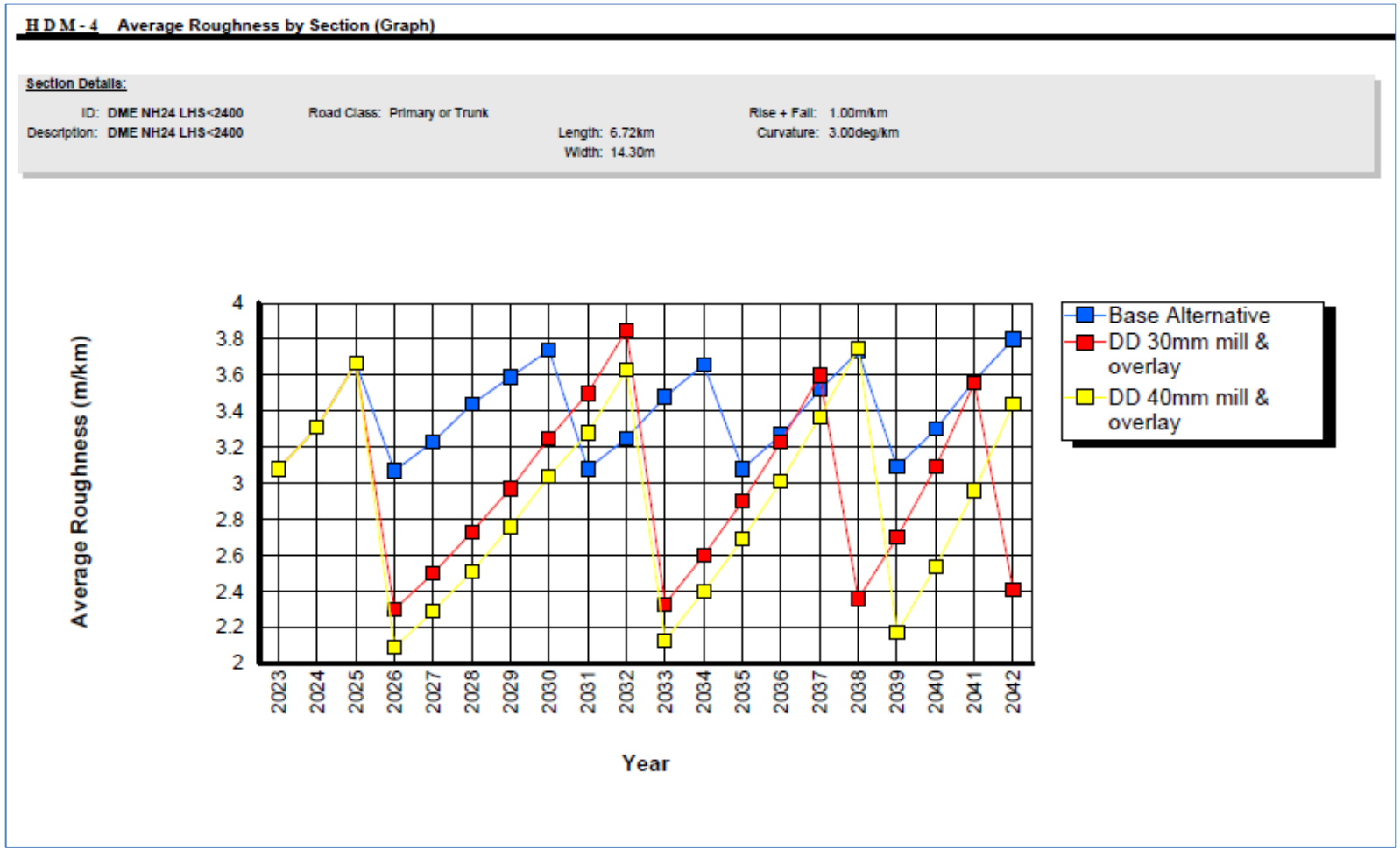


Figure 5: Average Roughness in NH-LHS (UP) Carriageway (Case-2 <2400mm/Km)

HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT

Average Roughness by Section (Graph)

Study Name: DME NH24 RHS
Run Date: 14-03-2022

Section Details:

ID: DME NH24 RHS<2000
Description: DME NH24 RHS<2000
Road Class: Primary or Trunk
Length: 4.00km
Width: 14.30m
Rise + Fall: 1.00m/km
Curvature: 3.00deg/km

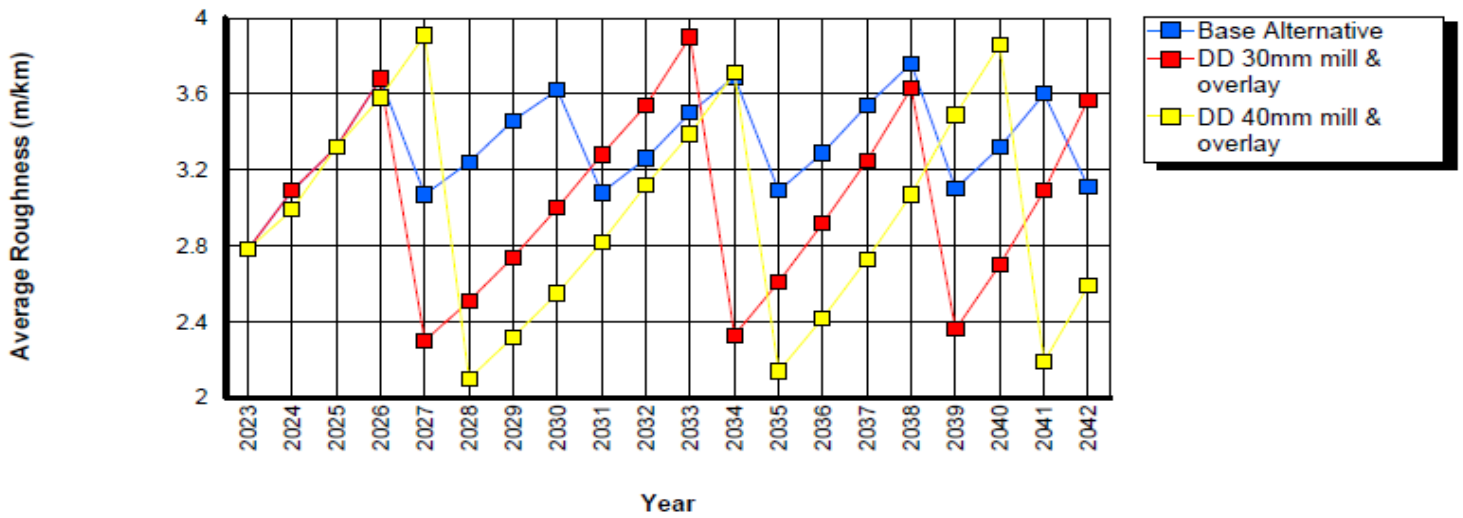


Figure 6: Average Roughness in NH-RHS (DN) Carriageway (Case-1 <2000mm/Km)

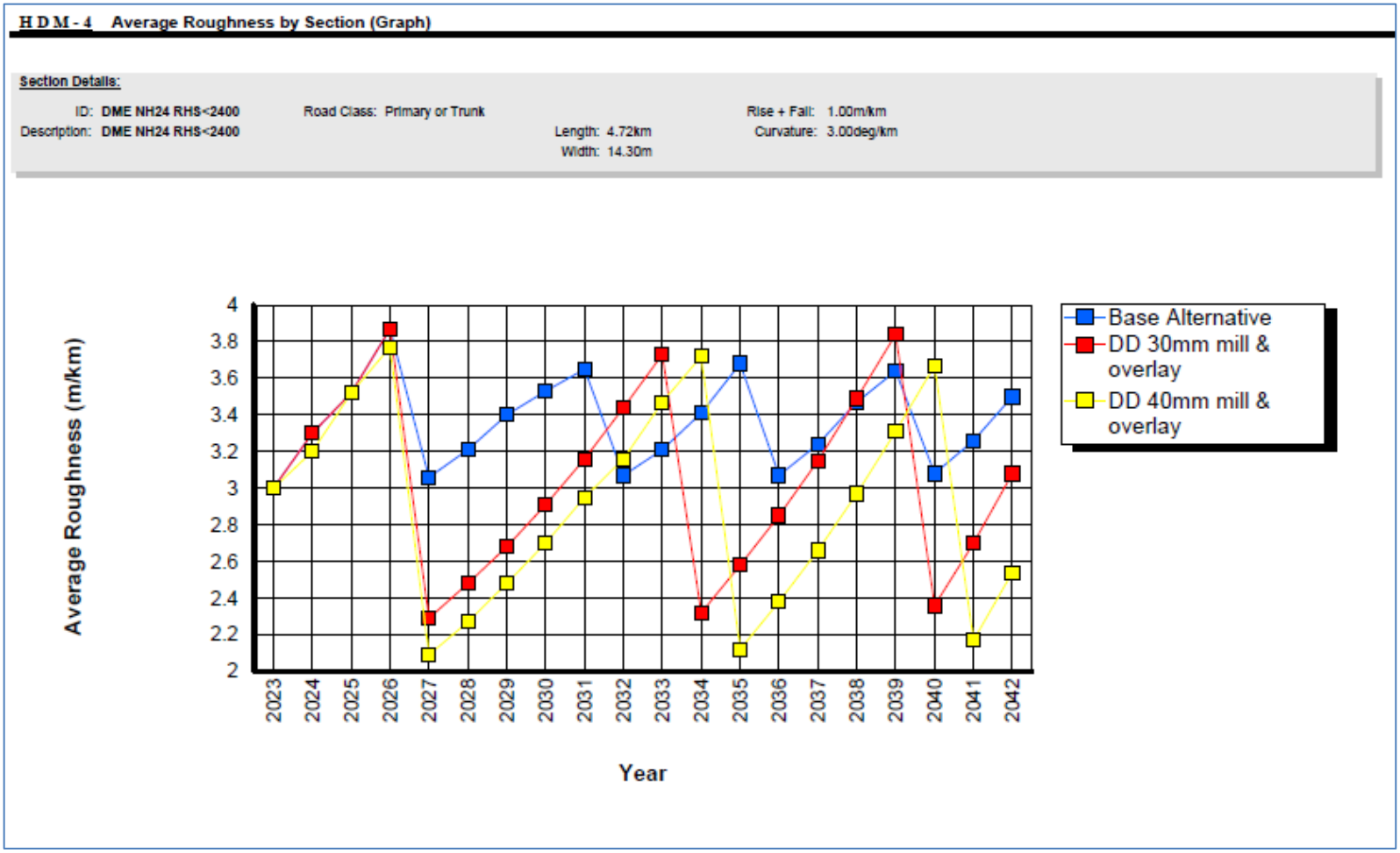


Figure 7: Average Roughness in NH-RHS (DN) Carriageway (Case-2 <2400mm/Km)

6.5 M&M SCHEDULE

Looking at the present condition and progression of roughness, it is felt prudent to consider the 40mm OL as the preferred option. Adopted MM schedule for the project is as below:

LHS (Expressway) Section - MM Schedule								
Obtained						Adjusted		
Base Year	Option-1 (40mm Mill and OL)					Option-1 (40mm Mill and OL)		
	Criteria:	IRI<2000	2000-2400	Remarks		IRI<2000	2000-2400	Remarks
	Length:	7000	1716			7000	1716	
	Year	Case-1	Case-2			Case-1	Case-2	
0	2022							
1	2023							
2	2024							
3	2025							
4	2026	40	40			40	40	
5	2027							
6	2028							
7	2029							
8	2030							
9	2031							
10	2032		40					
11	2033	40				40	40	
12	2034							
13	2035							

RHS (Expressway) Section - MM Schedule								
Obtained						Adjusted		
Base Year	Option-1 (40mm Mill and OL)					Option-1 (40mm Mill and OL)		
	Criteria:	IRI<2000	2000-2400	Remarks		IRI<2000	2000-2400	Remarks
	Length:	8716	0			8716	0	
	Year	Case-1	Case-2			Case-1	Case-2	
0	2022							
1	2023							
2	2024							
3	2025							
4	2026	40				40		
5	2027							
6	2028							
7	2029							
8	2030							
9	2031							
10	2032							
11	2033	40				40		
12	2034							
13	2035							

LHS(NH-24) Section - MM Schedule								
Obtained						Adjusted		
Base Year	Option-2 (40mm Mill and OL)					Option-2 (40mm Mill and OL)		
	Criteria:	IRI<2000	>=2000 and <2400	Remarks		IRI<2000	>=2000 and <2400	Remarks
	Length:	2000	6716			2000	6716	
	Year	Case-1	Case-2			Case-1	Case-2	
0	2022							
1	2023							
2	2024							
3	2025		40					
4	2026	40				40	40	
5	2027							
6	2028							
7	2029							
8	2030							
9	2031							
10	2032		40					
11	2033	40				40	40	
12	2034							
13	2035							

RHS (NH-24) Section - MM Schedule								
Obtained						Adjusted		
Base Year	Option-2 (40mm Mill and OL)					Option-2 (40mm Mill and OL)		
	Criteria:	IRI<2000	>=2000 and <2400	Remarks		IRI<2000	>=2000 and <2400	Remarks
	Length:	4000	4716			4000	4716	
	Year	Case-1	Case-2			Case-1	Case-2	
0	2022							
1	2023							
2	2024							
3	2025							
4	2026		40			40	40	
5	2027	40						
6	2028							
7	2029							
8	2030							
9	2031							
10	2032							
11	2033					40	40	
12	2034	40	40					
13	2035							

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.
- 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.
- 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.
- 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.
- All Metallic Bearings need to be taken up for servicing.

Wearing Coat:

In bridge structure wearing coat is considered to be a weak component as it is subjected to severe deterioration due to Loading, Environment etc. It is necessary to replace the Wearing coat at 15-years interval. As of now we have considered sealing of cracks by Fog Seal which does not show any distress than cracking by viz. Pot holes, abrading etc. based on this aspect BOQ is formed.

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:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 17: Summary of Unit Rates

S. No	Type of Material	Units	Source	Average Lead in Kms	Market Rates Adopted for Rate Analysis
1	**Aggregate**				
a)	40 mm	Cum	Crusher	124.64	1666
b)	20 mm	Cum	Crusher	124.64	1666
c)	12 mm	Cum	Crusher	124.64	1648
d)	6 mm	Cum	Crusher	124.64	1630
e)	Dust	Cum	Crusher	124.64	1630
2	Gravel/Moorum				
	Embankment	cum	Borrows for Embankment	12.0	275.36
	Subgrade	cum	Borrows for Subgrade	12.0	275.36
3	Other Major Material				
4	Bitumen 60/70	tone	Mathura	174.0	36218
5	Bitumen 80/100	tone	Mathura	174.0	36218
6	CRMB	tone	Mathura	174.0	36218
7	Emulsion	tone	Mathura	174.0	45218
8	Steel	tone	Outlet	23.00	57104
9	HTS Strands	tone	Delhi	23.00	70104
10	Cement	tone	Delhi	23.00	8004
11	Structural Steel	tone	Delhi	23.00	71004

S. No	Type of Material	Units	Source	Average Lead in Kms	Market Rates Adopted for Rate Analysis
12	**VG-40**	tone	Mathura	174.00	36218

Table 18: Summary of Major Material Rates

S.No	Activities	Unit	Rate (Rs)	Remarks
1	BC	Cum	9653	VG-40
2	Tack Coat	Sqm	13	
3	DBM	Cum	8912	VG-40
4	PC	Sqm	35	
5	WMM	Cum	2926	
6	GSB	Cum	2675	
7	Embankment	Cum	609	
8	Subgrade	Cum	657	
9	Shoulder Filling	Cum	657	
10	Thermoplastic Paint	Sqm	452	
11	Road Studs	Nos	195	
12	DLC	Cum	4703	
13	PQC	Cum	9652	
14	RE panel	Sqm	3996	
15	M-15	Cum	8028	
16	M-20	Cum	8253	
17	M-25	Cum	8872	
18	M-30	Cum	8891	
19	M-35	Cum	9846	
20	M-40	Cum	11192	
21	M-45	Cum	11499	
22	M-50	Cum	13219	
23	Reinforcement steel	MT	79230	
24	1.2m Dia pile	Rm	14104	
25	HT strands	MT	130377	

7.2 IMMEDIATE REPAIR COST

Costs associated with immediate repairs shall be estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Following items shall be mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

There is no immediate cost associated with this project.

7.3 ROUTINE MAINTENANCE & INCIDENT MANAGEMENT COSTS

Routine maintenance costs include general maintenance costs of road elements, bridge elements and road furniture and appurtenances. This can be mainly divided into two parts as:

- ✓ General Maintenance of Works
- ✓ Repairs to Highway & Bridge Elements

7.3.1 General Routine Maintenance

General Routine Maintenance of Roads generally include following items:

- Cleaning of Project facilities
- Structures cleaning,
- Cleaning of ROW
- Cleaning and Maintenance of Toll Plaza
- Unlined Drain Maintenance
- Lined Drain Maintenance
- Maintenance of Highway Lighting at Toll Plaza and other project locations
- Median Plantation maintenance & Avenue plantation maintenance:
- Maintenance of Road Furniture
- Maintenance of Road Safety Items

The above items are estimated by considering the detailed break-up of following items:

- Manpower including Managers/Labour etc
- Vehicles for Labour Transport/Water Tankers/Sweeping Machines Etc
- Resources/Equipment's such as grass cutters, tools, jet sprayers, hydraulic trimmers etc

7.3.2 Repairs to Highway & Bridge Works

Repairs to highway and bridge works have been estimated based on the assumed quantities (Percentage basis) of execution for every year.

These items include the following:

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 VG 40 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	Providing and laying apron/ stone pitching on slopes of guide bunds/ road embankment / other location
12	Providing and laying stone aggregate filter material (150 mm compacted thickness) underneath pitching
13	Unlined drain
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
	(iii) Diagonal Chevrons Markings
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

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per Technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labor etc.
10. Carrying out 50 to 60 mm thick shotcrete 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 labor, material, scaffolding, equipment etc complete.
11. Repair of Floor Aprons, pitching and other protection works
12. Cleaning of Drainage Spouts

13. M-25 Concrete

7.3.3 Incident Management Cost

Incident Management & Safety items include the following:

- ✓ ATMS control room operations,
- ✓ Regular patrolling & reaching accident/incident site,
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, labors 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 ATMS and TMS

Following table includes the cost of Major Maintenance works for the project:

Table 19: Summary of Periodic Maintenance Costs

Financial Year	Functional +Structural overlay MCW+ S/R	Replacement of ATMS @ every 7 Years	Replacement of TMS @ every 5 years	Structure specified repairs
2023	-			-
2024	-	-	-	221.13
2025	-	-	-	-
2026	3,390.56	-	-	197.91
2027	-	174.69	-	-
2028	-	-	-	15.76
2029	-	-	-	-
2030	64.22	-	-	-
2031	-	-	-	-
2032	-	-	-	-
2033	3,390.56	174.69	-	1,094.26
2034	-		-	
TOTAL	**6,845.33**	**349.39**	**-**	**1,529.05**

Note: The cost is inclusive of GST without escalation and the amount is in Lakhs

7.5 OPERATIONS COSTS

Cost towards Operations include the following:

- SPV Costs
- Electricity Bill of lighting
- Toll Plaza Operation cost
- Operation and management costs of rest areas and lay byes
- Survey Costs
- IE Fee
- Insurance
- Audit Charges
- Administrative Cost

Following table depicts the cost of operations for the project:

Table 20: 1st year O&M Costs, FY2024(including GST)

S No	Description	Amount in Lakhs.
	SPV - Expenditure	
1	SPV staff	43.80
2	Highway lighting - Power Charges	98.00
3	Highway lighting - Maintenance charges	31.00
4	Tolling and HTMS AMC/ Spare Parts	17.47
5	Surveys & Investigations (BBD, Roughness)	1.65
6	IE fees	33.40
7	Insurance Charges	119.00

S No	Description	Amount in Lakhs.
8	Audit Charges	40.00
9	LIE Fee	22.00
10	Admin cost - Board Meeting Expenses, valuation etc.	
	Agency - Expenditure	
11	Toll Operation - Agency	-
12	Route patrolling	136.57
13	Route patrolling – Periodic Vehicle replacement cost	-
14	Routine maintenance	221.79
15	Repair of Road - BoQ Items	72.17
16	Repair of Structures	29.97
	1st year O&M cost (including GST)	**866.81**

Note: The cost is inclusive of GST without escalation and the amount is in Lakhs.

7.6 TOTAL OPERATION & MAINTENANCE COSTS

Year on year operation cost is summation of following:

- ✓ Immediate Costs
- ✓ Routine Maintenance & Incident Management
- ✓ Periodic Maintenance
- ✓ Operations Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 21: Cost Summary

Financial Year	SUMMARY OF VARIOUS EXPENSES in Rs. Lakhs				
	Immediate Repair's Cost	Toll Collection Expenses and Patrolling expenses	Routine Maintenance Expenses	Periodic Maintenance (Functional +Struc Overlay+ Toll collection system)	Total Cost
2022-2023	-	-			
2023-2024	-	-	861.16	221.13	1082.29
2024-2025	-	-	861.16	-	861.16
2025-2026		-	863.63	3588.47	4452.10
2026-2027		-	875.32	174.69	1050.01
2027-2028		-	861.16	15.76	876.92
2028-2029		-	861.16	-	861.16
2029-2030		-	861.16	64.22	925.38
2030-2031		-	863.63	-	863.63
2031-2032		-	904.82	-	904.82
2032-2033		-	861.16	4659.51	5520.67
2033-2034		-	280.77	-	280.77
Total Cost:	**-**	**-**	**8955.15**	**8723.77**	**17678.93**

Note: The cost is inclusive of GST without escalation and the amount is in lakhs.

SIT/PJRP/2312188/060
22nd December 2023

To
M/S Actis Highway Infra Ltd
The Sponsor

Sub: Submission of Technical Reports for Walter Projects

K/A Mr. Rakshit Jain,

We are pleased to submit hereby the "Technical Report" in hard/soft copies for the following assets.

S. No	Project Title
1	Technical Diligence of Delhi-Meerut Expressway (Section from km 0.000 to UP Border) including 8 laning of NH-24 in the state of Delhi. (Design Length-8.716)
2	Technical Diligence for 4-Laning of Chutmalpur - Ganeshpur of NH-72A from Ch. 0.000 to Ch. 17.900 & Roorkee – Chutmalpur - Gagalehri of NH-73 from Ch. 0.000 to Ch. 35.400 in the state of Uttar Pradesh & Uttarakhand on Hybrid Annuity Basis (Pkg-1)
✓ 3	Technical Diligence for 4-Laning of Gagalheri–Saharapur–Yamunanagar (UP/Haryana Border) section of NH-73 from Km 35.400 to Km 86.855 in the State of Uttar Pradesh under NHDP-IV on Hybrid Annuity Mode (PKG-II)
4	Technical Diligence for Four Laning Chikhali – Tarsod (Package-IIA) Section of NH-6 from Km 360.000 to Km 422.700 in the State of Maharashtra to be executed on Hybrid Annuity pattern under NHDP Phase IV (CTHPL)
5	Technical Diligence of Two Lanning with paved shoulders Road on Package HAM-AM-2 in the State of Maharashtra under MRIP on Hybrid Annuity Mode
6	Technical Diligence for the 8 Laning of NH-1 from Mukarba Chowk at km 15.500 to km 86.000 in the State of Haryana on DBFOT Basis

Thanking you and assuring you best services all the time.

Yours faithfully,

For Samarth Infraengg Technocrats Pvt Ltd.,

SAMARTH INFRAENGG TECHNOCRATS PVT. LTD.

Authorized Signatory
Name: [Mr. Kalva Kiran Kumar]
Designation: [Director]

TECHNICAL REPORT

Technical Diligence for 4-Lane Gagalheri–Saharapur–Yamunanagar (UP/Haryana Border) section of NH-73 from Km 35.400 to Km 86.855 in the State of Uttar Pradesh under NHDP-IV on Hybrid Annuity Mode (PKG-II)

SAMARTH INFRAENGG Technocrats Private Limited

DECEMBER 2023

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
BC	-Bituminous Concrete
BOQ	-Bill of Quantities
BOT	-Build, Operate & Transfer
CA	-Concession Agreement
CBR	-California Bearing Ratio
CCB	-Concrete Crash Barrier
CCR	-Cement Concrete Railing
COD	-Commercial Operation Date
COS	-Change of scope
CPI	-Consumer Price Index
CUP	-Cattle Underpass
CVC	-Classified Volume Count
CVPD	-Commercial Vehicles per Day
DBM	-Dense Bituminous Concrete
DPR	-Detailed Project Report
ECB	-Emergency Call Box
EPC	-Engineering, Procurement and Construction
ESI	- Employees' State Insurance
FDD	-Filed Dry Density
FOB	-Foot Over Bridge
FRL	-Finished Road Level
FSI	-Free Swell Index
FWD	-Falling Weight Deflectometer
FY	-Financial Year
GOI	- Government of India
GR	-Growth Rates
GS	-Grade Separated
GSB	-Granular Sub Base
GST	-Goods and Services Tax
HCPT	-Half cell Potential Test
HPC	-Hume Pipe Culvert
HR	- Human Resources
HTMS	-Highway Traffic Management Systems

IE	-Independent Engineer
IRC	- Indian Roads Congress
IRC SP	- Indian Roads Congress Special Publications
IRI	-International Roughness Index
Km	-kilometer
LHS	-Left Hand Side
LL	-Liquid Limit
LS	-Lumpsum
m	-Meter
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 Underpass
WBM	-Water Bound Macadam
WMM	-Wet Mix Macadam
WPI	-Wholesale Price Index

CHAPTER 1. INTRODUCTION

1.1 INTRODUCTION

The Government of India had entrusted to the Authority (National Highways Authority of India, **NHAI**) the development, maintenance and management of National Highway No.73 including the section from km 35.400 to km 85.855 (approx. 51.455 km). The Authority had resolved to augment the existing road from km 33.000 to km 71.640 on the Gagalheri-Saharanpur-Yamunanagar section of National Highway No.73 (hereinafter called the "NH 6") in the State of Uttarakhand/Uttar Pradesh by Four-Laning there of (the "Project") on design, build, operate and transfer (the "DBOT Annuity" or "Hybrid Annuity") basis under NHDP Phase IV, which shall be partly financed by the Concessionaire who shall recover its investment and costs through payments to be made by the Authority, in accordance with the terms and conditions to be set forth in a concession agreement.

The Authority had accordingly invited the bid proposals and upon the evaluation of received bids, the Authority has awarded the Project to M/s **MBL Infrastructures Ltd**. Consequent to this, M/s **MBL Infrastructures Ltd**, formed a Special Purpose Vehicle (SPV) in the name of M/s **MBL(GSY) Road Limited,** (Concessionaire) for implementation/execution of the project. Further, recently the name of the Concessionaire has been changed to M/s **NXT-INFRA GSY Highways Limited** with effect from Dt. 09.11.2023.

Concessionaire could not achieve the Financial Close within the stipulated time and has submitted a proposal for induction of **Welspun Enterprise Ltd** (Welspun") as a "Sponsor" of the project and subsequent to detailed deliberations, Authority approved for acquisition of 49% equity in the project company by Welspun.

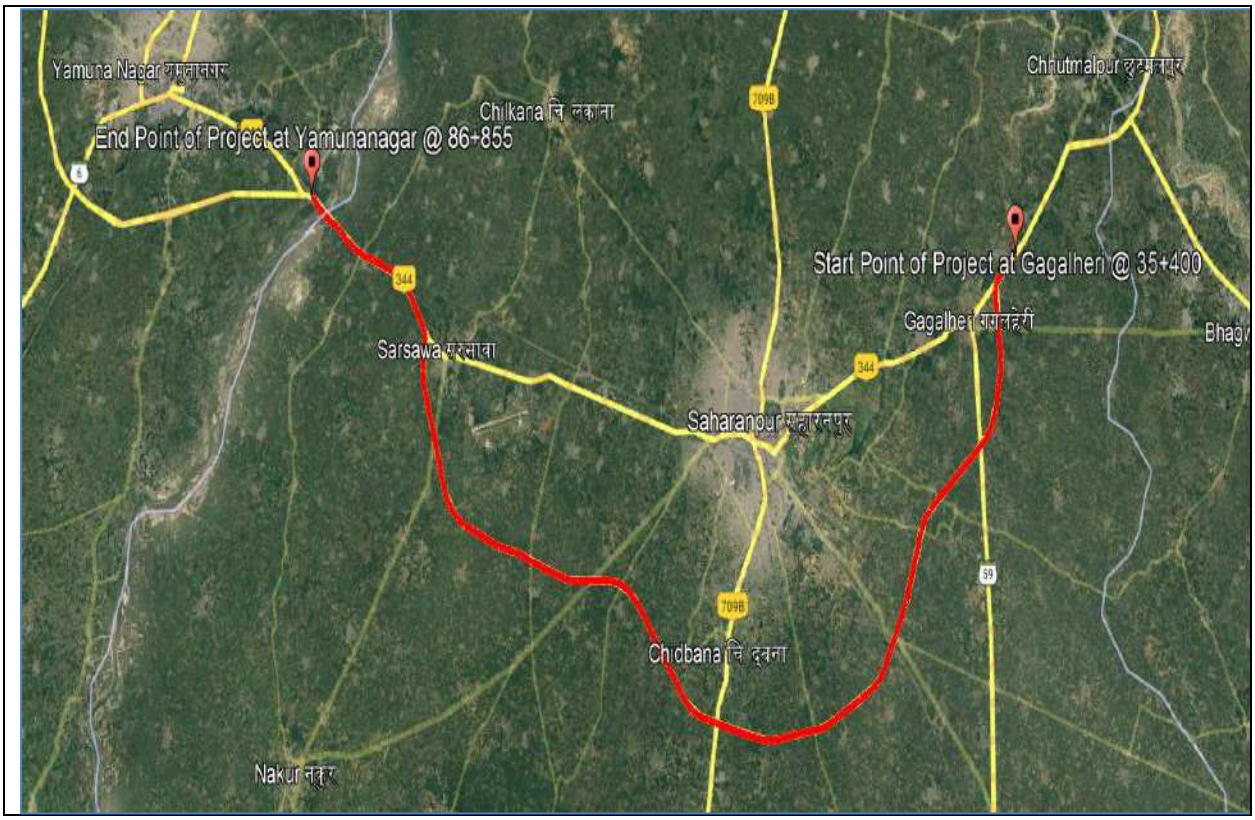
After delinking certain 2-lane works on RHS, km 49+187 to km 49+750 (ROB portion) and km 58+666 to km 59+126 (ROB portion) and other few items, the Concessionaire has achieved PCOD for the remaining length of project on 31.10.2020. To process the PCOD, NHAI has made 2nd supplementary agreement on 01.10.2020 with no claims from damages from either party to complete this delinked works within 90-days of issuance of PCOD. Finally, Completion Certificate obtained on 10.02.2022. This project road is acquired by **M/s Actis GP LLP** and is presently under Operation and Maintenance phase.

Actis GP LLP Ltd has engaged **M/s Samarth Infra-engg Technocrats to** undertake due-diligence study for self-assessment and/or for its Concessioning Authority and/ or for InvIT purpose and/ or for its present/ future investors/ lenders whom this Report will be presented as Vendors Technical Due Diligence Report.

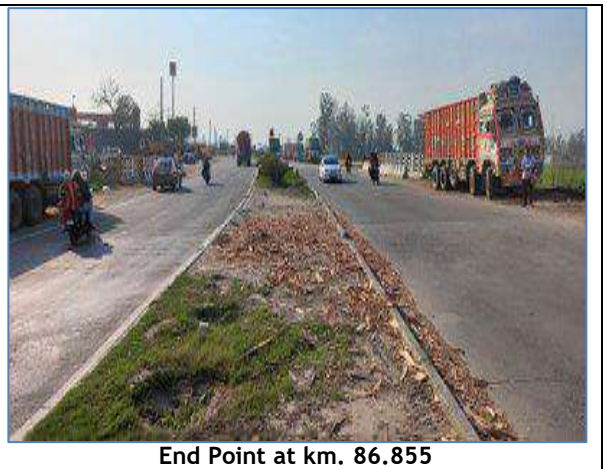
This report highlights about the project at a glance and to evaluate the asset condition and work out O&M Cost, Major Maintenance cost and additional facilities cost/improvement works of the project during the Concession period.

1.2 PROJECT AT GLANCE

The project corridor has rigid pavement in the entire length with 7.0m wide carriageway plus 1.5m paved shoulder on each side. In approach locations 10.5m wide carriageway plus 1.5m paved shoulder on each side. The project corridor generally runs in Plain terrain. The land use along the project road is mostly built-up areas. It passes through villages like Gagalheri, kailashpur, Mahipura, Saharanpur, Ismailpur, Sarsawa, etc. In general, road embankments are in the range of 1.0m-2.0m height. Embankments higher than 2.0m are observed mainly in the approaches of CD structures and Underpass locations



Photographs showing the various corridors of the project road are presented below:

	
Start Point at km.35.400	**End Point at km. 86.855**

Following Table highlights the total project at a glance:

SI No.	Description	Date
1.	Date of Signing the Concession Agreement	27.05.2016
2.	Appointment Date	27.01.2018(Revised)
3.	Scheduled Project completion (730 Days from Appointed date)	26·01.2020 (as per CA)
4.	Revised Schedule Project completion	31.10.2020
5.	Date of issue of Provisional Completion Certificate, PCOD	31.10.2020
6.	Scheduled End of Concession	25.01.2035 (as per CA)
7.	Revised Scheduled End of Concession	30.10.2035
8.	Date of Issue of Final Completion Certificate	10.02.2022

1.3 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 due diligence for said project.

The scope of services as defined in the "terms of reference" for consultants is as below:

1. Review of Contractual documents

- ✓ Review of CA/ Schedules pertaining to scope of work
- ✓ Collection of relevant records and documents and review of same
- ✓ Review correspondences with NHAI/IE on technical issues
- ✓ Review of EPC contracts/Maintenance Contracts
- ✓ Review of As-built drawings & Detailed Project Reports and Designs
- ✓ Review of COS works if any
- ✓ Review the technical approvals from IE or another agency required under the CA

2. Field Investigations

- ✓ Review and Update of Field investigations survey data done during Technical Due Diligence time.

3. Major Maintenance

- ✓ Review of current maintenance system.
- ✓ Updating of Maintenance costs to be incurred over the period of the concession keeping in mind the maintenance requirements of the Concession Agreement.

4. Operations cost

- ✓ Updating of O&M cost for the concession period.

5. BOQ and Cost Estimates

- ✓ Updating of BOQ & Cost for Immediate works (1st year Capex)
- ✓ Updating of BOQ and Costs for Major Maintenance
- ✓ Updating of BOQ and cost for Routine maintenance, Route Patrolling
- ✓ Updating of BOQ and Cost for Operations
- ✓ Updating of year-by-year O&M cost
- ✓ The costs would be updated till the end of the concession period including any expected extension of Concession periods as informed to us.

6. Reports & Presentation

- ✓ Draft O&M cost
- ✓ Final Reports along with Final BoQ

1.4 REVIEW OF CONCESSION AGREEMENT

1. Concession Parties and date of execution of Agreement: NHAI referred as "Authority" entered in to Agreement with M/s **MBL(GSY) Road Limited** referred as "Concessionaire" on 27.05.2016
2. Appointed Date, Commercial Operation Date (Article 3 & 4, Article 12): As the Concession Agreement was signed on 31 Mar 2016, with the 1st settlement agreement made on 19th Jan 2018. With no penalties on either party, appointed date issued by Authority on 27 Jan 2018. Accordingly, construction period is 730 days from Appointed date, and Concession period is 15 years from COD.
3. Concession Period (Clause 3): This includes Construction Period of 730 days and Operation Period of 15 years commencing from COD. As the Appointed Date is declared on 27.01.2018, considering 730days as Construction period, the scheduled construction completion date is 26.01.2020. In the 2nd Supplementary Agreement dated 01 OCT 2020, scheduled project completion has been extended to the actual date of provisional certificate after excluding the delinked items without levy of any damages and penalties from NHAI. Accordingly, PCOD achieved on date, i.e., on 31.10.2020. Thus, considering15yrs from COD, end of concession period is 30.10.2035 (scheduled date 25.01.2035)

4. Obligations of Concessionaire & Authority (Article 5 & 6): The Concessionaire and Authority have fulfilled most of the obligations.
5. Representation and warranties (Article 7): The Concessionaire shall at no time undertake any change of ownership except in accordance with Clause 5.3. Concessionaire has submitted a proposal for induction of Welspun Enterprise Ltd (Welspun") as a sponsor of the project and subsequent to detailed deliberations, Authority approved for acquisition of 49% equity in the project company by Welspun.
6. Release of Performance Security (Article-9.3): The performance security bank guarantee (PSBG) is Rs 59.2 Cr. Details of release back the Performance guarantee to the Concessionaire from the Authority is not known.
7. Right of Way (Article 10): If the Authority is unable to provide the remaining site within 180 days from the Appointed Date, the remaining Site of the Project Highway shall be removed from the scope of the work under the provision of Change of Scope. Right of Way is granted within 180 (one hundred and eighty) days of the Appointed Date shall be completed on or before the Scheduled Completion Date.
8. Construction of the Project (Schedule-G, Article12): Construction period 730 days from the appointed date i.e., schedule date of completion is on 26th Jan 2020. In the Supplementary Agreement dated 01 OCT 2020, scheduled project completion has been extended to the actual date of provisional certificate after excluding the delinked items without levy of any damages and penalties from NHAI. Hence, PCOD achieved date on 31th OCT 2020, shall be considered as revised Schedule completion date.

Milestone	Completion days	Schedule date	Actual achieved	Delay/(early) days	% Total Capital Cost (TCC) / Physical progress in %
MS-I	214	29/08/2018	30/06/2018	(60 days)	20% of TCC / 20% Physical Progress
MS-II	334	27/12/2018	22/12/2018	(5 days)	35% of TCC / 35% Physical Progress
MS-III	548	29/07/2019	31/08/2019	33 days	75% of TCC / 75% Physical Progress
MS-IV	730	27/01/2020	10/02/2022	745 days	100% of TCC /100% Physical Progress

9. Monitoring of Construction (Article 13): The Concessionaire shall, perform all the tests as per Schedule-I, with the instructions of the Independent Engineer. Half of the costs incurred on such tests, and to the extent certified by the Independent Engineer as reasonable, shall be reimbursed by Authority the to the Concessionaire.
10. Completion Certificate/ Provisional Certificate (Article-14): Independent Engineer may, upon request of Concessionaire, issue a provisional certificate for completion of 100% construction site, which made available to the Concessionaire up to 146 days from Appointed Date. Provisional certificate should have list of outstanding items in the punch list. These shall be completed within 90 days from issue of Provisional certificate. Authority shall recover damages for any delay in completion as per clause 14.4.1.

    IE has issued the Provisional Certificate for the remaining length of project on 31st October 2020 after delinking the unfinished works. To process the PCOD, NHAI has made 2nd supplementary agreement on 01.10.2020 with no claims from damages from either party to complete this delinked works within 90-days of issuance of PCOD. Finally, Completion Certificate obtained on 10.02.2022. Extension of time till FCOD is not clearly known from available data.

11. Change of Scope (Article 16): Any additional works and services which are not included in scope of project shall be addressed in Change of Scope Notice. The costs thereof shall be expended by concessionaire and reimbursed by Authority with an advance payment of 20% of agreed COS cost.
12. Reduction of Scope (Article 16.6): if Concessionaire fails to complete the construction works on Force Majeure or for reasons attributable to Authority or under right-of-way clause 10.3.1. On direction of Authority, IE shall assess the civil cost for reduced scope as per Clause 16.6.1. Thus, revised Bid Project Cost shall be calculated. Accordingly, O&M cost shall be reduced or increase in proportion to reduction or increase in the length of the Project Highway.
13. Operation & Maintenance (Article 17): Concessionaire to maintain project road as per Schedule-K requirements. The roughness value exceeding 2750mm/km in a stretch of 1km should be rectified with 180-days.
14. Safety requirements (Article 18): All costs and expenses arising related to safety requirement shall be borne by Concessionaire as per scope of the project. If any not forming the scope shall be as per Article 16, change of scope.
15. Renumeration to Independent Engineer (Article 21.3): As per Schedule-M, one- half of remuneration towards the cost and expenses of the Independent Engineer during the development and construction period shall be borne by Concessionaire by do not exceeding 3% of the BPC. Payment in excess of 3% shall borne entirely by Authority. All the payments made to Independent Engineer during O&M period shall be borne equally by Authority and Concessionaire.
16. Financial Close (Article 22.1): Concessionaire to achieve Financial close within 150 days from date of the agreement. In the event of delay, further extension not exceeding 120days, subject to payment of damages to the Authority in the sum calculated at a rate of 0.05% of Performance security for each day of delay. Beyond this further 95 days shall be allowed with 0.1% of Performance security for each day of delay.

    Financial Close in this project happened on 29.11.2017 with no penalties, as ROW under Project is not provided as per CA.
17. Bid Project Cost (Article-23): The cost of construction of the project (BPC) is Rs.1184 Cr. and will be adjusted for the price index multiple. 40% of this Cost shall be payable to Concessionaire during Construction period in 5 installments of 8% each with adjusted price index multiple. Clarification sought from the Concessionaire about the total amount received against the receivable amount in the consolidated format.

    The remaining 60% of Bid Project Cost, adjusted for Price Index multiple, shall be payable in 30 biannual installments commencing from 180th day of COD with the percentage payments as suggested in the table 23.6.3 along with the interest as per 23.6.4.

    The first year O&M Bid cost 10 Cr. and any expenses in excess of O&M payments shall be borne by Concessionaire. O&M payments due payable to the Concessionaire shall be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.
18. Mobilization Advance (Article 23.8): Upon request from Concessionaire, 10% of Bid Project Cost shall be paid by Authority. This shall be repaid by Concessionaire with Bank interest compounded annually in 4 equal installments from each payment made by Authority to Concessionaire.

    Concessionaire has availed this facility, Status of repayment to the Authority to be clarified.

19. Insurance (Article 26): The Concessionaire has been fulfilling this obligation.
20. Force Majeure (Article 28): As per Clause 28.6.2, at any time after the Appointed Date, if any Force Majeure Event occurs before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; or (b) after COD, the Concessionaire shall be entitled to receive Annuity payments plus interest due and payable under this Agreement.
21. Compensation for Breach of Agreement (Article 29): The Concessionaire has made no correspondence on this.
22. Suspension of Concessionaire Rights (Article 30): There was no necessity of any invocation of this clause.
23. Termination (Article 31): There was no necessity of any invocation of this clause
24. Defects and liability after termination (Article 33): There was no necessity of any invocation of this clause.
25. Change in Law (Article 35): As a result of Change in Law, if Concessionaire suffers an increase in cost or reduction in the net after-tax return subject to higher of 1 Cr or 2% of Total Annuity payments in any accounting year, Concessionaire may notify Authority to amend the agreement so as to place Concessionaire in same financial position as before the Change in Law.

    Concessionaire has claimed Rs 76.91 Cr. due to implementation of GST. Further correspondence on this for the approved amount is not available.
26. Dispute resolution (Article 38): Any dispute not resolved amicably by conciliation, arbitration shall be held in accordance with rules of Society for Affordable Redressal of Disputes (SAROD), New Delhi or such other rules in-line with Arbitration and Conciliation Act,1996. Place of such arbitration shall be the Delhi and the language of arbitration proceedings shall be English. There are no disputes referred so far under the article 38.

1.5 REVIEW OF CORRESPONDENCES WITH NHAI/IE

There are several correspondences which are reviewed. Following are the some of the major correspondences that are reviewed for ready reference:

1) Concession Agreement with NHAI, Govt. of India, dated 27.05.2016
2) EPC Agreement with Welspun Enterprises Limited, dated 24.07.2017
3) IE has issued PCOD, after delinking certain 2-lane works on RHS, km 49+187 to km 49+750 (ROB portion) and km 58+666 to km 59+126 (ROB portion) and other few items, the Concessionaire has achieved PCOD for the remaining length of project on 31.10.2020. To process the PCOD, NHAI has made 2nd supplementary agreement on 01.10.2020 with no claims from damages from either party to complete this delinked works within 90days of issuance of PCOD. Finally, Completion Certificate obtained on 10.02.2022.
4) As-built drawings of Plan and Profile, Toll Plaza, Structural drawings, service road drawings were made available in technical correspondence No.TDD-16 & 52
5) Mix design approval are made available in technical correspondence No.TDD-17
6) The Concessionaire has submitted various letters related to Pavement Design and Geotechnical Investigations.
7) Concessionaire submitted tests on completion as per Schedule-I.

8) Monthly Inspection Reports of the Independent Engineer(O&M) (MPR)

1.6 REVIEW OF EPC CONTRACTS

(A) EPC CONTRACT:

1) Concession Parties and date of execution of Agreement: M/s MBL (GSY) Road Ltd (Concessionaire) and Welspun Enterprises Ltd (Contractor) entered into the EPC Agreement on 24th July 2017.
2) Appointment of Contractor, Effective Date and Term (Clause 2): The Concessionaire appointed Welspun Enterprises Limited as the Contractor to execute the EPC Works. The effective date of the Project is 24.07.2017. The EPC contract will be valid and subsisting from the effective date until the termination date.
3) Scope of Contractor's works (Clause 3): The Contractor shall construct the Project Highway on the Site set forth in Schedule A, B, C & D of the Concession Agreement and shall include the scope of work as set out in Annexure A Part II of EPC Agreement.
4) Obligations and Undertakings (Clause 4): The Contractor and concessionaire shall at their own cost and expense observe, undertake, comply with and perform his obligations as set out in EPC Contract.
5) Contract Price and Terms of Payment (Clause 5): The Contract Price payable by the Concessionaire to the Contractor shall be 1126 Cr (Annexure -B Part I) and the terms of payment shall be as specified in Annexure -B Part II. Contractor shall provide performance security in the form of corporate bond for an amount equal to 5.4% of Contract price (Annexure -C Part II).

   EPC contract, clause 5.3.1, mobilization advance of 10% of contract price (Annexure -B Part II). shall be paid by Concessionaire within 60days from effective date. And shall start recovery from RA bills from completion of 15% of contract price on proportionate percentage basis.
6) Change in Law (Clause 6): Under this clause, if the Authority make any payment to the Concessionaire, the concessionaire is liable to make over such amounts (less Statutory deductions) to the Contractor.
7) Guarantees, Liabilities, Liens and Indemnities (Clause 8): The Contractor acknowledges that the failure to meet the completion of each of Milestone set out in Annexure-D of EPC and to complete the EPC works on or prior to the Scheduled Completion date shall constitute a Material Breach of Contractor. If the contractor fails to achieve the completion Milestones and Scheduled Construction Completion date as in Annexure-D, he shall pay the damages to Concessionaire at a rate of 0.005% and 0.011% of Contract Price per day respectively until such Milestone/Completion date is achieved subject to a maximum of 10% of Contract Price. During, Construction DLP period (commence from date of issue of PCOD or COD and ending on expiry of 24 months from Completion Certificate), if any defect, damage of any EPC works thereof being non-operational by reason of such shall be borne by Contractor.
8) Change of Scope (Clause 9): All payments for execution of COS shall be made within 15 days from the date of receipt of the same from the Authority in accordance with clause 16.3 of Concession Agreement. In case of reduction in scope of works, the Contract Price shall stand decreased to the of such reduction. If Article-38(Dispute Resolution) is evoked, all risk, cost, expenses incurred by Concessionaire towards such procedure shall be borne by Contractor.
9) Force Majeure (Clause 11): Upon review of the EPC Contract, the "Force Majeure" has the same meaning given to such term in the Concession Agreement.

10) Suspension and Termination (Clause 12): The Concessionaire may, without prejudice to any of its other rights under the Contract, issue "Preliminary Notice" to the Contractor stating the nature of default. If the Contractor fails to remedy or to take effective steps, to remedy the same to the satisfaction of the Concessionaire within 15 days of receipt of the Preliminary Notice, then the Concessionaire shall be entitled to terminate the Contract forthwith, by issuing a Termination Notice to the Contractor. However, no such clause has been invoked on the Contractor.

1.7 RIVEW OF SCHEDULES

The following table depicts the project scope as given in schedules at a glance:

Table 1: Salient Features of Project Corridor

S. No	Description	Unit	As per CA
1	Start Chainage (km)	Km.	35.400
2	End chainage (km)	Km.	86.855
3	Length of the Project Corridor	Km.	51.455
4	Service Road / Slip Road	Km.	14.834
5	Toll Plaza	Nos.	1
6	No. of Lanes	Nos.	As per IRC SP 84-2014
7	**ROBs**	**Nos.**	**3**
8	ROBs-Reconstruction	Nos.	-
9	ROBs-Rehabilitation	Nos.	-
10	ROBs-Widening	Nos.	-
11	ROBs-New	Nos.	-
12	RUB's	Nos.	-
13	Interchange /GS	Nos.	-
14	Flyovers	Nos.	1
15	VUPs	Nos.	10
16	LVUP's	Nos.	10
17	PUP's	Nos.	6
18	CUP's	Nos.	
19	FOBs	Nos.	-
20	**Major Bridges**	**Nos.**	**3**
21	Major Bridges-Reconstruction	Nos.	-
22	Major Bridges-Rehabilitation	Nos.	1
23	Major Bridges-Widening	Nos.	-
24	Major Bridges-New	Nos.	-
25	**Minor Bridges**	**Nos.**	**9**
26	Minor Bridges-Reconstruction	Nos.	1
27	Minor Bridges-Rehabilitation	Nos.	-
28	Minor Bridges-Widening	Nos.	-
29	Minor Bridges- Retained	Nos.	-

S. No	Description	Unit	As per CA
30	Minor Bridges-New	Nos.	-
31	**Culverts (Pipe)**	**Nos.**	**69**
32	Culverts-Reconstruction	Nos.	3
33	Culverts-Rehabilitation	Nos.	1
34	Culverts-Widening	Nos.	1
35	Culverts-New	Nos.	-
36	**Culvert (Slab/Box)**	**Nos.**	**13**
37	Culverts-Reconstruction	Nos.	-
38	Culverts-Rehabilitation	Nos.	-
39	Culverts-Widening	Nos.	-
40	Culverts-New	Nos.	-
41	Street Lights	Kms	As per Schedule-D (IRC: SP:84-2014)
42	High Mast Lights	Nos.	As per Schedule-D (IRC: SP:84-2014)
43	Solar Blinkers	Nos.	-
44	Covered Drain cum Foot path	km	-
45	Median Opening	Nos.	-
46	Major Junctions	Nos.	2
47	Minor junctions	Nos.	4
48	W-Beam Safety Barriers	km	37.000
49	Rigid Concrete Barrier	km	8.600
50	Guard Posts	Nos	-
51	Pedestrian Guard Rails	km	-
52	Road Markings	km	As per IRC:35
53	Traffic Delineators	Nos.	-
54	Kilometer / Hectometer / Boundary Stones	Nos.	100/411
55	Gantry Sign Boards	Nos.	3
56	Cantilever Sign Boards	Nos.	4
57	No of Truck Lay bye	Nil	2
58	No of Bus Bays with Shelter	Nos.	12
59	Double Arm Lightnings	No's	As per Schedule-D (IRC: SP:84)
60	Three Arm Lightnings	No's	As per Schedule-D (IRC: SP:84)
61	Single Arm Lightnings	No's	As per Schedule-D (IRC: SP:84)
75			
76			
77			
78			
79			
80			
81			

1.8 REVIEW OF PAVEMENT DESIGN

1.8.1 Manual of Specification and Standards

The Schedule B, Clause 4.8 says Rigid pavement shall be provided on entire project length and at all toll plaza locations, bus bays, truck laybys and wayside amenities location. Flexible pavement shall be provided on service road/slip road sections. The minimum thickness for PQC is 300mm and DLC is 150mm. However, Schedule D suggests that Four-Laning with paved shoulders of the Project Highway shall conform to Manual of Specifications and Standards for Four-Laning of Highways through PPP IRC: SP:84-2014.

A) Rigid Pavement:

Clause 5.3.1 of IRC SP: 84-2014 stipulate that the new pavement shall be designed in accordance with the IRC: 58 Guidelines for the Design of Plain Jointed Rigid Pavements for Highways.

Clause 5.4.2 (i) of IRC SP: 84-2014 stipulates that the rigid pavement shall be designed for a minimum design period of 30 years. Stage Construction shall not be permitted.

Clause 5.4.2 (ii) of IRC SP: 84-2014 specifies that the Pavement Quality Concrete (PQC) shall rest over Dry lean Concrete (DLC) sub base of 150mm thickness.

Clause 5.4.2 (iii) of IRC SP: 84-2014 specifies that "A separation membrane shall be used between the PQC & DLC as per Clause 602.5 of MORTH Specifications".

Clause 5.4.2 (iv) of IRC SP: 84-2014 specifies that the DLC shall meet the minimum cement and comprehensive strength requirement as prescribed in IRC: SP: 49. The DLC shall extend beyond the PQC (including that in shoulder, if any) by 0.75m on either side.

Clause 5.4.2 (v) of IRC SP: 84-2014 specifies that Below DLC layer, a properly designed drainage layer Granular Sub Base (GSB) of 150mm thickness shall be provided throughout the road width. It shall be designed to obtain a drainage coefficient of not less than 30m per day.

B) Flexible Pavement:

Clause 5.3.1 of IRC SP: 84-2014 stipulate that the new pavement shall be designed in accordance with the IRC: 37 Guidelines for the Design of Flexible Pavement.

Clause 5.4.1 (i) of IRC SP: 84-2014 stipulates that the flexible pavement shall be designed for a minimum design period of 15 years or operation period, whichever is more. **Stage Construction will be permissible subject to the requirements specified in para (ii) below**.

Clause 5.4.1 (ii) of IRC SP: 84-2014 specifies that "Alternative strategies or combination of initial design, strengthening and maintenance can be developed by the Concessionaire to provide the

specified level of pavement performance over the operation period subject to satisfying the following minimum design requirements".

Clause 5.4.1 (ii) (a) indicates that, the thickness of sub-base and base of pavement section is designed for a minimum design period of 15 years or the operation period, whichever is more and the **initial bituminous surfacing for a minimum design period of 10 years**.

Clause 5.4.1 (ii-(b)) indicates that, the pavement shall be strengthened by bituminous overlay as and when required to extend the pavement life to full operation period. The thickness of bituminous overlay shall be determined on the basis of relevant IRC codes, IRC:81.

Clause 5.5.5 indicates that, the design traffic in case of Service Road shall be 10 MSA. The crust composition shall be provided accordingly.

Clause 5.9.6 (i) of IRC SP: 84-2014 stipulate the thickness of the bituminous overlay shall be determined on the basis of FWD Technique and the design traffic as per the procedure outlined in IRC: 81 as also from structural numbers of existing pavement layers.

Clause 5.9.6 (ii) of the same manual also stipulates that the initial **strengthening shall be done for a minimum design period of 10 years**. Subsequent strengthening to extend the pavement to full operation period shall be implemented at the end of initial design period or earlier, in case of any structural distress in the pavement or if the surface roughness exceeds the value specified in Schedule-K of the CA.

Clause 5.9.6 (iv) of the same Section stipulate that the thickness of Bituminous Overlay for pavement strengthening shall not be less than 50 mm Bituminous concrete, after attending to the requirements of profile corrective course".

1.8.2 The Review of Pavement Design Report

As per section 5 of Schedule B, the scope of Pavement improvement for the project road includes:

a) Pavement design shall be carried out in accordance with IRC: SP-84-2014 four lane manual, IRC 37-2012 and IRC 58:2015

b) The existing road shall be reconstructed as Rigid Pavement and Flexible Pavement in Service Road/ Slip Road.

c) Flexible Pavement shall be designed for a minimum period of 15 years excluding construction period.

d) Rigid Pavement shall be designed for a minimum period of 30 years.

- ✓ **Adopted ADT**

The design of Pavement is based on the data provided by the Traffic report.

ADT adopted for design of Pavement as per Traffic Report is presented below

Type of Vehicle	ADT at Km 35.400	ADT at Km 81.500
Mini Bus	35	56
Bus	599	269
LCV	603	638
2A Truck	739	1160
3A Truck	423	1278
MAV	226	899

- ✓ **New Construction of Rigid Pavement**

Design of New construction was carried out in accordance with IRC 58-2015. The pavement layer for new construction has been designed for 30-year design traffic for the PQC layers. The Pavement layer thickness proposed for new construction is as

Length (Km)	Pavement Layer	Design Period (Years)	Pavement Thickness as Per Design (mm)	Adopted as Per Schedule(mm)
51.455	Pavement Quality Concrete (PQC)	30	210	300
	Dry Lean Concrete (DLC)		150	150
	Granular Sub Base (GSB)		150	150
	Subgrade		500	500

- ✓ **New Construction of Flexible Pavement**

There is no thickness for each layer of flexible pavement is given in the pavement design report. However, it is mentioned in the report to adopt 10 msa, 15-year design life and suggested 10% CBR.

1.9 REVIEW OF COS WORKS

The list of compiled COS work orders related to the project are presented below for the amount in million rupees:

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COS number	Description	Amount	Bill raised/ Work Done	Work pending to be done	Amount received	Amount pending to be received	Samarth Comments
1	Reconstruction of box culverts	2	2	-	2	0	Work completed
2	Reconstruction of box culverts	2	2	-	2	0	Work completed
3	Reconstruction of box culverts	2	2	-	2	0	Work completed
4	Widening of Minor Bridge (6lane in lieu of 4 lane)	2	2	-	2	0	Work completed
5	Protective Structure over IOCL pipeline	12	12	-	12	-	Work completed
6	Additional of GAIL Pipeline	3	3	-	3	-	Work completed
7	Construction of Service Road 56+820	20	20	-	19	0	Work completed
8	Construction of Service Road (one	96	22	74	22	-	Work completed

COS number	Description	Amount	Bill raised/ Work Done	Work pending to be done	Amount received	Amount pending to be received	Samarth Comments
	side of bypass) 71+170						
9	Construction of LVUP	11	11	-	11	0	Work completed
10	Construction of RCC Box	5	5	-	4	0	Work completed
11	Construction of Service Road (Gravel Road) (1865m) (BHS) of NH-73	12	8	5	6	2	Work completed
12	Construction of Service Road (Gravel Road) (RHS) of NH-73	2	2	-	2	1	Work completed
13	Upgradation of HTMS in all lanes of toll plaza	13	6	7	6	-	Work completed
14	Increase in Height CUP	8	8	-	-	8	Work completed
15	Encasing culvert over IOCL pipeline	12	12	-	-	12	Work completed
16	Construction of Slip Road	18	18	-	17	0	Work completed
Total in Millions Rs.		**220**	**134**	**86**	**110**	**24**	

1.10 HEAD OF TERMS

A) Key terms of Concession Agreement

Particulars	Description
Date of Agreement **Settlement Agreement** **Appointed Date**	27.05.2016 19.01.2018 27.01.2018
Employer	NHAI, Government of India
Concessionaire	MBL (GSY) Road Ltd
Concession Period	15 Years from COD
Length of the Project, Total project Cost	51.455 Km Rs.1184 Cr Bid project Cost, 1st year O&M Bid cost Rs 10.00Cr
Achievement of Project Mile Stones	Mile Stone-I: Achieved on 30.06.2018 (As per CA Sch-G, Scheduled Completion Date is 29.09.2018 i.e., 214th day from Appointed Date) Mile Stone-II: Achieved on 22.12.2018 (As per CA Sch-G, Scheduled Completion Date is 27.12.2018 i.e., 365th day from Appointed Date) Mile Stone-III: Achieved on 31.08.2019 (As per CA Sch-G, Scheduled Completion Date is 29.07.2019 i.e., 548th day from Appointed Date) Mile Stone-IV: Achieved on 10.02.2022 (As per CA Sch-G, Scheduled Completion Date is 27.01.2020 i.e., 730th day from Appointed Date)
Construction Period/ Scheduled completion	730 days from the Appointed Date/

date	27.01.2020
Annuity	First Year O&M Cost-RS 10.00 Crore, to be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.
Extension of Time **COD** **PCOD** **FCOD**	PCOD achieved on 31.10.2020 with 2nd settlement agreement dtd 01.10.2020 with no claims or damages from either party to complete delinked works within 90days of issuance of PCOD. Final completion certificate 10.02.2022.
Respective rights and obligations of the Parties	Article 4, 9, 10, 23, 34, 42
Change in Ownership	The Concessionaire shall take prior approval of the Authority for any change in ownership in accordance with the article 5.3 of CA
Dispute Resolution	1.At first instance by mediation by the Independent Engineer 2.Amicable settlement by conciliation by the Chairman of the Authority & Chairman of the board of directors of the Concessionaire 3. Finally by Arbitration in accordance with Arbitration and Conciliation Act 1996
Governing Law and Jurisdiction	Courts New Delhi shall have exclusive jurisdiction over matters arising out of or relating to this Agreement

B) Key terms of EPC Agreement

Particulars	Description
Date of Agreement **Appointed Date**	24-July -2017 24-July-2017
Concessionaire	MBL (GSY) Road Ltd
Contractor	Welspun Enterprises Limited
Commencement Date **Construction Period**	24-July-2017 Beginning from the commencement Date and ending on the completion of EPC Works
Length of the Project, Contract Price	51.455 Km Base price Rs 1126 Cr + GST as per clause 5 of EPC agreement, + Price Index Multiple as per CA, Article 23
Achievement of Project Mile Stones	Mile Stone-I: Achieved on 30.06.2018 (As per CA Sch-G, Scheduled Completion Date is 29.09.2018 i.e., 214th day from Appointed Date) Mile Stone-II: Achieved on 22.12.2018 (As per CA Sch-G, Scheduled Completion Date is 27.12.2018 i.e., 365th day from Appointed Date) Mile Stone-III: Achieved on 31.08.2019 (As per CA Sch-G, Scheduled Completion Date is 29.07.2019 i.e., 548th day from Appointed Date) Mile Stone-IV: Achieved on 10.02.2022 (As per CA Sch-G, Scheduled Completion Date is 27.01.2020 i.e., 730th day from Appointed Date)

Extension of Time **COD** **PCOD** **FCOD** **DLP**	PCOD achieved on 31.10.2020 with 2nd settlement agreement dtd 01.10.2020 with no claims or damages from either party to complete delinked works within 90days of issuance of PCOD. Final completion certificate 10.02.2022. DLP period 24 months from the Completion certificate
Liquidated Damages for Delay	If the Contractor fails to achieve any completions Project Milestones, the following delay damages, on demand, be paid to the Concessionaire not exceeding 10% of Contract Price 1) Milestone-I, II & III: 0.005% of the Contract Price per day until completion of such milestone 3) Milestone-IV: 0.011% of the Contract Price per day for each package until EPC works are completed
Monthly Progress Report	The Contractor shall prepare a monthly report on the progress of the works and submit to the Concessionaire
Retention Money	-
Dispute Resolution	1. Amicable Resolution, 2. Three Member Arbitration in accordance with Arbitration & Conciliation Act 1996

1.11 MAINTENANCE REQUIREMENTS:

Concessionaire shall undertake maintenance requirements as per Schedule-K of CA, below is the requirement

S. No	Description	Length (Km)	Lanes	Applicable Schedule for O&M	Maximum Roughness Allowed
1	GSY	51.455	4LPS	Schedule-K	2750 mm/Km

As per Manual, IRC SP:84-2014:

S. No	Description	Length (Km)	Lanes	Maximum allowable deflection	Frequency of Roughness Test	Frequency of FWD Test
1	GSY	51.455	4LPS	1.2mm	Twice a Year	In every 5 Years

- No specific Handing Over (Divestment) requirements are mentioned under CA. It shall be same as Schedule-K

1.12 CLAIMS:

The current year witnessed unprecedented, heavy and concentrated rains in most of North India causing severe devastation to the infrastructure in the states of Himachal Pradesh and Uttarakhand. The GSY project is in the state of Uttarakhand, which witnessed heavy downpour in the months of June & July, 2023 vs the average rainfalls in the last 3 years for same months.

This caused localized but severe damages to certain stretches of the projects, they being located in the immediate plains located in the vicinity of the hilly areas from which water has flowed down at unprecedented quantities.

The Project took immediate measures to protect the site by taking temporary measures, however, given the significant quantities, these measures were not sufficient and have resulted in certain damages.

The Project also notified the Insurance Company immediately of the said occurrence.

Subsequently, a detailed claim has been filed with the Insurance Company ICICI Lombard. However, the Project from the planned expenditure of one-time repair the Company has commenced the repair and rectification works. The estimate of the claim filed by the SPV with the insurance company is Rs 22.41 crores including GST, however, this is an estimate based on maximum possible amount of loss, the actual loss and the rectification cost will be determined at the time of work being carried out. Given the estimate is prepared based on SOR/DSR rates and once actual work is carried out the Company should be able to make full recovery of the cost being incurred on such repair and rectification works.

The following is the estimate for the claim.

Insurance Claim BOQ for GSY					
S.No	**Item**	**Unit**	**Quantity**	**Rate (Rs)**	**Amount (Rs)**
1	Excavation	cum	86841.25	300	26052375
2	Embankment with Borrow Earth	cum	49299.7	500	24649850
3	Embankment with Excavated Earth	cum	86841.25	300	26052375
4	Earthen Shoulder	cum	1824	750	1368000
5	Dismantling of PQC	cum	1650.75	6000	9904500
6	PQC	cum	1685.85	14000	23601900
7	DLC	cum	819.525	9000	7375725
8	GSB	cum	1365.875	3500	4780562.5
9	Dismantling of MBCB	Rms	14433.3	1000	14433300
10	MBCB Beam	Rms	14433.3	3000	43299900
11	MBCB Pole	Nos	763	2000	1526000
12	Chute Drain	Rms	2515.7	1200	3018840
13	Kerb	Rms	2295	1500	3442500
14	Kerb Painting	Rms	2156.65	150	323497.5
15	Pavement Marking	sqm	254.745	550	140109.75
	Total				**18,99,69,435**
	GST 18%				3,41,94,498
	Total				**22,41,63,933**

1.13 SITE OBSERVATIONS:

1. Project road is in compliance to CA provisions.
2. In outer lane and middle lane, in few locations longitudinal wide cracks are observed
3. At slip road location flexible pavement settlements are observed.
4. Condition of rigid pavement to be fair to good with few settlements noted high embankment locations.
5. Flexible overlay is laid at s approach slab location to correct settlements in rigid panels.
6. Saharanpur Bypass at high embankment locations slope chutes have failed leading to slope erosion. Geotextile used in slope protection got exposed. Slope protection works and chutes are required to be repaired immediately to protect pavement.
7. The structures in Project Road have different varieties of super structure such as Steel Truss, Steel Girders, PSC Box, PSC Girders, RCC Girders, RCC Solid Slab.
8. All the structures are in good condition. Few locations (Underpasses) cracks have been noticed on abutments & Soffit of deck slab.
9. The Project contains large stock of Structures and in general it is observed that most of the structures are in relatively good condition not requiring immediate intervention and also not much maintenance efforts are likely.
10. At the outset in can be said that without any hesitation the remaining life of these structures are much longer than intended project duration.

CHAPTER 2. SURVEYS AND INVESTIGATIONS

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 Surveys and Investigations have been undertaken in the month of March 2022, 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 Network Survey Vehicle (NSV)
- Pavement Composition surveys (Test Pits)
- Subgrade Investigations & Laboratory testing
- Material Investigations
- Axle Load Survey
- Structure Inventory and Condition Surveys

2.1 ROAD INVENTORY

The project corridor has rigid pavement in the entire length with 7.0m wide carriageway plus 1.5m paved shoulder on each side. In approach locations 10.5m wide carriageway plus 1.5m paved shoulder on each side. The project corridor generally runs in Plain terrain. The land use along the project road is mostly built-up areas. It passes through villages like Gagalheri, kailashpur, Mahipura, Saharanpur, Ismailpur, Sarsawa, etc. In general, road embankments are in the range of 1.0m-2.0m height. Embankments higher than 2.0m are observed mainly in the approaches of CD structures and Underpass locations.

Typical View of Project Road is shown below:

A view of the Project Road with Median 4m wide at km 36.000 - NH-73

A view of the Project Road with Median 4m at Km 43.000 - NH-73

A view of the Project Road with Median 4m at Km 53.000 - NH-73

A view of the Project Road with Median 4m at Km 60.000 - NH-73

A view of the Project Road with Median 4m at Km 65.000 - NH-73

A view of the Project Road with Median 4m at Km 70.000 - NH-73

The Project Road has 2 Major junctions and 4 Minor junctions. Photographs showing junctions locations are presented below:

Major Junction @ km 36.288 RHS – NH-73

Major Junction @ km 79.682 RHS – NH-73

Minor Junction @ km 79.838 LHS – NH-73

Minor Junction @ km 80.325 RHS – NH-73

About 19 numbers of High mast lighting is observed along the project road. Mostly they are located at Junctions and Toll Plaza locations. Few photos showing High mast lighting are presented below:

A view of High mast lighting @ km 81.000

A view of High mast lighting @ km 81.000

All together the Project Road has about 11 Bus Bay with Bus shelters, 2 Bus bays on Main carriageway and 2 Bus Shelter on Service Road. Few photos taken at the Bus Bays and Bus Shelter are presented below:

 Bus bay with Bus shelter @ Km 42+550 -RHS @ NH-73	 **Bus bay with Bus shelter @ Km 75.170 LHS @ NH-73**
 Bus Bay with Shelter near km 57.570 RHS - NH-72A	 **Bus Bay with Shelter near km 80.000 RHS - NH-73**

The Project Road has Three Truck lay byes. In this, 2 Truck lay byes are provided with Rest Areas. The Truck lay byes have been provided with Rigid. Toilet Blocks and Single arm lightings has been provided.

Few photos depicting the truck lay bye portion are presented below:

Truck lay bye cum rest area @ Km 79.950 -LHS @ NH-73

Truck lay bye cum rest area @ Km 80.000 RHS @ NH-73

Truck lay bye near km 85.050 RHS – NH-73

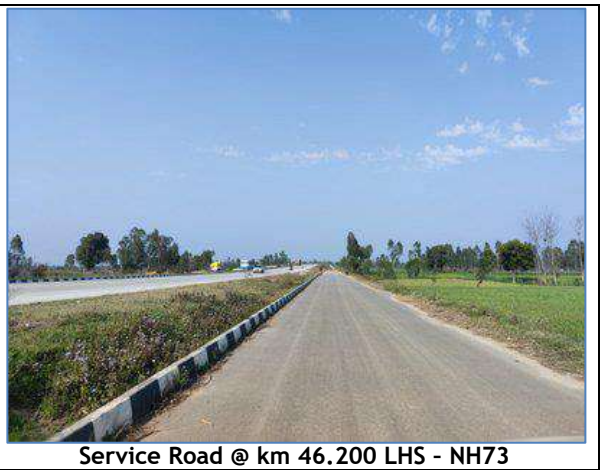
The Project Road has One Toll Plaza (8+8) at km 81+300. Rigid pavement exists at the toll plaza and in tapering portions. It has 8 ETC lanes on each side. Eight high mast lights are provided at toll plaza. Double arm lighting also provided in the approaches of the toll plazas.

A view of Toll Plaza near km 81.000 (Sarsawa)

Admin Building at km.81.000

Service road/slip roads of varying carriageway width of 5.5m to 7m have been observed along the Project Corridor. Service road/slip roads have been constructed for most of the length of the project corridor except at few locations. Photos depicting the service road pavement surface type, Condition and the other associated features like drain, pedestrian guard rails and metal Beam crash barriers on the separator are presented below. Few photos taken at service road locations are presented below:

Service Road @ km 35.400 LHS – NH73



Service Road @ km 46.200 LHS – NH73

Service Road @ km 58.320 RHS – NH-73

Service Road @ km 65.400 LHS – NH-73

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.2 PAVEMENT CONDITION SURVEYS

The present Pavement condition has been accessed by visual inspection. The total length of Pavement Condition is fair. At some locations were observed Cracks, Minor Ravelling and Pop outs etc., are noted. The Pavement Condition report showing the data collected for each km length in each direction is presented in **Appendix 2** of this Report.

The visual inspection of the pavement condition appears to be fair and the riding quality is satisfactory. Condition of rigid pavement to be fair to good with settlements observed at high embankment locations. Flexible overlay is laid at such location to correct settlements in rigid panels. Slope erosions have been noticed at several places in Saharanpur Bypass at high embankment locations especially near ROB. Drainage chutes have failed leading to slope erosion. Geotextile used in slope protection got exposed. Raveling is another predominant distress on rigid pavement along the corridor. Rounded (River Bed Aggregates) are noticed on surface of pavement. This could be one of the reasons for raveling.

The photographs showing the pavement condition of the Project Road is presented below.

Fair Condition at 36+500 RHS @ NH-73	**Raveling at 36+400 LHS @ NH-73**	**Fair Condition at 39+000 LHS @ NH-73**
Fair Condition at 43+000 LHS @ NH-73	**Longitudinal joints at 47+000 LHS @ NH-73**	**Fair Condition at 81+650 LHS @ NH-73**

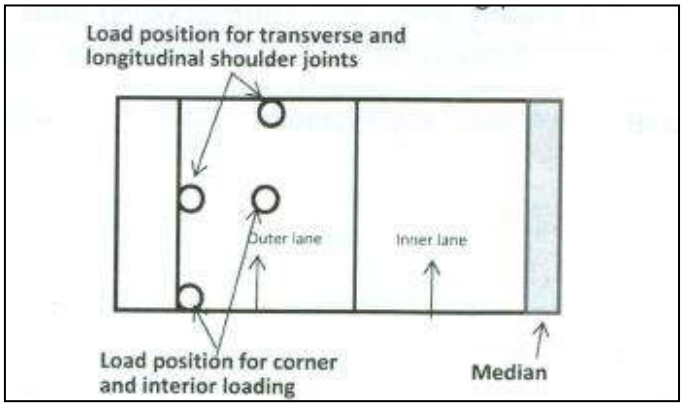
2.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

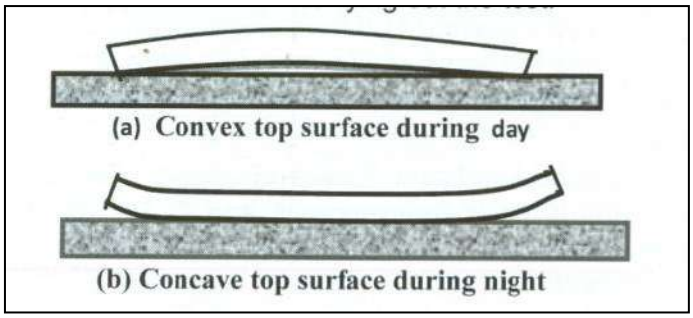
2.3.1 Pavement Evaluation Using FWD-RIGID Pavement

Structural condition of in-service rigid pavement can be evaluated using Falling Weight Deflectometer. FWD surveys are done at interior of panel to determine the Strength of Concrete and Subgrade Support and to Detect voids for loss of support FWD has been done in Wheel path.

For Evaluation of Modulus of Subgrade reaction and Strength of Concrete i.e., "Interior" loading case is done when temp gradient is zero or Negative (Top Surface is Cooler than Bottom), i.e., in the Early Morning or night time has been dine.

Corner loading has no indirect measure from the test, FWD test to be done when pavement is not in curled position and Deflections measured along wheel paths to get void locations. Load position for various cases has been presented below:



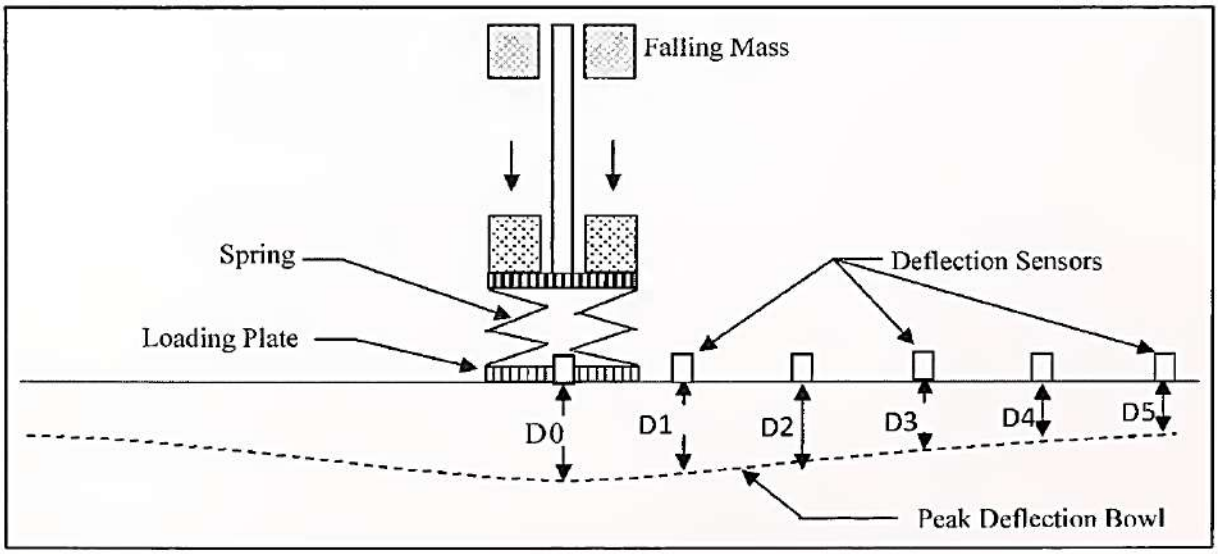


Among equipment available for structural evaluation of pavements, the Falling Weight Deflectometer (FWD) is extensively used world-wide because it simulates, to a large extent, the actual loading conditions of the pavement. When a moving wheel load passes over the pavement it produces load pulses. Normal stresses (vertical as well as horizontal) at a location in the pavement will increase in magnitude from zero to a peak value as the moving wheel load approaches the location. The time taken for the stress pulse to vary from zero to peak value is termed as 'rise time of the pulse'. As the wheel moves away from the location, magnitude of stress reduces from peak value to zero. The time period during which the magnitude of stress pulse varies from 'zero-to-peak-to-zero' is the pulse duration. Peak load and the corresponding pavement responses are of interest for pavement evaluation.

2.3.2 Working Principle of Falling Weight Deflectometer

Falling Weight Deflectometer (FWD) is an impulse-loading device in which a transient load is applied to the pavement and the deflected shape of the pavement surface is measured. The working principle of a typical FWD is illustrated in Fig below. D0, D1, etc., are surface deflections measured at different radial distances. Impulse load is applied by means of a falling mass, which is allowed to drop vertically on a system of springs placed over a circular loading plate. The deflected shape of the pavement surface is measured using displacement sensors which are placed at different radial distances starting with the center of the load plate.

A mass of weights is dropped from a pre-determined height onto a series of springs / buffers placed on top of a loading plate. The corresponding peak load and peak vertical surface deflections at different radial locations are measured and recorded.



Basically, the FWD generates a transient, of different magnitudes of impulse load by selection of a suitable mass and an appropriate height of fall. Under the application of the impulse load, the pavement deflects. Velocity transducers are placed on the pavement surface at different radial locations to measure surface deflections. Geophones or seismometers are used as displacement transducers. Load and deflection data are acquired with the help of a data acquisition system. 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

Maintaining Safety During Survey

FWD includes a circular loading plate of 300 to 450mm diameter, in the present survey 300mm diameter load plate is used. A falling mass in the range of 50 to 350 kg is dropped from a height of fall in the range of 100 to 600mm to produce load pulses of desired peak load and duration. The target peak load in the range of 40KN to 60KN or Higher may be applied on Concrete Pavement to get a reasonable deflection of the order of 0.15 mm since pavements of major highways in India consisting of 150mm DLC and 300mm PQC are very stiff and a higher load may be required to get a deflection of about 0.15mm. In the present case target peak load as high as 150 KN is also used to get a reasonable deflection on concrete pavement.

2.3.3 Methodology adopted for carrying the survey

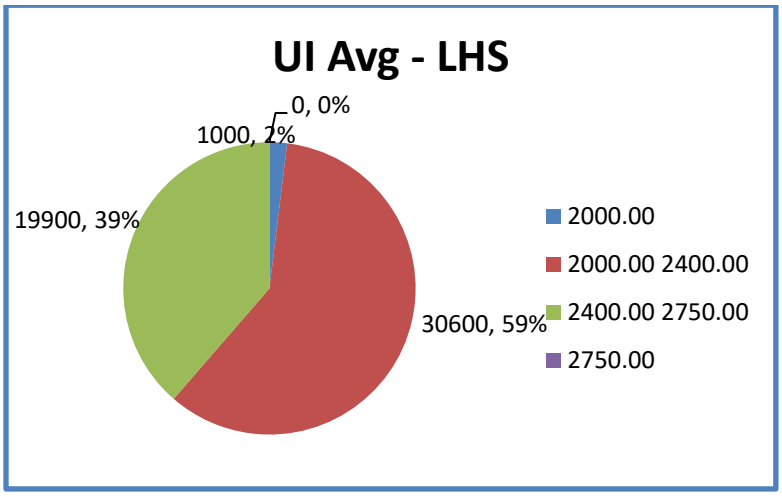
- ✓ The FWD Surveys are carried out as per IRC:117-2014
- ✓ The project road has two longitudinal joint one at center and other paved shoulder. Panel size is nearly 4.5x3.5m
- ✓ Interior points at a distance of 2.25m from edge (1.5m paved shoulder+0.75m for wheel path). These points will also act as under wheel path for detection of voids. Testing was done at two interior points in a km at 200 and 600. Three points @ 0, 400 and 800 in inner lane to know strength/subgrade support. (These have been taken at night)

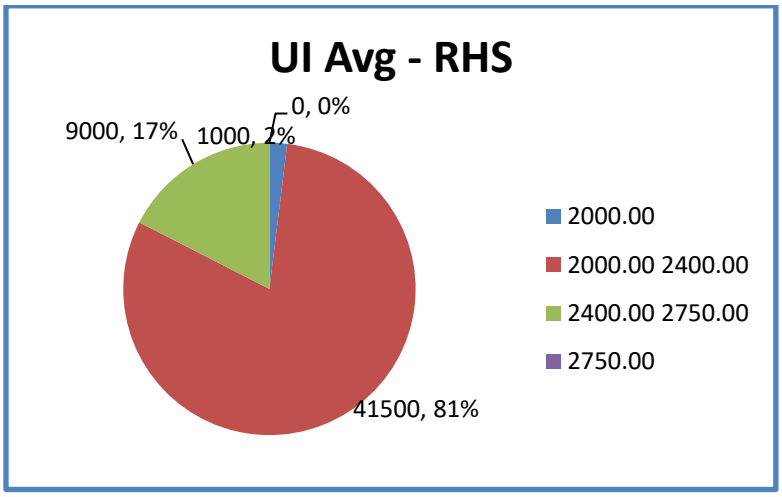
2.4 ROUGHNESS SURVEYS

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 IRC-SP:16-2004, Bituminous Concrete pavement surface is considered to be good when its UI value is less than 2000 mm/km and the same is considered to be average for UI values between 2000 and 2750 mm/km whilst the surface is treated as Poor for UI values greater than 2750 mm/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 59% & 81% of the length of the Project Road has fair riding quality (UI<2750 mm/km) in LHS carriageway and RHS carriageway respectively.

2.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys. Thus, a total of Fourteen (12 no's) pits have been dug along the corridor and the data on composition of pavement has been noted. 11 out of 12 pits done on Main Carriageway edge and remaining 1 test pits done on Service Road edge. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few photographs are presented below:

RK-TP-8	RK-TP-9
RK-TP-10	RK-TP-11
RK-TP-12	RK-TP-13

RK-TP-14	RK-TP-15
RK-TP-17	
RK-TP-18	RK-SR-TP-1

Results of the test pit survey showing average thickness of pavement layers are presented in the Table below.

Table 2: Pavement Composition of Existing Pavement along Project Road

Sl. No	Test Pit Number	Design Chainage	Direction	PQC	DLC	BT	WMM	GSB	Total
1	RK-TP-8	35+000	RHS	300	150	-	-	160	610
2	RK-TP-9	40+080	LHS	300	150	-	-	180	630
3	RK-TP-10	47+150	RHS	300	130	-	-	170	600
4	RK-TP-11	50+600	LHS	300	150	-	-	150	600
5	RK-TP-12	56+380	RHS	300	150	-	-	120	570
6	RK-TP-13	60+060	LHS	300	130	-	-	180	610
7	RK-TP-14	64+700	RHS	310	150	-	-	180	640
8	RK-TP-15	70+000	LHS	300	160	-	-	160	620
9	RK-TP-16	75+300	RHS	300	140	-	-	150	590
10	RK-TP-17	79+950	LHS	310	120	-	-	150	580
11	RK-TP-18	84+600	RHS	300	200	-	-	200	700
12	RK-SR-TP-1	66+750	RHS	-	-	150	250	200	600

Total average crust thickness of the MCW pavement is 615mm. The average thickness of PQC layer is about 300mm. Pavement is mainly composed of a PQC layer, DLC & GSB base over subgrade.

2.6 SUBGRADE INVESTIGATIONS & LABORATORY TESTING

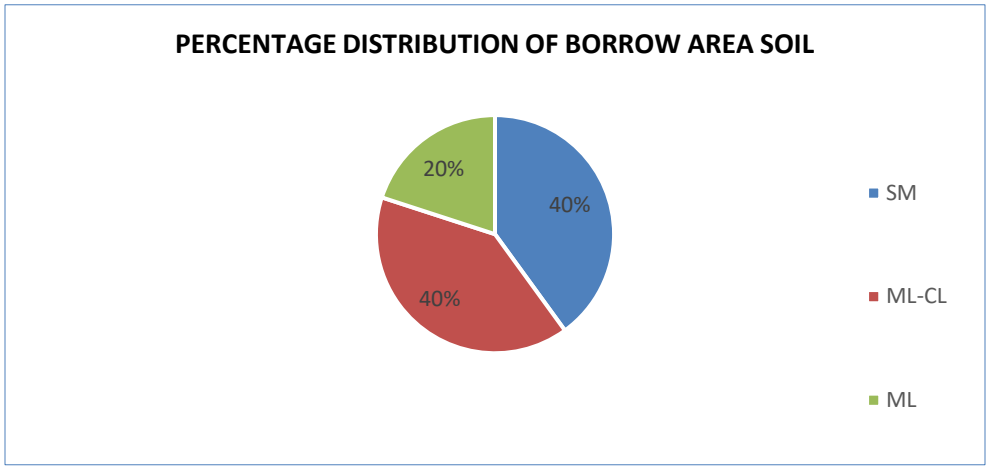
Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 12 test pits have been carefully dug from the pavement surface up to sub-grade level. 11 out of 12 pits done on Main Carriage way edge and remaining 1 test pit done on 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.

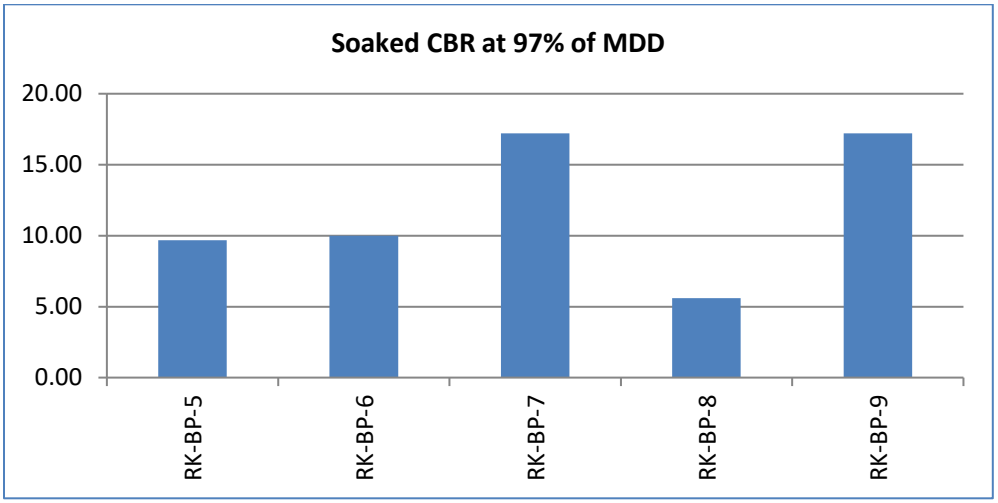
The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- 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 that out of 5 samples 2 samples belongs to SM type of soil, 2 samples belong to ML-CL type of soil and 1 sample belongs to ML type of soil.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:





It is seen that the tested samples have a CBR of more than 7 % for most of the samples, for the pavement design purposes CBR value of 10 % can assume as design CBR.

2.7 BORROW AREA

As obtained information, the 5 sources are identified, potential borrow sources for subgrade are shown in the following table and include certain useful information such as, distance from the project road, location, village name etc. The soil up to 1.5m to 2m may use for embankment. Borrowing soil from these areas would require prior approval of the local authorities' negotiations with private people. Soil samples from these borrow sources have been collected in bulk quantities by excavating test pits down up to 0.5m-1.0m depth from the existing ground surface. The top organic soil layer of approximately 150 mm thickness has been removed before sampling

Table 3: Borrow Area Details

Sl.No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Area	Rate	Remarks	Co-ordinate
1	RK-BP-5	37+800	LHS	2.0 km	Village: Gagalheri Name: Rajeev Kumar Contact no: 9528246387	10 Bigha* 3feet	Rs-25,000/-1BighaX1m	Pvt. land	29919629 77.619172
2	RK-BP-6	46+150	LHS	500m	Village: Kapasi Name: vishu Contact no: 9760286510	20 Bigha* 3feet	Rs-20,000/-1BighaX1m	Pvt. land	29919629 77.619173
3	RK-BP-7	52+830	LHS	1.2 km	Village: Nandhi Name: Somesh Contact no: 9012911221	15 Bigha* 6feet	Rate not told	Pvt. land	29.875225 77.567774
4	RK-BP-8	66+420	LHS	1.3 km	Village: Bandhukheri Name: Rithik Contact no: 6398334070, 7668439466	10 Bigha* 3feet	Rs-30,000/-1BighaX1m	Pvt. land	29.937158 77.447243
5	RK-BP-9	75+800	LHS	4.8 km	Village: Gadar heri Name: Kavarpal Contact no: 8869004388 (Ashu)	15 Bigha* 4feet	Rs-25,000/-1BighaX1m	Pvt. land	

RK-BP-5

RK-BP-6

RK-BP-7	RK-BP-8
RK-BP-9	

2.8 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 and the approximate distance from each source to the nearest point on the Project Road are compiled and presented in the following table. Schematic locations of these quarries are shown in Figure 2.

Table 4: Aggregate Samples Details

sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
RK-AQ-1	14+700 (From Chutmalpur-	RHS	Biharigarh	Everest stone crusher Owner-Choudhary	6.0 km	Plenty	53mm-Rs 450/- per tonne 40mm-Rs 450/- per tonne 20mm-Rs 520/- per tonne	Including Royalty & GST 5% Extra	30.111778 77.867892

sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
	Ganeshpur Pkg-I)			Sant. Pal Contract no-9719019099			12mm-Rs 520/- per tonne 6mm-Rs 480/- per tonne Dust-Rs 510/- per tonne M-sand-Rs 330/- per tonne		
RK-AQ-2	12+700 (From Chutmalpur-Ganeshpur pkg-I)	RHS	Biharigarh	Kubher Kutiya stone crusher Owner-Hemanth kumar Contract no-9719011093, 9758842605	7.8 km	Plenty	53mm-Rs 440/- per tonne 40mm-Rs 440/- per tonne 20mm-Rs 470/- per tonne 10mm-Rs 480/- per tonne 6mm-Rs 480/- per tonne Dust-Rs 480/- per tonne Corse-sand-Rs 290/- per tonne	Including Royalty & GST 5% Extra	30.111550 77.891639
RK-AQ-3	0+000 (From Roorkee-Yamuna Nagar Pkg-1	RHS	Ibrahimpur	Jai Durga Stone mills Owner-Ashwani Kumar Contract no-9837002569, 9837468271	24 km	Plenty	53mm-Rs 650/- per tonne 40mm-Rs 650/- per tonne 20mm-Rs 650/- per tonne 10mm-Rs 650/- per tonne 6mm-Rs 650/- per tonne Dust-Rs 650/- per tonne Corse-sand-Rs 750/- per tonne	Including Royalty, Tax & GST 5% Extra	29.912581 78.071525
RK-AQ-4	0+000 (From Roorkee-Yamuna Nagar Pkg-1	RHS	Ibrahimpur	Sri ganga Stone Crusher Owner- R.P Agarwal Contract no-9719004005, 9058343343	25 km	Plenty	40mm-Rs 620/- per tonne 20mm-Rs 650/- per tonne 10mm-Rs 620/- per tonne 6mm-Rs 620/- per tonne Dust-Rs 650/- per tonne	Including Royalty, Tax & GST 5% Extra	29.908853 78.073256
RK-AQ-5	86+100	RHS	Tapu Majri Yamuna Nagar	Shashank Shekar Stone Crusher Contact Person: Pankaj Chowdary Contact No: 9728315409	16 km	Plenty	40mm-Rs 430/- per ton 20mm-Rs 450/- per ton 10mm - Rs 480/- per ton 6mm -Rs 470/- per ton	GST 5% and Royalty Extra	30.130528 77.405350
RK-AQ-6	86+100	RHS	Tapu Majri Yamuna Nagar	Shiv Shakti Stone Crusher Contact Person: Tapu Ravi Contact no: 8053501857	16 km	Plenty	40mm-Rs 440/- per ton 20mm-Rs 440/- per ton 10mm - Rs 470/- per ton 6mm -Rs 440/- per ton	GST 5% and Royalty Extra	30.131083 77.406461

RK-AQ-1	RK-AQ-2
RK-AQ-3	RK-AQ-4

RK-AQ-5	RK-AQ-6

One Sand sample have been collected from the source and tested. The location of this sand quarry along with lead to the Project Road is presented in the following table. Schematic locations of these quarries are shown in Figure 2.

Table 5: Sand Samples Details

sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approx. Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
RK-SQ-1	83+550	LHS	Yamuna nagar	Owner-Sachin Contract no-9045125020	12 km	Plenty	Yamuna River - 2200 Rs/- Per Tonne		30.031763 77.292173

RK-SQ-1

2.9 AXLE LOAD SURVEYS

Traffic loading has a significant impact on pavement performance and design. This is because the damage that vehicles create to a road depends very strongly on the axle loads of the vehicles. The exact relationship is influenced by the type of road structure and the way the road deteriorates but a "fourth power" damage law gives a good approximation.

Axle load study has been conducted using portable axle load pads. Surveys have been conducted on the Project Road at one location in either direction at Km 81+300, near Toll Plaza location on 2nd Mar 2022. 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: 37-2012. The standard axle loadings adopted have been presented in the following table

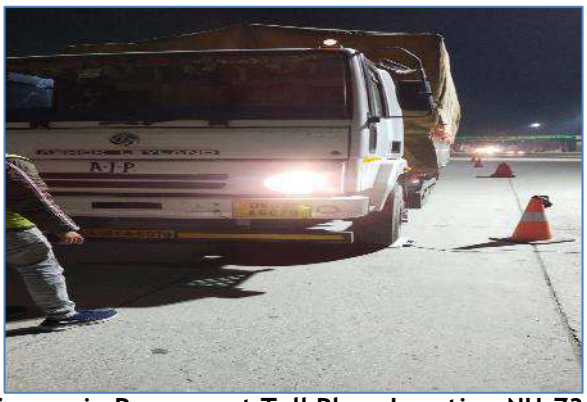
Details of Standard Axels Used

Axle Configuration	Standard Axle load (Tonnes)*	Remarks
Single Wheel, Single Axle	6.60	As per IRC 37-2012
Dual Wheel, Single Axle	8.16	As per IRC 37-2012
Dual Wheel, Tandem Axle group	15.10	As per IRC 37-2012
Dual Wheel, Tridem Axle group	22.90	As per IRC 37-2012

Few photographs illustrating the survey locations and axle load measurements are presented below.

Survey in Progress at Toll Plaza Location-NH-73

Survey in Progress at Toll Plaza Location-NH-73



Survey in Progress at Toll Plaza Location-NH-73

Survey in Progress at Toll Plaza Location-NH-73

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 6: VDF Values Estimated at the Toll Plaza Location (Near Chainage km 81.300)

Mode Type	UP	DOWN
LCV	0.75	0.39
2 Axle Truck	0.74	0.88
3 Axle Truck	2.22	2.08
MAV (4-6 Axle)	9.98	10.38
Buses	0.42	0.47

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. As a part of the validation, the available as-built drawings and the inventory data received from the Concessionaire were also referred. 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 7: Details of Executed works

Sl. No.	Particulars	Length/ Nos.	As per Site
1	Start Chainage (Km)	Km.	35.400
2	End chainage (Km)	Km.	86.855
3	Length of the Project Corridor	Kms	51.455
4	Service Road / Slip Road	Kms	18.22
5	Bypass Length	Kms	0
6	Toll Plaza	Nr.	1
7	No. of Lanes (Both side)	Nr.	16
8	ROBs	Nr.	3
9	RUB's	Nr.	0
10	Interchange /Grade Separators	Nr.	0
11	Flyovers	Nr.	1
12	Uni Directional Flyovers	Nr.	0
13	Over Passes	Nr.	0
14	VUPs	Nr.	10
15	LVUP's	Nr.	10
16	PUP's/CUP's	Nr.	8
17	Major Bridges	Nr.	3
18	Minor Bridges	Nr.	9
19	Culverts (Pipe)	Nr.	69
20	Culvert (Slab/Box)	Nr.	20
21	Major Junctions	Nr.	2
22	Minor junctions	Nr.	4
23	High Embankments	Kms	33.590
24	Partial RCC Wall with Embankment	Kms	0.29

Sl. No.	Particulars	Length/ Nos.	As per Site
25	RE Blocks/PANELS	Kms	7.36
26	Partial RE Wall with Grouting	Kms	1.520
27	Bus Bays with Shelter	Nr.	11
28	Bus Bays	Nr.	2
29	Bus Shelters	Nr.	2
30	Truck Lay bye	Nr.	3
31	Rest Areas	Nr.	3
32	High Mast Lights	Nr.	19
33	Highway Lighting (length only)	Kms	8.17
34	Single Arm Lightings	Nr.	136
35	Double Arm Lightings	Nr.	191
36	Solar Blinkers	Nr.	16
37	RCC Cover Drain	Kms	8.87
38	RCC Open Lined Drain	Kms	0
39	Median Cuts	Nr.	667
40	Chutes	Nr.	745
41	Median Opening	Nr.	7
42	Median kerb Damages	m	146
43	Median Plantation Functional	Kms	46.285
44	Median Plantation Functional	Kms	0.52
45	Road Markings	Sqm	46640
46	W-Beam Safety Barriers	Kms	34.070
47	Rigid Concrete Barriers	Kms	14.83
48	Concrete Railing	Kms	2.68
49	Pedestrian Guard Rails	Kms	1.65
50	Delineators	Nr.	167
51	Kilometer Stones	Nr.	99
52	Hectometer Stones	Nr.	306
53	Road Signs	Nr.	460
54	Gantry Sign Boards	Nr.	7
55	Cantilever Sign Boards	Nr.	5
56	Varying Message Signs (VMS)	Nr.	2
57	Emergency Call Box	Nr.	8
58	Advanced Traffic Management System (ATMS)	Kms	51.455
59	Anti-Glare	m	655

The project corridor appears to have been constructed with the cross-sectional elements matching to those given in the manual at the time of execution. The carriageway width of 7 plus paved

shoulders of 1.5m and a shyness of 0.5m has been provided over the entire length except at structures.

In the project stretch, the Service/Slip Roads with an overall both side length of km 18.220 have been observed. Location wise details of service roads and slip roads presented in **Appendix 6** are listed as below:

Lined Covered drains in a length of 8.870 km are provided at total length respectively along the Project corridor, the location and condition of the same are presented below:

Table 8: Details of Drain along Project Road

S. No.	Existing Km		Length (km)	Direction	Damage(m)	Remark
	From	To				
1	35.400	35.900	0.500	LHS		RCC Covered Drain
2	35.810	35.600	0.210	RHS		RCC Covered Drain
3	35.600	35.650	0.050	RHS		Not Constructed
4	35.650	35.250	0.400	RHS		RCC Covered Drain
5	33.680	33.500	0.180	RHS		RCC Covered Drain
6	32.400	32.300	0.100	LHS		RCC Covered Drain
7	82.630	83.420	0.790	LHS		RCC Covered Drain
8	83.420	84.480	1.060	LHS		RCC Covered Drain
9	18.960	16.800	2.160	RHS	10.0	RCC Covered Drain
10	16.800	16.600	0.200	RHS		Not Constructed
11	16.600	16.330	0.270	RHS		RCC Covered Drain
12	14.350	11.150	3.200	RHS		RCC Covered Drain
Total Length			**9.120 km**		**10.0m**	

RE walls & RCC walls are provided in approaches of under passes are observed along the Project Corridor. Summary of the embankment slope details are given below

Table 9: Summary of Type of Slope Details

Approach Type	Units	Qty
Embankment	Km	33.590
RE Wall	Km	7.360
Partial RE Wall with Grouting	Km	1.520
Partial RCC Wall with Embankment	Km	0.290

Median width of 1.2m to 4.0m was generally adopted along the project road. Median openings are provided.

Table 10: Details of Median Openings along Project Road

Sl. No	Chainage	Length (m)	Reserved Lane	Remarks
1	34.990	25	No	
2	36.450	35	Yes	

Sl. No	Chainage	Length (m)	Reserved Lane	Remarks
3	43.020	35	Yes	
4	57.800	35	Yes	
5	68.650	35	Yes	
6	79.300	25	No	
7	81.900	35	Yes	

Solar Blinkers are provided at most of the Traffic signals locations and the number accounts to 16. The table below represents the summary of the Solar Blinker and their condition. The location wise details are presented in the **Appendix 6**.

Safety barriers have been provided along the project road at high embankment, sharp curve locations and on the approaches of grade separated and cross drainage structures. The summary of safety barriers provided along the corridor are presented in the following table and the location wise details are presented in **Appendix 6:**

Table 11: Summary of Safety Barriers along Project Road

S. No	Safety Barrier	Length (km)
1	Metal Beam Crash Barrier	34.070
2	Concrete Crash Barrier	14.830
3	Concrete Railing	2.680
4	Pedestrians Guard Rail	1.650

Table 12: Details of Anti-Glare along Project Road

S.no	Chainage		Length (km)	Side	Anti-Glare (Nos)	Remarks
	From	To				
1	35.400	35.850	0.450	Median	128	Double faced MCB
2	82.650	83.600	0.950	Median	265	Double faced MCB
3	83.620	84.550	0.930	Median	262	Double faced MCB
Total Length			**2.330**		**655**	

There are 2 major and 4 Minor Junction along the Project Corridor. Summary of Junctions are presented in table below and the location wise details are presented in **Appendix 6**

Table 13: List of Junctions along Project Road

S. No	Type	No's
1	Major junctions	02
2	Minor Junctions	04

Road furniture in the form of Signboards (Information, Gantry, Cantilever signs and Toll Boards) Pavement Markings, Delineators, Guard Posts and Highway Lighting have been provided along the project road. The Tables below depict the particular details of the Road Furniture.

Table 14: Details of Road Signs along Project Road

Description	LHS	RHS	Junction	Total
Octagonal	0	0	0	**0**
Circular	0	0	0	**0**
Triangular	24	14	0	**38**
Rectangular	70	59	0	**129**
Facility informatory	0	0	0	**0**
Chevron	32	23	0	**55**
Hazard	94	110	0	**204**
Route Marker	0	8	0	**8**
Safety Boards	0	0	0	**0**
Toll Boards	0	0	0	**0**
Cantilever Gantry	3	2	0	**5**
Over Head Gantry	4	3	0	**7**
Variable Message Sign	2	0	0	**2**
Project Descriptive	0	0	0	**0**
Total	**229**	**219**	**12**	**460**

Delineators are provided along the Project Highway.

Table 15: Details of Delineators along Project Road

As Per Site	167
Missing	0
Damaged	0

High mast lighting is provided at 19 locations mainly at intersections and Toll Plaza locations. Highway Lighting is provided on Median and on service road over a total length of 8.170 km. Lighting with 191 No's of Double arm poles are provided in length of 4.600 km and with 136 No's of Single arm poles in a length of 3.570 km. The location wise details of high mast and highway lighting are presented in **Appendix 6** of this report.

The Project Road has about 11 No's Bus bays with Bus Shelters, 02 No's Bus bays and, 02 No's Bus Shelters on Main Carriageway and Service Road. The details of the same are presented in **Appendix 6** of this report.

The Project Road has 3 nos. of Truck laybys.

Table 16: Details of Truck Lay-Byes along Project Road

S. No.	Existing Km		Length	Width(m)	Separator	Side	Pavement Type	Toilet Block	Remarks
	From	To							
1	79.950	80.200	0.250	32.00	1.0	LHS	Rigid	Available	
2	80.000	79.750	0.250	32.00	1.0	RHS	Rigid	Available	
3	85.050	84.800	0.250	7.00	1.0	RHS	Rigid	Available	

3.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 17: Details of Major CD & Other Structures along Project Road

S No.	Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Remarks
1	37+492	MNB (IOCL)	LHS	MCW	New	1 x 8.25	15	
2	37+493	MNB (IOCL)	RHS	MCW	New	1 x 8.25	15	
3	37+875	VUP	LHS	MCW	New	1 x 12	14.5	
4	37+875	VUP	RHS	MCW	New	1 x 12	14.5	
5	38+876	CUP	LHS	MCW	New	1 x 8.5	14.5	
6	38+876	CUP	RHS	MCW	New	1 x 8.5	14.5	
7	41+129	LVUP	LHS	MCW	New	1 x 10.5	14.5	
8	41+129	LVUP	RHS	MCW	New	1 x 10.5	14.5	
9	41+844	Flyover	LHS	MCW	New	2 x 36.921	14.5	
10	41+844	Flyover	RHS	MCW	New	2 x 36.921	14.5	
11	43+619	LVUP	LHS	MCW	New	1 x 10.5	14.5	
12	43+619	LVUP	RHS	MCW	New	1 x 10.5	14.5	
13	44+450	CUP	LHS	MCW	New	1 x 8.5	17.5	
14	44+450	CUP	RHS	MCW	New	1 x 8.5	17.5	
15	44+684	ROB	LHS	MCW	New	1 x 31.5 + 1 x 24.607 + 1 x 23.87 + 1 x 45 + 1 x 33.7 + 1 x 24.607 + 1 x 31.5	12.5	
16	44+684	ROB	RHS	MCW	New	1 x 31 + 1 x 24.607 + 1 x 23.87 + 1 x 45 + 1 x 19.9 + 1 x 24.607 + 1 x 31.5	12.5	
17	45+770	VUP	LHS	MCW	New	1 x 12	14.5	
18	45+770	VUP	RHS	MCW	New	1 x 12	14.5	
19	46+614	CUP	LHS	MCW	New	1 x 8.5	14.5	
20	46+614	CUP	RHS	MCW	New	1 x 8.5	14.5	
21	48+065	LVUP	LHS	MCW	New	1 x 10.5	14.5	
22	48+065	LVUP	RHS	MCW	New	1 x 10.5	14.5	
23	49+457	ROB	LHS	MCW	New	14 x 40	12.5	
24	49+457	ROB	RHS	MCW	New	14 x 40	12.5	
25	51+589	MJB	LHS	MCW	New	6 x 36.7	12.5	
26	51+589	MJB	RHS	MCW	New	6 x 36.7	12.5	
27	52+820	VUP	LHS	MCW	New	1 x 12	14.5	
28	52+820	VUP	RHS	MCW	New	1 x 12	14.5	
29	53+647	LVUP	LHS	MCW	New	1 x 10.5	14.5	

S No.	Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Remarks
30	53+647	LVUP	RHS	MCW	New	1 x 10.5	14.5	
31	53+974	MNB	LHS	MCW	New	2 x 30	12.5	
32	53+974	MNB	RHS	MCW	New	2 x 30	12.5	
33	54+149	VUP	LHS	MCW	New	1 x 12	14.5	
34	54+149	VUP	RHS	MCW	New	1 x 12	14.5	
35	54+985	LVUP	LHS	MCW	New	1 x 10.5	14.5	
36	54+985	LVUP	RHS	MCW	New	1 x 10.5	14.5	
37	55+825	VUP	LHS	MCW	New	1 x 12	14.5	
38	55+825	VUP	RHS	MCW	New	1 x 12	14.5	
39	57+074	CUP	LHS	MCW	New	1 x 8.5	14.5	
40	57+074	CUP	RHS	MCW	New	1 x 8.5	14.5	
41	58+143	LVUP	LHS	MCW	New	1 x 10.5	14.5	
42	58+143	LVUP	RHS	MCW	New	1 x 10.5	14.5	
43	58+935	ROB	LHS	MCW	New	2 x 32 + 4 x 36 + 5 x 40 + 1 x 52	12.5	
44	58+935	ROB	RHS	MCW	New	2 x 32 + 4 x 36 + 5 x 40 + 1 x 52	12.5	
45	59+207	CUP	LHS	MCW	New	1 x 4.53	14.5	
46	59+207	CUP	RHS	MCW	New	1 x 4.53	14.5	
47	60+730	CUP	LHS	MCW	New	1 x 8.5	14.5	
48	60+730	CUP	RHS	MCW	New	1 x 8.5	14.5	
49	62+185	VUP	LHS	MCW	New	1 x 12	14.5	
50	62+185	VUP	RHS	MCW	New	1 x 12	14.5	
51	63+070	MJB	LHS	MCW	New	2 x 40	12.5	
52	63+070	MJB	RHS	MCW	New	2 x 40	12.5	
53	65+047	LVUP	LHS	MCW	New	1 x 10.5	14.5	
54	65+047	LVUP	RHS	MCW	New	1 x 10.5	14.5	
55	65+548	MNB	LHS	MCW	New	2 x 7.5	14	
56	65+548	MNB	RHS	MCW	New	2 x 7.5	14	
57	65+548	MNB	LHS	SR	New	1 x 6	8.5	
58	66+484	VUP	LHS	MCW	New	1 x 27.214	14.5	
59	66+484	VUP	RHS	MCW	New	1 x 27.214	14.5	
60	67+427	LVUP	LHS	MCW	New	1 x 10.5	14.5	
61	67+427	LVUP	RHS	MCW	New	1 x 10.5	14.5	
62	67+604	MNB	LHS	MCW	New	1 x 15	14.5	
63	67+604	MNB	RHS	MCW	New	1 x 15	14.5	
64	69+416	CUP	LHS	MCW	New	1 x 8.5	14.5	
65	69+416	CUP	RHS	MCW	New	1 x 8.5	14.5	
66	69+954	MNB	LHS	MCW	New	1 x 15	12.5	
67	69+954	MNB	RHS	MCW	New	1 x 15	12.5	
68	71+170	VUP	LHS	MCW	New	1 x 12	14.5	
69	71+170	VUP	RHS	MCW	New	1 x 12	14.5	
70	72+809	CUP	LHS	MCW	New	1 x 8.5	14.5	
71	72+809	CUP	RHS	MCW	New	1 x 8.5	14.5	
72	74+194	MNB	LHS	MCW	New	1 x 10	12.5	
73	74+194	MNB	RHS	MCW	New	1 x 10	12.5	
74	75+110	MNB (IOCL)	LHS	MCW	New	1 x 8.25	11	
75	75+110	MNB (IOCL)	RHS	MCW	New	1 x 8.25	11	
76	75+110	MNB (IOCL)	RHS	SR	New	1 x 8.25	8.5	
77	75+856	VUP	LHS	MCW	New	1 x 29	14.5	
78	75+856	VUP	RHS	MCW	New	1 x 29	14.5	

S No.	Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Remarks
79	77+519	LVUP	LHS	MCW	New	1 x 10.5	14.5	
80	77+519	LVUP	RHS	MCW	New	1 x 10.5	14.5	
81	78+139	VUP	LHS	MCW	New	1 x 12	14.5	
82	78+139	VUP	RHS	MCW	New	1 x 12	14.5	
83	78+713	LVUP	LHS	MCW	New	1 x 10.5	14.5	
84	78+713	LVUP	RHS	MCW	New	1 x 10.5	14.5	
85	79+320	MNB	LHS	MCW	New	1 x 15	13	
86	79+320	MNB	RHS	MCW	New	1 x 15	13	
87	80+599	MNB	LHS	MCW	New	2 x 16	12.5	
88	80+599	MNB	RHS	MCW	New	2 x 16	12.5	
89	85+849	MJB	LHS	MCW	New	16 x 30	12.5	
90	85+849	MJB	RHS	MCW	Old	16 x 30	12.5	

4.1 EMBANKMENT & SUBGRADE

Test results of subgrade samples reveal that the soil collected primarily belong to Coarse grain soil type for subgrade. Out of 12 test pits, 12 samples have been collected. Out of 12 subgrade samples, 5 samples belong to SM type of soil, 2 samples belong to ML type of soil, 2 samples belong to ML-CL type of soil, 2 samples belong to CL type of soil and 1 sample belongs to SM-SC type of soil. The testing results are given below in the following table. The percentage distribution of existing subgrade soil and soaked CBR values are presented below. Summary of the test results carried out on these samples are presented in the following tables whilst the complete details are presented as an Annexure-7 at the end of this report.

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 Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %									
RK-TP-8	35+000	RHS	96.73	93.88	26.70	3.27	70.03	-	NP	NP	SM	1.92	10.20	1.86	13.23	5.88
RK-TP-9	40+080	LHS	98.23	95.42	72.07	1.77	26.16	20	15	5	ML-CL	1.95	9.00	1.89	7.31	0.00
RK-TP-10	47+150	RHS	93.96	91.81	79.21	6.04	14.75	23	16	7	ML-CL	1.87	9.40	1.81	6.45	9.52
RK-TP-11	50+600	LHS	97.18	93.98	27.93	2.82	69.25	-	NP	NP	SM	1.91	11.20	1.85	13.23	0.00
RK-TP-12	56+380	RHS	98.27	93.86	41.93	1.73	56.34	-	NP	NP	SM	2.00	9.60	1.94	19.99	11.11
RK-TP-13	60+060	LHS	98.65	94.62	85.57	1.35	13.08	30	20	10	CL	1.87	9.40	1.81	7.31	16.67
RK-TP-14	64+700	RHS	99.08	97.61	89.92	0.92	9.16	27	18	9	CL	1.82	11.80	1.77	3.23	14.29
RK-TP-15	70+000	LHS	97.30	94.39	43.60	2.7	53.7	-	NP	NP	SM	2.06	8.40	2.00	17.33	5.26
RK-TP-16	75+300	RHS	97.04	91.55	40.33	2.96	56.71	-	NP	NP	SM	1.99	8.60	1.93	19.99	0.00
RK-TP-17	79+950	LHS	100	96.92	82.23	0	17.77	-	NP	NP	ML	1.88	8.60	1.82	7.42	0.00
RK-TP-18	84+600	RHS	96.36	92.72	51.84	3.64	44.52	-	NP	NP	ML	1.87	12.20	1.81	7.42	0.00
RK-SR-TP-1	66+750	RHS	95.06	89.40	42.41	4.94	52.65	19	15	4	SM-SC	2.08	9.40	2.02	14.86	5.26

List of the FDD test results carried out existing subgrade are presented in the following table.

Table 19: Field Dry Density Test Results of Existing Subgrade Soils

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	LHS/RHS				
RK-TP-8	35+000	RHS	SM	1.92	1.86	96.9%
RK-TP-9	40+080	LHS	ML-CL	1.95	1.89	96.9%
RK-TP-10	47+150	RHS	ML-CL	1.87	1.81	96.8%

Lab Sample No	Site Identification		Soil Class	MDD (gm/cc)	FDD (gm/cc)	% Compaction
	Location (km)	LHS/RHS				
RK-TP-11	50+600	LHS	SM	1.91	1.85	96.9%
RK-TP-12	56+380	RHS	SM	2.00	1.94	97.0%
RK-TP-13	60+060	LHS	CL	1.87	1.81	96.8%
RK-TP-14	64+700	RHS	CL	1.82	1.77	97.3%
RK-TP-15	70+000	LHS	SM	2.06	2.00	97.1%
RK-TP-16	75+300	RHS	SM	1.99	1.93	97.0%
RK-TP-17	79+950	LHS	ML	1.88	1.82	96.8%
RK-TP-18	84+600	RHS	ML	1.87	1.81	96.8%
RK-SR-TP-1	66+750	RHS	SM-SC	2.08	2.02	97.1%

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 1.82 and 2.08 gm/cc. All samples are satisfying the MDD criterion (MDD>=1.75 gm/cc)
- OMC for existing subgrade samples varies between 8.4 to 12.20.
- Free Swelling Index for existing subgrade samples varies between 0 to 16.67. All samples satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in fair condition. The test results and photographs are presented at **Appendix 7** of this report.

Table 20: Test Results of Borrow 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 Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %									
RK-BP-5	37+800	LHS	99.90	99.29	88.23	0.1	11.67	24	19	5	ML-CL	1.93	10.20	1.87	9.68	9.09
RK-BP-6	46+150	LHS	99.91	99.47	71.67	0.09	28.24	-	NP	NP	ML	1.90	11.20	1.84	10.00	5.88
RK-BP-7	52+830	LHS	100	97.24	33.75	0	66.25	-	NP	NP	SM	1.97	10.80	1.91	17.21	5.00
RK-BP-8	66+420	LHS	100	98.92	82.43	0	17.57	24	20	4	ML-CL	1.86	12.20	1.80	5.59	4.17
RK-BP-9	75+800	LHS	99.49	94.63	27.13	0.51	72.36	-	NP	NP	SM	2.00	9.40	1.94	17.21	0.00

A total of 6 aggregate sample have been identified and collected from different crusher and quarries for the project corridor. Selection of the quarry would depend upon engineering properties, lead and quantity available. All samples have been tested for Aggregate Impact Value (AlV), with all of them fulfilling the stipulated requirement. Water absorption is found to be less than 2% for all samples. Summary of the test

results carried out on these samples are presented in the following tables whilst the complete details are presented as an Annexure-3 at the end of this report.

Table 21: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	Up/Dn	A.I.V	Water Absorption	Specific Gravity	Remarks
1	RK-AQ-1	14+700 (From Chutmalpur-Ganeshpur Pkg-I)	RHS	14.39	0.21	0.21	
2	RK-AQ-2	12+700 (From Chutmalpur-Ganeshpur Pkg-I)	RHS	15.26	0.20	0.20	
3	RK-AQ-3	0+000 (From Roorkee-Yamuna Nagar Pkg-1	RHS	14.62	0.26	0.26	
4	RK-AQ-4	0+000 (From Roorkee-Yamuna Nagar Pkg-1	RHS	14.13	0.23	0.23	
5	RK-AQ-5	86+100	RHS	13.03	0.4	0.4	
6	RK-AQ-6	86+100	RHS	9.9	0.28	0.28	

Table 22: 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
1	RK-SQ-1	83+550	LHS	100	99	99	98	94	59	11	1.4

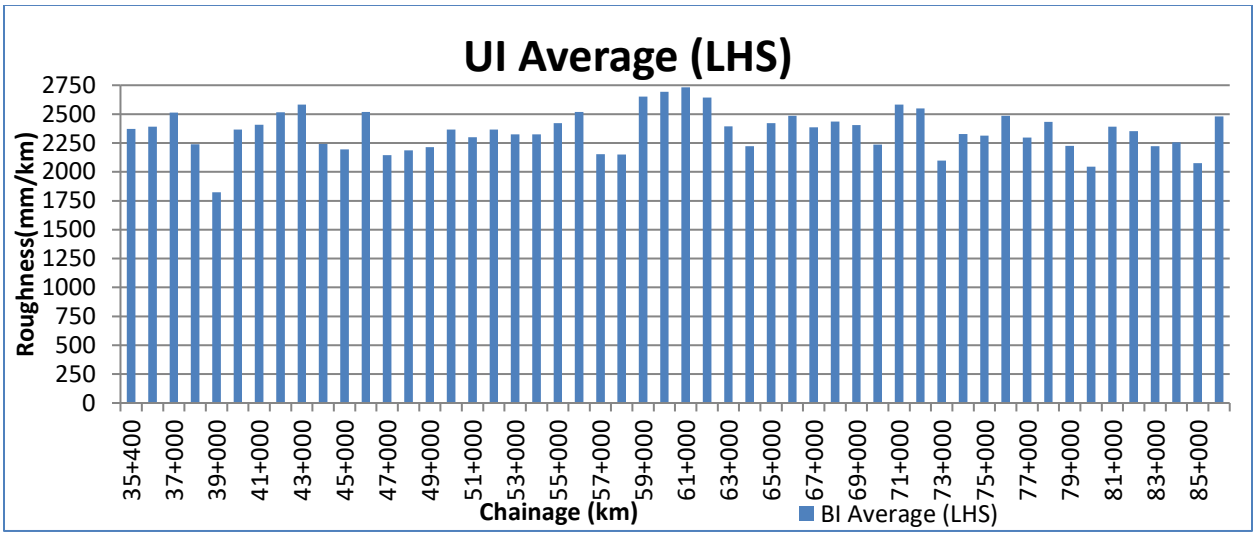
4.2 PAVEMENT CONDITION

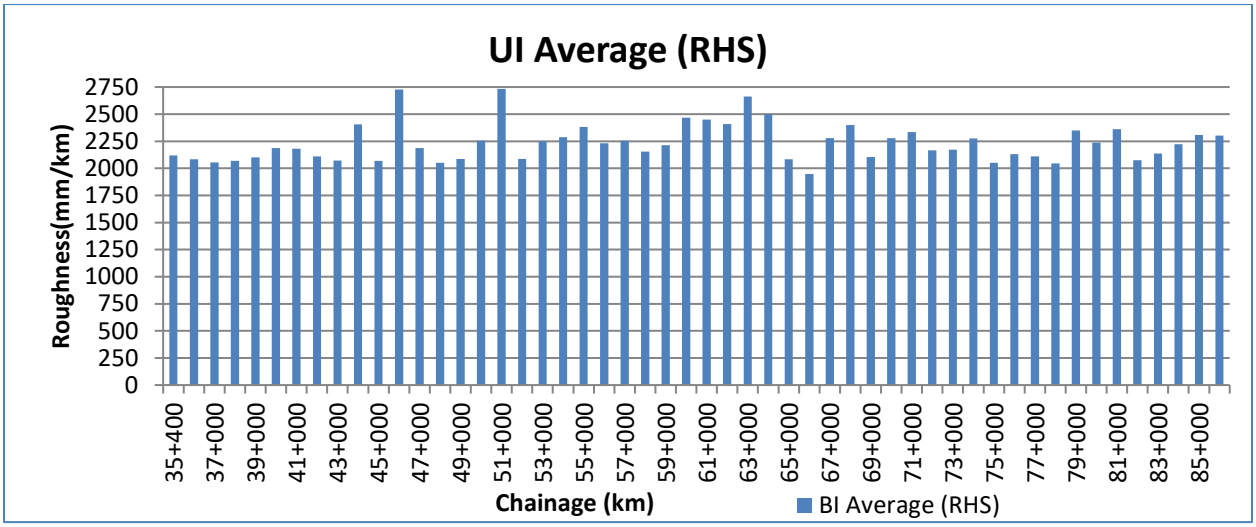
The distresses in rigid surface have been captured on the project corridor for each lane separately by visual. Pavement Condition report covering the data collection for each km length in each direction has been presented in the **Annexure-2**.

The project corridor has been provided with rigid pavement over entire length and flexible surface on service roads. Presently the surface appears to be intact without any major distresses. However, minor raveling and pop outs, settlement of panels and corner breaks are observed.

4.3 ROUGHNESS

Almost entire project road is having Good to Fair riding quality. From the above charts, overlay not required on LHS & RHS carriageway unevenness Index (UI) is less than 2750mm/km. bar diagrams showing the Kilometer wise roughness along the project road are presented below:



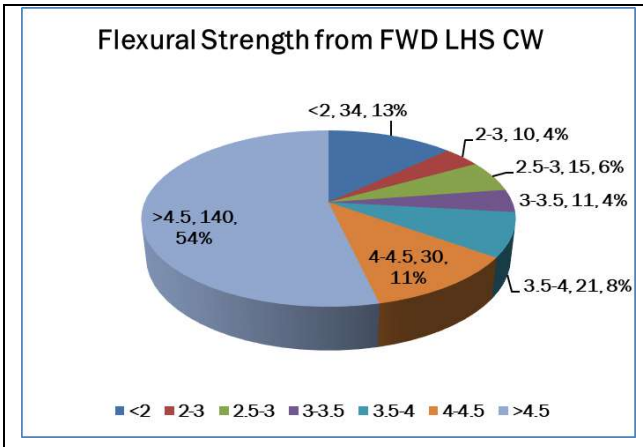


4.4 FWD ANALYSIS AND ASSESSMENT OF OVERLAY REQUIREMENT

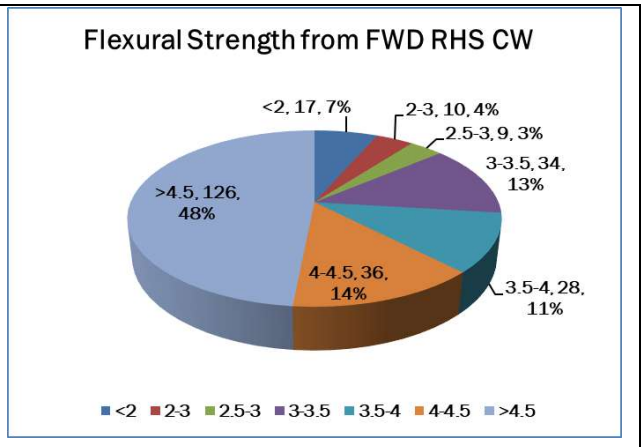
Pie charts showing the variation of the Flexural Strength estimated from FWD Surveys are presented below:

Table 23: FWD Data - Summary of Homogenous Section - LHS & RHS

Flexural strength (Mpa) CW		
Range	**LHS**	**RHS**
<2	34	17
2-3	10	10
2.5-3	15	9
3-3.5	11	34
3.5-4	21	28
4-4.5	30	36
>4.5	140	126
Total	261	260



GSY



GSY

Flexural Strength of the PQC estimated from FWD Surveys indicates that:

a) More than 54% of samples in LHS Carriageway and 48% of samples in RHS Carriageway are having values greater than 4.5 Mpa.

b) 11% of samples in LHS Carriageway and 14% of samples in RHS Carriageway are having values between 4 – 4.5 Mpa in NH-73.

c) 8% of samples in LHS Carriageway and 11% of samples in RHS Carriageway are having values between 3.5 – 4.0 Mpa in NH-73.

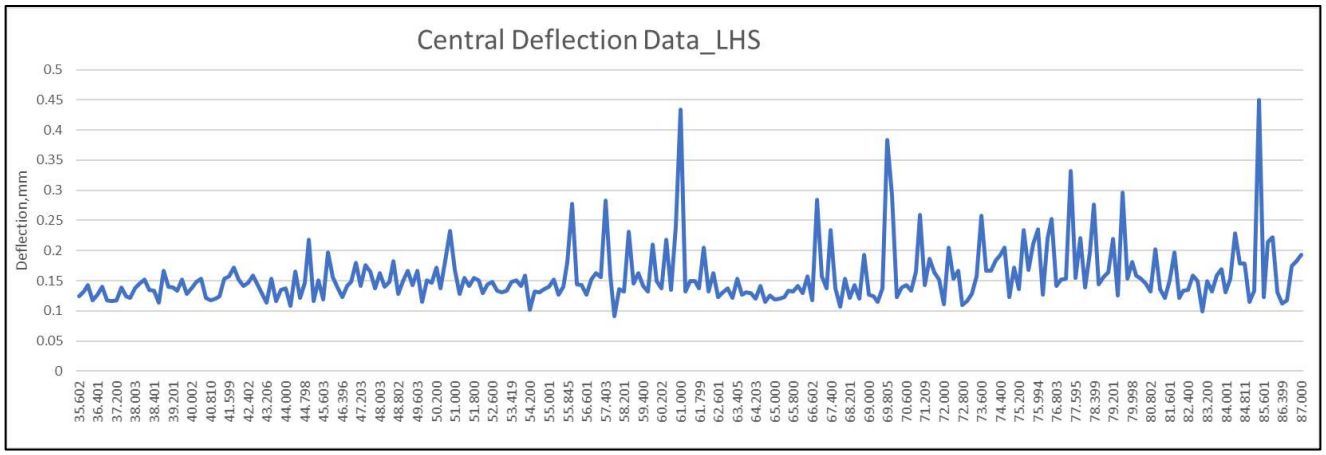
d) 4% of samples in LHS Carriageway and 13% of samples in RHS Carriageway are having values between 3 – 3.5 Mpa in NH-73

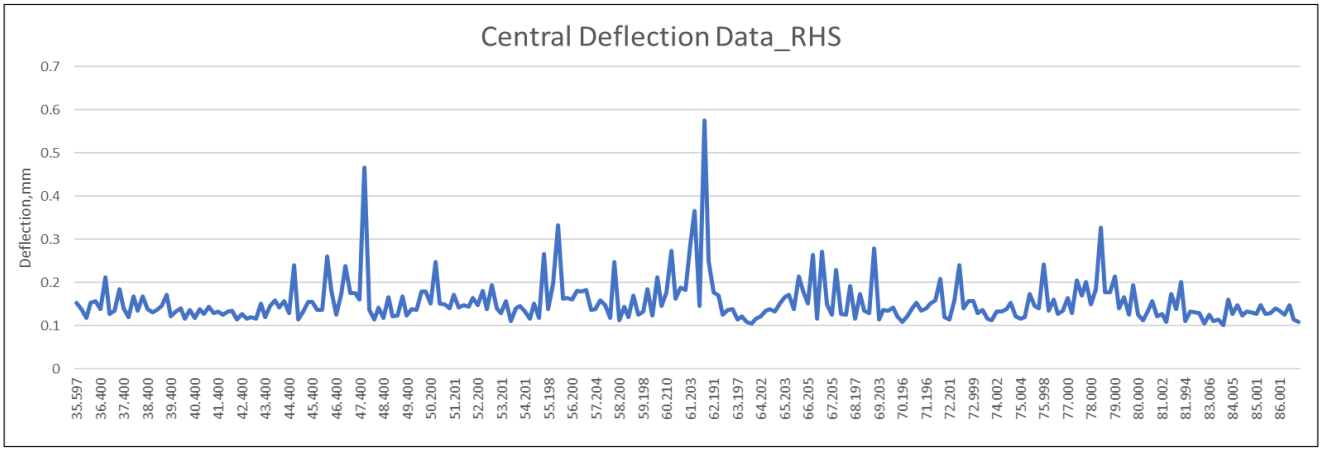
e) 23% of samples in LHS Carriageway and 14% of samples in RHS Carriageway are having values less than 3 Mpa in NH-73 .

The PQC pavement was constructed and opened to traffic in 2020. Initial design period for the PQC slab is 30 years out of which 2 years is already consumed.

4.4.1 Detection of Voids underneath the Rigid Pavement

- Deflection of Voids below a pavement slab can be easily be done by a FWD. Deflections are measured along the wheel path and a plot of central deflections versus distance has to be made.
- The locations where the deflections are much higher than the normal may indicate presence of voids. Sample is shown in below





FWD Survey results indicates that in few locations voids underneath the rigid pavement were observed at km60.6-km61.2 LHS, km69.6-km70.2 LHS, km77.2-km77.6 LHS, km85.2-km85.6 LHS, km47.4-km47.8 RHS, km61.6-km62.4 RHS on NH73 respectively.

4.5 PAVEMENT COMPOSITION

As per Sch-B Clause 4.8 the minimum thickness of the PQC should be 300mm and DLC should be 150mm

However, in Chapter 2, Table-5, the crust composition for the test pits dug in 11 locations along the main carriageway and 1 location in the service road reveal that there are no noticeable major discrepancies in terms of adopted crust thicknesses.

4.6 STRUCTURES

The structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, all structures appear new and seem to be in good condition without any major distress. Structure wise conditions along the project corridor are presented below:

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 24: Summary of Major Structures

S. No	Type of Str	No. of Str			Total No. of Str's	Total No. of Locations
		LHS	RHS	BHS		
1	ROB	3	3	0	6	3.00
2	MJB	3	3	0	6	3.00
3	MNB	10	10	0	20	9.00
4	Flyover	1	1	0	2	1.00
5	VUP	10	10	0	20	10.00
6	LVUP	10	10	0	20	10.00
7	CUP	8	8	0	16	8.00

Table 25: Details of ROB's

S.No.	Skew (Yes/No)	Chainage (Km)	Type of Structure	Side	Age of Str	Span Arrangement (m)	Total length (m)	Deck Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Foot path (Yes/No)	Type of Exp. Joints
										Abutment	Pier				
1	Yes	44+684	ROB	LHS	New	1 x 31.5 + 1 x 24.607 + 1 x 23.87 + 1 x 45 + 1 x 33.7 + 1 x 24.607 + 1 x 31.5	214.78	12.5	Not visible	RCC Circular with RE wall	RCC Circular type	PSC, RCC & Steel Girder	Elastomeric & Pot PTFE	Yes	Strip seal
2	Yes	44+684	ROB	RHS	New	1 x 31 + 1 x 24.607 + 1 x 23.87 + 1 x 45 + 1 x 19.9 + 1 x 24.607 + 1 x 31.5	200.48	12.5	Not visible	RCC Circular with RE wall	RCC Circular type	PSC, RCC & Steel Girder	Elastomeric & Pot PTFE	Yes	Strip seal
3	No	49+457	ROB	LHS	New	14 x 40	560.00	12.5	Not visible	RCC Circular with RE wall	RCC Circular type	PSC & Steel Girder	Elastomeric & Pot PTFE	Yes	Strip seal
4	No	49+457	ROB	RHS	New	14 x 40	560.00	12.5	Not visible	RCC Circular with RE wall	RCC Circular type	PSC & Steel Girder	Elastomeric & Pot PTFE	Yes	Strip seal
5	No	58+935	ROB	LHS	New	2 x 32 + 4 x 36 + 5 x 40 + 1 x 52	460.00	12.5	Not visible	RCC Circular with RE wall	RCC Circular type	PSC & Bow String Girder	POT PTFE	Yes	Strip seal
6	No	58+935	ROB	RHS	New	2 x 32 + 4 x 36 + 5 x 40 + 1 x 52	460.00	12.5	Not visible	RCC Circular with RE wall	RCC Circular type	PSC & Bow String Girder	POT PTFE	Yes	Strip seal

Table 26: Details of Major Bridge's

S. No.	Skew (Yes/No)	Chainage (Km)	Type of Structure	Side	Stron	Age of Str	Span Arrangement (m)	Total length (m)	Deck Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Foot path (Yes/No)	Type of Exp. Joints
											Abutment	Pier				
1	No	51+589	MJB	LHS	MCW	New	6 x 36.7	220.20	12.5	Not visible	RCC Wall type	RCC Circular type	PSC Girder	Pot PTFE	Yes	Strip Seal
2	No	51+589	MJB	RHS	MCW	New	6 x 36.7	220.20	12.5	Not visible	RCC Wall type	RCC Circular type	PSC Girder	Pot PTFE	Yes	Strip Seal
3	No	63+070	MJB	LHS	MCW	New	2 x 40	80.00	12.5	Not visible	RCC Circular with RE wall	RCC Circular type	PSC Girder	Pot PTFE	Yes	Strip Seal
4	No	63+070	MJB	RHS	MCW	New	2 x 40	80.00	12.5	Not visible	RCC Circular with RE wall	RCC Circular type	PSC Girder	Pot PTFE	Yes	Strip Seal
5	No	85+849	MJB	LHS	MCW	New	16 x 30	480.00	12.5	Well foundation	RCC Wall type	RCC Circular type	PSC Girder	Pot PTFE & Elastomeric	Yes	Strip Seal
6	No	85+849	MJB	RHS	MCW	Old	16 x 30	480.00	12.5	Well foundation	RCC Wall type	RCC Circular type	PSC Box Girder	Pot PTFE	Yes	Double Strip Seal

Table 27: Details of Minor Bridge's

S. No.	Skew (Yes/No)	Chainage (Km)	Type of Structure	Side	Stron	Age of Str	Span Arrangement (m)	Total length (m)	Deck Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Foot path (Yes/No)	Type of Exp. Joints
											Abutment	Pier				
1	No	53+974	MNB	LHS	MCW	New	2 x 30	60.00	12.5	Not visible	RCC Wall type	RCC Circular	PSC Girder	POT PTFE	Yes	Strip Seal
2	No	53+974	MNB	RHS	MCW	New	2 x 30	60.00	12.5	Not visible	RCC Wall type	RCC Circular	PSC Girder	POT PTFE	Yes	Strip Seal
3	No	65+548	MNB	LHS	MCW	New	2 x 7.5	15.00	14	Not visible	RCC Box	-	RCC Box	-	No	
4	No	65+548	MNB	RHS	MCW	New	2 x 7.5	15.00	14	Not visible	RCC Box	-	RCC Box	-	No	

S. No.	Skew (Yes/ No)	Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Total length (m)	Deck Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Foot path (Yes/ No)	Type of Exp. Joints
											Abutment	Pier				
5	No	65+548	MNB	LHS	SR	New	1 x 6	6.00	8.5	Not visible	RCC Box	-	RCC Box	-	No	
6	Yes	67+604	MNB	LHS	MCW	New	1 x 15	15.00	14.5	Not visible	RCC Box	-	RCC Box	-	No	
7	Yes	67+604	MNB	RHS	MCW	New	1 x 15	15.00	14.5	Not visible	RCC Box	-	RCC Box	-	No	
8	Yes	69+954	MNB	LHS	MCW	New	1 x 15	15.00	12.5	Not visible	RCC Box	-	RCC Box	-	Yes	
9	No	69+954	MNB	RHS	MCW	New	1 x 15	15.00	12.5	Not visible	RCC Box	-	RCC Box	-	Yes	
10	Yes	74+194	MNB	LHS	MCW	New	1 x 10	10.00	12.5	Not visible	RCC Box	-	RCC Box	-	Yes	
11	Yes	74+194	MNB	RHS	MCW	New	1 x 10	10.00	12.5	Not visible	RCC Box	-	RCC Box	-	Yes	
12	No	79+320	MNB	LHS	MCW	New	1 x 15	15.00	13	Not visible	RCC Box	-	RCC Box	-	No	
13	No	79+320	MNB	RHS	MCW	New	1 x 15	15.00	13	Not visible	RCC Box	-	RCC Box	-	No	
14	No	80+599	MNB	LHS	MCW	New	2 x 16	32.00	12.5	Not visible	RCC Wall type	RCC Wall type	RCC T Girder	POT PTFE	Yes	
15	No	80+599	MNB	RHS	MCW	New	2 x 16	32.00	12.5	Not visible	RCC Wall type	RCC Wall type	RCC T Girder	POT PTFE	Yes	
16	Yes	37+492	MNB (IOCL)	LHS	MCW	New	1 x 8.25	8.25	15	Not visible	RCC Wall type	-	RCC Slab	-	No	-
17	Yes	37+493	MNB (IOCL)	RHS	MCW	New	1 x 8.25	8.25	15	Not visible	RCC Wall type	-	RCC Slab	-	No	-
18	Yes	75+110	MNB (IOCL)	LHS	MCW	New	1 x 8.25	8.25	11	Not visible	RCC Wall type		RCC Solid slab	-	No	
19	Yes	75+110	MNB (IOCL)	RHS	MCW	New	1 x 8.25	8.25	11	Not visible	RCC Wall type		RCC Solid slab	-	No	
20	Yes	75+110	MNB (IOCL)	RHS	SR	New	1 x 8.25	8.25	8.5	Not visible	RCC Wall type		RCC Solid slab	-	No	

Table 28: Details of Flyover's

S.No.	Skew (Yes/ No)	Chainage (Km)	Type of Structure	Side	Age of Str	Span Arrangement (m)	Total length (m)	Deck Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Footpath (Yes/ No)	Type of Exp. Joints
										Abutment	Pier				
1	Yes	41+844	Flyover	LHS	New	2 x 36.921	73.84	14.5	Not visible	RCC Circular with RE wall	RCC Circular type	PSC Girder	Elastomeric & Pot PTFE	Yes	Strip Seal
2	Yes	41+844	Flyover	RHS	New	2 x 36.921	73.84	14.5	Not visible	RCC Circular with RE wall	RCC Circular type	PSC Girder	Elastomeric & Pot PTFE	Yes	Strip Seal

Table 29: Details of VUP's

S.No.	Skew (Yes/ No)	Chainage (Km)	Type of Structure	Side	Age of Str	Span Arrangement (m)	Total length (m)	Deck Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Footpath (Yes/No)	Type of Exp. Joints
										Abutment	Pier				
1	No	37+875	VUP	BHS	New	1 x 12	13.30	2 x 14.5	Not visible	RCC Box	-	RCC Box	-	No	-
2	No	45+770	VUP	BHS	New	1 x 12	13.30	2 x 14.5	Not visible	RCC Box	-	RCC Box	-	No	-
3	No	52+820	VUP	BHS	New	1 x 12	13.30	2 x 14.5	Not visible	RCC Box	-	RCC Box	-	No	-
4	No	54+149	VUP	BHS	New	1 x 12	13.30	2 x 14.5	Not visible	RCC Box	-	RCC Box	-	No	-
5	No	55+825	VUP	BHS	New	1 x 12	13.30	2 x 14.5	Not visible	RCC Box	-	RCC Box	-	No	-
6	No	62+185	VUP	BHS	New	1 x 12	13.30	2 x 14.5	Not visible	RCC Box	-	RCC Box	-	No	-
7	Yes	66+484	VUP	BHS	New	1 x 27.214	27.21	2 x 14.5	Not visible	RCC Trestle type	-	PSC Girder	POT PTFE	No	Strip Seal
8	No	71+170	VUP	BHS	New	1 x 12	13.30	2 x 14.5	Not visible	RCC Box	-	RCC Box	-	No	-
9	Yes	75+856	VUP	BHS	New	1 x 29	29.00	2 x 14.5	Not visible	RCC Trestle type	-	PSC Girder	POT PTFE	No	Strip Seal
10	No	78+139	VUP	BHS	New	1 x 12	13.30	2 x 14.5	Not visible	RCC Box	-	RCC Box	-	No	-

Table 30: Details of LVUP's, CUP's

S.No.	Skew (Yes/No)	Chainage (Km)	Type of Structure	Side	Age of Str	Span Arrangement (m)	Total length (m)	Deck Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure
										Abutment	Pier	
1	No	41+129	LVUP	BHS	New	1 x 10.5	11.80	2 x 14.5	Not visible	RCC Box		
2	No	43+619	LVUP	BHS	New	1 x 10.5	11.80	2 x 14.5	Not visible	RCC Box		

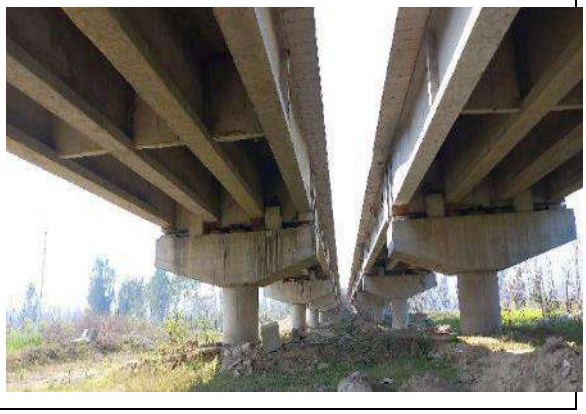
S.No.	Skew (Yes/No)	Chainage (Km)	Type of Structure	Side	Age of Str	Span Arrangement (m)	Total length (m)	Deck Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure
										Abutment	Pier	
3	No	48+065	LVUP	BHS	New	1 x 10.5	11.80	2 x 14.5	Not visible	RCC Box		
4	No	53+647	LVUP	BHS	New	1 x 10.5	11.80	2 x 14.5	Not visible	RCC Box		
5	No	54+985	LVUP	BHS	New	1 x 10.5	11.80	2 x 14.5	Not visible	RCC Box		
6	No	58+143	LVUP	BHS	New	1 x 10.5	11.80	2 x 14.5	Not visible	RCC Box		
7	No	65+047	LVUP	BHS	New	1 x 10.5	11.80	2 x 14.5	Not visible	RCC Box		
8	No	67+427	LVUP	BHS	New	1 x 10.5	11.80	2 x 14.5	Not visible	RCC Box		
9	No	77+519	LVUP	BHS	New	1 x 10.5	11.80	2 x 14.5	Not visible	RCC Box		
10	No	78+713	LVUP	BHS	New	1 x 10.5	11.80	2 x 14.5	Not visible	RCC Box		
1	No	38+876	CUP	BHS	New	1 x 8.5	9.50	2 x 14.5	Not visible	RCC Box		
2	Yes	44+450	CUP	BHS	New	1 x 8.5	9.80	35	Not visible	RCC Box		
3	No	46+614	CUP	BHS	New	1 x 8.5	9.50	2 x 14.5	Not visible	RCC Box		
4	No	57+074	CUP	BHS	New	1 x 8.5	9.50	2 x 14.5	Not visible	RCC Box		
5	Yes	59+207	CUP	BHS	New	1 x 4.53	5.73	2 x 14.5	Not visible	RCC Box		
6	No	60+730	CUP	BHS	New	1 x 8.5	9.50	2 x 14.5	Not visible	RCC Box		
7	Yes	69+416	CUP	BHS	New	1 x 8.5	9.70	2 x 14.5	Not visible	RCC Box		
8	No	72+809	CUP	BHS	New	1 x 8.5	9.50	2 x 14.5	Not visible	RCC Box		

Chainage: 51+589
General Description
LHS

- Type of Structure : MJB
- Span Arrangement : 6 x 36.7 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type Abutment & RCC Circular type Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Rubber sealant damaged on Pier 2 & remaining filled with silt & debris
- ✓ Drainage spout clogged at some locations
- ✓ Segregation observed on Cross Girders at some locations
- ✓ Structure condition fair



Chainage: 51+589
General Description
RHS

- Type of Structure : MJB
- Span Arrangement : 6 x 36.7 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type Abutment & RCC Circular type Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Rubber sealant damaged on Pier 3 & remaining filled with silt & debris
- ✓ Drainage spout clogged at some locations
- ✓ Segregation observed on the soffit of the girder on Span 6 (2nd Girder at the middle)
- ✓ Structure condition fair

Chainage: 63+070
General Description
LHS

- Type of Structure : MJB
- Span Arrangement : 2 x 40 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : PSC Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joints partially filled with silt & debris
- ✓ Drainage spout clogged at some location
- ✓ Structure condition fair

Chainage: 63+070
General Description
RHS

- Type of Structure : MJB
- Span Arrangement : 2 x 40 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : PSC Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joints partially filled with silt & debris
- ✓ Drainage spout clogged at some location
- ✓ Structure condition fair

Chainage: 85+849
General Description
LHS

- Type of Structure : MJB
- Span Arrangement : 16 x 30 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Well Foundation
- Type of Substructure : RCC Wall type & RCC Circular type
- Type of Superstructure : PSC Girder
- Type of Bearing : POT PTFE & Elastomeric
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joint filled with silt & debris
- ✓ Rubber sealant damaged on Pier 7 & 13
- ✓ Reinforcement exposed on pedestal at pier cap 8, below girder 4.
- ✓ Segregation observed on soffit of the girders in Span 8&14
- ✓ Structure condition fair

Chainage: 85+849
General Description
RHS OLD

- Type of Structure : MJB
- Span Arrangement : 16 x 30 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Well Foundation
- Type of Substructure : RCC Wall type & RCC Circular type
- Type of Superstructure : PSC Box Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joint filled with silt & debris
- ✓ Rubber sealant damaged on A1 & A2
- ✓ Minor spalling observed on soffit of box girder in Span 9,13&14
- ✓ Hand railing partially damaged
- ✓ Structure condition fair

Chainage: 44+684
General Description
LHS

- Type of Structure : ROB
- Span Arrangement : 1 x 31.5 + 1 x 24.607 + 1 x 23.87 + 1 x 45 + 1 x 33.7 + 1 x 24.607 + 1 x 31.5 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : PSC, RCC & Steel Girder
- Type of Bearing : POT PTFE & Elastomeric
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joint partially filled with silt & debris
- ✓ Railway adjacent spans are only in skew
- ✓ Structure condition fair

Chainage: 44+684
General Description
RHS

- Type of Structure : ROB
- Span Arrangement : 1 x 31.5 + 1 x 24.607 + 1 x 23.87 + 1 x 45 + 1 x 19.9 + 1 x 24.607 + 1 x 31.5m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : PSC, RCC & Steel Girder
- Type of Bearing : POT PTFE & Elastomeric
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joint partially filled with silt & debris
- ✓ RE panels bulging observed on A2
- ✓ Structure condition fair

Chainage: 49+457
General Description
LHS

- Type of Structure : ROB
- Span Arrangement : 14 x 40 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : PSC & Steel Girder
- Type of Bearing : Elastomeric & POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joint partially filled with silt & debris
- ✓ Drainage spout clogged at some locations
- ✓ Honey comb & Reinforcement exposed on 10th span on 3rd Girder soffit
- ✓ Structure condition fair

Chainage: 49+457
General Description
RHS

- Type of Structure : ROB
- Span Arrangement : 14 x 40 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : PSC & Steel Girder
- Type of Bearing : Elastomeric & POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Rubber sealant damaged on Pier 5 & remaining filled with silt & debris
- ✓ Drainage spout clogged at some locations
- ✓ Segregation observed on bottom of Pier cap on Pier 8
- ✓ Structure condition fair

Chainage: 58+935
General Description
LHS

- Type of Structure : ROB
- Span Arrangement : 2 x 32 + 4 x 36 + 5 x 40 + 1 x 52 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : PSC & Bow string Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Rubber sealant damaged on P3 & P6, remaining filled with silt & debris
- ✓ Drainage spout clogged at some location
- ✓ Approach slab bottom reinforcement exposed & spalling observed
- ✓ Crack on RE wall at A2 side median location
- ✓ RE wall bulging on A2 approach slab

Chainage: 58+935
General Description
RHS

- Type of Structure : ROB
- Span Arrangement : 2 x 32 + 4 x 36 + 5 x 40 + 1 x 52 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : PSC & Bow string Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Rubber sealant damaged on P6, remaining filled with silt & debris
- ✓ Settlement observed on approach on A2
- ✓ Crack observed on friction slab crash barrier & RE wall
- ✓ Reinforcement exposed on soffit of 2nd girder on pier 7
- ✓ RE wall bulging on abutment A2
- ✓ Crack observed on the approach slab bottom

Chainage: 41+844
General Description
LHS

- Type of Structure : Flyover
- Span Arrangement : 2 x 36.921 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : PSC Girder
- Type of Bearing : Elastomeric & POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joint partially filled with silt & debris
- ✓ Unevenness in RE panels observed on approach
- ✓ Previous repair works are done on approach RE panels
- ✓ Structure condition fair

Chainage: 41+844
General Description
RHS

- Type of Structure : Flyover
- Span Arrangement : 2 x 36.921 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Circular type
- Type of Superstructure : PSC Girder
- Type of Bearing : Elastomeric & POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joint partially filled with silt & debris
- ✓ Unevenness in RE panels observed on approach
- ✓ Crack observed on crash barrier at the bottom of the approach on A2
- ✓ Previous repair works are done on approach RE panels
- ✓ Structure condition fair

Chainage: 37+492
General Description
LHS

- Type of Structure : MNB (IOCL)
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 15 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid slab
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant Pitching partially damaged
- ✓ Structure condition fair

Chainage: 37+492
General Description
RHS

- Type of Structure : MNB (IOCL)
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 15 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid slab
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 53+974
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 2 x 30 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type Abutment & RCC Circular type Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant pitching partially damaged on A1
- ✓ Expansion joint filled with silt & debris
- ✓ Drainage spout clogged at some location
- ✓ Structure condition fair

Chainage: 53+974
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 2 x 30 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type Abutment & RCC Circular type Pier
- Type of Superstructure : PSC Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Crash barrier & Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Quadrant pitching partially damaged on A2
- ✓ Expansion joint filled with silt & debris
- ✓ Drainage spout clogged at some location
- ✓ Structure condition fair

Chainage: 65+548
General Description
LHS - MCW

- Type of Structure : MNB
- Span Arrangement : 2 x 7.5 m
- Total deck width of structure : 14 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good

Chainage: 65+548
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 2 x 7.5 m
- Total deck width of structure : 14 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good

Chainage: 65+548
General Description
LHS - SR

- Type of Structure : MNB
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 8.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Structure condition good
- Canal bridge

Chainage: 67+604
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 1 x 15 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- Cracks observed on soffit of the deck slab
- Structure condition fair

Chainage: 67+604
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 1 x 15 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

✓ Structure condition fair

Chainage: 69+954
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 1 x 15 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓ Structure condition fair

Chainage: 69+954
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 1 x 15 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓ Quadrant pitching partially damaged on A2
- ✓ Structure condition fair

Chainage: 74+194
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 1 x 10 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab
- ✓ Structure condition fair

Chainage: 74+194
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 1 x 10 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab
- ✓ Structure condition fair

Chainage: 75+110
General Description
LHS

- Type of Structure : MNB (IOCL)
- Span Arrangement : 1 x 8.25 m
- Total deck width of structure : 11 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid slab
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good

Chainage: 75+110
General Description
RHS - MCW

- Type of Structure : MNB (IOCL)
- Span Arrangement : 1 x 8.25 m
- Total deck width of structure : 11 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid slab
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good

Chainage: 75+110
General Description
RHS - SR

- Type of Structure : MNB (IOCL)
- Span Arrangement : 1 x 8.25 m
- Total deck width of structure : 8.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid slab
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good

Chainage: 79+320

General Description

LHS

- Type of Structure : MNB
- Span Arrangement : 1 x 15 m
- Total deck width of structure : 13 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair

Chainage: 79+320
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 1 x 15 m
- Total deck width of structure : 13 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair

Chainage: 80+599
General Description
LHS

- Type of Structure : MNB
- Span Arrangement : 2 x 16 m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC T Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ .Expansion joint filled with silt & debris
- ✓ Down take pipe not provided for drainage spout
- ✓ Structure condition fair

Chainage: 80+599
General Description
RHS

- Type of Structure : MNB
- Span Arrangement : 2 x 16m
- Total deck width of structure : 12.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC T Girder
- Type of Bearing : POT PTFE
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joint filled with silt & debris
- ✓ Drainage spout clogged at some location & down take pipes not provided
- ✓ Minor damages on bottom of the girder in span 1
- ✓ Crack observed on Abutment 2

Chainage: 37+875
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good

Chainage: 37+875
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair

Chainage: 45+770
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Minor cracks on A2 abutment wall
- ✓ Structure condition fair

Chainage: 45+770
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓ Structure condition fair

Chainage: 52+820
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on abutment wall
- ✓ Structure condition fair

Chainage: 52+820
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on abutment wall
- ✓ Structure condition fair

Chainage: 54+149
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Segregation on A2 wall
- ✓ Structure condition fair

Chainage: 54+149
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 55+825
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 55+825
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓ RE wall bulging observed on A2 wall back side
- ✓ Structure condition fair

Chainage: 62+185
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 62+185
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Approach damaged on A2
- ✓ RE wall bulging on A1 approach
- ✓ Cracks observed on Abutment walls & Crash barrier A1 Bottom damage

Chainage: 66+484
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 27.214 m
- Total deck width of structure : 14.5 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:

- ✓ Rubber sealant damaged on A2 & filled with silt & debris
- ✓ Previous repair works done on RE walls
- ✓ Structure condition fair

Chainage: 66+484
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 27.214 m
- Total deck width of structure : 14.5 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:

- ✓ Rubber sealant damaged on A2 & filled with silt & debris
- ✓ Previous repair work done on RE walls
- ✓ Structure condition fair

Chainage: 71+170
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & A2 abutment wall
- ✓ Cracks observed on friction slab crash barrier bottom and continued on RE wall
- ✓ Structure condition fair

Chainage: 71+170
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

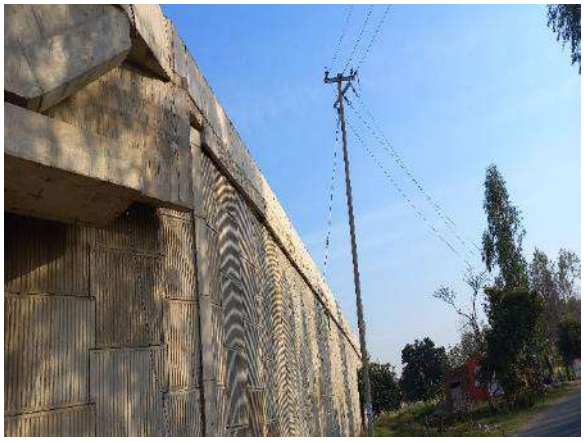
- ✓ Cracks observed on soffit of deck slab & A2 abutment wall
- ✓ Crack on RE wall approach on A2 side
- ✓ Structure condition fair

Chainage: 75+856
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 29 m
- Total deck width of structure : 14.5 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:

- ✓ Expansion joint partially filled with silt & debris
- ✓ Minor damages on LHS A1 median side crash barrier
- ✓ Structure condition fair



Chainage: 75+856
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 29 m
- Total deck width of structure : 14.5 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:

- ✓ Expansion joint partially filled with silt & debris
- ✓ Structure condition fair

Chainage: 78+139
General Description
LHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 78+139
General Description
RHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 41+129
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓ Structure condition fair

Chainage: 41+129
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓ Structure condition fair

Chainage: 43+619
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓ Structure condition fair

Chainage: 43+619
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓ Structure condition fair

Chainage: 48+065
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on abutment wall
- ✓ Structure condition fair

Chainage: 48+065
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on abutment wall
- ✓ Structure condition fair

Chainage: 53+647
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 53+647
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 54+985
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on abutment wall
- ✓ Structure condition fair

Chainage: 54+985
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 58+143
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Crack on RE wall on A1 Slab approach
- ✓ Structure condition fair

Chainage: 58+143
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 65+047
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Top slab edge damaged
- ✓ Structure condition fair

Chainage: 65+047
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 67+427
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on abutment wall
- ✓ Minor spalling & reinforcement exposed on median wall
- ✓
- ✓ Structure condition fair

Chainage: 67+427
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓
- ✓ Structure condition fair

Chainage: 77+519
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab
- ✓ Structure condition fair

Chainage: 77+519
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 78+713
General Description
LHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on A2 abutment wall
- ✓
- ✓ Structure condition fair

Chainage: 78+713
General Description
RHS

- Type of Structure : LVUP
- Span Arrangement : 1 x 10.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual
- **Observations**

Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓
- ✓ Structure condition fair

Chainage: 38+876
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair

Chainage: 38+876
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair

Chainage: 44+450
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 17.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓
- ✓ Structure condition fair

Chainage: 44+450
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 17.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓
- ✓ Structure condition fair

Chainage: 46+614
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 46+614
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 57+074
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ RE wall crack on A1 approach
- ✓ Structure condition fair

Chainage: 57+074
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 59+207
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 4.53 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation on soffit of the deck slab
- ✓ Previous repair works done on RE walls
- ✓ Structure condition fair

Chainage: 59+207
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 4.53 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation on soffit of the deck slab
- ✓ Previous repair works done on RE walls
- ✓ Structure condition fair

Chainage: 60+730
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 60+730
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on abutment wall
- ✓ Structure condition fair

Chainage: 69+416
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓
- ✓ Structure condition fair

Chainage: 69+416
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & abutment wall
- ✓ Structure condition fair

Chainage: 72+809
General Description
LHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of the deck slab
- ✓ Segregation observed on outside of crash barrier at the bottom
- ✓ Structure condition fair

Chainage: 72+809
General Description
RHS

- Type of Structure : CUP
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 14.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on soffit of deck slab & A2 abutment wall
- ✓ Structure condition fair

Details of Culverts

S No.	Skew	Structure type as per site	P&P Chainage	Chainage as per site	Span as per P&P	Span as per site	Vertical Clearance (m)	Deck Width (m) As per Site	Floor Protection (Yes/No)	Quadrant Stone Pitching (Yes/No)		Observations
										LHS	RHS	
1	No	PC	35+496	35+496	1x1.2	1x1.2	1.2	32.50	NV	NV	NV	> Pipe connected to drains
2	No	PC	36+710	36+710	1x1.2	1x1.2	1.2	27.00	NV	Wing Wall	Wing Wall	> Partially buried with silt & debris on LHS > Vegetation observed on Wing Walls
3	No	PC	37+110	37+110	1x1.2	1x1.2	1.2	27.00	NV	Wing Wall	Wing Wall	> Vegetation observed on Wing Walls > Culvert condition fair
4	Yes	BC	37+510	37+510	1x1.2	1 x 6	2	27.50	NV	No	Yes	> No protection on LHS > Soil erodes at A1&A2 on LHS > Culvert condition fair
5	No	PC	38+235	38+235	1x1.2	1x1.2	1.2	37.50	NV	Wing Wall	Wing Wall	> Vegetation observed on BHS > Culvert condition fair
6	No	PC	38560	38+560	1x1.2	1x1.2	1.2	37.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
7	No	PC	39+280	39+280	1x1.2	1x1.2	1.2	27.50	NV	Wing Wall	Wing Wall	> No head wall provided > Minor damages on pipe on RHS > Culvert condition fair
8	No	PC	39650	39+650	1x1.2	1x1.2	1.2	27.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
9	No	PC	40+020	40+020	1x1.2	1x1.2	1.2	27.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
10	No	PC	40+390	40+150	1x1.2	1x1.2	1.2	27.50	NV	Wing Wall	Wing Wall	> No head wall provided > Reinforcement exposed on the pipe on LHS > Culvert condition fair
11	No	PC	40+760	40+760	1x1.2	1x1.2	1.2	27.50	NV	Wing Wall	Wing Wall	> Partially buried with silt & debris on RHS > Culvert condition fair
12	No	PC	41+480	41+100	1x1.2	1x1.2	1.2	52.50	NV	Wing Wall	Wing Wall	> Culvert condition fair
13	No	PC	42+530	42+530	1x1.2	1x1.2	1.2	28.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
14	No	PC	42+900	42+900	1x1.2	1x1.2	1.2	31.50	NV	Wing Wall	Wing Wall	> Vegetation on LHS wing wall > Culvert condition fair
15	No	PC	43+270	43+270	1x1.2	1x1.2	1.2	35.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair

S No.	Skew	Structure type as per site	P&P Chainage	Chainage as per site	Span as per P&P	Span as per site	Vertical Clearance (m)	Deck Width (m) As per Site	Floor Protection (Yes/No)	Quadrant Stone Pitching (Yes/No)		Observations
										LHS	RHS	
16	No	PC	43+980	43+980	1x1.2	1x1.2	1.2	40.00	NV	Wing Wall	Wing Wall	> No head wall provided > Service Road provided on RHS > Culvert condition fair
17	No	PC	44+310	44+310	1x1.2	1x1.2	1.2	40.00	NV	-	-	> Culvert not found > Approach of underpass & ROB
18	No	PC	45+150	45+150	1x1.2	1x1.2	1.2	40.00	NV	-	-	> Culvert not found > Location ROB approach end
19	No	PC	45+450	45+450	1x1.2	1x1.2	1.2	36.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
20	No	PC	46+070	46+070	1x1.2	1x1.2	1.2	61.00	NV	No	Wing Wall	> No head wall provided at LHS > Culvert condition fair
21	No	PC	46+370	46+370	1x1.2	1x1.2	1.2	60.50	NV	Wing Wall	Wing Wall	> No head wall provided > Service Road provided on BHS > Culvert condition fair
22	No	PC	47+030	47+030	1x1.2	1x1.2	1.2	35.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
23	No	PC	47+380	47+380	1x1.2	1x1.2	1.2	32.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
24	No	PC	47+730	47+730	1x1.2	1x1.2	1.2	32.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
25	No	PC	48+500	48+500	1x1.2	1x1.2	1.2	30.00	NV	Wing Wall	Wing Wall	> No head wall provided > Partially buried on LHS > Culvert condition fair
26	No	PC	48+890	48+890	1x1.2	1x1.2	1.2	27.50	NV	-	-	> Culvert not found > Location ROB approach starts, Service Road available
27	No	PC	49+990	49+990	1x1.2	1x1.2	1.2	27.50	NV	-	-	> Culvert not found > Location ROB approach end, Service Road available
28	No	BC	50+431	50+530	1x5	1x5	2	36.00	Yes	Wing Wall	Wing Wall	> Culvert condition fair
29	No	PC	50+800	50+800	1x1.2	1x1.2	1.2	30.00	NV	Wing Wall	Wing Wall	> No head wall provided > Vegetation on wing wall on BHS > Culvert condition fair
30	No	PC	51+100	51+100	1x1.2	1x1.2	1.2	30.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair

S No.	Skew	Structure type as per site	P&P Chainage	Chainage as per site	Span as per P&P	Span as per site	Vertical Clearance (m)	Deck Width (m) As per Site	Floor Protection (Yes/No)	Quadrant Stone Pitching (Yes/No)		Observations
										LHS	RHS	
31	No	PC	52+120	52+120	1x1.2	1x1.2	1.2	30.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
32	No	PC	52+490	52+490	1x1.2	1x1.2	1.2	47.50	NV	Wing Wall	Wing Wall	> No head wall provided > 1.5m pipe extra widened on RHS > Culvert condition fair
33	No	PC	53+260	53+260	1x1.2	1x1.2	1.2	50.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
34	No	PC	54+610	54+610	1x1.2	1x1.2	1.2	50.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
35	Yes	SC	55+152	55+152	1x5	1x5	1.8	57.50	Yes	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
36	No	PC	55+520	55+520	1x1.2	1x1.2	1.2	47.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
37	No	BC		55+835		1x3	2	36.30	NV	Wing Wall	Wing Wall	> Culvert condition fair
38	No	SC	56+151	56+151	1x5	1x5	3	26.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
39	No	PC	56+450	56+450	1x1.2	1x1.2	1.2	50.50	NV	Wing Wall	Wing Wall	> No head wall provided > Extended on Service Road > Reinforcement exposed on RHS pipe > Culvert condition fair
40	No	PC	56+760	56+760	1x1.2	1x1.2	1.2	40.50	NV	Wing Wall	Wing Wall	> No head wall provided > Service Road not constructed > Culvert condition fair
41	No	PC	57+470	57+450	1x1.2	1x1.2	1.2	32.50	NV	Wing Wall	Wing Wall	> No head wall provided > LHS buried due to construction > Culvert condition fair
42	No	PC	57+820	57+820	1x1.2	1x1.2	1.2	30.00	NV	Wing Wall	Wing Wall	> No head wall provided > Service Road is available > Culvert condition fair
43	Yes	BC	58+190	58+190	1x2	1x2	2	45.00	NV	Wing Wall	Wing Wall	> Culvert condition fair
44	No	PC	59+510	59+510	1x1.2	1x1.2	1.2	27.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert not visible at RHS > Culvert condition fair

S No.	Skew	Structure type as per site	P&P Chainage	Chainage as per site	Span as per P&P	Span as per site	Vertical Clearance (m)	Deck Width (m) As per Site	Floor Protection (Yes/No)	Quadrant Stone Pitching (Yes/No)		Observations
										LHS	RHS	
45	No	BC		59+750		1x2.5	1.5	27.00	NV	Wing Wall	Wing Wall	> No head wall on LHS > Vegetation on Wing wall LHS > Culvert condition fair
46	No	PC	59+930	60+012	1x1.2	1x1.2	1.2	29.00	NV	Wing Wall	Wing Wall	> No head wall provided > Reinforcement exposed on the pipe on RHS > Culvert condition fair
47	No	PC	61+060	61+060	1x1.2	1x1.2	1.2	52.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert not visible on RHS > No Service Road at RHS > Culvert condition fair
48	Yes	BC	-	61+265	-	1x5	3	37.50	NV	Wing Wall	Wing Wall	> Service road on LHS > Culvert condition fair
49	No	PC	-	61+287	1x6	1x1.2	1.2	40.00	NV	-	-	> Not found at the site
50	No	PC	61+780	61+780	1x1.2	1x1.2	1.2	42.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert not visible on RHS > No Service Road at RHS > Culvert condition fair
51	No	PC	62+670	62+670	1x1.2	1x1.2	1.2	32.50	NV	Wing Wall	Wing Wall	> No head wall provided > Partially buried on RHS > Culvert condition fair
52	No	BC	-	63+425	1x6	1x4.3	1.5	35.00	NV	Wing Wall	Wing Wall	> No head wall provided > Soil erosion on RHS A2 > Culvert condition fair
53	No	SC	63+447	63+447	1x4	1x4	2	33.00	NV	-	-	> Culvert not found
54	No	PC	63+950	63+950	1x1.2	1x1.2	1.2	32.50	NV	Wing Wall	Wing Wall	> No head wall provided > Partially buried on RHS > Culvert condition fair
55	No	BC	64+347	64+347	1x6	1x6	2	26.00	NV	No	No	> No head wall provided > LHS A2 Ret wall provided > Culvert condition fair
56	No	PC	64+740	64+740	1x1.2	1x1.2	1.2	30.00	NV	Wing Wall	Wing Wall	> No head wall provided > Vegetation growth observed on BHS > Culvert condition fair

S No.	Skew	Structure type as per site	P&P Chainage	Chainage as per site	Span as per P&P	Span as per site	Vertical Clearance (m)	Deck Width (m) As per Site	Floor Protection (Yes/No)	Quadrant Stone Pitching (Yes/No)		Observations
										LHS	RHS	
57	No	PC	65+340	65+340	1x1.2	1x1.2	1.2	45.00	NV	NV	NV	> No head wall provided > Pipe partially buried at LHS > Culvert condition fair
58	No	BC	65+791	65+791	1x1.2	1x6	2	26.00	NV	No	No	> Culvert condition fair
59	No	PC	66+180	66+180	1x1.2	1x1.2	1.2	52.50	NV	-	-	> Culvert not found > Approach of VUP > Service Road at RHS
60	No	PC	66+835	66+835	1x1.2	1x1.2	1.2	61.50	NV	Wing Wall	Wing Wall	> No head wall provided > Service Road provided > Culvert condition fair
61	No	PC	67+140	67+140	1x1.2	1x1.2	1.2	40.00	NV	Wing Wall	Wing Wall	> No head wall provided > Vegetation observed on wing wall > Culvert condition fair
62	No	BC	67+767	67+767	1x4	1x4	2	26.00	NV	Wing Wall	Wing Wall	> Culvert condition fair
63	No	BC	-	69+516	-	1x2	2	34.00	NV	Wing Wall	Wing Wall	> Culvert condition fair
64	No	PC	70+250	70+250	1x1.2	1x1.2	1.2	30.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
65	No	PC	71+660	71+660	1x1.2	1x1.2	1.2	42.50	NV	No	Wing Wall	> No head wall provided > Service Road available at LHS > Culvert condition fair
66	No	PC	71+976	71+994	1x1.2	1x1.2	1.2	32.50	NV	No	Wing Wall	> No head wall provided > Service Road provided at LHS > Culvert condition fair
67	No	BC	72+276	72+276	1x5	1x5	1.5	36.00	NV	No	Wing Wall	> Service road provided at LHS > Culvert condition fair
68	No	PC	73+200	73+200	1x1.2	1x1.2	1.2	37.50	NV	Wing Wall	Wing Wall	> No head wall provided > Service Road available at LHS > Reinforcement exposed on pipe at LHS > Culvert condition fair
69	No	PC	73+540	73+540	1x1.2	1x1.2	1.2	37.50	NV	Wing Wall	Wing Wall	> No head wall provided > Service Road provided at LHS > Culvert condition fair
70	No	PC	73+880	73+880	1x1.2	1x1.2	1.2	35.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair

S No.	Skew	Structure type as per site	P&P Chainage	Chainage as per site	Span as per P&P	Span as per site	Vertical Clearance (m)	Deck Width (m) As per Site	Floor Protection (Yes/No)	Quadrant Stone Pitching (Yes/No)		Observations
										LHS	RHS	
71	No	SC	75+000	75+050	1x3.0	1x7	1.5	40.00	NV	No	No	> Service road at RHS > Culvert condition fair
72	No	PC	75+450	75+450	1x1.2	1x1.2	1.2	30.00	NV	-	-	> Culvert not found
73	No	PC	76+310	76+310	1x1.2	1x1.2	1.2	30.00	NV	-	-	> Culvert not found > Approach of VUP at end
74	No	PC	76+710	76+710	1x1.2	1x1.2	1.2	32.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
75	No	PC	77+110	77+110	1x1.2	1x1.2	1.2	40.00	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
76	No	PC	77+830	77+830	1x1.2	1x1.2	1.2	37.50	NV	Wing Wall	Wing Wall	> No head wall provided > Culvert condition fair
77	No	PC	78+440	78+500	1x1.2	1x1.2	1.2	47.50	NV	Wing Wall	Wing Wall	> No head wall provided > Vegetation on wing wall > Culvert condition fair
78	No	BC	-	79+250	-	1x3.5	2	38.00	NV	No	No	> No head wall provided > Silt & debris observed on LHS > Culvert condition fair
79	No	BC	79+494	79+494	1x3.5	1x3.5	1.8	26.00	NV	NV	No	> LHS closed with sheet > RHS no Head wall > Culvert condition fair
80	No	SC	81+290	81+290	1x3.5	1x3.5	2	26.00	NV	NV	NV	> Not visible due to embankment on BHS > Located near toll plaza location
81	No	BC	81+739	81+739	1x6.0	1x6.0	2.5	26.00	NV	Wing Wall	Wing Wall	> Culvert condition fair
82	No	PC	82+076	82+076	1x1.2	1x1.2	1.2	35.00	NV	Wing Wall	Wing Wall	> Vegetation observed on BHS > Segregation observed on wing walls > Culvert condition fair
83	No	PC	82+500	82+500	1x1.2	1x1.2	1.2	35	NV	Wing Wall	Wing Wall	> Partially buried with silt & debris > Culvert condition fair
84	No	PC	83+082	83+082	1x1.2	1x1.2	1.2	32.5	NV	No	No	> Pipe on Service Road LHS connected to drains > Culvert condition fair
85	No	PC	83+732	83+732	1x1.2	1x1.2	1.2	32.5	NV	No	Wing Wall	> Pipe on Service Road LHS connected to drains > Culvert condition fair
86	No	PC	84+280	84+280	1x1.2	1x1.2	1.2	32.50	NV	No	NV	> Pipe on Service Road LHS connected to drains > Pipe on RHS fully covered with bushes not visible

S No.	Skew	Structure type as per site	P&P Chainage	Chainage as per site	Span as per P&P	Span as per site	Vertical Clearance (m)	Deck Width (m) As per Site	Floor Protection (Yes/No)	Quadrant Stone Pitching (Yes/No)		Observations
										LHS	RHS	
87	No	PC	85+540	85+540	1x1.2	1x1.2	1.2	35	NV	NV	NV	> Culvert on Major bridge A1 side approach > High embankment not visible
88	No	PC	86+448	86+448	1x1.2	1x1.2	1.2	27.50	NV	NV	NV	> Culvert on Major bridge A2 side approach > High embankment not visible & Heavy bushes observed
89	No	PC	86+848	86+848	1x1.2	1x1.2	1.2	30	NV	NV	NV	> Both sides fully covered with bushes & vegetation > Not visible

✓ Photos depicting the existing culvert are presented below Photos of Pipe Culvert

Pipe Culvert at Km 36+710

Pipe Culvert at Km 37+110

Pipe Culvert at Km 40+390

Pipe Culvert at Km 43+980

Pipe Culvert at Km 47+730

Pipe Culvert at Km 41+480

Pipe Culvert at Km 45+450

Pipe Culvert at Km 70+250

Pipe Culvert at Km 82+076	**Pipe Culvert at Km 83+732**
Pipe Culvert at Km 86+448	**Pipe Culvert at Km 86+848**

Photos of Box\Slab Culverts

Box Culvert at Km 37+510	**Slab Culvert at Km 55+152**

Box Culvert at Km 59+750	Slab Culvert at Km 75+000
Box Culvert at Km 79+494	Slab Culvert at Km 81+739

4.7 DRAINAGE AND SLOPE PROTECTION

- ✓ Lined Covered drains observed at Service Road Separator and service road Locations along the corridor.

4.8 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.
- ✓ Pedestrian guard rails installed at Service Road separator locations appear to be in good condition

Traffic blinkers established in some locations and street lighting and high mast lighting are all functioning well. At few locations the solar blinkers, street lightings are got damaged and not functioning well, those locations are mentioned in the above presented table

4.9 ROAD USER FACILITIES

The Bus Shelter, provided along the corridor appear to be good condition.

CHAPTER 5. REHABILITATION PLANS AND DESIGNS

5.1 DESIGN TRAFFIC LOADING

Design Traffic loading has been estimated by considering the latest traffic (given) and VDFs as estimated from the latest axle load survey data and with 5% growth rates for 10 years, 15 years and 20 years design period as below:

Table 31: Traffic Volume (AADT)

TP 1	81+300	Growth Rate
Bus	395	5.00%
LCV	775	5.00%
Truck / 2A	1410	5.00%
3A	1553	5.00%
MAV	1093	5.00%

50:50 directional distributions are considered

Table 32: Estimated Design traffic loading

Year	5% Growth rates	
	km 81+300 UP	km 81+300 DN
10th year from Now	35	36
15th year from Now	61	61
20th year from Now	93	94

The computation of traffic loadings is presented in **Appendix 8** of this Report. Design traffic corresponding to 10 years period has been considered for overlay design.

5.2 PAVEMENT REHABILITATION AND STRENGTHENING

5.2.1 Rigid Pavement Strengthening

Based on the FWD survey and their results it appears that the majority of the flexural strength values ranges from 3.0 to more than 4.5 Mpa. The rigid pavement design period has been checked with various flexural strength values by considering the existing PQC & DLC thickness.

Number of axle load repetitions for each year of operation is estimated and cumulated for entire operation period of 30 years from now. Using IRC 58-2015 design charts, stress ratios corresponding each Flexural strength values ranging from 2.75-4.5 have been estimated and number repetitions that existing pavement serves is also established.

The summary of the Design period satisfies for various flexural strength values as given below:

Flexural Strength	Existing Rigid Pavement Thickness satisfies to the design period in Years	
	Km 81+300	
Side	LHS	RHS
2.75	Immediate	Immediate
3.0	3 Years	4 Year
3.5	27 Years	30 Years
4.0	30 Years	30 Years
4.5	30 Years	30 Years

From the FWD data analysis it is found that on NH-73, nearly 73% of samples in on LHS & 73% sample in RHS were having flexural strength values more than 3.5. These are considered to be fair condition and requires minimal maintenance. Similarly, flexural strength values less than 3.5mpa were considered to be average to poor condition and are estimated nearly 27% of samples in on LHS & 27% sample in RHS of project road may require major rehabilitation measures during operation period. Thus, the same has been considered in cost estimates apart from routine and periodic maintenance of rigid pavement.

5.3 STRUCTURAL REHABILITATION

All the structure found to be in good condition except little minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- Repair/ Replacement of Existing Bearings
- Repair / Replacement of Existing Expansion Joints
- Repair / Replacement of Existing Wearing Coat
- Profile Correction for Existing Deck Slab by Cement Concrete
- Sealing of Cracks for Bridges by Epoxy Resin
- Replacement of Spalled Concrete of ECW by Epoxy Mortar
- Cement Grouting for Repair of Existing Bridges
- Guniting / Shotcreting for Repair of Existing Bridges
- Providing & Fixing of Drainage Spouts
- Repair of Substructure Component
- Repair / Replacement of Railing & Crash Barrier
- Epoxy Bonding between New and Old Concrete.

CHAPTER 6. OPERATION AND MAINTENANCE

Looking at the contractual requirements of maintaining project road under specified level of roughness it is felt that roughness is the most important criterion for finalizing the O&M schedule for the project. Accordingly, the methodology adopted by present consultants includes predicting the roughness year by year under the traffic using a well acknowledged HDH-4 model developed for developing countries like India after lot of research by World Bank. The said model is widely prescribed by MORTH and NHAI during the preparation of detailed project reports for several projects in doing economic analysis for the projects. The economic analysis mainly consists of two parts:

1. Predicting the road deterioration and estimating VOC
2. Estimating Benefits

Considering its importance and present use in India, consultants felt prudent to use the first part, i.e., estimating road deterioration and predicting roughness in HDM 4 model to finalize the O&M schedule for the project. This approach is more scientific as it does not assume hypothetical deflection values at 10th and 20th year and includes main criterion of maintaining roughness at 2750mm/Km as per Schedule K.

6.1 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

- Schedule K of CA species that Roughness values exceeds 2750mm/km in a length of KM, needs to be corrected within 180 days.
- Deflection (BBD) values exceeding 1.2mm shall be strengthened. These tests are to be performed in every 5-year period.

6.2 RIGID PAVEMENT PERIODIC MAINTENANCE STRATEGY

Apart from the above requirements of Sch-F and maintaining the roughness and skid number for the rigid pavements, there are several other repair strategies included in Sch-K for rectification of defects in rigid pavement. These include following:

- Crack Seal
- Seal & Stitch
- Staple or Dowel Bar Retrofit
- Partial Depth Repair with Stapling
- Full Depth Repair: Dismantle and reconstruct affected Portion
- Diamond Grinding
- Joint Cleaning & Repair

Looking at the above requirements, it is felt necessary to consider following activities as part of periodic maintenance cycle at every 6 years apart from routine maintenance activities:

Description	%	Unit	Rate	Quantity	Amount
Length of Rigid Pavement		Kms		102.910	
PQC Qty		Cum		330117	
Total Area		Sqm		1166580	
No of Transverse Joints		no		28804	
No of Panels		no		59255	
Length of Transverse Joints		m		259240	
Longitudinal Joint		m		311088	
Repair of Transverse Joint @ 7 years	75.0%	m	107.00	194430	20804006
Repair of Longitudinal Joint @ 7 years	75.0%	m	107.00	233316	24964812
Replacement of Transverse Joint@ 7years	2.0%	m	870	5185	4510775
Replacement of Longitudinal Joint@ 7years	2.0%	m	870	6222	5412931
Ravelling surface @7years	5.0%	Sqm	519	58329	30255246
Crack sealing Surface @ 7years	3.0%	m	445	12349	5490454
Repair of Panels @ 7years	1.00%	No	15165	593	8992578
Removal of Panels @ 7years	0.50%	No	8387	296	2482515
Relaying of Panels @ 7years	0.50%	No	49158	296	14550755
Regrinding @ 7years	30%	Sqm	160	349974	55995828
Total Amount in Rs.					173459900
7th year periodic maintenance cost in Crores					**17.35**
Per Sqm per Cycle (Rs.)					**149**

The above are in addition to routine maintenance activities which include following for every year:

Longitudinal Cracks more than 1.5m	Lin.m	0.25%
Longitudinal Cracks less than 1.5m	Lin.m	0.75%
Transverse Cracks less than 1.5m	Lin.m	0.25%
Transverse Cracks more than 1.5m	Lin.m	0.75%
Longitudinal Crack full Depth	Cum	0.10%
Pothole	Sq.m	24.000
Corner Cracks	cum	0.10%
Condition of Joints	Lin.m	1%
Diagonal Cracking	Lin.m	0.5%
Raveling of panel	Sq.m	0.10%

6.3 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.
- 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.
- 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.
- All Metallic Bearings need to be taken up for servicing.

Wearing Coat:

Since there is a very week component of the bridge structure which is subjected to severe deterioration due to Loading, Environment etc. It is necessary to replace the Wearing coat at 15years frequency. As of now we have considered sealing of cracks by Fog Seal which is other does not show any distress than cracking by viz. Pot holes, abrading etc. based on this aspect BOQ is formed.

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:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 33: Summary of Unit Rates

S.No	Type of Material	Units	Source	Average Lead in Kms	Market Rates (Rs) Adopted for Rate Analysis - including lead
1	Aggregate				
a)	40 mm	Cum	Crusher	17.82	930
b)	20 mm	Cum	Crusher	17.82	984
c)	12 mm	Cum	Crusher	17.82	1020
d)	6 mm	Cum	Crusher	17.82	972
e)	Dust	Cum	Crusher	17.82	1046
2	Gravel/Murrum				
	Embankment	cum	Borrows for Embankment	3.60	16.99
	Subgrade	cum	Borrows for Subgrade	3.60	16.99
3	Other Major Material				
	Bitumen 60/70	tonne	Mathura	378.00	37646
	Bitumen 80/100	tonne	Mathura	378.00	37646
	CRMB	tonne	Mathura	378.00	37646
	Emulsion	tonne	Mathura	378.00	46646
	Steel	tonne	Outlet	44.00	57198
	HTS Strands	tonne	YAMUNANAGAR	44.00	70198
	Cement	tonne	YAMUNANAGAR	44.00	7798
	Structural Steel	tonne	YAMUNANAGAR	44.00	71098
	VG-40	tonne	Mathura	378.00	37646

Table 34: Summary of Major Rates

Sl.no	Activities	Unit	Rate (Rs) per Unit	Remarks
1	BC	Cum	8899	VG-40
2	Tack Coat	Sqm	13	
3	DBM	Cum	8122	VG-40
4	PC	Sqm	36	
5	WMM	Cum	2052	
6	GSB	Cum	1696	
7	Embankment	Cum	204	
8	Subgrade	Cum	243	
9	Shoulder Filling	Cum	243	
10	Thermoplastic Paint	Sqm	452	
11	Road Studs	Nos	195	
12	DLC	Cum	4817	
13	PQC	Cum	9713	
14	RE panel	Sq.m	4029	
15	M-15	Cum	8154	
16	M-20	Cum	8517	
17	M-25	Cum	9120	
18	M-30	Cum	9137	
19	M-35	Cum	10108	
20	M-40	Cum	11476	
21	M-45	Cum	11767	
22	M-50	Cum	13508	
23	Reinforcement steel	MT	79469	
24	1.2m Dia. pile	Rm	14310	
25	HT strands	MT	130443	

7.2 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs are estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Items which are not executed as part of scope or in damaged condition have been considered for immediate costs as a part of 1-year capex. Following items are mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

Summary of Immediate costs are included in table below:

Table 35: Summary of immediate Repairs Cost

S.no	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
1	Immediate Repair's (Highway)	LS	1	3,39,93,303	3,39,93,303
2	Immediate Repair's - Structures	LS	1	3,01,074	3,01,074
3	TMS	LS	1	2,05,205	2,05,205
4	ATMS	LS	1	0	0
Total Cost					3,44,99,582
Total Cost including GST (12%)					**3,86,39,531**

7.3 OUTINE 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:

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 VG 40 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	Providing and laying apron/ stone pitching on slopes of guide bunds/ road embankment / other location
12	Providing and laying stone aggregate filter material (150 mm compacted thickness) underneath pitching
13	Unlined drain
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
	(iii) Diagonal Chevrons Markings
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

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
10. Carrying out 50 to 60 mm thick 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 Concrete

7.3.3 Incident Management Cost

Incident Management & Safety items include the following:

- ✓ ATMS control room operations,
- ✓ Regular patrolling & reaching accident/incident site,
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, 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

Following table includes the cost of Major Maintenance works for the project:

Table 36: Summary of Periodic Maintenance Costs

Financial Year	Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of ATMS @ every 7 Years	Replacement of TMS @ every 5 years	Structure specified repairs
2023	-	-			-
2024	140.05	-	-	-	-
2025	-	-	-	-	96.56
2026	-	-	-	-	-
2027	702.37	1,769.81	187.05	264.54	-
2028	-	-	-	-	-
2029	-	-	-	-	-
2030	140.05	-	-	-	-
2031	-	-	-	-	-
2032	-	-	-	264.54	-
2033	280.11	-	-	-	-
2034	422.26	1,769.81	187.05	-	747.90
2035	-	-	-	-	-
2036	140.05	-	-	264.54	-
TOTAL	**1,824.90**	**3,539.61**	**374.09**	**793.62**	**844.45**

Note: The cost is inclusive of GST without escalation and the amount is in Lakhs.

7.5 OPERATIONS COSTS

Cost towards Operations include the following:

- Electricity Bill of lighting
- Toll Plaza Operation cost
- Operation and management costs of rest areas and lay byes
- SPV Costs
- Survey Costs
- Insurance
- IE for O&M period
- Administrative Cost

Following table depicts the cost of operations for the project:

Table 37: Summary of 1st year O&M cost

S No	Description	Amount in Lakhs. (including GST)
	SPV - Expenditure	
1	SPV staff	81.60
2	Highway lighting - Power Charges	79.00
3	Highway lighting - Maintenance charges	4.00
4	Tolling and HTMS AMC/ Spare Parts	37.60
5	Surveys & Investigations (BBD, Roughness)	4.86

S No	Description	Amount in Lakhs. (including GST)
6	IE fees	73.83
7	Insurance Charges	115.00
8	Audit Charges	40.00
9	LIE Fee	25.80
10	Admin cost - Board Meeting Expenses, valuation etc.	
	Agency - Expenditure	
11	Toll Operation - Agency	-
12	Route patrolling	139.93
13	Cost towards Periodic Vehicle replacement	
14	TAP & MAP	46.80
15	Routine maintenance	232.37
16	Repair of Road - BoQ Items	117.77
17	Repair of Structures	26.27
	1st year O&M cost in Lakhs	**1,024.82**

Note: The cost is inclusive of GST without escalation and the amount is in Lakhs.

7.6 TOTAL OPERATION & MAINTENANCE COSTS

Year on year operation cost is summation of following:

- ✓ Immediate Costs
- ✓ Routine Maintenance & Incident Management
- ✓ Periodic Maintenance
- ✓ Operations Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 38: Summary Total cost

Financial Year	SUMMARY OF VARIOUS EXPENSES in Rs. Lakhs				
	Immediate Repair's Cost	Toll Collection Expenses and Patrolling expenses	Routine Maintenance Expenses	Periodic Maintenance (Functional +Struc. Overlay+ Toll collection system)	Total Cost
2022-2023	-	-	-	-	-
2023-2024	-	-	1,030.68	140.05	1,170.74
2024-2025	386.40	-	1,016.52	96.56	1,499.47
2025-2026		-	1,023.81	-	1,023.81
2026-2027		-	1,030.68	2,923.76	3,954.44
2027-2028		-	1,016.52	-	1,016.52
2028-2029		-	1,016.52	-	1,016.52
2029-2030		-	1,030.68	140.05	1,170.74
2030-2031		-	1,023.81	-	1,023.81
2031-2032		-	1,060.18	264.54	1,324.72
2032-2033		-	1,016.52	280.11	1,296.63
2033-2034		-	1,016.52	3,127.01	4,143.53
2034-2035		-	1,030.68	-	1,030.68
2035-2036		-	649.40	404.60	1,054.00
Total Cost:	386.40	-	12,962.55	7,376.68	20,725.62

Note: The cost is inclusive of GST without escalation and the amount is in Lakhs.

SIT/PJRP/2312188/060
22nd December 2023

To
M/S Actis Highway Infra Ltd
The Sponsor

Sub: Submission of Technical Reports for Walter Projects

K/A Mr. Rakshit Jain,

We are pleased to submit hereby the "Technical Report" in hard/soft copies for the following assets.

S. No	Project Title
1	Technical Diligence of Delhi-Meerut Expressway (Section from km 0.000 to UP Border) including 8 laning of NH-24 in the state of Delhi. (Design Length-8.716)
2	Technical Diligence for 4-Laning of Chutmalpur - Ganeshpur of NH-72A from Ch. 0.000 to Ch. 17.900 & Roorkee – Chutmalpur - Gagalehri of NH-73 from Ch. 0.000 to Ch. 35.400 in the state of Uttar Pradesh & Uttarakhand on Hybrid Annuity Basis (Pkg-1)
3	Technical Diligence for 4-Laning of Gagalheri–Saharapur–Yamunanagar (UP/Haryana Border) section of NH-73 from Km 35.400 to Km 86.855 in the State of Uttar Pradesh under NHDP-IV on Hybrid Annuity Mode (PKG-II)
4	Technical Diligence for Four Laning Chikhali – Tarsod (Package-IIA) Section of NH-6 from Km 360.000 to Km 422.700 in the State of Maharashtra to be executed on Hybrid Annuity pattern under NHDP Phase IV (CTHPL)
5	Technical Diligence of Two Lanning with paved shoulders Road on Package HAM-AM-2 in the State of Maharashtra under MRIP on Hybrid Annuity Mode
✓6	Technical Diligence for the 8 Laning of NH-1 from Mukarba Chowk at km 15.500 to km 86.000 in the State of Haryana on DBFOT Basis

Thanking you and assuring you best services all the time.

Yours faithfully,

For Samarth Infraengg Technocrats Pvt Ltd.,

SAMARTH INFRAENGG TECHNOCRATS PVT. LTD.

Authorized Signatory
Name: [Mr. Kalva Kiran Kumar]
Designation: [Director]

TECHNICAL REPORT

Technical Diligence for 8 Lane of NH-1 (New NH-44) from Mukarba Chowk at km 15.500 to km 86.000 in the State of Haryana

SAMARTH INFRAENGG Technocrats Private Limited

SAMARTH
committed competence

DECEMBER 2023

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
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
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
MPRDCL	-Madhya Pradesh Road Development Corporation Ltd.
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

The National Highways Authority of India (the "**Authority**") is engaged in the development of highways and as part of this endeavor, the Authority has decided to undertake development and operation/ maintenance of 8 Laning of NH-1 (New NH-44) from Mukarba Chowk at km 15.500 to km 86.000 (the "**Project**") in the State of Haryana under Design, Build, Finance, Operate and Transfer ("**DBFOT**") Basis. The Authority had accordingly invited the bid proposals and upon the evaluation of received bids, the Authority has awarded the Project to **M/s Essel Infraprojects Ltd.**

Consequent to this, **M/s Essel Infraprojects Ltd,** formed a Special Purpose Vehicle (SPV) in the name of **M/s Mukarba Chowk - Panipat Toll Roads Limited (MCPTRL, Concessionaire)** for implementation/execution of the project.

Due to default of Concessionaire, NHAI issued cure period notice vide letter Dt 16.04.2019. Intention to terminate notice was issued by NHAI on 16.10.2019 under clause 37.2.2 of the Concession Agreement.

The Lead banker, **India Infrastructure Finance Company Ltd**, vide his letter dated 16.10.2019 issued notice of financial default to the Concessionaire and vide letter dated 23.10.2019 requested NHAI to exercise its right of substitution in accordance with Substitution Agreement.

The Lead banker has requested NHAI to approve the substitution of **MCPTRL** with **M/s Welspun Infra Facility Pvt Ltd.** which is wholly owned subsidiary of **M/s Welspun Enterprises Ltd.**

Accordingly, a Settlement Agreement was signed between NHAI and **MCPTRL** on 20.03.2020, wherein a payment of Rs. 9.60 Cr is to be made by the existing concessionaire to the NHAI before signing of the substitution agreement in full and final settlement in respect of all claims, counter claims and all the various disputes under the Concession Agreement. Extension time of 15 months for the New Concessionaire from the date of implementation of the substitution for commencement of commercial operations without extension of Concession Period any no Claim w.r.t to Clause 35.2 & 35.3 shall be raised by New Entity in this regard. The Net amount payable by NHAI to MCPTRL is Nil.

M/s Welspun Infra Facility Pvt. Limited the prospective substituted party in place of the existing Concessionaire has also signed the Settlement Agreement as a witness upon being satisfied that all the pre-existing disputes are fully and finally settled and no residual.

A substitution agreement was signed by NHAI, the Substituted Concessionaire, **M/s Welspun Infrafacility Pvt Ltd** and the lead banker, I**ndia Infrastructure Finance Company Ltd on 08.06.2020.**

The new concessionaire has submitted different proposals for PCOD to NHAI in various length. The latest proposal for PCOD for the consolidated length of 52.896 Km out of 70.5 Km was submitted on the date 29.07.2021 to NHAI.

This project road is acquired by M/s Actis GP LLP and is presently under Operation and Maintenance phase.

Actis GP LLP Ltd has engaged M/s Samarth Infraengg Technocrats to undertake due-diligence study for self-assessment and/or for its Concessioning Authority and/ or for InvIT purpose and/ or for its present/ future investors/ lenders whom this Report will be presented as Vendors Technical Due Diligence Report.

This report highlights about the project at a glance and to evaluate the asset condition and work out O&M Cost, Major Maintenance cost and additional facilities cost/improvement works of the project during the Concession period.

1.2 PROJECT AT A GLANCE

National Highway-44 (old NH-1) forms a part of the proposed widening of 8 lanes of existing National Highway from Mukarba Chowk to Panipat in the state of Haryana. The total length of the Project Highway is 70.500 Km. The major portion of the project highway runs through Sonipat & Panipat Districts. It mainly passes through Narela, Sonipat, Ganaur, Samalkha, and Panipat Districts etc. Project stretch is proposed to be explored for rehabilitation and widening of existing carriageway.

Table 1: Project Corridor Chainage System

Referencing system	Project Corridor Start Point (km)	Project Corridor End Point (km)	Length (km)
Old Chainage	15.500	86.000	70.50
CA Design Chainage	15.500	86.000	70.50

Photographs showing the start and end point of the project road are presented below:

Start Point at km.15.000

End Point at km.86.100

Following Table highlights the total project at a glance:

SI No.	Description	Date
1.	Date of Signing the Concession Agreement	28th Aug 2015
2.	Appointment Date	27th Oct 2016
3.	Scheduled Project completion	25th April 2019
4.	Signing of Substitution Agreement with New Entity	08th June 2020
5.	Revised Scheduled Project completion	07th Sep 2021
6.	Scheduled End of Concession	17 years from Appointed date
7.	Date of issue of Provisional Completion Certificate	Not received
8.	Date of Commencement of Commercial Operation	Not received
9.	Date of Issue of Final Completion Certificate	Not received

1.3 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 due diligence for said project.

The scope of services as defined in the "terms of reference" for consultants is as below:

1. Review of Contractual documents

- ✓ Review of CA/ Schedules pertaining to scope of work
- ✓ Collection of relevant records and documents and review of same
- ✓ Review correspondences with NHAI/IE on technical issues
- ✓ Review of EPC contracts/Maintenance Contracts
- ✓ Review of As-built drawings & Detailed Project Reports and Designs
- ✓ Review of COS works if any
- ✓ Review the technical approvals from IE or another agency required under the CA

2. Field Investigations

- ✓ Review and Update of Field investigations survey data done during Technical Due Diligence time.

3. Major Maintenance

- ✓ Review of current maintenance system.
- ✓ Updating of Maintenance costs to be incurred over the period of the concession keeping in mind the maintenance requirements of the Concession Agreement.

4. Operations cost

- ✓ Updating of O&M cost for the concession period.

5. BOQ and Cost Estimates

- ✓ Updating of BOQ & Cost for Immediate works (1st year Capex)
- ✓ Updating of BOQ and Costs for Major Maintenance
- ✓ Updating of BOQ and cost for Routine maintenance, Route Patrolling
- ✓ Updating of BOQ and Cost for Operations
- ✓ Updating of year-by-year O&M cost
- ✓ The costs would be updated till the end of the concession period including any expected extension of Concession periods as informed to us.

6. Reports & Presentation

- ✓ Draft O&M cost
- ✓ Final Reports along with Final BoQ

1.4 REVIEW OF CONCESSION AGREEMENT

1) Concession Parties and date of execution of Agreement: NHAI and MCPTRL entered into the Concession Agreement on 28th Aug, 2015.
2) Appointed Date, Commercial Operation Date (Article 4, Article 15 & Article 3): As the Concession Agreement was signed on 28th Aug, 2015, the Appointed Date as per the definition in the Concession Agreement would be required to be achieved by 24th Feb 2016. The same has been declared as 27th Oct 2016 with the approval of the competent authority vide letter no NHAI/11012/NH-1/BOT/2014/HR/464 date 07/08th Nov 2016. The Financial Closure occurred on 06rd May 2016.
3) Based on the aforesaid, it appears that there has been a delay of about 8 months for the declared Appointed Date. The Authority and the Concessionaire mutually agreed for waiving off all the damages/penalties to be levied from Concessionaire as well as from NHAI. The delay damages/penalties on account of 72 days in achieving the Financial Close is considered in the Settlement Agreement between NHAI and M/s MCPRTL.
4) Concession Period (Article 3): The Appointed Date is declared on 27.10.2016, accordingly the expiry date of the Concession Period would be 23.10.2033. The Authority vide its letter NHAI/RO/CH/11011/PD-SNP/Mukarba chowk-Panipat/NH-1/337-4383 dt: 01.11.2021 has granted extension of Concession period by 104 days on account of Force Majeure Event (Pandemic COVID-19) in terms of Article 34 of Concession Agreement to the condition that in case the Concessionaire achieve the Provisional completion/Completion of the project on or before the extended date due to the Covid-19 pandemic, then number of extended days shall be deemed reduced to the extent date of Provisional/Completion, as the case may be) proceeds revised schedule date of completion. The Authority vide its letters No NHAI/PIU/NH-44/M-115/2021/D-5551 Dt: 02.09.2021 Dt: 01.11.2021 has granted approval for extension of Time for 104 days. The Scheduled Completion date would be 19.12.2021.
5) Condition Precedent (Article 4): The Condition Precedent required to be satisfied both by the Authority and Concessionaire are presumed to be fulfilled by the either party as the settlement Agreement has been signed by the Authority and the MCPRTL. However, the New Concessionaire vide his letter no WIPL/IE/Site/2021/731 conveyed the Authority about the Non-Availability of land
6) Obligations of Concessionaire (Article 5): The Concessionaire has fulfilled most of the obligations.

7) Change in Ownership (Clause 5.3 read with Clause 7.1(k)): The Concessionaire shall it shall at no time undertake or permit any Change in Ownership except in accordance with the provisions of Clause 5.3 and that the selected bidder, together with its Associates, hold not less than 51 % (fifty-one percent) of its issued and paid up Equity as on the date of this Agreement; and that each member of the Consortium whose technical and financial capacity was evaluated for the purposes of prequalification and short-listing in response to the Request for Qualification shall hold at least 26% (twenty six per cent) of Equity during the Construction Period and two years thereafter along with its Associates

8) Obligations of Authority (Article 6): The Authority has fulfilled most of its obligations. However, the Land was not provided to the Concessionaire as per CA.

9) Performance Security (Article 9): The performance security is Rs 106.44 Cr. The Concessionaire has fulfilled this condition.

10) Scheduled Completion Date (Schedule-G, Article12 & Article 37): Construction period is 910 days from the Appointed Date 27.10.2016. The Schedule Completion date is 25.04.2019. The Concessionaire MCTRPL, achieved the Project Milestone 1 & II and could not achieve the Project Milestone III & Scheduled completion date as per the provisions of CA. After terminating the Concessionaire on his default in successful implementation of the Project, the Authority has entered into a settlement agreement with MCTRPL. Subsequently the Authority has entered into a substitution agreement with a new entity M/s Welspun Infrafacility Pvt Ltd. The Construction period is 15months effective from the Substitution agreement date i.e., 8th June 2020 without extension of Concession Period. The Scheduled completion date is 7th Sept 2021.

11) Construction of Service Roads by Authority (Article 12.7): The Authority at any time after the 6th (Sixth) anniversary of the Appointed Date, can undertake at its cost, construction of service roads on the Project Highway. The Concessionaire shall have the obligation to maintain the service roads in accordance with Good Industry Practice

12) Provisional Completion Certificates, Final Completion Certificate and Punch List Items (Article 14 & Article 37): The new concessionaire has submitted different proposals for PCOD to NHAI in various lengths. The latest proposal for PCOD for the consolidated length was submitted on the date 29.07.2021 to NHAI, for a length 52.896 Km out of 70.5 Km.

13) Change of Scope (Article 16): The Concessionaire has executed certain works under change of scope and details were given in the COS page.

14) O& M Obligations of the Concessionaire: The Concessionaire has been fulfilling this obligation

15) Grant (Article 25): The authority agrees to provide the Concessionaire cash support by way of an outright grant of 189 Cr disbursed by the way of Equity Support.

16) Premium (Article 26): Concessionaire shall pay a sum of Rupee One to the Authority in consideration towards the grant of Concession.

17) Fees and Fee Notification (Article 27): The Authority and the Concessionaire acknowledge that a notification for levy and collection of Fee shall be issued by the Government under section 8A of the Act with Rule 3 of National Highways Fee Amendment Rules, 2008 (the **Fee Notification**) within 90 days hereof substantially in the form set forth in Schedule R. Revision of Fee shall annually on 1st April.

18) Revenue Shortfall Loan (Article 28): If the Realizable fee in any Accounting Year shall fall short of the Subsistence Revenue as a result of an Indirect Political Event, a Political event

or an Authority default as the case may be, the Authority shall upon request of Concessionaire, provide a loan for meting such short fall "**Revenue Shortfall Loan**" at an interest rate equal to 2% above the Bank rate.

19) Effect of Variation in Traffic Growth (Article 29): As per the clause the traffic sampling shall be carried out as below (i) On the date falls one year prior to the Target Date (ii) On the Target Date (iii) On the first anniversary of the Target Date. Target date is 01.04.2025 and the Target Traffic is 1,32,197 PCU. Design capacity for Six Lane project highway is 2,10,000 PCU.

    In the event that the actual Average Traffic shall have fallen short of the Target Traffic by more than 2.5% thereof or exceeded the Target Traffic by more than 2.5% thereof, the Concession Period shall be deemed to be modified in accordance with Clause 29.2.

    As per Clause 29.2.1, if the Actual Average traffic has fallen short of the Target Traffic, then for every 1% shortfall as compared to the Target Traffic, the Concession Period shall subject to payment of Concession Fee be increased by 1.5% thereof; provided that such increase shall not exceed 20% of the Concession Period.

    As per Clause 29.2.2, if the Actual Average traffic has exceeded the Target Traffic, then for every 1% excess as compared to the Target Traffic, the Concession Period shall be reduced by 0.75% thereof; provided that such reduction shall not exceed 10% of the Concession Period.

20) Competing Road (Clause 6.3) & Additional Toll way (Article 30) and Compensation for Competing Roads (Clause 35.4): As per Clause the 6.3, no competing road should be constructed before the 10th anniversary of the Appointed Date. As per Article 30, no additional tollway should be constructed before the 9th anniversary of the Appointed Date. As per Clause 35.4, in the event that an additional Tollway or a Competing Road as the case may be, is opened for traffic, the Authority shall pay the compensation to the Concessionaire.

21) Insurance (Article 32): The Concessionaire has been fulfilling this obligation.

22) Force Majeure (Article 34): **The effect of Force Majeure Event on the Concession period** in accordance with Clause 34.6.2, at any time after the Appointed Date, if any Force Majeure Event occurs a) before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; or (b) after COD, whereupon the Concessionaire is unable to collect Fee despite making best efforts or it is directed by the Authority to suspend the collection thereof during the subsistence of such Force Majeure Event, the Concession Period shall be extended by a period, equal in length to the period during which the Concessionaire was prevented from collection of Fee on account thereof; provided that in the event of partial collection of Fee where the daily collection is less than 90% (ninety per cent) of the Average Daily Fee, the Authority shall extend the Concession Period in proportion to the loss of Fee on a daily basis. For the avoidance of doubt, loss of 25% (twenty-five per cent) in collection of Fee as compared to the Average Daily Fee for four days shall entitle the Concessionaire to extension of one day in the Concession Period.

    Allocation of Costs arising out of Force Majeure Event after the Appointed Date shall follow clause 34.7.2 (a) i.e., upon the occurrence of any **Non-Political Event** after the Appointed date, the parties shall bear their respective Force Majeure Cost and neither party shall be required to pay the other any costs. As per Clause 34.7.2 (c) upon the

occurrence of any **Political Event** after the Appointed date all FM Costs attributable to such Political Event shall be reimbursed by the Authority to the Concessionaire.

For the avoidance of doubt, the Clause 34.7.2 also specifies that the Force Majeure Costs shall not include loss of Fee revenues or debt repayment obligations and for determining such cost, information contained in the Financial Package may be relied upon to the extent that such information is relevant.

The Authority vide its letter NHAI/RO/CH/11011/PD-SNP/Mukarba chowk-Panipat/NH-1/337-4383 dt: 01.11.2021 has granted extension of Concession period by 104 days on account of Force Majeure Event.

23) Suspension of Concessionaire's Rights (Article 36): The NHAI has invoked this clause on M/s MCPTRL.

24) Termination (Article 37): The NHAI has invoked this clause on M/s MCPTRL.

25) Change in Law (Article 41): Change in law occurred due to eruption of COVID-19 and its impact by way of change in legislations by both the Central Government and respective State Governments.

26) Governing Law (Article 47) and Dispute resolution (Article 44): Governed by Laws of India and the Court at Delhi shall have the exclusive jurisdiction. There are no disputes referred so far under the article 44.

1.5 REVIEW CORRESPONDENCES WITH NHAI /IE

Following correspondences were reviewed:

1) Concession Agreement with NHAI, dated 28.08.2015.
2) EPC Agreement is not available.
3) Appointed Date NHAI letter No NHAI/11012/NH-1/BOT/2014/HR/464 Dt 07.08.2016
4) Settlement Agreement of M/s MCPTRL with NHAI on 20.03.2020.
5) Substitution Agreement of M/s Welspun Infrafacility Ltd with NHAI on 08.06.2020.
6) Approval of COS-1 from NHAI vide Letter NHAI/PIU-EPE-I/NH-1/M-33/2017/D-4380 dt 23.08.2018.
7) Approval of COS-2 from NHAI vide Letter NHAI/PIU-EPE-I/NH-1/M-33/2018/D-4403 dt 31.08.2018. {82.82 Cr (COS1-28.55 Cr, COS-2- 54.27)}
8) Approval of COS-3 from NHAI vide Letter NHAI/PIU/SNP/NH-44/M-33/COS-III/2020/D-4403 dt 14.01.2021. (202.45 Cr)
9) The Authority vide its letter No NHAI/PIU/NH-44/M-115/2021/D-5551 Dt: 02.09.2021 has granted approval for extension of Time for 104 days
10) The Authority vide its letter & NHAI/RO/CHD/11011//PD-SNP/Mukarba-Chowk-Panipat/nh-1/337-4383 Dt: 01.11.2021 has granted approval for Extension of Concession Period for 104 days.
11) COS proposal 4, from M/s Welspun Infrafacility Pvt Ltd (WIPL) to PD, NHAI for widening of carriageway towards the median instead of widening towards extreme ends due to Land constraint. Ltr No. WIPL/NHAI/Site/2021/585 dt 16.02.2021 (25.21 Cr)
12) The other COS correspondences done by the concessionaire with IE and NHAI are due to increase in length of FOB, Installation of Thrie Beam, Hybrid ETC, additional Flyover at Ch.

27+405, proposal for shifting of FOB, shifting of school boundary wall, variation in dimensions of culverts & additional culverts, additional VUP at Ch. 68+955.

13) The Authority vide its letter No NHAI/PIU/SNP/NH-44/M-1033/2021/4765 requested the Chief Engineer, Panipat Thermal Power Plant for the reimbursement of transportation cost (avg Lead 55Kms) for 11,92,781 cum of lifting the Flyash as per new Haryana Schedule of Rates (2021) to the Concessionaire.

1.6 REVIEW OF EPC CONTRACT

(A) EPC CONTRACT:

1) Concession Parties and date of execution of Agreement: Welspun Infrafacility Pvt Ltd (Client) and Welspun Enterprises Ltd. (Contractor) entered into the EPC Agreement on 04 June 2020.
2) Appointment of Contractor, Effective Date and Term (Clauses 2): The Concessionaire appoints Welspun Enterprises Limited as the Contractor to execute the EPC Works. The effective date of the Project is 04.06.2020. The EPC contract will be valid and subsisting from the effective date until the termination date.
3) Scope of Contractor's Works (Clause 3): The Contractor shall construct the Project Highway on the Site set forth in Schedule A, B, C & D of the Concession Agreement and shall include the scope of work as set out in Annexure A Part II of EPC Agreement.
4) Obligations and Undertakings (Clause 4): The Contractor and concessionaire shall at their own cost and expense observe and undertake comply and perform his obligations as set out in EPC Contract.
5) Contract Price and Terms of Payment (Clause 5): The Contract Price payable by the Concessionaire to the Contractor shall be 1167 Cr and the terms of payment shall be as specified in Annexure -B Part II.
6) Change in Law (Clause 6): Under this clause, if the Authority make any payment to the Concessionaire, the concessionaire is liable to make over such amounts (less Statutory deductions) to the Contractor.
7) Guarantees, Liabilities, Liens and Indemnities (Clause 8): The Contractor acknowledges that the failure to meet the completion of each of Milestone set out in Annexure-D of EPC and complete the EPC works on the Schedule Completion date shall constitute a Material Breach of Contractor. If the contractor fails to achieve the completion Milestones and Scheduled Construction Completion date as in Annexure-D, he shall pay the Concessionaire the damages at rate of 0.005% and 0.011% of Contract Price per day respectively until such Milestone/Completion date is achieved subject to a maximum of 10% of Contract Price.
8) Change of Scope (Clause 9): All payments for execution of COS shall be made within 15 days from the date of receipt of the same from the Authority in accordance with clause 16.3 of Concession Agreement. In case of reduction in scope of works, the Contract Price shall stand decreased to the of such reduction.
9) Force Majeure (Clause 11): Upon review of the EPC Contract, the "Force Majeure" has the same meaning given to such term in the Concession Agreement
10) Suspension and Termination (Clause 12): The Concessionaire may, without prejudice to any of its other rights under the Contract, issue "Preliminary Notice" to the Contractor stating the nature of default. If the Contractor fails to remedy or to take effective steps, to remedy the same to the satisfaction of the Concessionaire within 15 days of receipt of the Preliminary Notice, then the Client shall be entitled to terminate the Contract forthwith, by issuing a Termination Notice to the Contractor. However, no such clause has been invoked on the Contractor

1.7 REVIEW OF SCHEDULES

The following table depicts the project scope as given in schedules at a glance:

Table 2: Salient Features of Project Corridor

S. No	Description	Unit	As per CA
1	Start Chainage (km)	km.	14.972
2	End chainage (km)	km.	86.361
3	Length of the Project Corridor	km	71.389
4	Service Road / Slip Road	km	138.300
5	Toll Plaza	Nos.	1
6	Flyovers	Nos.	10
7	VUPs	Nos.	5
8	PUP's	Nos.	6
9	CUP's	Nos.	2
10	FOBs	Nos.	11
11	**Major Bridges**	**Nos.**	
12	Major Bridges-Reconstruction	Nos.	Nil
13	Major Bridges-Rehabilitation	Nos.	Nil
14	Major Bridges-Widening	Nos.	Nil
15	Major Bridges-New	Nos.	Nil
16	**Minor Bridges**	**Nos.**	18 MCW / 18 SR
17	Minor Bridges-Reconstruction	Nos.	13 MCW BHS
18	Minor Bridges-Rehabilitation	Nos.	5 MCW BHS / 2 SR BHS and 1 SR RHS
19	Minor Bridges-Widening	Nos.	1 SR RHS
20	Minor Bridges-New	Nos.	16 SR LHS and 14 SR RHS
21	**Culverts (Pipe)**	**Nos.**	**29**
22	Culverts-Reconstruction	Nos.	Not specified
23	Culverts-Rehabilitation	Nos.	Not specified
24	Culverts-Widening	Nos.	29 (SR BHS)
25	Culverts-New (Including HPC)	Nos.	Not specified
26	**Culvert (Slab/Box)**	**Nos.**	**02 Slab / 36 Box**
27	Culverts-Reconstruction	Nos.	14 Box (MCW BHS)
28	Culverts-Rehabilitation	Nos.	Not specified
29	Culverts-Widening	Nos.	02 Slab / 36 Box (SR BHS)
30	Culverts-New	Nos.	Not specified
31	Street Lights	Kms	As per Manual IRC: SP:87-2013
32	High Mast Lights	Nos.	As per Manual IRC: SP:87-2013
33	Solar Blinkers	Nos.	As per IRC Manual
34	Major Junctions	Nos.	15

S. No	Description	Unit	As per CA
35	Minor junctions	Nos.	23
36	W-Beam Safety Barriers	km	96.950 (BHS)
37	Kilometer / Hectometer / Boundary Stones	Nos.	142/710/2840
38	Gantry Sign Boards	Nos.	23
39	Cantilever Sign Boards	Nos.	46
40	Only Bus bays	Nos.	78 (BHS)
41	Double Arm Lightnings-Length	km	66.200 (BHS)
42	RE Wall	km	17.449 (BHS)
43	Road Signs	No's	As per Sch-D & IE
44	RCC Cover Drain	km	211.856 (BHS)
45	Steel Railing	Kms	71.946 (BHS)

1.8 REVIEW OF PAVEMENT DESIGN

1.1.1 Manual of Specification and Standards for Eight Laning

The Schedule-D states that "Subject to the provisions of Paragraph 2 of this Annex-I, Eight-Laning of the Project Highway shall conform to the Manual of Specifications and Standards for Six-Laning of Highway through Public Private Partnership Published by Indian Road Congress lRC: SP:87-2013"

1.1.2 Review of CA stipulations for Pavement Design

Clause 5.3.1 of IRC SP: 87-2013 stipulate that the new pavement shall be designed in accordance with the IRC: 37.

Clause 5.4.1 (i) of IRC SP: 87-2013 stipulates that the flexible pavement shall be designed for a minimum design period of 15 years or operation period, whichever is more. **Stage Construction will be permissible subject to the requirements specified in para (ii) below**.

Clause 5.4.1 (ii) of IRC SP: 87-2013 specifies that "Alternative strategies or combination of initial design, strengthening and maintenance can be developed by the Concessionaire to provide the specified level of pavement performance over the operation period subject to satisfying the following minimum design requirements".

Clause 5.4.1 (ii) (a) indicates that, the thickness of sub-base and base of pavement section is designed for a minimum design period of 15 years and the **initial bituminous surfacing for a minimum design period of 10 years**.

Clause 5.4.1 (ii-(b)) indicates that, the pavement shall be strengthened by bituminous overlay as and when required to extend the pavement life to full operation period. The thickness of bituminous overlay shall be determined on the basis of relevant IRC codes.

Clause 5.5.5 indicates that, the design traffic in case of Service Road shall be minimum ten million standard axles. The crust composition shall be provided accordingly.

Clause 5.9.6 (i) of IRC SP: 87-2013 stipulate the thickness of the bituminous overlay shall be determined on the basis of FWD method and the design traffic as per the procedure outlined in IRC: 81 as also from structural numbers of existing pavement layers.

Clause 5.9.6 (ii) of the same manual also stipulates that the initial **strengthening shall be done for a minimum design period of 10 years**. Subsequent strengthening to extend the pavement to full operation period shall be implemented at the end of initial design period or earlier, in case of any structural distress in the pavement or if the surface roughness exceeds the value specified in Schedule-K of the CA.

Clause 5.9.6 (iv) of the same Section stipulate that the thickness of Bituminous Overlay for pavement strengthening shall not be less than 50 mm Bituminous concrete, after attending to the requirements of profile corrective course"

1.1.3 Concession Period

As per the Concession Agreement the Concession Period is 17 years.

1.1.4 Design Period

As per the submitted Pavement design report, the thickness of base and sub-base is designed for 15 years and bituminous layers are designed for 10 years. **Stage construction has been adopted.**

1.1.5 Design CBR

As per the submitted pavement design report, the effective CBR value for the design of Pavement is considered as 8%.

1.1.6 Design MSA

The Design traffic for the project road in term of cumulative number of standard axles has been computed for a design life of 10 years and for 15 years design period of main carriageway as given below:

Sl. No	Location	MSA for 10 years	MSA for 15 years
1	Km 28+700	53	92
2	Km 52+000		

1.1.7 Pavement Crust Main carriageway

Design of new construction and at widening portion is carried out in accordance with IRC 37. The pavement layer for new construction / Widening portion has been designed for 10-year design traffic load for the Bituminous layers.

The Pavement layer thickness for various design loading as given below:

S. No	Design MSA	New construction at Widening portion	New construction at Approach of Underpasses
1	**Adopted MSA – 10 years**	**53**	
2	BC in mm	50	50
3	DBM in mm	120	80
4	WMM in mm	250	150
5	GSB in mm	200	-
6	CTSB in mm	-	200

1.1.8 Overlay Design

The Overlay thickness proposed for 10-year design traffic for the project corridor. Based on the deflection values overlay has been proposed for 10-year design traffic. The Overlay sections as given below:

- Entire project corridor in both the direction the remaining life more than the design MSA, hence no overlay required. However, a 50mm thick functional overlay has been proposed for complete length of the project road in both the direction.

1.1.9 Service Road Design

The Service Road has to be designed for design traffic of 10 MSA as per Cl. 5.5.5 of IRC SP 87-2013.

As per submitted Pavement Design Report the service road has been designed for 10 MSA & 8%. The Pavement layer adopted for service road as given below:

- BC -40 mm
- DBM -50 mm
- WMM -200 mm
- GSB -200 mm

1.1.10 Rigid Pavement Design

As per submitted Pavement Design Report, Rigid Pavement design at Toll Plaza location the proposed crust as given below:

- PQC -300 mm
- DLC -150 mm
- GSB -150 mm
- Subgrade -500 mm (8% effective CBR)

1.9 REVIEW OF COS WORKS

There are 3 cos submitted to client

- ✓ Cos-01 Rs 27.73 cr. approved (during the previous concessioner) work completed
- ✓ Cos-02 Rs 54.27 cr. Approved (during the previous concessioner) work completed
- ✓ Cos-03 Rs 202 cr. In principle approval received.

Total cos 27.7+54.27+202 = appx. 280cr and 40cr. Advance received.

The other COS correspondences done by the concessionaire with IE and NHAI are COS due to increase in length of FOB, Installation of Thrie Beam, Hybrid ETC, additional Flyover at Ch 27+405, proposal for shifting of FOB, shifting of school boundary wall, variation in dimensions of culverts & additional culverts, additional VUP at Ch 68+955.

1.10 HEAD OF TERMS

Key terms of Concession Agreement

Particulars	Description
Date of Agreement/ Substitution Agreement/ Appointed Date	28-Aug-2015 08-June-2020 27-Oct-2016
Employer	NHAI (National Highways Authority of India)
Concessionaire	M/s Mukarba Chowk Panipat Toll Roads Ltd (old Concessionaire) M/s Welspun Infra facility Ltd (New Concessionaire)
Concession Period	17 Years (27-Oct-2016 to 23-Oct-2033)
Length of the Project, Total project Cost	70.5 Km Rs.2122 Cr
Achievement of Project Mile Stones	Milestone-I: As per CA Sch-G, Scheduled Completion Date is 25.04.2017 i.e., 180th day from Appointed Date Milestone-II: As per CA Sch-G, Scheduled Completion Date is 27.10.2017 i.e., 365th day from Appointed Date Milestone-III: As per CA Sch-G, Scheduled Completion Date is 08.08.2018 i.e., 650th day from Appointed Date The above Milestones are not achieved
Construction Period/ Scheduled completion date	910 days from the Appointed Date/ 25.04.2019 Revised date for Completion 08.09.2021
Premium/Grant	The Authority agrees to provide to the Concessionaire cash support by way of an outright grant equal to the sum set forth in the Bid, namely, Rs. 189.00 Crore in accordance with the provisions of this Article 25 (the "Grant"). Clause 26.1 of CA Concession Fee: Rs.1 per annum
Extension of Time **COD** **PCOD** **FCOD**	First EOT granted by NHAI is for 104 days against Covid 1st wave. Further 2nd EOT for 64 days has been requested by SPV against covid 2nd wave. Approval from authority for the same is not known
Respective rights and obligations of the Parties	Article 4, 9, 10, 24, 34, 44 & 47 of CA
Change in Ownership	The Concessionaire shall take prior approval of the Authority for any change in ownership in accordance with the article 5.3 of CA
Dispute Resolution	1.At first instance by mediation by the Independent Engineer 2.Amicable settlement by conciliation by the Chairman of the Authority & Chairman of the board of directors of the Concessionaire 3. Finally by Arbitration in accordance with Arbitration and Conciliation Act 1996

Governing Law and Jurisdiction	Courts at Delhi shall have exclusive jurisdiction over matters arising out of or relating to this Agreement

Key terms of EPC Agreement

Particulars	Description
Date of Agreement **Appointed Date**	04-June-2020 27-Oct-2016
Concessionaire	M/s Welspun Infrafacility Private Ltd (new Concessionaire)
Contractor	M/s Welspun Enterprises Limited
Commencement Date **Construction Period**	From the date of issue of Notice to Proceed beginning from the Commencement Date and ending on Scheduled Construction Completion Date;
Length of the Project, Contract Price	70.500 Km Contract price Rs 1167 Cr
Achievement of Project Milestones	The Contractor guarantees that the entire EPC Works shall be completed by the Contractor in all respects on or prior to 3rd September 2021 (Schedule Construction Completion Date). The intermediate Progress Milestone shall be as determined by Independent Engineer.
Extension of Time **COD** **PCOD** **FCOD** **DLP**	First EOT granted by NHAI is for 104 days against Covid 1st wave. Further 2nd EOT for 64 days has been requested by SPV against covid 2nd wave. Approval from authority for the same is not known. - - The period commencing from the date of issue of Provisional Completion Certificate (if applicable) or Completion Certificate by the Concessionaire and ending on expiry of 12months from Completion Certificate
Liquidated Damages for Delay	1) If the Contractor fails to achieve any of the Project Milestone as per specified in Annexure-D, the Contractor shall pay Damages to the Concessionaire at the rate 0.005% of the Contract Price per day until such Completion Milestone is achieved subject to a maximum of 10% of Contract Price 2) If the EPC Works are not completed on or prior to the Scheduled Construction Completion Date, then the Contractor shall pay Damages to the Concessionaire at the rate of 0.011 % of the Contract Price per day for each of the packages until the EPC Works are completed, subject to a maximum of 10% of the Contract Price. 3) The Concessionaire reserves the right to recover the Damages under the aforesaid Sections from the payments that may be due and payable to the Contractor under this EPC Contract or demand payment thereof from the Contractor. In case demanded by the Concessionaire, the Contractor shall forthwith (in any event not exceeding 3 (three) days) upon receiving such demand from the Concessionaire, make payment of such Damages and any delay in making such payment shall attract interest @ SBI PLR plus 2 (two) per cent.
Monthly Progress Report	The Contractor shall prepare a monthly report on the progress of the works and submit to the Concessionaire
Dispute Resolution	1. Either Party shall require such Dispute to be referred to the Chief Executive Officer(s) of the Concessionaire and the Contractor for amicable settlement. 2. Three Member Arbitration in accordance with Arbitration & Conciliation Act 1996

1.11 MAINTENANCE REQUIREMENTS:

Concessionaire shall undertake maintenance requirements as per Schedule-K of CA, below is the requirement

S.No	Description	Length (Km)	Lanes	Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Maximum allowable deflection	Frequency of Roughness Test	Frequency of FWD Test
1	Mukarba Chowk to Panipat	71.40	8	IRC:SP:87-2013	Schedule-K and Manual	2500 mm/Km	Nil	2 Times in a Year	Once in a 5 Years

No specific Handing Over (Divestment) requirements are mentioned under CA. It shall be same as Schedule-K

1.12 SITE OBSERVATIONS:

1. Project road is in compliance to CA provisions.
2. The overall pavement condition of Project Road is good except minor cracking and raveling observed at few locations

Due to farmers' agitation works hampered between section Km 29 to Km 37. Following Structures are under construction in this section:

a. Flyovers : 04nos
b. MJB : 01nos
c. MNB : 03nos
d. PUP : 01nos
e. VUP : 01nos

No major work activity is happening at this section. EOT related to this section is already submitted by SPV.

3. FOB total 11 nos FOB's as per schedules but 5 Nos de-scoped and balance 6 nos. are to be constructed.
   a. 17+650 D&R but drg not submitted
   b. 19.+500 is part of PCOD.
   c. 24+000 drg not submitted.
   d. 28+680 drg not submitted
   e. 66+200 drg submitted
   f. 86+330 drg approved but work not started.

4. Overall condition of structures is fair.

CHAPTER 2. SURVEYS AND INVESTIGATIONS

2.1 INTRODUCTION

The main objective of undertaking Surveys and Investigations is to appreciate the existing engineering features along the project corridor and to understand the present condition of the various elements of the project road and to prepare required inputs for various rehabilitation and maintenance strategies.

Following Survey and Investigations have been undertaken as a part of study with an objective to understand the present condition of the road and there by access the quality of construction and as well to prepare requisite rehabilitation/corrective designs where necessary.

- Road Inventory Surveys
- Visual Pavement Condition
- FWD Surveys
- Roughness Surveys using 5th Wheel BI
- 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 Road has flexible pavement over the entire length (except at Toll Plaza) with paved carriageway of 15.5m/12m wide including paved shoulder. The project corridor generally runs in plain terrain. The land use along the project road is mostly built-up areas. It passes through villages like Alipur, Kundli, Rai, Murthal, Bari, Samalkha, Panipat, etc. In general, road embankments are in the range of 1.0m-2.0m height. Embankments higher than 2.0m are observed mainly in the approaches of CD structures and Underpass locations.

The view of project road at different locations is shown in the following photographs:

A view of the Project Road with median 1.2m wide at km 15.000

A view of the Project Road on Structure approach with Highway Lighting & CCB at Km 50.000-LHS

A view of the Project Road with 6-Lane Approach having Lighting, MCB & CCB at Km 62.000-RHS

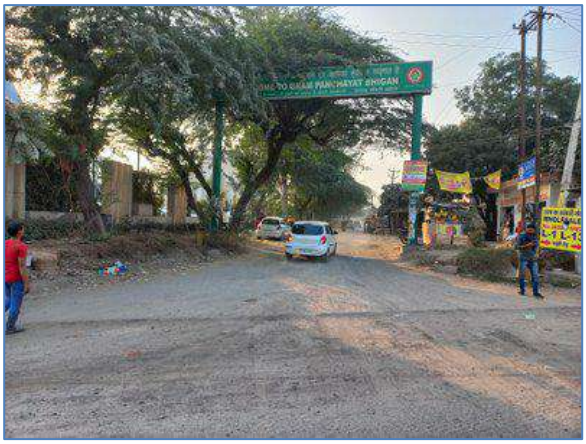
A view of the Project Road with Median 1.2m wide & MCB at Km 71.000-BHS

A view of the Project Road with PGR in SR Separator at Km 76.000-RHS

A view of the Project Road with MCB & PGR at Km 81.000-LHS

The Project Road has 13 Major junctions and 22 Minor junctions. Photographs showing junctions locations are presented below:

Major Junction Towards Sonipat @ km 50.170 LHS



Minor Junction Towards Bhighan @ km 53.400 LHS

Major Junction Towards Ganaur @ km 61.990 LHS

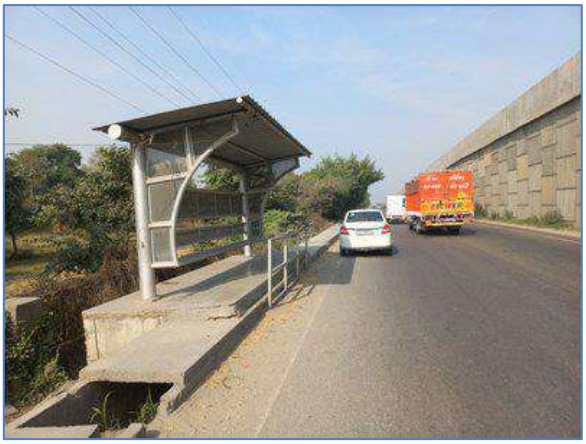
Minor Junction Towards Bhodwal Majri Station Road @ km 68.900 LHS

About 18 numbers of High mast lighting is observed along the project road. Mostly they are located at Junctions and Toll Plaza locations. Few photos showing High mast lighting are presented below:

A view of High mast lighting @ km 53.850

A view of High mast lighting @ km 84.500

All together the Project Road has about 53 Bus shelters on Service Road. Few photos taken at the Bus Bays and Bus Shelter are presented below:

 **Bus Shelter near km 43.480 LHS**	 **Bus Shelter near km 50.900 LHS**
 Bus Shelter near km 64.900 LHS	 **Bus Shelter near km 66.900 RHS**

The Project Road has one staggered Toll Plaza at km 54.230-LHS & km 53.770-RHS provided with Rigid pavement including its tapering portions. It has sixteen (13+13) ETC lanes at Toll Plaza. Eight high mast lights on either ends of the toll plaza are provided. Double arm lighting provided in the approaches of both the toll plazas.

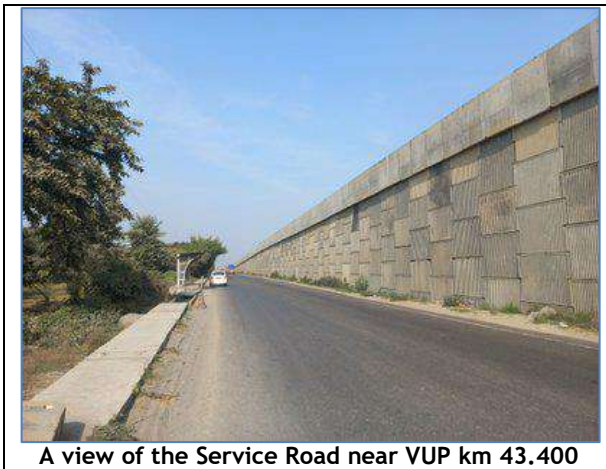
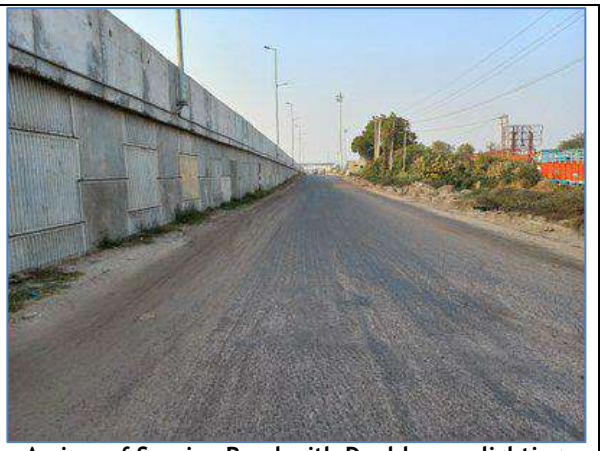
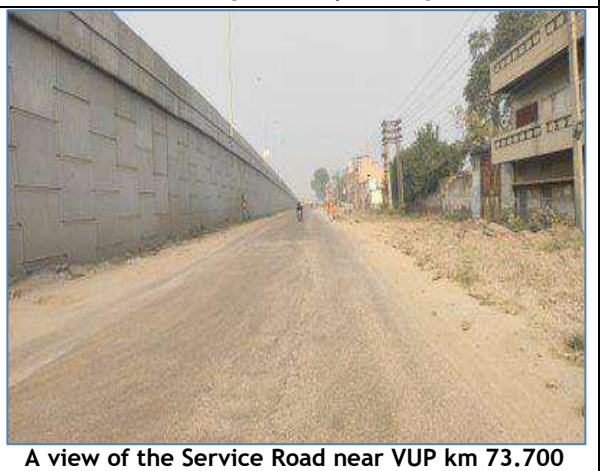
A view of the Toll Plaza near km 54.230 (Baghan)

A view of the Toll Plaza near km 53.770 (Baghan)

Admin Building at km.54.160 RHS

Temporary Toilets at km 54.300 LHS

Service road/slip roads of varying carriageway width of 7m to 12m have been observed along the Project Corridor. Service road/slip roads have been constructed for most of the length of the project corridor except at few locations. Photos depicting the service road pavement surface type, Condition and the other associated features like drain, pedestrian guard rails and metal Beam crash barriers on the separator are presented below. Few photographs taken at service road locations are presented below:

 A view of the Service Road near VUP km 43.400 with covered drain & Bus shelter on LHS	 A view of Service Road with Double arm lighting near PUP km 53.400 RHS
A view of the Service Road near km 60.000 with Pedestrian Guardrail on LHS	 A view of the Service Road near VUP km 73.700 RHS

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.3 PAVEMENT CONDITION SURVEYS

The present Pavement condition has been accessed by visual inspection in the month of November 2021. The pavement distresses like cracking, potholes, patching, rutting and ravelling etc., are noted at an interval of 200m on both the carriageways. The Pavement Condition report showing the data collected for each km length in each direction is presented in **Appendix 2** of this Report. The visual inspection of the pavement condition appears to be fair and the riding quality is satisfactory.

The photographs showing the pavement condition of the Project Road is presented below.

Fair condition of pavement at km 38.000-LHS	Outer Lane Bleeding condition at km 41.000-RHS	Raveling & Rutting at km 49.000-RHS
Rutting in middle & outer Lanes at km 52.000-RHS	Fair condition of pavement at km 75.000-LHS	Rigid Pavement Fair condition at km 54.250-LHS

2.4 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

Falling Weight Deflectometer Survey

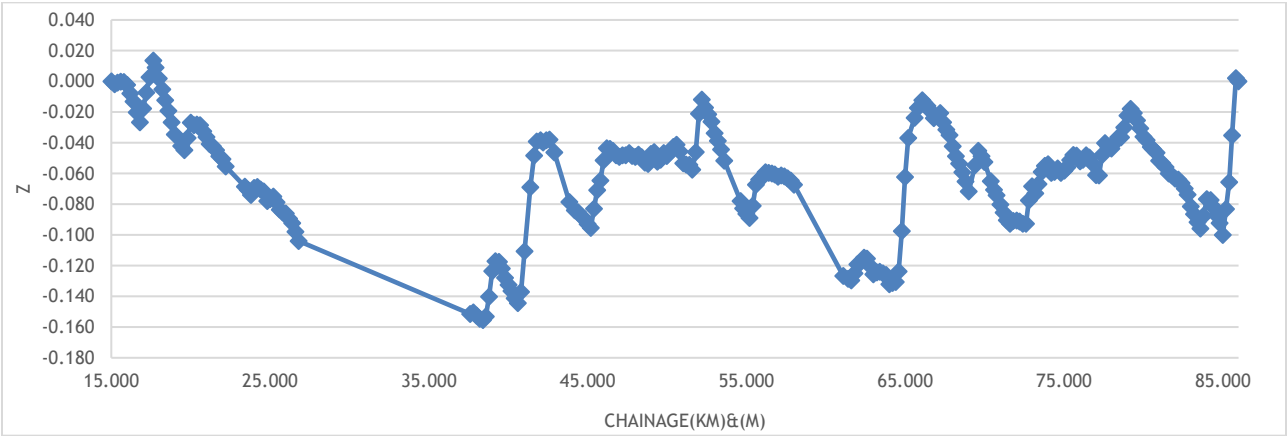
In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road in the month of November 2021. The collected FWD data and analysis is presented in **Appendix 3** of this report.

Few photos taken during the progress of FWD Surveys are presented below:

Deflection Measurement in progress	Maintaining Safety During Survey

The homogenous sections in each direction of traffic (i.e., LHS & RHS) for the project stretch have been identified from graphical representation arrived from cumulative difference method followed by table presentation for the same.

Delineation of Homogeneous Section - LHS



Delineation of Homogeneous Section – RHS

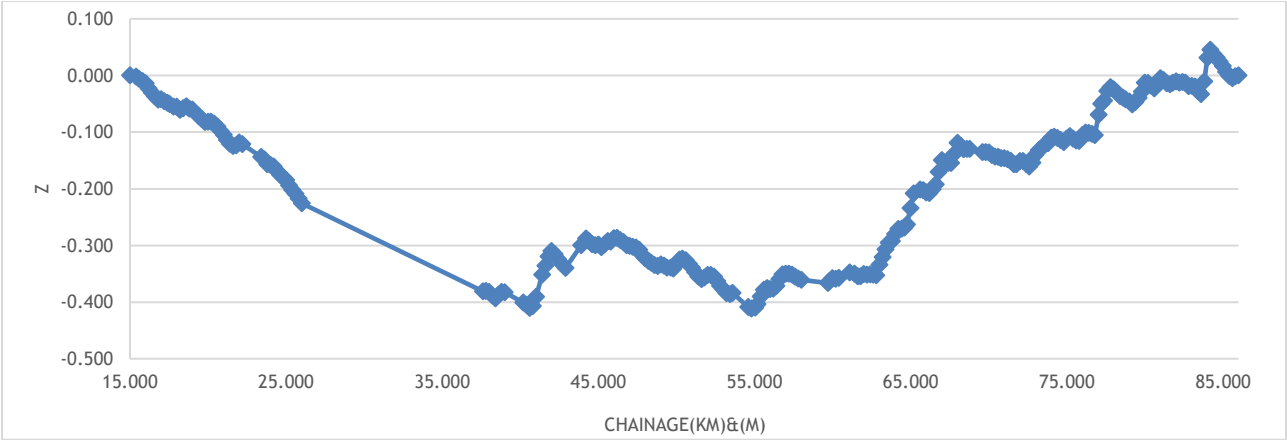


Table 3: FWD Data - Summary of Homogenous Section - LHS & RHS

S. No	From	To	Length (km)	Side
1	15.00	17.65	2.6	LHS
2	17.65	22.20	4.6	LHS
3	22.20	23.40	1.2	LHS
4	23.40	26.80	3.4	LHS
5	26.80	37.60	10.8	LHS
6	37.60	39.20	1.6	LHS
7	39.20	42.90	3.7	LHS
8	42.90	43.85	1.0	LHS
9	43.85	45.00	1.2	LHS
10	45.00	46.00	1.0	LHS
11	46.00	46.80	0.8	LHS

S. No	From	To	Length (km)	Side
12	46.80	47.63	0.8	LHS
13	47.63	49.60	2.0	LHS
14	49.60	50.40	0.8	LHS
15	50.40	51.02	0.6	LHS
16	51.02	52.02	1.0	LHS
17	52.02	53.00	1.0	LHS
18	53.00	53.60	0.6	LHS
19	53.60	54.64	1.0	LHS
20	54.64	55.00	0.4	LHS
21	55.00	56.80	1.8	LHS
22	56.80	58.00	1.2	LHS
23	58.00	61.10	3.1	LHS
24	61.10	64.40	3.3	LHS
25	64.40	65.80	1.4	LHS
26	65.80	66.40	0.6	LHS
27	66.40	67.20	0.8	LHS
28	67.20	69.00	1.8	LHS
29	69.00	70.00	1.0	LHS
30	70.00	71.80	1.8	LHS
31	71.80	74.00	2.2	LHS
32	74.00	74.80	0.8	LHS
33	74.80	75.59	0.8	LHS
34	75.59	76.02	0.4	LHS
35	76.02	79.00	3.0	LHS
38	79.00	81.40	2.4	LHS
1	15.00	18.20	3.2	RHS
2	18.20	22.20	4.0	RHS
3	22.20	23.40	1.2	RHS
4	23.40	26.00	2.6	RHS
5	26.00	37.60	11.6	RHS
6	37.60	39.00	1.4	RHS
7	39.00	40.20	1.2	RHS
8	40.20	42.90	2.7	RHS
9	42.90	43.90	1.0	RHS
10	43.90	45.00	1.1	RHS
11	45.00	46.00	1.0	RHS
12	46.00	46.80	0.8	RHS
13	46.80	47.60	0.8	RHS
14	47.60	49.40	1.8	RHS
15	49.40	50.38	1.0	RHS
16	50.38	51.39	1.0	RHS
17	51.39	52.00	0.6	RHS
18	52.00	53.00	1.0	RHS
19	53.00	53.60	0.6	RHS
20	53.60	54.60	1.0	RHS
21	54.60	54.80	0.2	RHS
22	54.80	56.79	2.0	RHS
23	56.79	58.00	1.2	RHS
24	58.00	59.70	1.7	RHS
25	59.70	60.40	0.7	RHS
26	60.40	61.10	0.7	RHS

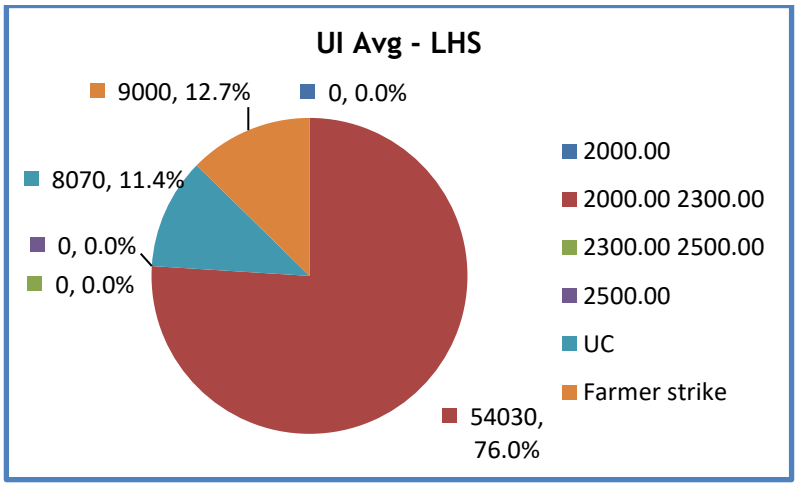
S. No	From	To	Length (km)	Side
27	61.10	64.20	3.1	RHS
28	64.20	67.20	3.0	RHS
31	67.20	68.78	1.6	RHS
32	68.78	69.60	0.8	RHS
33	69.60	70.20	0.6	RHS
34	70.20	71.78	1.6	RHS
35	71.78	74.00	2.2	RHS
36	74.00	74.80	0.8	RHS
37	74.80	75.60	0.8	RHS
38	75.60	76.20	0.6	RHS
39	76.20	77.80	1.6	RHS
40	77.80	78.20	0.4	RHS
41	78.20	79.00	0.8	RHS
42	79.00	81.40	2.4	RHS
43	81.40	82.20	0.8	RHS
44	82.20	86.00	3.8	RHS

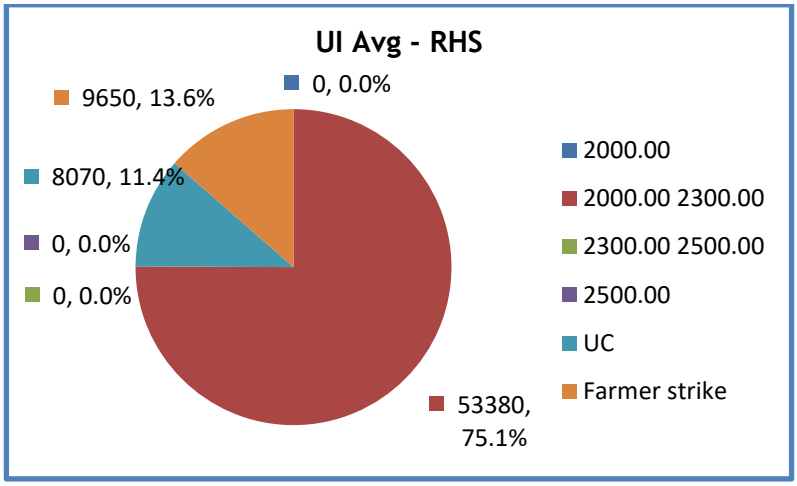
2.5 ROUGHNESS SURVEYS

The Roughness data has been collected using 5th Wheel Bump Indicator and analyzed in terms of International Roughness Index (IRI) in the month of November 2021, 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 IRC-SP:16-2004, Bituminous Concrete pavement surface is considered to be good when its UI value is less than 2000 mm/km and the same is considered to be average for UI values between 2000 and 2500 mm/km whilst the surface is treated as Poor for UI values greater than 2500 mm/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 76% & 75.1% of the length of the Project Road has fair riding quality (UI<2300 mm/km) on left and right carriageways respectively. 11.4% of the project length is under construction on Both Carriageways. The farmer strike is going on project road for which 12.7% on left carriageway and 13.6% right carriageway of the project length the survey could not be conducted.

2.6 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys carried out in the month of November 2021. Test pits have been undertaken at an interval of 5.0 km in each carriageway along the project road. A total of Eleven (11 nos) pits have been dug along the corridor and the data on composition of pavement has been noted. 6 out of 11 pits done on Main Carriageway edge and remaining 4 test pits done on edge of Service Road and 1 test pit on toll plaza. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few photographs are presented below:

Km 61.150 LHS (MP-TP-1)

Km 68.700 LHS (MP-TP-2)

Km 74.400 LHS (MP-TP-3)

Km 83.400 LHS (MP-TP-4)

Km 83.200 RHS (MP-TP-5)

Km 61.200 RHS (MP-TP-6)

Km 56.000 LHS (MP-SR-TP-1)

Km 80.300 RHS (MP-SR-TP-2)

Km 45.450 RHS (MP-SR-TP-3)

Km 42.400 LHS (MP-SR-TP-4)

Km 53.900 RHS (MP-Toll-1)

Results of the test pit survey showing average thickness of pavement layers are presented in the Table below.

Table 4: Pavement Composition of Existing Pavement along Project Road

S. No	Test Pit No	Existing Chainage	Direction	BT (mm)	WMM (mm)	PQC (mm)	DLC (mm)	GSB (mm)	Total (mm)
1	MP-TP-1	61+150	LHS	260	240	-	-	220	**720**
2	MP-TP-2	68+700	LHS	240	240	-	-	280	**760**
3	MP-TP-3	74+400	LHS	180	240	-	-	250	**670**
4	MP-TP-4	83+400	LHS	210	120	-	-	220	**550**
5	MP-TP-5	83+200	RHS	250	240	-	-	230	**720**
6	MP-TP-6	61+200	RHS	270	200	-	-	280	**750**
7	MP-SR-TP-1	56+000	LHS	170	170	-	-	200	**540**
8	MP-SR-TP-2	80+300	RHS	100	130	-	-	300	**530**
9	MP-SR-TP-3	45+450	RHS	50	130	-	-	270	**450**
10	MP-SR-TP-4	42+400	LHS	100	170	-	-	200	**470**
11	MP-TOLL-1	53+900	RHS	-	-	310	160	160	**630**

Total average crust thickness of the MCW pavement is 700mm having bituminous layer thickness of about 215mm. Pavement is mainly composed of a BT layer, WMM & GSB base over subgrade.

2.7 SUBGRADE INVESTIGATIONS & LABORATORY TESTING

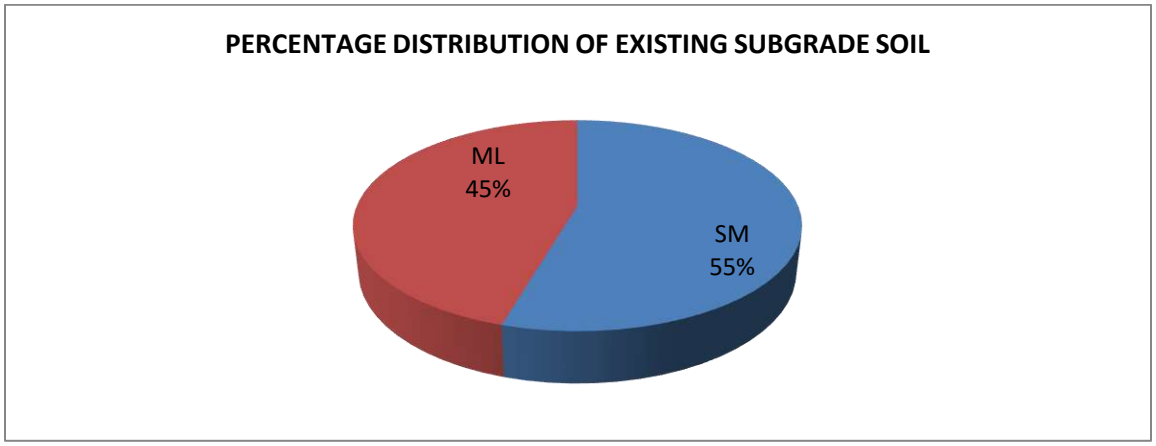
Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 11 test pits have been carefully dug from the pavement surface up to sub-grade level. 6 out of 11 pits done on Main Carriage way edge and remaining 4 test pits done on Service Road edge and one near Toll Plaza location. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978. Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. About 6 Numbers belongs to SM type and 5 Numbers belongs to ML type.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.8 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 in the month of November 2021. 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

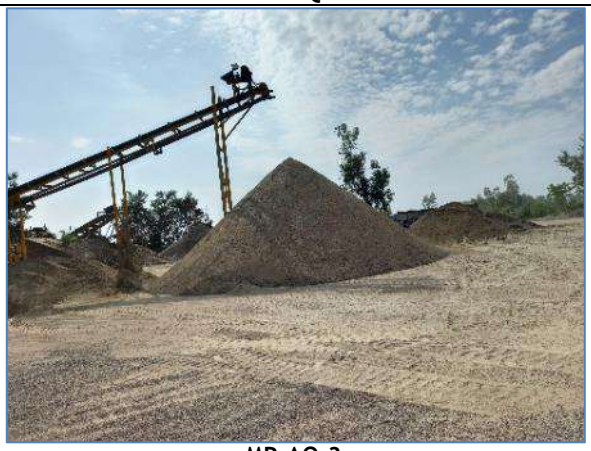
sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks
MP-AQ-1	86+100	RHS	Tapu Majri Yamuna Nagar	Shashank Shekar Stone Crusher Contact Person: Pankaj Chowdary Contact No: 9728315409	110 KM	Plenty	40mm-Rs 430/- per ton 20mm-Rs 450/- per ton 10mm - Rs 480/- per ton 6mm -Rs 470/- per ton	GST 5% and Royalty Extra
MP-AQ-2	86+100	RHS	Tapu Majri Yamuna Nagar	Shiv Shakti Stone Crusher Contact Person: Tapu Ravi Contact no: 8053501857	110 KM	Plenty	40mm-Rs 440/- per ton 20mm-Rs 440/- per ton 10mm - Rs 470/- per ton 6mm -Rs 440/- per ton	GST 5% and Royalty Extra
MP-AQ-3	36+700	LHS	Vill: Kaliyana Charki Dadri	KVR Minerals Pvt. Ltd Contact Person: Kishan Contact no: 8818000054	110 KM	Plenty	VSI Material 40mm-Rs 450/- per ton 20mm-Rs 450/- per ton 10mm - Rs 450/- per ton 6mm -Rs 450/- per ton Dust - Rs 450/- per ton GSB- Rs. 310/- per ton	GST 5% and Royalty Extra
MP-AQ-4	36+700	LHS	Vill: Kaliyana Charki Dadri	Milan Stone Crusher Contact Person: Rajesh Contact no: 9813406818	110 KM	Plenty	40mm-Rs 370/- per ton 20mm-Rs 370/- per ton 10mm - Rs 360/- per ton 6mm -Rs 350/- per ton Dust - Rs 350/- per ton	GST 5% and Royalty Extra

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
MP-AQ-5	36+700	LHS	Vill: Nawal Kushal Pura Kotputli	National Stone Crusher Contact Person: Shri Baan Contact no: 8094444910	190 KM	Plenty	20mm-Rs 430/- per ton 10mm - Rs 330/- per ton 6mm -Rs 350/- per ton Dust - Rs 170/- per ton	GST 5% and Royalty Extra
MP-AQ-6	36+700	LHS	Vill: Nawal Kushal Pura Kotputli	Sri Kunj Bihari Stone Crusher Contact Person: Suresh Saradhana Contact no: 9929989496	190KM	Plenty	20mm-Rs 450/- per ton 10mm - Rs 330/- per ton Dust- Rs. 180/- per ton	GST 5% and Royalty Extra
MP-AQ-7	36+700	LHS	Vill: Dokan	Sri Krishna Stone Crusher Contact Person: Kishan Contact no: 9772651271	220KM	Plenty	20mm-Rs 420/- per ton 10mm - Rs 280/- per ton Dust- Rs 140/ per ton	GST 5% an Royalty Extra
MP-AQ-8	36+700	LHS	Vill: Dokan	Sitaram Infracon Pvt. LtdContact Person: Navneeth Contact no: 6378116403	220 KM	Plenty	20mm-Rs 420/- per ton10mm - Rs 320/- per tonDust- Rs 170/ per ton	GST 5% and Royalty Extra
MP-AQ-9	36+700	LHS	Vill: Jhunjhunu	Jai Hindusthan Stone Crusher Contact Person: Devender Contact no: 9414080827	230 KM	Plenty	40mm- Rs. 420/- per ton 20mm-Rs 432/- per ton 10mm - Rs 432/- per ton Dust- Rs. 460/- per ton	GST 5% and Royalty Extra
MP-AQ-10	36+700	LHS	Vill: Jhunjhunu	Shri Ram Sharan Stone Crusher Contact Person: Contact no: 8955125207	230 KM	Plenty	40mm- Rs. 450/- per ton 20mm-Rs 462.50/- per ton 10mm - Rs 475/- per ton Dust- Rs. 475/- per ton	GST 5% and Royalty Extra
MP-AQ-11	36+700	LHS	Vill: Jhunjhunu	Siddi Vinayaka Stone Crusher Contact Person: Pavan Singhal Contact no: 9254120528	230 KM	Plenty	40mm- Rs. 450/- per ton 20mm-Rs 460- per ton 10mm - Rs 460/- per ton Dust- Rs. 460/- per ton	GST 5% and Royalty Extra

Sample photos of aggregate quarry locations are presented below.

MP-AQ-1

MP-AQ-2



MP-AQ-3

MP-AQ-4

MP-AQ-5

MP-AQ-6

MP-AQ-7

MP-AQ-8

River sand and M-sand sample have been collected from the following locations and necessary details are presented below.

Table 6: Sand Samples Details

sample No.	Ex. Chainage (Km.)	Left/ Right	Contact Details	Name of River	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks
MP-SQ-1	41+200	RHS	Contact Person: Rakesh Sharma Contact No: 9306686849 Village-Nadnor Sonipat	Yamuna	13.2 KM	Plenty	Sand Rs. -14/- Per cft	GST Rs-150/- Per ton
MP-SQ-2	86+100	RHS	Contact Person: Rahul Contact No: 8814000783 Faridapur Panipat	Yamuna	23 km	Plenty	Sand Rs. 425/- per ton	
MP-SQ-3	86+100	RHS	Contact Person: Pankaj Chowdary Contact No: 9728315409 Tapu Majri Yamuna Nagar	Yamuna	130 KM	Plenty	Sand Rs. 400/- per ton	GST 5% and Royalty Extra
MP-M-SAND-1	86+100	RHS	Tapu Majri Yamuna Nagar	Shashank Shekar Stone Crusher Contact Person: Pankaj Chowdary Contact No: 9728315409	110 KM	Plenty	M. Sand-Rs 550/- per ton	GST 5% and Royalty Extra
MP-M-SAND-5	36+700	LHS	Vill: Nawal Kushal Pura Kotputli	National Stone Crusher Contact Person: Shri Baan Contact no: 8094444910	190 KM	Plenty	M. Sand-Rs. 700/- per ton	GST 5% and Royalty Extra
MP-M-SAND-7	36+700	LHS	Vill: Dokan	Sri Krishna Stone Crusher Contact Person: Kishan Contact no: 9772651271	220KM	Plenty	M. sand-Rs. 380/- per ton	GST 5% and Royalty Extra

Sample photos of sand source locations are presented below

MP-SQ-1

MP-SQ-2

MP-SQ-3

MP-M Sand-1

MP-M Sand-5

MP-M Sand-7

2.9 AXLE LOAD SURVEYS

Traffic loading has a significant impact on pavement performance and design. The damage that vehicles create to a road depends very strongly on the axle loads of the vehicles.

Axle load study has been conducted using portable axle load pads. Surveys have been conducted on the Project Road at one location one at Km 54.600 on 27.11.2021 and 28.11.2021. 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

Details of Standard Axles Used

Axle Configuration	Standard Axle load (Tonnes)*	Remarks
Single Wheel, Single Axle	6.60	As per IRC 37-2018
Dual Wheel, Single Axle	8.16	As per IRC 37-2018
Dual Wheel, Tandem Axle group	15.10	As per IRC 37-2018
Dual Wheel, Tridem Axle group	22.90	As per IRC 37-2018

Few photographs illustrating the survey locations and axle load measurements are presented below.

Survey in Progress at Toll Plaza Location

Survey in Progress at Toll Plaza Location

Survey in Progress at Toll plaza Location

Survey in Progress at Toll plaza Location

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 7: VDF Values Estimated at the Toll Plaza Location (Near Chainage km 54+600)

Mode Type	UP	DOWN
LCV	0.090	0.160
2 Axle Truck	1.190	1.060
3 Axle Truck	2.110	5.370
MAV (4-6 Axle)	10.290	9.660
Buses	0.310	0.360

CHAPTER 3. VALIDATION OF EXECUTED WORKS

3.1 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground. As a part of the validation, the available as-built drawings and the inventory data received from the Concessionaire were also referred. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the executed works on ground..

Table 8: Executed works

S. No	Description	Unit	As per Site
1	Start Chainage (Km)	Km.	15.000
2	End chainage (Km)	Km.	86.100
3	Length of the Project Corridor	Km's	71.100
4	Service / Slip	Km's	111.200
5	Toll Plaza	Nos	1
6	No. of Lanes	Nos	26
7	Flyovers	Nos	18 (3 existing, 6 COS, 1 extra found at site, 8 out of 10 as per Sch-B)
8	Uni Directional Flyovers	Nos	-
9	Overpass	Nos	-
10	VUPs	Nos	21 (3 existing, 14 COS, 4 out of 5 as per Sch-B)
11	LVUP's	Nos	-
12	PUP's	Nos	13 (3 existing, 4 COS, 6 as per Sch-B)
13	CUP's	Nos	1 (1 no deleted)
14	FOBs	Nos	6 (1 COS, 5 out of 11 as per Sch-B)
15	Major Bridges	Nos	1
16	Minor Bridges	Nos	18
17	Culverts (Pipe)	Nos	33
18	Culvert (Slab/Box)	Nos	Slab-4 /Box-42
19	Major Junctions	Nos	13
20	Minor junctions	Nos	22
21	RCC Wall	Kms	4.230
22	RE Wall (BHS)	Kms	28.040
23	Only Bus Shelter	Nos	53
24	No of Truck Lay bye	Nos	-
25	Rest Areas	Nos	-
26	High Mast Lights	Nos	18
27	Highway Lighting (length only)	Kms	54
28	Single Arm Lightnings	Nos	496
29	Double Arm Lightnings	Nos	827

S. No	Description	Unit	As per Site
30	Solar Blinkers	Nos.	24
31	Underpasses Lighting	Nos.	199
32	RCC Cover Drain	Kms	118.630
33	RCC Open Lined Drain	Kms	5.275
34	Earthen Drain	Kms	3.430
35	Median Kerb Damages	Kms	96.0
36	Road Markings	Sqm	78.600
37	W-Beam Safety Barriers (BHS)	Kms	83.575
38	Rigid Concrete Barrier	Kms	30.145
39	Hand Railing	Kms	5.150
40	Pedestrian Guard Rails	Kms	35.640
41	Kilometer Stones	Nos	75
42	Road Signs	Nos	244
43	Gantry Sign Boards	Nos	2
44	Cantilever Sign Boards	Nos	19
45	VMS	Nos	2
46	Approaches	Kms	32.270
47	Underpasses Lighting	Nos.	199

The project corridor appears to have been constructed with the cross-sectional elements matching to those given in the manual at the time of execution. The carriageway width of 14m plus paved shoulders of 1.5m and a shyness of 0.5m has been provided over the entire length except at structures.

In the project stretch, the Service/Slip Roads with an overall both side length of 111.200 km have been observed. Location-wise details of service roads and slip roads presented in **Appendix 6** of this report.

Lined Covered drains in a length of 118.630 km are provided. And open lined drains and earthen drains are provided in a length of 5.275 km and 3.430 km respectively along the Project corridor. The location and condition details for the same are presented in **Appendix 6** of this report and its summary is tabulated below.

Table 9: Drain lengths along Project Road

S. No	Length	RCC Cover Drain	RCC Open Drain	Earthen Drain
1	LHS (km)	61.285	4.700	3.230
2	Median (km)	-	-	-
3	RHS (km)	57.345	0.575	0.200
Total length (km)		118.630	5.275	3.430

RE walls & RCC walls are provided in approaches of underpasses along the Project Corridor. Summary of the embankment slope details are given below

Table 10: Summary of Type of Slope Details

Type of slope Protection	Length km
RE Wall	28.040
RCC Wall	4.230

Median width varying from 1m to 1.5m was generally adopted along the project road. No Median openings are provided.

Solar Blinkers are provided in 36 nos. at most of the major junction locations. The location-wise details are presented in the **Appendix 6** of this report.

Safety barriers have been provided along the project road at high embankment, sharp curves, on the approaches to the grade-separator and cross drainage structures. The summary of safety barriers provided along the corridor are presented in the following table and the location wise details are presented in **Appendix 6** of this report:

Table 11: Summary of Safety Barriers along Project Road

S. No	Safety Barrier	Length (km)
1	Metal Beam Crash Barrier	83.575
2	Concrete Crash Barrier	30.145
3	Pedestrians Guard Rail	35.640
4	Metal Hand Rail	5.150

There are 13 major and 22 Minor Junction along the Project Corridor. Summary of Junctions are presented in table below and the location wise details are presented in **Appendix 6**

Table 12: List of Junctions along Project Road

S. No	Type	No's
1	Major junctions	13
2	Minor Junctions	22

Road furniture in the form of Signboards (Information, Gantry, Cantilever signs and Toll Boards) Pavement Markings, Delineators, Guard Posts and Highway Lighting have been provided along the project road. The Tables below depict the particular details of the Road Furniture.

Table 13: Details of Road Signs along Project Road

S. No	Sign Description	LHS (Nos)	RHS (Nos)	Total (Nos)
1	Octagonal	2	0	**2**
1	Circular	24	32	**56**
2	Triangular	27	26	**53**
3	Rectangular	21	34	**55**
4	Chevron	7	22	**29**
5	Hazard	17	18	**35**
6	Toll Boards	8	6	**14**

S. No	Sign Description	LHS (Nos)	RHS (Nos)	Total (Nos)
7	Cantilever Gantry	6	13	**19**
8	Over Head Gantry	2	0	**2**
Total		**114**	**151**	**265**

High mast lighting is provided at 18 locations mainly at intersections and Toll Plaza locations. Highway Lighting is provided on Median and on service road over a total length of 48.490 km. Lighting with 827 No's of Double arm poles are provided in length of 34.840 km and with 496 No's of Single arm poles over a length of 15.550 km. The location wise details of high mast and highway lighting are presented in **Appendix 6** of this report

The Project Road has about 53 Bus Shelters on Service Road. The details of the same are presented in **Appendix 6** of this report.

3.2 STRUCTURES

List of major structures found during the inventory surveys along the corridor are as follows:

Table 14: List of Major Structures along Project Road

S No.	Design Chainage (km)	Type of Str.	Side	Str. on	Age of Structure	Span Arrangement (No x Length, m)	Deck Width (m)
1	17+065	VUP	LHS	MCW	Old	2 x 10 x 4.5	20
2	17+065	VUP	RHS	MCW	Old	2 x 10 x 4.5	20
3	17+650	FOB	BHS	MCW	Old	2 x 30	3.5
4	18+640	MNB	LHS	SR	Old	3.3 + 3.2 + 3.3	14
5	18+640	MNB	LHS	MCW	Old	3.6 + 3.4 + 3.6	16.9
6	18+640	MNB	RHS	MCW	Old	3.6 + 3.4 + 3.6	16.9
7	18+640	MNB	RHS	SR	Old	3.3 + 3.2 + 3.3	10
8	19+248	VUP	LHS	MCW	Old	2 x 10 x 4.5	21.4
9	19+248	VUP	RHS	MCW	Old	2 x 10 x 4.5	21.4
10	19+500	FOB	BHS	MCW	New	2 x 36.5	3.5
11	20+271	PUP	LHS	MCW	Old	1 x 6 x 3.5	19
12	20+271	PUP	RHS	MCW	Old	1 x 6 x 3.5	19
13	20+450	MNB	LHS	SR	Old	3 x 10.6	10.5
14	20+450	MNB	LHS	MCW	Old	3 x 10.6	15
15	20+450	MNB	RHS	MCW	Old	3 x 10.6	15
16	20+450	MNB	RHS	SR	Old	3 x 10.6	7.9
17	21+753	VUP	LHS	MCW	Old	2 x 10 x 4.5	19
18	21+753	VUP	RHS	MCW	Old	2 x 10 x 4.5	19
19	22+746	MNB	LHS	SR	New	7.71 + 7.7 + 7.71	10.2
20	22+746	MNB	LHS	MCW	New	7.71 + 7.7 + 7.71	16.9
21	22+746	MNB	RHS	MCW	New	7.71 + 7.7 + 7.71	16.9
22	22+746	MNB	RHS	SR	New	7.71 + 7.7 + 7.71	11.5
23	22+805	Flyover	LHS	MCW	New	1 x 30	16.9
24	22+805	Flyover	RHS	MCW	New	1 x 30	16.9
25	24+000	FOB	BHS	MCW	New	2 x 48	3.5
26	24+800	MNB	LHS	SR	New	7.31 + 7.2 + 7.31	10.2
27	24+800	MNB	LHS	MCW	Old	7.5 + 7.2 + 7.5	18.2
28	24+800	MNB	RHS	MCW	Old	7.85 + 7.5 + 7.85	15.5
29	24+800	MNB	RHS	SR	Old	7.85 + 7.5 + 7.85	18
30	26+450	Flyover	LHS	MCW	New	2 x 30	16.9

S No.	Design Chainage (km)	Type of Str.	Side	Str. on	Age of Structure	Span Arrangement (No x Length, m)	Deck Width (m)
31	26+450	Flyover	RHS	MCW	New	2 x 30	16.9
32	27+405	Flyover	LHS	MCW	New	36.7+47.2+32.2	16.9
33	27+405	Flyover	RHS	MCW	New	36.7+47.2+32.2	16.9
34	28+520	MNB	LHS	SR	New	6.71 + 6.6 + 6.71	10.2
35	28+520	MNB	LHS	MCW	Old	6.9 + 6.6 + 6.9	16.9
36	28+520	MNB	RHS	MCW	Old	6.9 + 6.6 + 6.9	16.9
37	28+520	MNB	RHS	SR	New	6.71 + 6.6 + 6.71	10.2
38	28+530	FOB	BHS	MCW	New	2 x 34.4	3.5
39	29+160	Flyover	LHS	MCW	New	5 x 30	16.9
40	29+160	Flyover	RHS	MCW	New	5 x 30	16.9
41	30+667	Flyover	LHS	MCW	New	1 x 30	16.9
42	30+667	Flyover	RHS	MCW	New	1 x 30	16.9
43	30+925	MNB	LHS	SR	New	3 x 7	12.3
44	30+925	MNB	LHS	MCW	New	3 x 7	16.9
45	30+925	MNB	RHS	MCW	New	3 x 7	16.9
46	30+925	MNB	RHS	SR	New	3 x 7	12.3
47	31+329	Flyover	LHS	MCW	New	1 x 30	16.9
48	31+329	Flyover	RHS	MCW	New	1 x 30	16.9
49	31+900	PUP	LHS	MCW	New	1 x 12 x 3.5	16.9
50	31+900	PUP	RHS	MCW	New	1 x 12 x 3.5	16.9
51	32+275	MJB	LHS	SR	New	20 + 30 + 20	12
52	32+275	MJB	LHS	MCW	Old	7 x 10	10.22
53	32+275	MJB	LHS	MCW	Old	20 + 30 + 20	9.88
54	32+275	MJB	RHS	MCW	Old	20 + 30 + 20	9.66
55	32+275	MJB	RHS	MCW	Old	7 x 10	10.95
56	32+275	MJB	RHS	SR	New	20 + 30 + 20	12
57	33+596	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
58	33+596	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
59	34+240	MNB	LHS	SR	New	1 x 8.9	10.2
60	34+240	MNB	LHS	MCW	New	1 x 8.9	16.9
61	34+240	MNB	RHS	MCW	New	1 x 8.9	16.9
62	34+240	MNB	RHS	SR	New	1 x 8.9	10.2
63	35+025	Flyover	LHS	MCW	New	1 x 30	16.9
64	35+025	Flyover	RHS	MCW	New	1 x 30	16.9
65	35+812	MNB	LHS	SR	New	8.4 + 8 + 8.4	10.2
66	35+812	MNB	LHS	MCW	New	8.4 + 8 + 8.4	16.9
67	35+812	MNB	RHS	MCW	New	8.4 + 8 + 8.4	16.9
68	35+812	MNB	RHS	SR	New	8.4 + 8 + 8.4	10.2
69	36+900	Flyover	LHS	MCW	New	2 x 30	16.9
70	36+900	Flyover	RHS	MCW	New	2 x 30	16.9
71	37+780	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
72	37+780	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
73	37+900	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
74	37+900	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
75	37+915	VUP	LHS	MCW	New	1 x 15 x 5.5	16.9
76	37+915	VUP	RHS	MCW	New	1 x 15 x 5.5	16.9
77	38+825	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
78	38+825	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
79	41+215	Flyover	LHS	MCW	Old	3 x 45	16.9

S No.	Design Chainage (km)	Type of Str.	Side	Str. on	Age of Structure	Span Arrangement (No x Length, m)	Deck Width (m)
80	41+215	Flyover	RHS	MCW	Old	3 x 45	16.9
81	42+331	MNB	LHS	SR	New	2 x 8.9	10.2
82	42+331	MNB	LHS	MCW	New	2 x 8.9	16.9
83	42+331	MNB	RHS	MCW	New	2 x 8.9	16.9
84	42+331	MNB	RHS	SR	New	2 x 8.9	10.2
85	43+395	Flyover	LHS	MCW	New	1 x 30	16.9
86	43+395	Flyover	RHS	MCW	New	1 x 30	16.9
87	43+734	MNB	LHS	SR	New	1 x 7.8	12.3
88	43+734	MNB	LHS	MCW	New	1 x 7.8	16.9
89	43+734	MNB	RHS	MCW	New	1 x 7.8	16.9
90	43+734	MNB	RHS	SR	New	1 x 7.8	12.3
91	44+043	MNB	LHS	SR	New	1 x 7.1	10.2
92	44+043	MNB	LHS	MCW	New	1 x 7.1	16.9
93	44+043	MNB	RHS	MCW	New	1 x 7.1	16.9
94	44+043	MNB	RHS	SR	New	1 x 7.1	10.2
95	45+606	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
96	45+606	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
97	45+619	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
98	45+619	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
99	47+290	PUP	LHS	MCW	New	1 x 12 x 4	16.9
100	47+290	PUP	RHS	MCW	New	1 x 12 x 4	16.9
101	47+415	MNB	LHS	SR	New	1 x 7.1	12.3
102	47+415	MNB	LHS	MCW	New	1 x 7.1	16.9
103	47+415	MNB	RHS	MCW	New	1 x 7.1	16.9
104	47+415	MNB	RHS	SR	New	1 x 7.1	12.3
105	48+600	Flyover	LHS	MCW	Old	22+41+22	16.9
106	48+600	Flyover	RHS	MCW	Old	22+41+22	16.9
107	50+050	PUP	LHS	MCW	New	1 x 12 x 4	16.9
108	50+050	PUP	RHS	MCW	New	1 x 12 x 4	16.9
109	50+097	VUP	LHS	MCW	New	1 x 15 x 5.5	16.9
110	50+097	VUP	RHS	MCW	New	1 x 15 x 5.5	16.9
111	50+112	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
112	50+112	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
113	50+127	VUP	LHS	MCW	New	1 x 15 x 5.5	16.9
114	50+127	VUP	RHS	MCW	New	1 x 15 x 5.5	16.9
115	51+840	PUP	LHS	MCW	New	1 x 12 x 4	16.9
116	51+840	PUP	RHS	MCW	New	1 x 12 x 4	16.9
117	53+415	PUP	LHS	MCW	New	1 x 12 x 3	16.9
118	53+415	PUP	RHS	MCW	New	1 x 12 x 3	16.9
119	55+440	CUP	LHS	MCW	New	1 x 12 x 3.5	16.9
120	55+440	CUP	RHS	MCW	New	1 x 12 x 3.5	16.9
121	55+591	MNB	LHS	SR	New	1 x 7.6	12.3
122	55+591	MNB	LHS	MCW	New	1 x 7.6	16.9
123	55+591	MNB	RHS	MCW	New	1 x 7.6	16.9
124	55+591	MNB	RHS	SR	New	1 x 7.6	12.3
125	56+371	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
126	56+371	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
127	56+800	FOB	BHS	MCW	New	2 x 30	3.5
128	58+515	Flyover	LHS	MCW	New	1 x 30	16.9
129	58+515	Flyover	RHS	MCW	New	1 x 30	16.9
130	59+100	PUP	LHS	MCW	New	1 x 12 x 3.5	16.9

S No.	Design Chainage (km)	Type of Str.	Side	Str. on	Age of Structure	Span Arrangement (No x Length, m)	Deck Width (m)
131	59+100	PUP	RHS	MCW	New	1 x 12 x 3.5	16.9
132	59+407	MNB	LHS	SR	New	2 x 10.3	10.2
133	59+407	MNB	LHS	MCW	New	2 x 10.3	16.9
134	59+407	MNB	RHS	MCW	New	2 x 10.3	16.9
135	59+407	MNB	RHS	SR	New	2 x 10.3	10.2
136	61+000	Flyover	LHS	MCW	New	2 x 30	16.9
137	61+000	Flyover	RHS	MCW	New	2 x 30	16.9
138	61+500	PUP	LHS	MCW	Old	1 x 8.25 x 3.5	12
139	61+500	PUP	RHS	MCW	Old	1 x 8.25 x 3.5	12
140	61+725	MNB	LHS	SR	New	1 x 7.42	10.2
141	61+725	MNB	LHS	MCW	Old	3 x 2	12.5
142	61+725	MNB	RHS	MCW	Old	3 x 2	12.5
143	61+725	MNB	RHS	SR	New	2.2+2.62+2.52	14.53
144	62+100	Flyover	LHS	MCW	Old	22+37+22	16.9
145	62+100	Flyover	RHS	MCW	Old	22+37+22	16.9
146	64+875	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
147	64+875	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
148	65+071	MNB	LHS	SR	New	1 x 7.7	12.3
149	65+071	MNB	LHS	MCW	New	1 x 7.7	16.9
150	65+071	MNB	RHS	MCW	New	1 x 7.7	16.9
151	65+071	MNB	RHS	SR	New	1 x 7.7	12.3
152	65+410	Flyover	LHS	MCW	New	1 x 30	16.9
153	65+410	Flyover	RHS	MCW	New	1 x 30	16.9
154	65+872	MNB	LHS	SR	New	1 x 6.82	10.2
155	65+872	MNB	LHS	MCW	New	1 x 6.82	16.9
156	65+872	MNB	RHS	MCW	New	1 x 6.82	16.9
157	65+872	MNB	RHS	SR	New	1 x 6.82	10.2
158	65+920	FOB	BHS	MCW	New	2 x 29.3	3.5
159	66+872	PUP	LHS	MCW	New	1 x 12 x 4	16.9
160	66+872	PUP	RHS	MCW	New	1 x 12 x 4	16.9
161	68+955	VUP	LHS	MCW	New	1 x 15 x 5.5	16.9
162	68+955	VUP	RHS	MCW	New	1 x 15 x 5.5	16.9
163	69+105	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
164	69+105	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
165	69+231	MNB	LHS	SR	New	9.2+9.4+9.2	12.3
166	69+231	MNB	LHS	MCW	New	9.2+9.4+9.2	16.9
167	69+231	MNB	RHS	MCW	New	9.2+9.4+9.2	16.9
168	69+231	MNB	RHS	SR	New	9.2+9.4+9.2	12.3
169	69+850	VUP	LHS	MCW	New	1 x 12 x 4.5	16.9
170	69+850	VUP	RHS	MCW	New	1 x 12 x 4.5	16.9
171	72+400	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
172	72+400	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
173	73+100	Flyover	LHS	MCW	Old	6 x 36	16.9
174	73+100	Flyover	RHS	MCW	Old	6 x 36	16.9
175	73+700	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
176	73+700	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9
177	75+300	PUP	LHS	MCW	New	1 x 12 x 4	16.9
178	75+300	PUP	RHS	MCW	New	1 x 12 x 4	16.9
179	77+416	PUP	LHS	MCW	New	1 x 12 x 4	16.9
180	77+416	PUP	RHS	MCW	New	1 x 12 x 4	16.9
181	78+735	PUP	LHS	MCW	New	1 x 12 x 4.5	16.9
182	78+735	PUP	RHS	MCW	New	1 x 12 x 4.5	16.9
183	81+934	VUP	LHS	MCW	New	1 x 12 x 5.5	16.9
184	81+934	VUP	RHS	MCW	New	1 x 12 x 5.5	16.9

S No.	Design Chainage (km)	Type of Str.	Side	Str. on	Age of Structure	Span Arrangement (No x Length, m)	Deck Width (m)
185	83+830	PUP	LHS	MCW	Old	1 x 8.4 x 4.2	16
186	83+830	PUP	RHS	MCW	Old	1 x 8.4 x 4.2	16
187	84+600	Flyover	LHS	MCW	New	2 x 30	16.9
188	84+600	Flyover	RHS	MCW	New	2 x 30	16.9
189	85+744	Flyover	LHS	MCW	New	1 x 30	16.9
190	85+744	Flyover	RHS	MCW	New	1 x 30	16.9
191	86+333	FOB	BHS	MCW	New	2 x 26.5	3.5

3.3 PENDING & MISSING WORKS

- ✓ 9 Nos of Flyovers are under construction and 4 No's of Flyovers not yet started at site.
- ✓ 3 Nos of VUP's are under construction at site.
- ✓ 2 Nos of PUP's Under Construction at site.
- ✓ 1 No of Major bridge (SR) not yet started at site which is under COS.
- ✓ 6 Nos of FOB's not yet started at site and R&R for 1 No. of FOB at site.
- ✓ 5 Nos of Minor bridges Under Construction and 1 No. (SR) of Minor bridge Not yet started (Reconstruction at LHS SR and Widening at RHS SR) at site.

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 and clay of low 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 is in good condition as revealed by test pit investigations. Laboratory results conducted on subgrade indicates that most of subgrade soils are of SM & ML type with no PI values. 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 five locations. Results of Subgrade CBR are as follows:

Table 15: 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 (%)	Soaked CBR 97% MDD	FDD	% Compaction	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 %										
MP-TP-1	61+150	LHS	96	92	46	4	50	-	NP	NP	SM	1.96	10.60	7.69	1.78	91	10.00
MP-TP-2	68+700	LHS	97	91	61	3	36	-	NP	NP	ML	2.01	8.80	8.47	1.83	91	9.09
MP-TP-3	74+400	LHS	100	99	63	0	37	-	NP	NP	ML	2.06	8.80	14.01	1.85	90	4.76
MP-TP-4	83+400	LHS	99	95	62	1	37	-	NP	NP	ML	1.07	29.80	6.57	1.05	98	0.00
MP-TP-5	83+200	RHS	100	96	44	0	56	-	NP	NP	SM	2.02	8.60	12.94	1.76	87	0.00
MP-TP-6	61+200	RHS	100	99	38	0	62	-	NP	NP	SM	1.95	9.80	10.08	1.84	94	0.00
MP-SR-TP-1	56+000	LHS	99	97	77	1	22	-	NP	NP	ML	1.85	12.80	7.01	1.58	85	0.00
MP-SR-TP-2	80+300	RHS	100	100	45	0	55	-	NP	NP	SM	2.04	8.60	16.79	1.72	84	0.00
MP-SR-TP-3	45+450	RHS	98	95	38	2	60	-	NP	NP	SM	1.84	11.00	6.86	1.68	92	0.00
MP-SR-TP-4	42+400	LHS	100	99	76	0	24	-	NP	NP	ML	1.96	10.40	9.03	1.68	86	0.00
MP-TOLL-1	53+900	RHS	95	88	41	5	54	-	NP	NP	SM	1.99	9.60	20.76	1.79	90	0.00

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 1.07 and 2.06 gm/cc. Out of 11 samples, 10 samples satisfying the MDD criterion (MDD>=1.75 gm/cc)
- OMC for existing subgrade samples varies between 8.6% to 29.80%.
- Free Swelling Index for existing subgrade samples varies between 0 to 10.0. All the 11 samples are satisfying the FSI criterion (FSI<=50%).

On whole, it can be concluded that the existing subgrade is in fair condition.

The test results and photographs are presented at **Appendix 7** of this report.

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 16: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	LHS/RHS	A.I.V (%)	Water Absorption (%)	Specific Gravity	Remarks
1	MP-AQ-1	86+100	RHS	13.03	0.40	2.65	
2	MP-AQ-2	86+100	RHS	9.90	0.28	2.67	
3	MP-AQ-3	36+700	LHS	9.63	0.36	2.61	
4	MP-AQ-4	36+700	LHS	14.66	0.28	2.62	
5	MP-AQ-5	36+700	LHS	15.56	0.23	2.76	
6	MP-AQ-6	36+700	LHS	9.54	0.33	2.66	
7	MP-AQ-7	36+700	LHS	14.08	0.26	2.79	
8	MP-AQ-8	36+700	LHS	8.01	0.24	2.67	
9	MP-AQ-9	36+700	LHS	23.81	0.15	2.75	
10	MP-AQ-10	36+700	LHS	11.73	0.20	2.74	
11	MP-AQ-11	36+700	LHS	9.1	0.26	2.77	

Note: Aggregate samples are satisfying MORTH requirements

Table 17: 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
1	MP-M-SAND-1	86+100	RHS	100	75	67	60	55	32	7	3.05
2	MP-M-SAND-5	36+700	LHS	100	96	66	39	31	19	7	3.41
3	MP-M-SAND-7	36+700	LHS	100	98	69	44	34	20	7	3.28

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
4	MP-SQ-1	41+200	RHS	100	99	98	97	96	62	7	1.40
5	MP-SQ-2	86+100	RHS	100	100	99	98	97	50	6	1.51
6	MP-SQ-3	86+100	RHS	97	93	90	85	76	43	8	2.09
7	MP-SQ-3 (Screening)	86+100	RHS	100	97	93	88	79	38	4	2.00

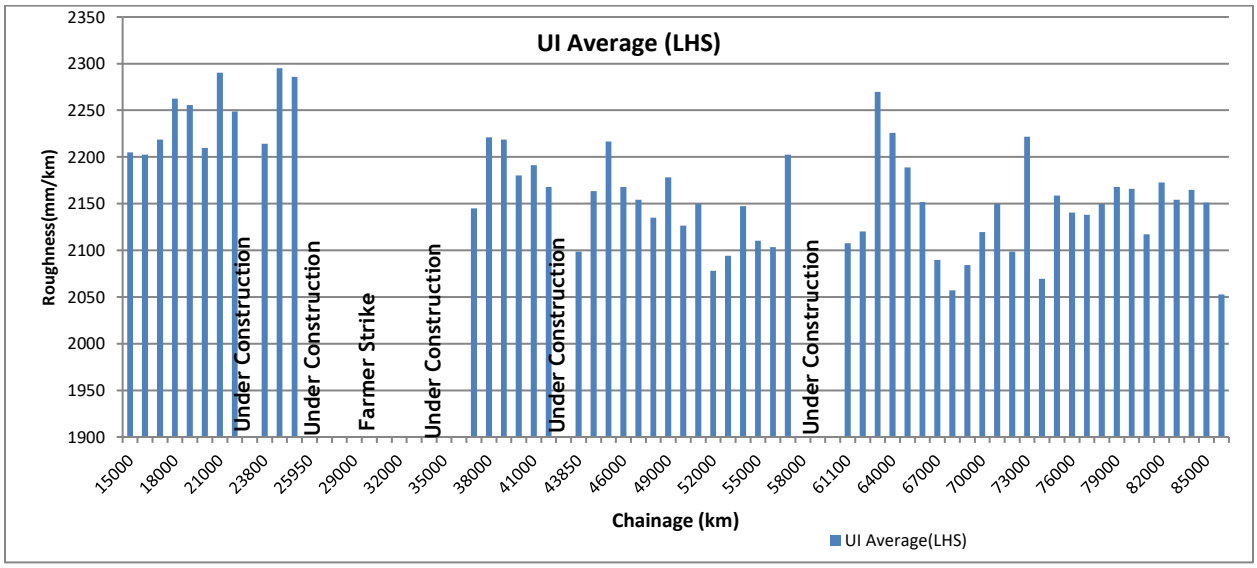
4.2 PAVEMENT CONDITION

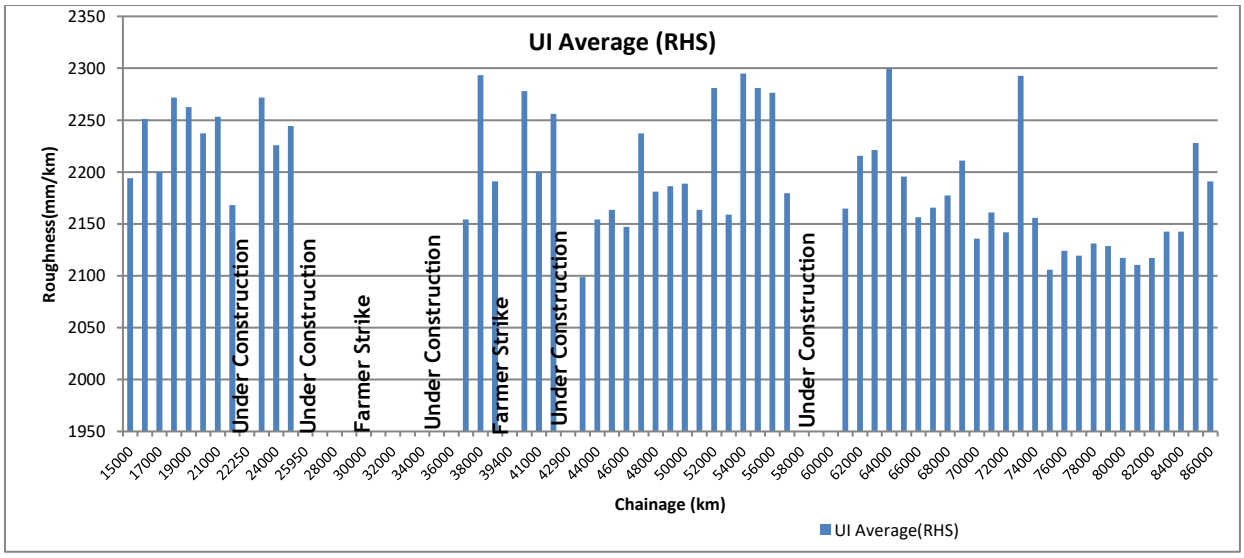
The distresses in bituminous surface have been captured on the project corridor for each lane separately by visual observation. Pavement Condition report covering the data collection for each km length in each direction has been presented in the **Appendix-2** of this report.

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. Presently, the construction work in progress over existing main carriageway & service road, about 70% length has been completed and surface appears to be intact without any major distresses. However, minor raveling and rutting is observed.

4.3 ROUGHNESS

Almost entire project road is having Good to Fair riding quality. From the above charts, overlay not required on LHS & RHS carriageway unevenness Index (UI) is less than 2500mm/km. Bar diagrams showing the Kilometer wise roughness along the project road are presented below:





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 18: Summary of Design Moduli of different layers – LHS

S. No	Chainage (km)		Length (km)	15th Percentile MR values (MPa)		
	From	To		MR for BT	MR for Granular	MR for Subgrade
1	15.00	17.65	2.6	2072	377	86
2	17.65	22.20	4.6	2254	391	86
3	22.20	23.40	1.2	Under construction		
4	23.40	26.80	3.4	2757	391	86
5	26.80	37.60	10.8	Farmer strike		
6	37.60	39.20	1.6	2434	270	86
7	39.20	42.90	3.7	2411	392	86
8	42.90	43.85	1.0	Under construction		
9	43.85	45.00	1.2	2389	393	86
10	45.00	46.00	1.0	1781	291	87
11	46.00	46.80	0.8	2451	216	86
12	46.80	47.63	0.8	2297	278	87
13	47.63	49.60	2.0	1853	392	86
14	49.60	50.40	0.8	2027	364	87
15	50.40	51.02	0.6	1721	393	86
16	51.02	52.02	1.0	1851	222	85
17	52.02	53.00	1.0	1748	393	87
18	53.00	53.60	0.6	1730	394	87
19	53.60	54.64	1.0	Under construction		
20	54.64	55.00	0.4	1705	393	87
21	55.00	56.80	1.8	1666	319	86
22	56.80	58.00	1.2	1710	391	86
23	58.00	61.10	3.1	Under construction		

S. No	Chainage (km)		Length (km)	15th Percentile MR values (MPa)		
	From	To		MR for BT	MR for Granular	MR for Subgrade
24	61.10	64.40	3.3	1708	392	86
25	64.40	65.80	1.4	1585	254	87
26	65.80	66.40	0.6	2150	322	86
27	66.40	67.20	0.8	1949	393	87
28	67.20	69.00	1.8	1903	391	87
29	69.00	70.00	1.0	1927	395	87
30	70.00	71.80	1.8	1905	394	86
31	71.80	74.00	2.2	1906	364	78
32	74.00	74.80	0.8	1909	394	86
33	74.80	75.59	0.8	1808	294	87
34	75.59	76.02	0.4	1973	394	87
35	76.02	79.00	3.0	1881	226	86
36	79.00	81.40	2.4	2100	332	86
37	81.40	82.20	0.8	2193	283	81
38	82.20	86.00	3.8	2183	347	87

Table 19: Summary of Design Moduli of different layers – RHS

Sl. No	Chainage(km)		Length(km)	15th Percentile MR values		
	From	To		MR for BT	MR for Granular	MR for Subgrade
1	15.00	18.20	3.2	1609	277	87
2	18.20	22.20	4.0	1382	247	86
3	22.20	23.40	1.2	Under construction		
4	23.40	26.00	2.6	1933	390	86
5	26.00	37.60	11.6	Farmer strike		
6	37.60	39.00	1.4	2553	256	87
7	39.00	40.20	1.2	Under construction		
8	40.20	42.90	2.7	1817	254	87
9	42.90	43.90	1.0	Under construction		
10	43.90	45.00	1.1	1442	388	86
11	45.00	46.00	1.0	2457	395	87
12	46.00	46.80	0.8	2603	394	87
13	46.80	47.60	0.8	2646	390	87
14	47.60	49.40	1.8	1766	315	86
15	49.40	50.38	1.0	2577	197	87
16	50.38	51.39	1.0	2803	391	87
17	51.39	52.00	0.6	2550	359	87
18	52.00	53.00	1.0	2852	300	87
19	53.00	53.60	0.6	2522	354	87
20	53.60	54.60	1.0	Under construction		
21	54.60	54.80	0.2	2818	391	87
22	54.80	56.79	2.0	1745	258	87
23	56.79	58.00	1.2	2831	392	86
24	58.00	59.70	1.7	Under construction		
25	59.70	60.40	0.7	2143	371	87
26	60.40	61.10	0.7	Under construction		

Sl. No	Chainage(km)		Length(km)	15th Percentile MR values		
	From	To		MR for BT	MR for Granular	MR for Subgrade
27	61.10	64.20	3.1	1477	261	87
28	64.20	67.20	3.0	2511	249	79
31	67.20	68.78	1.6	2786	394	86
32	68.78	69.60	0.8	Under construction		
33	69.60	70.20	0.6	2765	326	87
34	70.20	71.78	1.6	2782	393	87
35	71.78	74.00	2.2	2115	346	80
36	74.00	74.80	0.8	2831	393	87
37	74.80	75.60	0.8	2808	391	87
38	75.60	76.20	0.6	1388	234	87
39	76.20	77.80	1.6	2728	357	86
40	77.80	78.20	0.4	2888	394	87
41	78.20	79.00	0.8	2865	322	82
42	79.00	81.40	2.4	2884	390	86
43	81.40	82.20	0.8	2857	348	73
44	82.20	86.00	3.8	2907	390	86

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 1585 Mpa to 2757 Mpa in LHS & 1382 Mpa to 2907 Mpa in RHS Carriageway. The MR value for Granular Layers is 216 Mpa to 395 Mpa in LHS & 197 Mpa to 395 Mpa in RHS Carriageway. Similarly, the MR value for Subgrade Layer is 78 Mpa to 87 Mpa in LHS carriageway & 73 Mpa to 87 Mpa in RHS Carriageway.

4.5 PAVEMENT COMPOSITION

As per Pavement Design Report crust composition of **Main carriageway** is as below:

Layers	Crust Thickness in mm	
	Widening	New
BC	50	50
DBM	120	80
WMM	250	150
GSB	200	200
SG	500	500
Total(mm)	**1120**	**980**

Service Road Crust

Layers	Crust Thickness in mm
BC	40
DBM	50
WMM	200
GSB	200
SG	500
Total(mm)	**990**

However, from the test pits dug 6 locations along the main carriageway and 4 locations in service road and 1 location on toll plaza reveal the following crust composition

a) Main Carriageway Crust

	BT, mm	Granular layers, mm	Total Crust, mm
Maximum	270	520	760
Minimum	180	340	550
Average	235	460	695

b) Service Road Crust

	BT, mm	Granular layers, mm	Total Crust, mm
Maximum	170	430	540
Minimum	50	370	450
Average	105	395	500

c) Toll plaza Crust

	PQC, mm	DLC, mm	GSB, mm	Total Crust, mm
Maximum	310	160	160	630

From the above, it is clear that test pits results are in line with pavement design report. No major discrepancies in terms of crust thickness have been noticed.

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, all structures appear new and seem to be in good condition without any major distress. Structure wise conditions along the project corridor are presented below:

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 20: Summary of Major Structures

	Type of Structure	Schedule-B	As per Site
(a)	No. of Major Bridges	0	1 (COS)
(b)	No. of Minor Bridges	18	23 (5 Existing)
(c)	No. of Flyovers	10	18 (3 existing, 6 COS, 1 extra found at site, 8 out of 10 as per Sch-B)
(d)	No. of Vehicular Underpasses	5	21 (3 existing, 14 COS, 4 out of 5 as per Sch-B)
(e)	No. of Pedestrian Under passes	6	13 (3 existing, 4 COS, 6 as per Sch-B)
(f)	No. of Cattle Under passes	2	1 (1 no deleted)
(g)	No. of Foot Over Bridges	11	6 (1 COS, 5 out of 11 as per Sch-B)

Table 21: Summary of Culverts

	Type of Structure	Schedule	As per Site
(a)	No. of Pipe Culverts	29	33
(b)	No. of Box / Slab Culverts	36/2	42/4

Chainage: 32+275
General Description
BHS MCW-1 (old)

- Type of Structure : MJB
- Span Arrangement : 7 x 10.00 m
- Total deck width of structure : LHS - 10.22 m
  RHS - 10.95 m
- Type of Foundation : Not Visible
- Type of Substructure : LHS - RCC Wall Type
  RHS - Brick masonry Type Abutment & RCC Wall Type Pier
- Type of Superstructure : Solid Slab
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are clogged.
- ✓ RCC Handrailing partially damaged and reinforcement exposed at RHS side.
- ✓ Vegetation observed on structure.
- ✓ Debris observed in vent area.
- ✓ Spalling of concrete observed at bottom of top slab.

Chainage: 32+275
General Description
BHS MCW-2

- Type of Structure : MJB
- Span Arrangement : (20 + 30 + 20) m
- Total deck width of structure : LHS: 9.88 m
  RHS: 9.66 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 : RCC 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 clogged at some locations.

Chainage: 18+640
General Description
BHS MCW & SR

- Type of Structure : MNB
- Span Arrangement : BHS MCW: 2 x (3.6 + 3.4 + 3.6) m
  BHS SR: 2 x (3.3 + 3.2 + 3.3) m
- Total deck width of structure : LHS SR: 14.00 m
  BHS MCW: 2 x 16.90 m
  RHS SR: 10.00 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC Box Type
- Type of Superstructure : RCC Box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Head Wall
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Partially buried with vegetation and debris.
- ✓ As per Schedule B R&R proposed for MCW & SR.

Chainage: 20+450
General Description
BHS MCW & SR

- Type of Structure : MNB
- Span Arrangement : 3 x 10.6 m
- Total deck width of structure : LHS SR: 10.50 m
  BHS MCW: 2 x 15.00 m
  RHS SR: 7.90 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Wall Type Abutment & Circular Type Pier
- Type of Superstructure : RCC Solid Slab
- Type of Bearing : Elastomeric (RHS SR)
- Type of Railing / Crash Barrier : RCC Crash Barrier & Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Debris observed in vent area.
- ✓ Vegetation observed on structure.
- ✓ Drainage spouts are clogged.
- ✓ Crack observed on parapet wall at LHS SR.
- ✓ Footpath partially damaged at RHS SR.
- ✓ Bund protection partially damaged at A2 RHS SR.
- ✓ Cracks observed on Crash Barrier at RHS SR.
- ✓ Crash Barrier damaged at LHS SR.
- ✓ As per Schedule B R&R proposed for MCW & SR.

Chainage: 22+746
General Description
BHS MCW & SR

- Type of Structure : MNB (Under Construction)
- Span Arrangement : (7.71 + 7.7 + 7.71) m
- Total deck width of structure : LHS SR: 10.20 m
  BHS MCW: 2 x 16.90 m
  RHS SR: 11.50 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC Box Type & RCC Wall Type
- Type of Superstructure : RCC Box Type & RCC Wall Type
- Type of Bearing : Elastomeric (RHS SR)
- Type of Railing / Crash Barrier : RCC Crash Barrier

Observations

Visual Observations on condition of the structure are as below:

- ✓ Both Service Roads Structure is in fair condition.
- ✓ New Bridge for service road on RHS already constructed.
- ✓ Work under progress.
- ✓ LHS MCW: A1-W1 Wall 1st lift completed.
- ✓ BHS MCW: W1-W2 Work not started.
  W2-A2 Work not started.
- ✓ RHS MCW: A1-W1 up to top slab completed.

Chainage: 24+800
General Description
BHS MCW & SR

- Type of Structure : MNB
- Span Arrangement : LHS SR: 7.31 + 7.2 + 7.31 m
  LHS MCW: 7.5 + 7.2 + 7.5 m
  RHS MCW & SR: 7.85 + 7.5 + 7.85 m
- Total deck width of structure : LHS SR: 10.20
  LHS MCW: 18.20 m
  RHS MCW: 15.50 m
  RHS SR: 18.00 m
- Type of Foundation : Raft (RHS MCW & BHS SR) &
  Not visible (LHS MCW)
- Type of Substructure : RCC Wall Type (LHS MCW)
  RCC Box Type (RHS MCW & BHS SR)
- Type of Superstructure : Girder Type (LHS MCW)
  RCC Box Type (RHS MCW & BHS SR)
- Type of Bearing : Elastomeric Bearing (LHS MCW)
- Type of Railing / Crash Barrier : RCC Crash Barrier

Observations

Visual Observations on condition of the structure are as below:

LHS MCW:

- ✓ Vegetation observed on structure at A1.
- ✓ Vent way fully covered with bushes.
- ✓ Spalling observed and reinforcement exposed on abutment cap and cross girder at A2.
- ✓ Debris observed on abutment cap.
- ✓ Drainage spouts are clogged.
- ✓ Structure widened with 3 cell RCC Box.
- ✓ As per Schedule B R&R proposed.

RHS MCW:

- ✓ Vegetation observed on structure at A1.
- ✓ Vent way fully covered with bushes.
- ✓ Spalling observed and reinforcement exposed on crash barrier.
- ✓ Drainage spouts are clogged.
- ✓ As per Schedule B R&R proposed.

LHS SR:

- ✓ Span 1 & 3 vent ways partially buried with soil.
- ✓ Reinforcement bars observed on side walls at median location.
- ✓ Drainage spouts are clogged.

RHS SR:

- ✓ Spalling and reinforcement exposed on top slab, side walls and retaining wall.
- ✓ Vegetation observed on structure at A1 and A2.
- ✓ Vent way fully covered with bushes.
- ✓ Stone pitching partially damaged.

- ✓ Crash barrier not provided at both sides.
- ✓ Drainage spouts are clogged.
- ✓ As per Schedule B R&R proposed.

Chainage: 28+520
General Description
BHS MCW & SR

- Type of Structure : MNB
- Span Arrangement : BHS SR: 9.71 + 6.6 + 6.71 m
  BHS MCW: 6.9 + 6.6 + 6.9 m
- Total deck width of structure : BHS SR: 2 x 10.20 m
  BHS MCW: 2 x 16.9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box Type
- Type of Superstructure : RCC Box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : SR: RCC Crash Barrier
  MCW: RCC Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

LHS:

- ✓ Main carriageway Retained.
- ✓ Service Road Construction under progress.
- ✓ A1 1st lift completed.
- ✓ A1 side Retaining Wall Raft Completed.
- ✓ P1 1st completed.
- ✓ P2-A2 Slab & Retaining wall completed, Crash barrier pending.
- ✓ As per Schedule B R&R proposed for MCW.

RHS:

- ✓ Main carriageway Retained.
- ✓ RHS MCW Reinforcement exposed on side wall in 2nd span.
- ✓ Service road Construction under progress.
- ✓ A1 1st lift completed.
- ✓ A1 side Retaining wall Raft completed.
- ✓ P1 2nd lift completed.
- ✓ P1-A2 Slab completed.
- ✓ A2 Retaining wall completed, Crash barrier pending.
- ✓ As per Schedule B R&R proposed for MCW.

Chainage: 30+925
General Description
BHS MCW & SR

- Type of Structure : MNB
- Span Arrangement : 3 x 7 m
- Total deck width of structure : BHS SR: 2 x 12.30 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC Box Type
- Type of Superstructure : RCC Box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Not Visible
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Unable to visit at this location due to under Kisan occupied stretch.

Chainage: 34+240
General Description
BHS MCW

- Type of Structure : MNB
- Span Arrangement : 1 x 8.90
- Total deck width of structure : BHS SR: 2 x 10.20 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC Box Type
- Type of Superstructure : RCC Box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier & Parapet Wall
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ LHS SR Structure completed, Crash Barrier construction works & Approach works are Pending.
- ✓ Both sides MCW & RHS SR Construction Not Yet Started.
- ✓ Median Parapet wall damaged.

Chainage: 35+812
General Description
BHS MCW & SR

- Type of Structure : MNB
- Span Arrangement : 4 x (8.4 + 8.0 + 8.4) m
- Total deck width of structure : BHS SR: 2 x 10.20 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC Box Type
- Type of Superstructure : RCC Box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Both sides Main carriageway Approach slab works pending.
- ✓ Debris & Vegetation observed in Vent area.
- ✓ Drainage spouts not visible.
- ✓ Approach slab settlement at A1 RHS SR side.
- ✓ Honey combing & Reinforcement exposed on Crash barrier at A2 RHS side.

Chainage: 42+331
General Description
BHS-MCW & SR

- Type of Structure : MNB
- Span Arrangement : 2 x 8.9 m
- Total deck width of structure : BHS SR: 2 x 10.20 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC Box Type
- Type of Superstructure : RCC Box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Both sides Quadrant pitching not provided.
- ✓ Both sides Debris & Water stagnation observed.
- ✓ Honey combing is observed on Crash barrier at RHS-A1 Location.

Chainage: 43+734
General Description
BHS-MCW & SR

- Type of Structure : MNB
- Span Arrangement : 1 x 7.8 m
- Total deck width of structure : BHS SR: 2 x 12.30 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC Box Type
- Type of Superstructure : RCC Box Type
- Type of Bearing : Not Available
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Silt & Vegetation observed in Vent area.
- ✓ Quadrant pitching not provided.
- ✓ Vegetation observed on Crash barrier at LHS-A1.
- ✓ Drainage spouts not provided.
- ✓ Damaged and Reinforcement exposed on Crash barrier at RHS-A1 & LHS-A2.

Chainage: 44+043
General Description
BHS- MCW & SR

- Type of Structure : MNB
- Span Arrangement : 1 x 7.1 m
- Total deck width of structure : BHS SR: 2 x 10.20 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC Box Type
- Type of Superstructure : RCC Box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier & Steel Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Silt & Debris observed in Vent area.
- ✓ Quadrant pitching not provided.
- ✓ Drainage spouts not provided.
- ✓ Finishing works pending.
- ✓ Shuttering steel left out without cutting
- ✓ Spalling of concrete observed at RHS A2 side.

Chainage: 47+415
General Description
BHS- MCW & SR

- Type of Structure : MNB
- Span Arrangement : 1 x 7.1 m
- Total deck width of structure : BHS SR: 2 x 12.30 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC box
- Type of Superstructure : RCC box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Silt & Debris observed in Vent area.
- ✓ Both sides Quadrant pitching not provided.
- ✓ Finishing works pending.
- ✓ Honey combing observed on Crash barrier at RHS side.
- ✓ Honey combing observed on Top Slab at LHS side.
- ✓ Water Stagnation observed at LHS side.
- ✓ Pot holes observed at LHS-SR on Pavement layer.

Chainage: 55+591
General Description
BHS- MCW & SR

- Type of Structure : MNB
- Span Arrangement : 1 x 7.6 m
- Total deck width of structure : BHS SR: 2 x 12.30 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC box Type
- Type of Superstructure : RCC box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Debris observed in Vent area.
- ✓ Water stagnation observed.
- ✓ Crash barrier pending on approach slabs A1 & A2 at RHS side.
- ✓ Crash Barrier pending at LHS side.

Chainage: 59+407
General Description
BHS- MCW & SR

- Type of Structure : MNB
- Span Arrangement : 2 x 10.3 m
- Total deck width of structure : BHS SR: 2 x 10.20 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC box Type
- Type of Superstructure : RCC box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Crash barrier not constructed at RHS A2 Approach side.
- ✓ Vegetation observed in Vent area.
- ✓ Honey combing observed on Side walls at RHS.
- ✓ Finishing works required.

Chainage: 61+725
General Description
BHS- MCW & SR

- Type of Structure : MNB
- Span Arrangement : LHS SR: 1 x 7.42 m
  BHS MCW: 3 x 2.0 m
  RHS SR: 2.2 + 2.62 + 2.52 m
- Total deck width of structure : LHS SR: 10.20 m
  BHS MCW: 2 x 12.50 m
  RHS SR: 14.53 m
- Type of Foundation : SR: Raft Foundation
  MCW: Not Visible
- Type of Substructure : SR: RCC Box Type
- MCW: RCC Wall Type
- Type of Superstructure : SR: RCC Box Type
  MCW: RCC Slab
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier & Hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Not yet started Reconstruction at LHS SR and Widening at RHS SR.
- ✓ Structure partially buried with Debris and silt at BHS.
- ✓ Main carriageway retained.
- ✓ As per Schedule B R&R proposed for MCW.

Chainage: 65+071
General Description
BHS- MCW & SR

- Type of Structure : MNB
- Span Arrangement : 1 x 7.7 m
- Total deck width of structure : BHS SR: 2 x 12.30 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC box Type
- Type of Superstructure : RCC box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ RHS-SR Partially buried with bushes.
- ✓ Water stagnated at LHS-SR.
- ✓ Structure is in Fair condition.
- ✓ Crack observed on Crash barrier at LHS side.

942

Chainage: 65+872
General Description
BHS- MCW & SR

- Type of Structure : MNB
- Span Arrangement : 1 x 6.82 m
- Total deck width of structure : BHS SR: 2 x 10.20 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC box Type
- Type of Superstructure : RCC box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Both sides Quadrant pitching not provided.
- ✓ Debris observed in vent area at LHS-SR.
- ✓ Structure is in Fair condition.

Chainage: 69+231
General Description
BHS- MCW & SR

- Type of Structure : MNB
- Span Arrangement : 9.2 + 9.4 + 9.2 m
- Total deck width of structure : BHS SR: 2 x 12.30 m
  BHS MCW: 2 x 16.90 m
- Type of Foundation : Raft Foundation
- Type of Substructure : RCC box Type
- Type of Superstructure : RCC box Type
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

SR BHS:
- ✓ Both sides Service roads construction completed.
- ✓ Structure is in fair condition.
- ✓ Vegetation observed in vent area at LHS SR.

MCW LHS:
- ✓ A1 & A2 second lift completed.
- ✓ P1 & P2 final lift completed.
- ✓ Crash barrier pending.

MCW RHS:
- ✓ A1 & A2 second lift completed.
- ✓ P1 & P2 final lift completed.
- ✓ Crash barrier pending.

Chainage: 22+805
General Description
BHS

- Type of Structure : Flyover (Under construction)
- Span Arrangement : 1 x 30.0 m
- Total deck width of structure : 2 x 16.90
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type Abutment
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

✓ Both sides completed up to Abutment cap.

Chainage: 26+450
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 2 x 30.0 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

LHS:

✓ Not yet Started.

RHS:

✓ Span1&2 completed up to Pier cap and Abutment cap.

Chainage: 27+405
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 36.7 + 47.2 + 32.2 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type
- Type of Superstructure : Steel Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

BHS:

- ✓ Span 1: - Steel Girders Launching Completed.
- ✓ Span 2: - Steel Girders Launching Pending.
- ✓ Span 3: - Steel Girders Launching Pending.

Chainage: 29+160
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 5 x 30.0 m
- Total deck width of structure : 2 x 16.90
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Unable to visit at this location due to under Kisan occupied stretch.

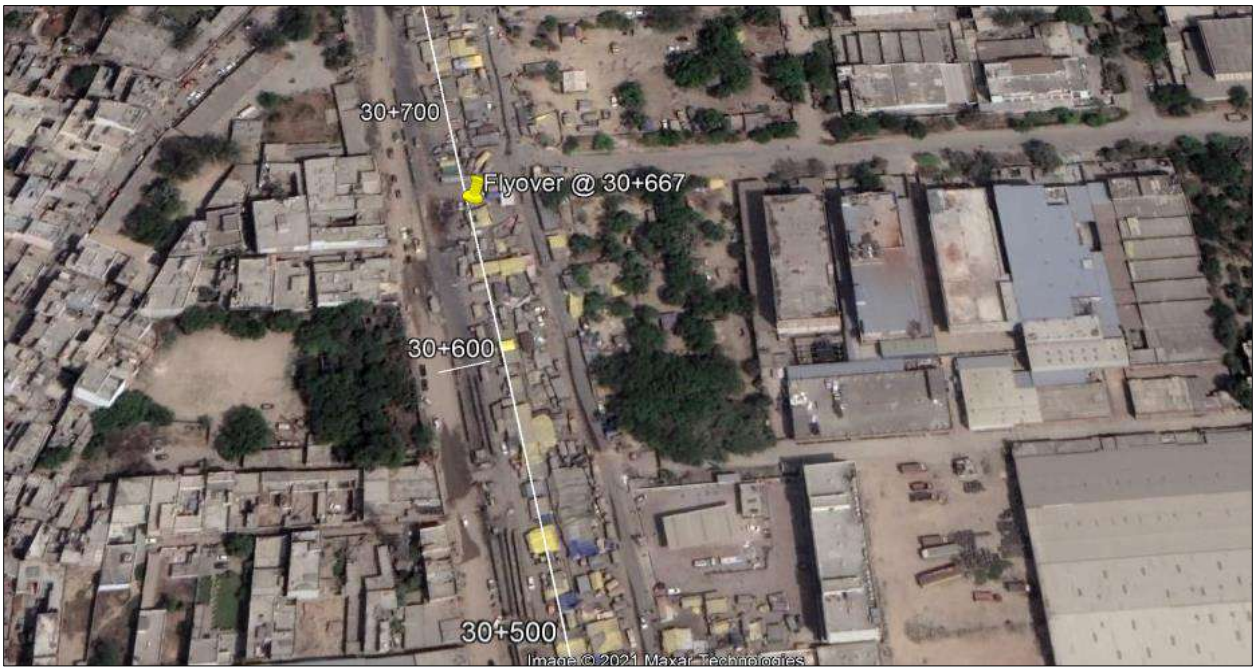
Chainage: 30+667
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 1 x 30.0 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type Abutment
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Unable to visit at this location due to under Kisan occupied stretch.



Chainage: 31+329
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 1 x 30.0 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type Abutment
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Unable to visit at this location due to under Kisan occupied stretch.

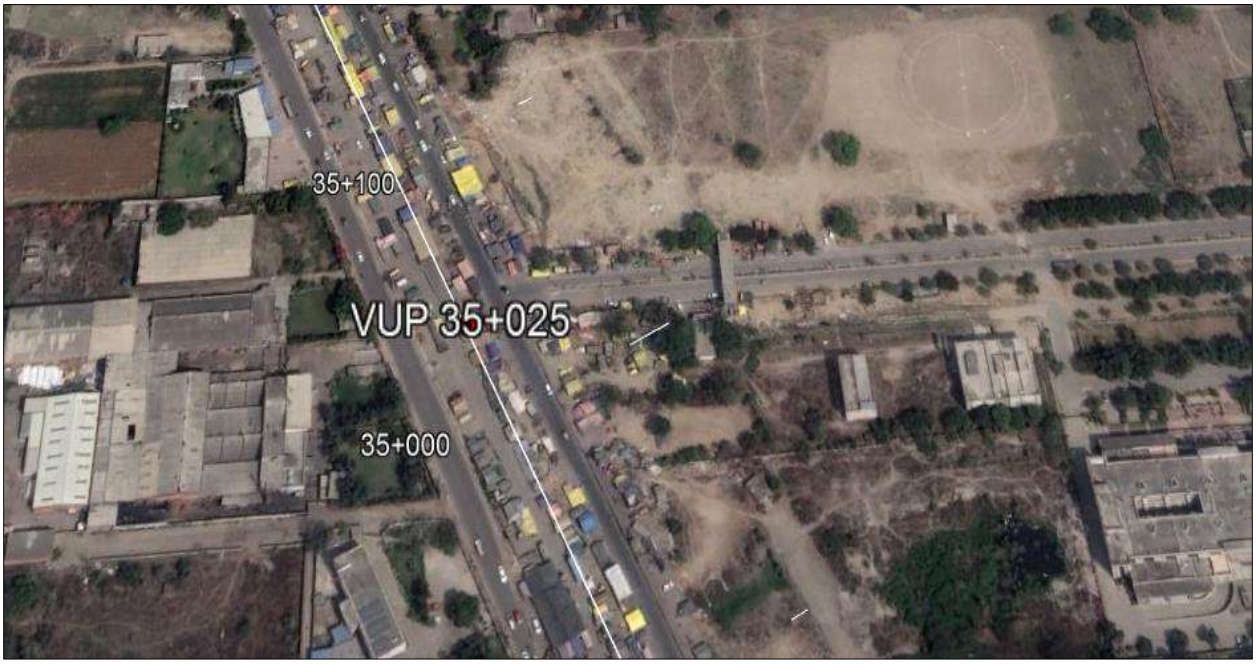
Chainage: 35+025
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 1 x 30.0 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type Abutment
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Unable to visit at this location due to under Kisan occupied stretch.



Chainage: 36+900
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 2 x 30.0 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

LHS:

- ✓ A1, P1 completed up to Pier Cap.
- ✓ A2 Pile Cap Pending.
- ✓ Approaches are in pending.

RHS:

- ✓ A1, A2 completed up to Pier Cap.
- ✓ P1 first lift completed.
- ✓ Approaches are in pending.

Chainage: 41+215
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 3 x 45.0 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Wall Type
- Type of Superstructure : PSC Girder Type
- 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:

- ✓ Drainage spouts are clogged, Cleaning required.
- ✓ Down take pipes are damaged.
- ✓ Both sides Previous patch repair works observed near Cross Girders.
- ✓ Reinforcement exposed on bottom of top slab at P1.
- ✓ Expansion joints filled with Debris & Mud.
- ✓ Strip seal damaged at RHS- P1&P2 & LHS- P2.
- ✓ Deck slab Reinforcement exposed at Span2 at RHS.
- ✓ Both sides Approach slab settlement observed.
- ✓ Honey combing observed on bottom of the 4th Girder at LHS

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JAINTA PROPERTIES

Chainage: 43+395
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 1 x 30.0 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type Abutment
- Type of Superstructure : PSC Girder Type
- 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:

LHS:

- ✓ Drainage spouts Down take pipes not provided.
- ✓ Seismic arrester reinforcement was provided, Concrete works are pending.
- ✓ All sides Expansion joints are not provided.
- ✓ A1 & A2 Gap slab completed.
- ✓ Crash barrier pending on Gap slab.
- ✓ Honey combing observed on bottom of Girder G-1.
- ✓ Segregation observed at A1 Cross girder.

RHS:

- ✓ Drainage spouts Down take pipes not provided.
- ✓ Seismic arrester reinforcement was provided, Concrete works are pending.
- ✓ All sides Expansion joints are not provided.
- ✓ A1 Gap slab completed.
- ✓ A2 Dirt wall & Gap slab Pending.
- ✓ Crash barrier pending on Gap slab.

Chainage: 48+600
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 22 + 41 + 22 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Wall Type
- Type of Superstructure : PSC Voided Type
- 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 observed on Dirt wall at RHS-A2 & LHS-A1.
- ✓ Both sides Drainage spouts clogged & down take pipes damaged at Mid span.
- ✓ Expansion joint Strip seal damaged at RHS-A1&A2.

Chainage: 58+515
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 1 x 30.0 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type Abutment
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

BHS:

- ✓ Girders Launching Completed.
- ✓ Middle Diaphragm work under progress.
- ✓ A1 & A2 Dirt wall pending.

Chainage: 61+000
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 2 x 30.0 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

BHS:

- ✓ Span 1: -Girders Launching Completed.
- ✓ Middle Diaphragm work under progress.
- ✓ Span 2: - Completed up to Bearings Level.
- ✓ A1 & A2 Dirt wall pending.

Chainage: 62+100
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 22 + 37 + 22 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Wall Type
- Type of Superstructure : PSC Voided Type
- 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 filled with debris and dust.
- ✓ Both sides drainage spouts clogged, and down take pipes not provided.
- ✓ Structure is in fair condition.

Chainage: 65+410
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 1 x 30.0 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type Abutment
- Type of Superstructure : PSC Girder Type
- 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:

- ✓ Both sides Drainage spouts clogged, cleaning required.
- ✓ Shuttering steel left out without cutting & finishing works required at both sides.

Chainage: 73+100
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 6 x 36.00 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Wall Type Abutment & RCC Circular Type Pier
- Type of Superstructure : PSC Voided Type
- 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:

- ✓ Both sides Drainage spouts clogged.
- ✓ Expansion joints Strip seal damaged at RHS- P1, P2, A2.
- ✓ All Expansion joint Strip seal damaged at LHS side.
- ✓ Structure is in Fair condition.

Chainage: 84+600
General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 2 x 30.00 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : -
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Construction not yet started at site.

Chainage: 85+744

General Description
BHS

- Type of Structure : Flyover
- Span Arrangement : 1 x 30.00 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Pile Foundation
- Type of Substructure : RCC Circular Type Abutment
- Type of Superstructure : PSC Girder Type
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Both sides completed up to Pier cap.
- ✓ Pedestal & Dirt wall pending at Both sides.
- ✓ Approach works pending.
- ✓ All Girders casting completed.

Chainage: 17+065
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 2 x 10 x 4.5 m
- Total deck width of structure : 2 x 20 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on RHS A2.
- ✓ Top slab damage and reinforcement expose due to heavy vehicle crossing.
- ✓ Honey combing observed on top slab LHS A2 and RHS A1 side wall.
- ✓ Drainage spouts clogged and down take pipes are not provided.

Chainage: 19+248
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 2 x 10 x 4.5 m
- Total deck width of structure : 2 X 21.40 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Top slab damage and reinforcement expose due to heavy vehicle crossing.
- ✓ Vegetation growth observed on LHS A2.
- ✓ Side wall damaged observed and reinforcement exposed.
- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Spalling observed on bracket at RHS A2.

19+242

Chainage: 21+753
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 2 x 10 X 4.5 m
- Total deck width of structure : 2 X 19.00 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on RHS A2.
- ✓ Spalling observed and reinforcement exposed on top slab.
- ✓ LHS A2 Retaining wall damaged and reinforcement exposed.
- ✓ Top slab damage and reinforcement expose due to heavy vehicle crossing.
- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Honey combing observed on side wall at LHS A2.

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Chainage: 33+596
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 X 5.5 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier under construction
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ A1 and A2 Both sides approach not constructed.
- ✓ Both sides crash barrier not constructed.
- ✓ Drainage spouts not provided.

Chainage: 37+780
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Not visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Honey combing observed on side wall and top slab.
- ✓ Previous patch works observed on bottom of top slab.

Chainage: 37+900
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Cracks observed on side wall at LHS A1.
- ✓ Honey combing observed on side walls and top slab.
- ✓ Shuttering steel left out without cutting on top slab.
- ✓ Previous patch works observed on side wall.

Chainage: 37+915
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 15 x 5.5 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Honey combing observed on side walls and top slab.
- ✓ Shuttering steel left out without cutting on top slab.
- ✓ Previous patch works observed on side wall.
- ✓ Reinforcement exposed on LHS top slab.

Chainage: 38+825
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 X 16.9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are not provided.
- ✓ Honey combing observed on side walls and top slab.
- ✓ Shuttering steel left out without cutting near approach slab.

Chainage: 45+606
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Shuttering steel left out without cutting.
- ✓ Segregation observed on side walls and top slab.
- ✓ Drainage spouts clogged and down take pipes are not provided.

Chainage: 45+619

General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 X 16.9
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Shuttering steel left out without cutting.
- ✓ Segregation observed on side walls and top slab.
- ✓ Drainage spouts clogged and down take pipes are not provided.

Chainage: 50+097
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 15 x 5.5 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are not provided.
- ✓ Water marks observed on bottom of top slab at construction joint.
- ✓ Shuttering steel left out without cutting.
- ✓ Segregation observed on side walls.

Chainage: 50+112
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 x 16.9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Shuttering steel left out without cutting.
- ✓ Segregation observed on side walls and top slab.

Chainage: 50+127
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 15 x 5.5 m
- Total deck width of structure : 2 X 16.9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Shuttering steel left out without cutting.
- ✓ Segregation observed on side walls and top slab.

Chainage: 56+371
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 X 16.9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Shuttering steel left out without cutting.
- ✓ Segregation observed on side walls.
- ✓ Previous patch works observed on side walls.

Chainage: 64+875
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 X 16.9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are not provided.
- ✓ Shuttering steel left out without cutting.
- ✓ Segregation observed on side walls and top slab.
- ✓ Bottom slab damaged and Reinforcement exposed at RHS.

Chainage: 68+955
General Description
RHS

- Type of Structure : VUP (Under construction)
- Span Arrangement : 1 x 15 x 5.5 m
- Total deck width of structure : 2 x 16.9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Work under progress at RHS.
- ✓ RHS side walls completed up to third lift.
- ✓ LHS not yet started.

Chainage: 69+105
General Description
RHS

- Type of Structure : VUP (Under construction)
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 x 16.9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Crash Barrier pending and approach slab pending at RHS.
- ✓ LHS not yet started.

Chainage: 69+850
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 4.5 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on bottom of top slab and crash barrier.
- ✓ Drainage spouts are not provided.
- ✓ Shuttering steel left out without cutting.
- ✓ Honey combing and steel exposed on side walls.
- ✓ Top slab damage due to heavy vehicle crossing.

Chainage: 72+400
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on bottom of top slab and side wall.
- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Shuttering steel left out without cutting.

Chainage: 73+700
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 X 16.9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Crash barrier damaged at RHS.
- ✓ Structure is in fair condition.

Chainage: 81+934
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 5.5 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on bottom of top slab edge.
- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Shuttering steel left out without cutting.

Chainage: 55+440
General Description
BHS

- Type of Structure : CUP
- Span Arrangement : 1 x 12 x 3.5 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on bottom of top slab and side wall.
- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Shuttering steel left out without cutting.

Chainage: 20+271
General Description
BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 6 x 3.5 m
- Total deck width of structure : 2 x 19 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Vegetation observed at RHS A1.
- ✓ Down take pipe not provided.
- ✓ Top slab damage due to heavy vehicle crossing.
- ✓ Honey combing and cracks observed on bottom of top slab.

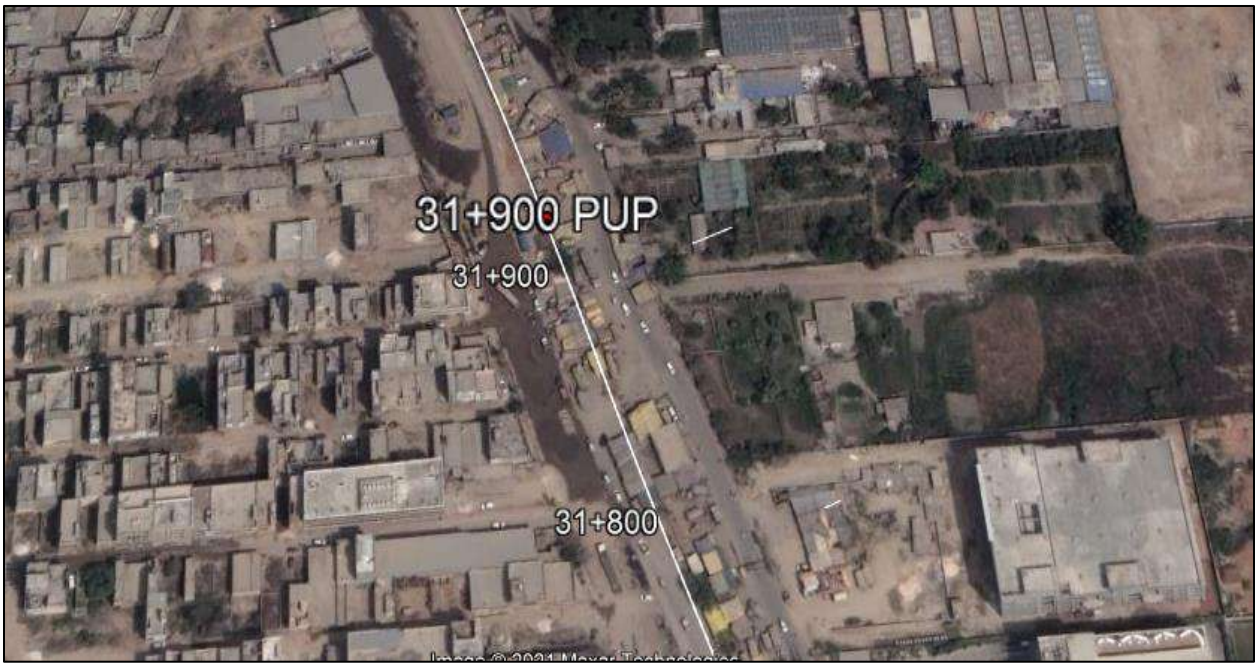
Chainage: 31+900
General Description
BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 12 x 3.5 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Structure completed at RHS.
- ✓ Unable to visit at this location due to under Kisan occupied stretch.



Chainage: 47+290
General Description
BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 12 x 4 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged and down take pipes are not provided.
- ✓ Shuttering steel left out without cutting.

Chainage: 50+050

General Description

BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 12 x 4 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on bottom of top slab.
- ✓ Drainage spouts are not provided.
- ✓ Shuttering steel left out without cutting.

Chainage: 51+840
General Description
BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 12 x 4 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Segregation observed on bottom of top slab and side wall.
- ✓ Drainage spouts are not provided.
- ✓ Shuttering steel left out without cutting.
- ✓ Top slab damage due to heavy vehicle crossing.

Chainage: 53+415
General Description
BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 12 x 3 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Bottom slab reinforcement exposed.
- ✓ Drainage spouts are not provided.
- ✓ Shuttering steel left out without cutting.
- ✓ Segregation observed on bottom of top slab edge and side wall.

Chainage: 59+100
General Description
BHS

- Type of Structure : PUP (Under construction)
- Span Arrangement : 1 x 12 x 3.5 m
- Total deck width of structure : 2 x 16.9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier (Under construction)
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Previous patch works observed on bottom of top slab and side walls.
- ✓ Work in under progress.
- ✓ Drainage spouts are not provided.

Chainage: 61+500
General Description
BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 8.25 x 3.5 m
- Total deck width of structure : 2 x 12.00 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are not provided.
- ✓ Structure is in fair condition.

Chainage: 66+872
General Description
BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 12 x 4 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Top slab damage and reinforcement expose due to heavy vehicle crossing at Both sides.
- ✓ Segregation observed on bottom of top slab and side walls.
- ✓ Spalling observed on top slab side at LHS.
- ✓ Drainage spouts are not provided.

Chainage: 75+300
General Description
BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 12 x 4 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are not provided.
- ✓ structure is in fair condition

Chainage: 77+416
General Description
BHS

- Type of Structure : VUP
- Span Arrangement : 1 x 12 x 4 m
- Total deck width of structure : 2 X 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Down take pipes are not provided.
- ✓ Cracks observed on crash barrier.
- ✓ Structure is in fair condition.

Chainage: 78+735
General Description
BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 12 x 4.5 m
- Total deck width of structure : 2 x 16.90 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Down take pipe not provided.
- ✓ Cracks observed on crash barrier.
- ✓ Top slab damage due to heavy vehicle crossing.

Chainage: 83+830
General Description
BHS

- Type of Structure : PUP
- Span Arrangement : 1 x 8.4 x 4.2 m
- Total deck width of structure : 2 x 16.00 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : NA
- Type of Railing / Crash Barrier : RCC Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Vegetation observed on side wall A2 at both sides.
- ✓ Down take pipe not provided.
- ✓ Top slab and side wall edges damaged at RHS.
- ✓ Honey combing and crack observed on top slab.

Chainage: 17+650
General Description
BHS

- Type of Structure : FOB
- Span Arrangement : 2 x 30
- Total deck width of structure : 1 x 3.5 m
- Type of Foundation : Open
- Type of Substructure : Steel Girder Column
- Type of Superstructure : Steel Plate Girder
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Steel Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

✓ Structure is in fair condition.

Chainage: 86+030
General Description
BHS

- Type of Structure : FOB
- Span Arrangement : 2 x 30
- Total deck width of structure : 1 x 3.5 m
- Type of Foundation : Open
- Type of Substructure : Steel Girder Column
- Type of Superstructure : Steel Plate Girder
- Type of Bearing : NA
- Type of Railing / Crash Barrier : Steel Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Structure is in Poor condition.

Details of Culverts

Sl No.	Design Chainage	Str. Number	Type of Str.	Side	Str. on	Structure Proposal	Span Arrangement (No x Length)	Deck Width	Observations
1	15+600	16/1	BC	BHS	MCW	Existing	1 x 2 x 2	35.04	> Debris and Vegetation observed in vent way. > Culvert extra found at site.
2	16+650	17/1	BC	BHS	MCW	Existing	1 x 2 x 2	60.00	> Debris and Vegetation observed in vent way. > Culvert extra found at site.
3	17+225	18/2	BC	BHS	MCW	Wid	1 x 1.3 x 1.5	72.00	> Silt and debris observed in vent way. > Vegetation growth on structure.
4	19+200	20/1	BC	BHS	MCW	Wid	1 x 4 x 1.5	61.70	> Vent way Partially buried with debris. > Vegetation growth on structure. > No head wall at LHS.
5	19+700	20/3	BC	BHS	MCW	Wid	1 x 2 x 2	78.50	> Spalling observed and Reinforcement exposed on bottom of top slab. > Silt and Debris observed in vent way.
6	20+000	21/1	BC	BHS	MCW	Wid	1 x 1.3 x 1.5	80.00	> Spalling observed on bottom of top slab. > Reinforcement exposed in vent area. > Silt and Debris observed in vent way.
7	20+787	21/4	BC	BHS	MCW	Wid	1 x 1.3 x 1.5	85.50	> Culvert not visible due to vegetation.
8	21+470	22/1	SC	BHS	MCW	Existing	1 x 1.5 x 1	81.50	> Silt and debris observed in vent way. > Culvert extra found at site.
9	22+058	23/1	BC	BHS	MCW	Wid	1 x 2 x 2	82.00	> Structure is fair condition. > Culvert extra found at site.
10	22+436	23/2	BC	BHS	MCW	Wid	1 x 4 x 3.5	72.00	> Culvert not reconstructed at RHS. > Silt observed in vent area.
11	23+310	24/1	BC	BHS	MCW	Wid	1 x 1.7 x 1.5	80.00	> Crash barrier not constructed at LHS. > Culvert extra found at site.
12	24+130	25/1	BC	BHS	MCW	Wid	1 x 1.8 x 1.5	106.50	> Silt and debris observed in vent way. > Structure is fair condition. > Culvert extra found at site.
13	25+380	26/1	BC	BHS	MCW	Rec	1 x 3.7 x 1.5	62.00	> Culvert partially buried with mud at RHS. > Crash barrier not constructed at LHS.
14	26+600	27/2	PC	BHS	MCW	Wid	2 x 1.2	61.75	> Silt and debris observed in vent area > Partially buried at LHS.
15	26+665	27/3	BC	BHS	MCW	Wid	1 x 3.2 x 2	60.00	> Vegetation growth and silt observed in vent area.

Sl No.	Design Chainage	Str. Number	Type of Str.	Side	Str. on	Structure Proposal	Span Arrangement (No x Length)	Deck Width	Observations
									> Crash barrier not constructed at LHS.
16	27+550	28/2	BC	BHS	MCW	Rec	1 x 1.3 x 1.5	66.50	> Crash barrier not constructed at BHS. > Debris observed in vent area. > Partially buried with bushes at RHS.
17	35+301	36/2	PC	BHS	MCW	Wid	1 x 0.9	60.00	> Pipe not visible due to merged with drain at both sides.
18	35+637	36/3	PC	BHS	MCW	Wid	1 x 0.9	63.50	> Pipe not visible due to covered with debris and bushes.
19	36+685	37/1	BC	BHS	MCW	Rec	1 x 1.3 x 2	61.70	> Culvert not visible due to merged with drain. > Culvert not reconstructed at RHS MCW.
20	36+830	37/2	BC	BHS	MCW	Wid	1 x 2 x 1.5	58.00	> Culvert not reconstructed at RHS MCW. > Culvert partially buried with mud and bushes at both sides. > Culvert extra found at site.
21	37+268	38/1	PC	BHS	MCW	Wid	1 x 0.9	60.00	> Pipe partially buried with debris at LHS. > Pipe not visible due to merged with drain at RHS.
22	39+073	40/1	PC	BHS	MCW	Wid	1 x 0.9	59.50	> Pipe not visible due to merged with drain at BHS.
23	39+424	40/2	PC	BHS	MCW	Wid	1 x 0.9	62.70	> Pipe not visible due to merged with drain at BHS.
24	39+580	40/3	BC	BHS	MCW	Wid	1 x 2 x 2	59.50	> Silt and debris observed in vent area. > Vegetation observed in vent area.
25	40+291	41/1	BC	BHS	MCW	Wid	2 x 2 x 1.5	60.00	> Crash barrier not constructed at LHS SR. > Bushes and debris observed in vent area.
26	40+430	41/2	SC	BHS	MCW	Existing	1 x 2 x 1	60.00	> Culvert partially buried. > Culvert extra found at site.
27	41+520	42/2	SC	BHS	MCW	Existing	1 x 2 x 1	61.20	> Culvert partially Buried with debris. > Culvert extra found at site.
28	41+940	42/3	SC	BHS	MCW	Existing	2 x 2.2 x 1.5	58.50	> Silt and debris observed in vent area. > partially covered with bushes. > Culvert extra found at site.
29	44+543	45/2	BC	BHS	MCW	Wid	1 x 1.8 x 2.2	61.00	> Silt and debris observed in vent area.
30	44+701	45/3	PC	BHS	MCW	Wid	1 x 0.9	57.50	> Pipe not visible due to

Sl No.	Design Chainage	Str. Number	Type of Str.	Side	Str. on	Structure Proposal	Span Arrangement (No x Length)	Deck Width	Observations
									Covered with bushes.
31	45+647	46/3	BC	BHS	MCW	Rec	1 x 1.5 x 1	61.20	> Partially buried with bushes.
32	46+021	47/1	BC	BHS	MCW	Rec	1 x 1.5 x 1.5	60.00	> Silt and debris observed in vent area. > Culvert not reconstructed at LHS SR.
33	46+416	47/2	PC	BHS	MCW	Wid	1 x 1	62.70	> Debris observed in vent way. > Extra pipe found at Site
34	46+776	47/3	BC	BHS	MCW	Wid	1 x 1.8 x 2	59.50	> Structure is fair condition.
35	47+583	48/3	BC	BHS	MCW	Wid	1 x 4.2 x 2.15	60.00	> Partially buried with mud at RHS SR. > Fully covered with bushes at LHS SR.
36	48+060	49/1	BC	BHS	MCW	Wid	1 x 2 x 1.5	60.00	> Structure is fair condition.
37	49+270	50/1	PC	BHS	MCW	Wid	1 x 1	62.50	> Debris observed in vent way.
38	51+139	52/1	PC	BHS	MCW	Wid	1 x 1	60.00	> Pipe not visible due to Covered with bushes.
39	52+402	53/1	PC	BHS	MCW	Wid	1 x 0.9	59.50	> Debris observed in vent way.
40	53+510	54/2	BC	BHS	MCW	Rec	1 x 1.5 x 1.5	60.30	> Silt and debris observed in vent way.
41	53+739	54/3	PC	BHS	MCW	Wid	1 x 1	84.00	> Pipe not visible due to merged with drain at BHS.
42	53+836	54/4	PC	BHS	MCW	Wid	1 x 1	89.70	> Pipe partially buried.
43	55+044	56/1	PC	BHS	MCW	Wid	1 x 1	60.00	> Debris observed in vent way.
44	55+303	56/2	BC	BHS	MCW	Rec	2 x 2 x 2	58.50	> Silt and debris observed in vent way. > Partially buried with bushes.
45	56+272	57/1	PC	BHS	MCW	Wid	1 x 0.9	58.00	> Pipe partially buried.
46	56+550	57/3	PC	BHS	MCW	Wid	1 x 0.9	64.50	> Pipe partially buried with debris.
47	56+700	57/4	PC	BHS	MCW	Wid	1 x 0.9	62.00	> Pipe not visible due to merged with drain at BHS.
48	56+865	57/5	PC	BHS	MCW	Wid	1 x 1.2	63.40	> Debris observed in vent way.
49	58+948	59/2	BC	BHS	MCW	Wid	2 x 2.5 x 1.5	58.71	> Silt and debris observed in vent way. > Under construction at RHS MCW. > Construction not yet started at RHS SR.
50	61+160	62/2	PC	BHS	MCW	Wid	1 x 0.9	60.00	> Debris observed in vent way.
51	62+980	63/2	PC	BHS	MCW	Wid	1 x 1	61.20	> Pipe not visible due to merged with drain at BHS.
52	63+425	64/1	PC	BHS	MCW	Wid	1 x 1	62.50	> Pipe partially buried.
53	63+877	64/2	PC	BHS	MCW	Wid	1 x 1	62.10	> Pipe partially buried.
54	65+295	66/2	BC	BHS	MCW	Rec	1 x 2 x 1.5	60.50	> Head wall not constructed at LHS. > Silt and debris observed in vent area.
55	67+312	68/1	PC	BHS	MCW	Wid	1 x 0.9	58.50	> Pipe partially buried.
56	68+882	69/1	BC	BHS	MCW	Rec	1 x 1.5 x 1.5	60.50	> Culvert not reconstructed at LHS MCW. > Silt and debris observed in

Sl No.	Design Chainage	Str. Number	Type of Str.	Side	Str. on	Structure Proposal	Span Arrangement (No x Length)	Deck Width	Observations
									vent area. > Head wall not constructed.
57	69+053	70/1	BC	BHS	MCW	Rec	1 x 1.5 x 1.5	59.50	> Culvert under construction at LHS SR. > Culvert not constructed at RHS MCW. > Head wall not constructed.
58	69+562	70/4	PC	BHS	MCW	Wid	2 x 0.9	61.50	> Debris observed in vent way.
59	70+523	71/1	BC	BHS	MCW	Wid	2 x 2 x 1.5	58.50	> Culvert not visible due to fully covered with bushes. > Head wall not constructed.
60	71+582	72/1	PC	BHS	MCW	Wid	1 x 0.9	58.90	> Pipe partially buried.
61	75+659	76/2	BC	BHS	MCW	Wid	2 x 2 x 2	60.00	> Silt and debris observed in vent area. > Head wall not constructed.
62	76+603	77/1	BC	BHS	MCW	Wid	2 x 2 x 1.5	58.00	> Silt and debris observed in vent area. > Head wall not constructed. > Fully covered with bushes.
63	77+085	78/1	BC	BHS	MCW	Rec	2 x 2 x 1.5	60.00	> Culvert not visible due to merged with drain.
64	78+430	79/1	PC	BHS	MCW	Wid	1 x 0.9	58.00	> Debris observed in vent way.
65	80+766	81/1	PC	BHS	MCW	Wid	1 x 0.9	66.00	> Pipe partially buried.
66	81+068	82/1	PC	BHS	MCW	Wid	1 x 0.9	60.00	> Pipe fully covered with bushes.
67	81+163	82/2	BC	BHS	MCW	Wid	2 x 2 x 2	59.50	> Head wall not constructed at LHS SR. > Culvert partially buried with soil.
68	81+847	82/3	BC	BHS	MCW	Rec	2 x 2 x 1.5	58.00	> Head wall not constructed at LHS SR. > Culvert partially buried with soil and debris.
69	82+472	83/1	PC	BHS	MCW	Wid	2 x 0.9	57.50	> Pipe not visible due to merged with drain at BHS.
70	83+312	84/1	PC	BHS	MCW	Wid	2 x 0.9	43.00	> Pipe fully covered with bushes. > Pipe Extra found at site.
71	83+470	84/2	PC	BHS	MCW	Wid	1 x 0.9	45.00	> Pipe buried with debris.
72	84+170	85/1	BC	BHS	MCW	Wid	1 x 2 x 1.5	58.00	> Culvert under construction at RHS SR. > Debris and vegetation observed in vent area.
73	84+397	85/2	BC	BHS	MCW	Wid	2 x 2 x 1.5	33.00	> Vegetation and Debris observed in vent area.
74	84+570	85/3	BC	BHS	MCW	Wid	2 x 2 x 1.5	53.00	> Silt and debris observed in vent area. > Vegetation observed in vent area.
75	84+742	85/5	BC	BHS	MCW	Wid	1 x 2 x 1.5	60.00	> Culvert under construction at RHS SR. > Vegetation observed in vent

Sl No.	Design Chainage	Str. Number	Type of Str.	Side	Str. on	Structure Proposal	Span Arrangement (No x Length)	Deck Width	Observations
									area.
76	85+200	86/1	PC	BHS	MCW	Wid	2 x 0.9	60.00	> Pipe not visible due to merged with drain at BHS.
77	85+517	86/2	PC	BHS	MCW	Wid	2 x 0.9	58.00	> Debris observed in vent way.
78	85+713	86/3	BC	BHS	MCW	Rec	2 x 2 x 1.5	57.50	> Culvert not visible due to merged with drain.
79	86+068	87/1	BC	BHS	MCW	Rec	1 x 2 x 1.5	46.50	> Culvert not reconstructed > vegetation and debris observed in vent area.

Few Culvert Locations

4.7 DRAINAGE AND SLOPE PROTECTION

- ✓ Lined Covered drains observed at Service Road Separator and service road Locations along the corridor.

4.8 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.
- ✓ Pedestrian guard rails installed at Service Road separator locations appear to be in good condition
- ✓ Traffic blinkers established in some locations and street lighting and high mast lighting are all functioning well.

4.9 ROAD USER FACILITIES

The Bus Shelter, provided along the corridor appear to be good condition.

CHAPTER 5. REHABILITATION PLANS AND DESIGNS

5.1 DESIGN TRAFFIC LOADING

Design Traffic loading has been estimated by considering the traffic (given) and VDFs as estimated from the axle load survey data and with 5% growth rates for 10 years, 15 years and 20 years design period as below:

Table 22: Traffic Volume (AADT)

Vehicle/Mode	AADT at 54+600, 2021 (Vehicles)
Car	45462
LCV	1920
2A truck	6878
3A truck	1982
MAV truck	2156
BUS	5220

50:50 directional distributions are considered

Table 23: Estimated Design traffic loading (msa)

Year	Design MSA with 5% Growth rates	
	km 54+600 UP	km 54+600 DN
10th year from Now	64	68
15th year from Now	110	117
20th year from Now	168	179

The computation of traffic loadings is presented in **Appendix 8** of this Report. Design traffic corresponding to 10 years period has been considered for overlay design.

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 24: 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	Critical Life
LHS																
1	15.00	17.65	2.6	2072	377	86	209	450	209	659	2072	188.40	117.10	206	1089	206
2	17.65	22.20	4.6	2254	391	86	208	450	208	658	2254	183.50	111.30	233	1227	233
3	22.20	23.40	1.2													
4	23.40	26.80	3.4	2757	391	86	217	450	217	667	2757	169.10	97.69	326	1777	326
5	26.80	37.60	10.8													
6	37.60	39.20	1.6	2434	270	86	170	450	170	620	2434	235.30	158.30	55	397	55
7	39.20	42.90	3.7	2411	392	86	212	450	212	662	2411	177.90	106.10	265	1412	265
8	42.90	43.85	1.0													
9	43.85	45.00	1.2	2389	393	86	210	450	210	660	2389	179.50	107.30	256	1356	256
10	45.00	46.00	1.0	1781	291	87	170	450	170	620	1781	243.70	174.00	50	339	50
11	46.00	46.80	0.8	2451	216	86	200	450	200	650	2451	215.00	148.30	71	598	71
12	46.80	47.63	0.8	2297	278	87	170	450	170	620	2297	234.90	160.20	56	400	56
13	47.63	49.60	2.0	1853	392	86	206	450	206	656	1853	192.70	121.10	198	983	198
14	49.60	50.40	0.8	2027	364	87	170	450	170	620	2027	221.80	144.60	92	519	92
15	50.40	51.02	0.6	1721	393	86	210	450	210	660	1721	192.70	122.00	205	983	205
16	51.02	52.02	1.0	1851	222	85	170	450	170	620	1851	263.10	198.70	29	240	29
17	52.02	53.00	1.0	1748	393	87	206	450	206	656	1748	193.90	123.50	193	955	193
18	53.00	53.60	0.6	1730	394	87	170	450	170	620	1730	222.00	145.40	103	517	103
19	53.60	54.64	1.0													
20	54.64	55.00	0.4	1705	393	87	210	450	210	660	1705	192.10	122.40	204	997	204
21	55.00	56.80	1.8	1666	319	86	170	450	170	620	1666	241.30	168.70	60	355	60
22	56.80	58.00	1.2	1710	391	86	210	450	210	660	1710	193.30	122.70	202	969	202
23	58.00	61.10	3.1													
24	61.10	64.40	3.3	1708	392	86	216	450	216	666	1708	189.10	119.30	225	1070	225
25	64.40	65.80	1.4	1585	254	87	170	450	170	620	1585	258.80	197.40	34	258	34
26	65.80	66.40	0.6	2150	322	86	210	450	210	660	2150	194.80	125.00	155	936	155
27	66.40	67.20	0.8	1949	393	87	170	450	170	620	1949	217.60	139.80	109	566	109
28	67.20	69.00	1.8	1903	391	87	210	450	210	660	1903	188.00	117.90	215	1099	215
29	69.00	70.00	1.0	1927	395	87	170	450	170	620	1927	217.60	139.70	110	566	110
30	70.00	71.80	1.8	1905	394	86	208	450	208	658	1905	189.90	118.40	212	1050	212
31	71.80	74.00	2.2	1906	364	78	170	450	170	620	1906	236.00	147.80	89	392	89
32	74.00	74.80	0.8	1909	394	86	200	450	200	650	1909	195.60	122.70	184	918	184
33	74.80	75.59	0.8	1808	294	87	170	450	170	620	1808	242.30	171.90	52	348	52
34	75.59	76.02	0.4	1973	394	87	230	450	230	680	1973	173.00	105.70	319	1602	319
35	76.02	79.00	3.0	1881	226	86	170	450	170	620	1881	259.40	195.40	30	255	30

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	Critical Life
36	79.00	81.40	2.4	2100	332	86	205	450	205	655	2100	198.00	127.30	147	869	147
37	81.40	82.20	0.8	2193	283	81	170	450	170	620	2193	244.80	162.30	55	332	55
38	82.20	86.00	3.8	2183	347	87	214	450	214	664	2183	186.10	117.10	197	1151	197

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	Critical Life
RHS																
1	15.00	18.20	3.2	1609	277	87	260	450	260	710	1609	179.00	121.60	220	1373	220
2	18.20	22.20	4.0	1382	247	86	260	450	260	710	1382	191.90	138.20	153	1001	153
3	22.20	23.40	1.2													
4	23.40	26.00	2.6	1933	390	86	260	450	260	710	1933	157.70	93.81	517	2438	517
5	26.00	37.60	11.6													
6	37.60	39.00	1.4	2553	256	87	170	450	170	620	2553	234.50	158.80	53	404	53
7	39.00	40.20	1.2													
8	40.20	42.90	2.7	1817	254	87	246	450	246	696	1817	185.60	127.70	164	1165	164
9	42.90	43.90	1.0													
10	43.90	45.00	1.1	1442	388	86	245	450	245	695	1442	178.20	112.40	328	1401	328
11	45.00	46.00	1.0	2457	395	87	170	450	170	620	2457	208.10	127.90	126	694	126
12	46.00	46.80	0.8	2603	394	87	215	450	215	665	2603	171.50	100.80	303	1667	303
13	46.80	47.60	0.8	2646	390	87	170	450	170	620	2646	206.10	125.20	129	725	129
14	47.60	49.40	1.8	1766	315	86	230	450	230	680	1766	178.30	110.40	296	1398	296
15	49.40	50.38	1.0	2577	197	87	170	450	170	620	2577	247.20	177.80	34	318	34
16	50.38	51.39	1.0	2803	391	87	224	450	224	674	2803	162.90	93.69	378	2105	378
17	51.39	52.00	0.6	2550	359	87	170	450	170	620	2550	213.30	133.20	104	620	104
18	52.00	53.00	1.0	2852	300	87	224	450	224	674	2852	173.30	104.90	240	1590	240
19	53.00	53.60	0.6	2522	354	87	170	450	170	620	2522	214.70	134.90	100	602	100
20	53.60	54.60	1.0													
21	54.60	54.80	0.2	2818	391	87	215	450	215	665	2818	168.60	97.61	321	1801	321
22	54.80	56.79	2.0	1745	258	87	170	450	170	620	1745	253.10	188.00	38	286	38
23	56.79	58.00	1.2	2831	392	86	260	450	260	710	2831	142.20	78.65	741	3898	741
24	58.00	59.70	1.7													
25	59.70	60.40	0.7	2143	371	87	260	450	260	710	2143	154.80	92.07	509	2652	509
26	60.40	61.10	0.7						0			0.00	0.00			0
27	61.10	64.20	3.1	1477	261	87	226	450	226	676	1477	209.50	152.70	98	673	98
28	64.20	67.20	3.0	2511	249	79	170	450	170	620	2511	249.50	162.70	49	305	49
31	67.20	68.78	1.6	2786	394	86	238	450	238	688	2786	154.70	87.31	500	2660	500
32	68.78	69.60	0.8													
33	69.60	70.20	0.6	2765	326	87	170	450	170	620	2765	216.10	135.50	91	585	91
34	70.20	71.78	1.6	2782	393	87	249	450	249	699	2782	148.00	83.33	600	3252	600
35	71.78	74.00	2.2	2115	346	80	170	450	170	620	2115	233.00	146.90	84	415	84
36	74.00	74.80	0.8	2831	393	87	215	450	215	665	2831	168.20	97.16	326	1821	326
37	74.80	75.60	0.8	2808	391	87	170	450	170	620	2808	203.00	121.50	137	776	137
38	75.60	76.20	0.6	1388	234	87	230	450	230	680	1388	214.60	163.20	80	603	80
39	76.20	77.80	1.6	2728	357	86	170	450	170	620	2728	212.00	129.90	109	638	109

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	Critical Life
40	77.80	78.20	0.4	2888	394	87	215	450	215	665	2888	167.20	96.11	334	1870	334
41	78.20	79.00	0.8	2865	322	82	170	450	170	620	2865	221.70	134.40	91	521	91
42	79.00	81.40	2.4	2884	390	86	223	450	223	673	2884	163.40	93.05	379	2076	379
43	81.40	82.20	0.8	2857	348	73	170	450	170	620	2857	228.70	129.60	105	452	105
44	82.20	86.00	3.8	2907	390	86	241	450	241	691	2907	151.90	85.06	534	2890	534

It can be seen from the above table that remaining life of existing pavement is more than 29MSA on LHS carriageway & 34MSA on RHS carriageway. Summary of overlay requirements for upcoming years with concern design traffic loadings are as presented below:

Sl. No	LHS				RHS			
	4 Years		10 Years		4 Years		10 Years	
	No OL	OL	No OL	OL	No OL	OL	No OL	OL
MCP	22 MSA		63 MSA		23 MSA		68 MSA	
	53.9	0	41.7	12.2	51.8	0	44.4	7.4
Remarks	Under Construction-6.3Km, Former Strike-10.8Km				Under Construction-7.6Km, Former Strike-11.6Km			

From the above table it can be summarized that:

- For 10 years design traffic OL requirement on LHS 12.2 Km + RHS 7.4 Km
- For 4 years design traffic OL requirement on LHS 0 Km + RHS 0 Km

Design period of 4 years is considered appropriate as 1st MMR cycle is most likely to happen within 4 years of operation from now. 10 years is the design traffic to be considered as per specifications.

Since the Concessionaire has applied PCOD on 29.07.2021, it is felt prudent to verify overlay requirement till 1st cycle of MMR. Since for 4 years no OL requirement is there, no immediate overlay is considered for the project.

However, for 10 years design period, an overlay with 40mm BC, in either direction has been assumed for the sections where the overlay requirement is there along the project Road and Pavement life for these sections have been worked out and presented in the Table below.

Summary of the above analysis is presented in the following tables; however, Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Appendix 9** of this Report.

Table 25: Summary of Pavement Life with 40mm, Overlay

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)	Proposed Overlay	Total BT Layer thickness	Total Crust	Proposed BT layer	ver. Strain(Ev)	tan. Strain(Et)	Nf- Fatigue life, mSA	Rutting life,mSA	Critical Life
LHS with Proposed Overlay With 40mm																	
1	37.600	39.200	1.600	2434	270	86	170	450	40	210	660	2434	193.1	126.6	132	974	132
2	45.000	46.000	1.000	1781	291	87	170	450	40	210	660	1781	197.6	139.8	117	877	117
3	46.802	47.628	0.826	2297	278	87	170	450	40	210	660	2297	192.4	128.2	132	990	132
4	51.018	52.019	1.001	1851	222	85	170	450	40	210	660	1851	210.8	156.6	73	654	73
5	55.000	56.800	1.800	1666	319	86	170	450	40	210	660	1666	195.8	136.7	136	914	136
6	64.400	65.801	1.401	1585	254	87	170	450	40	210	660	1585	207.3	157.2	82	706	82
7	74.801	75.593	0.792	1808	294	87	170	450	40	210	660	1808	196.6	138.2	121	897	121
8	76.018	79.000	2.982	1881	226	86	170	450	40	210	660	1881	208.2	154.2	77	692	77
9	81.401	82.201	0.800	2193	283	81	170	450	40	210	660	2193	200.2	130.2	130	827	130
RHS with Proposed Overlay With 40mm																	
1	37.60	39.00	1.4	2553	256	87	170	450	40	210	660	2553	192.6	126.7	127	985	127
2	49.40	50.38	1.0	2577	197	87	170	450	40	210	660	2577	200.7	139.8	86	817	86
3	54.80	56.79	2.0	1745	258	87	170	450	40	210	660	1745	203.7	149.8	91	764	91
4	64.20	67.20	3.0	2511	249	79	170	450	40	210	660	2511	204.4	129.7	117	752	117

5.3 STRUCTURAL REHABILITATION

All the structure found to be in good condition except minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- Repair/ Replacement of Existing Bearings
- Repair / Replacement of Existing Expansion Joints
- Repair / Replacement of Existing Wearing Coat
- Profile Correction for Existing Deck Slab by Cement Concrete
- Sealing of Cracks for Bridges by Epoxy Resin
- Replacement of Spalled Concrete of ECW by Epoxy Mortar
- Cement Grouting for Repair of Existing Bridges
- Guniting / Shotcreting for Repair of Existing Bridges
- Providing & Fixing of Drainage Spouts
- Repair of Substructure Component
- Repair / Replacement of Railing & Crash Barrier
- Epoxy Bonding between New and Old Concrete.

CHAPTER 6. OPERATION AND MAINTENANCE

6.1 INTRODUCTION

Looking at the contractual requirements of maintaining project road under specified level of roughness it is felt that roughness is the most important criterion for finalizing the O&M schedule for the project. Accordingly, the methodology adopted by present consultants includes predicting the roughness year by year under the traffic using a well acknowledged HDH-4 model developed for developing countries like India after lot of research by World Bank. The said model is widely prescribed by MORTH and NHAI during the preparation of detailed project reports for several projects in doing economic analysis for the projects. The economic analysis mainly consists of two parts:

1. Predicting the road deterioration and estimating VOC
2. Estimating Benefits

Considering its importance and present use in India, consultants felt prudent to use the first part, i.e estimating road deterioration and predicting roughness in HDM 4 model to finalize the O&M schedule for the project. This approach is more scientific as it does not assume hypothetical deflection values at 10th and 20th year and includes main criterion of maintaining roughness at 2500mm/Km as per Schedule K.

6.2 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

- Schedule K of CA species that Roughness values exceeds 2500mm/km in a length of KM, needs to be corrected within 180 days.
- No specific requirement with respect to deflection (BBD) measurement

6.3 INPUTS FOR MM SCHEDULE

6.3.1 PROJECT SECTIONS

The project corridor is mainly divided into two major sections depending on the applicability of toll plaza lengths and major intersections as:

- ✓ Section-1: Mukarba Chowk- Panipat (Non-Approaches)
- ✓ Section-2: Mukarba Chowk- Panipat (Approaches Done)
- ✓ Section-3: Mukarba Chowk- Panipat (Approaches Not Done)

Since roughness is the main criterion for major maintenance, Project Corridor has been sub divided in to various Cases depending the present roughness values:

- Case 1: Roughness value <2000 mm/Km
- Case 2: Roughness values >2000<2300 mm/Km
- Case 3: Roughness>2300<2500 mm/Km
- Case 4: Roughness>2500 mm/KM

6.3.2 TRAFFIC (AADT)

The following traffic data has been used in the analysis is as below:

Vehicle/Mode	AADT at 54+600, 2021 (Vehicles)
Car	45462
LCV	1920
2A truck	6878
3A truck	1982
MAV truck	2156
BUS	5220

Note: 50:50 directional distributions are considered.

6.3.3 VEHICLE DAMAGE FACTORS (VDF)

VDF values as obtained from axle load surveys are used for various sections are as given below:

Mode Type	UP	DOWN
LCV	0.090	0.160
2 Axle Truck	1.190	1.060
3 Axle Truck	2.110	5.370
MAV (4-6 Axle)	10.290	9.660
Buses	0.310	0.360

6.3.4 HDM INPUTS

Basically, FWD and Roughness values considered are from surveys and investigations are as below:

Non-Approach Section: -

Section-1	Case-2	
	LHS	RHS
	>=2000 and <2300	>=2000 and <2300
Length	37260	37260
Roughness	2166	2190
IRI	3.01	3.04
Deflection	0.20	0.26
Cracking	0.00%	0.00%
Raveling	0.25%	3.37%
Patching	0.07%	0.13%
Rut Depth	0	0
BT Crust	204	225
Granular Crust	443	444

Approach Done Section: -

Section-2	Case-2	
	LHS	RHS
	>=2000 and <2300	>=2000 and <2300
Length	16770	16770
Roughness	2149	2189
IRI	2.99	3.04

Section-2	Case-2	
	LHS	RHS
	>=2000 and <2300	>=2000 and <2300
Deflection	0.37	0.38
Cracking	0.00%	0.00%
Raveling	5.02%	3.39%
Patching	0.00%	0.34%
Rut Depth	0	1
BT Crust	134	137
Granular Crust	355	359

Approach Not Done Section: -

Section-3	Case-1	
	LHS	RHS
	=1750	=1750
Length	16470	16470
Roughness	1750	1750

Further, during the discussions with Vendor in the month of Feb-22, it is informed that as per CA requirements, roughness to the maximum permissible level of 1800mm/km in the project road shall be maintained per Schedule-I Tests (Page 246 of Vol-1) prior to issuance of Completion Certificate or Provisional Certificate from the Independent Engineer and the same clause is as produced below:

2.3 Riding quality Test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be 1,800 (one thousand and eight hundred) mm for each kilometre.

Accordingly, HDM inputs are reconsidered with case-1 (Roughness<1800) for all the three sections as follows

Non-Approach Section: -

Section-1	Case-1	
	LHS	RHS
	<1800	<1800
Length	37260	37260
Roughness	1750	1750
IRI	2.49	2.49
Deflection	0.20	0.26
Cracking	0.00%	0.00%
Raveling	0.25%	3.37%
Patching	0.07%	0.13%
Rut Depth	0	0
BT Crust	204	225
Granular Crust	443	444

Approach Done Section: -

Section-2	Case-1	
	LHS	RHS
	<1800	<1800
Length	16770	16770
Roughness	1750	1750
IRI	2.49	2.49
Deflection	0.37	0.38
Cracking	0.00%	0.00%
Raveling	5.02%	3.39%
Patching	0.00%	0.34%
Rut Depth	0	1
BT Crust	170	170
Granular Crust	450	450

Approach Not Done Section: -

Section-3	Case-1	
	LHS	RHS
	<1800	<1800
Length	16470	16470
Roughness	1600	1600
IRI	2.3	2.3
Deflection	0.3	0.3
BT Crust	170	170
Granular Crust	450	450

6.3.5 OPTIONS FOR MM SCHEDULES

Based on the requirements of CA, various options have been considered to be used as responsive overlays triggered at specified level of roughness of 2500 mm/km. Micro surfacing has also been considered to examine its feasibility for major maintenance.

In LHS direction following options were considered in the analysis:

- ✓ Base Case: MCS at Roughness of 2500mm/Km with regular maintenance
- ✓ Opt-1: Responsive Overlay of 30mm mill and OL BC whenever roughness is >2500mm/KM with regular maintenance
- ✓ Opt-2: Responsive Overlay of 40mm mill and OL BC whenever roughness is >2500mm/KM with regular maintenance

In RHS direction following options were considered in the analysis:

- ✓ Base Case: MCS at Roughness of 2500mm/Km with regular maintenance
- ✓ Opt-1: Responsive Overlay of 30mm mill and OL BC whenever roughness is >2500mm/KM with regular maintenance
- ✓ Opt-2: Responsive Overlay of 40mm mill and OL BC whenever roughness is >2500mm/KM 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:

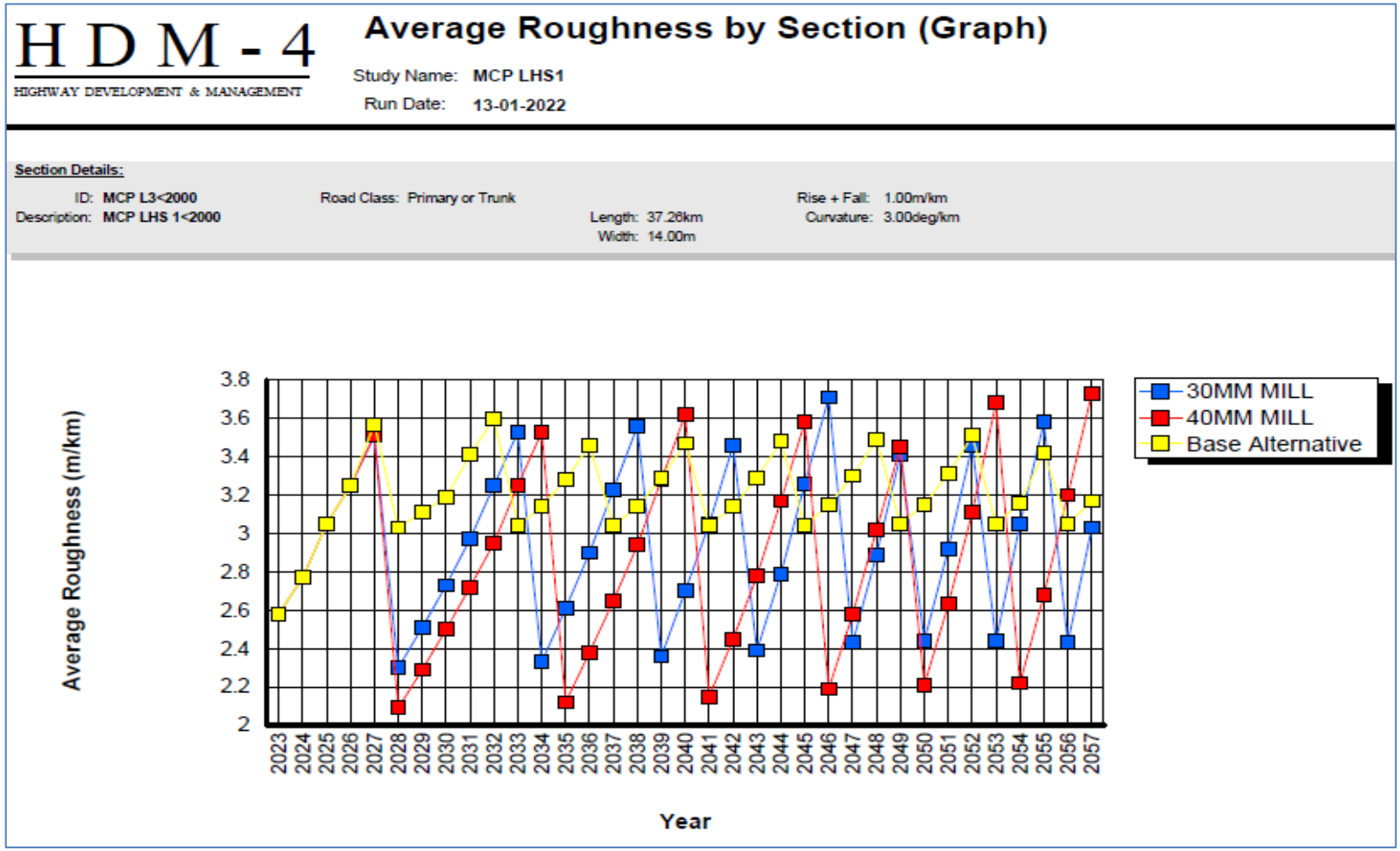


Figure 1: Average Roughness in LHS (UP) Carriageway (Non-Approach Section)

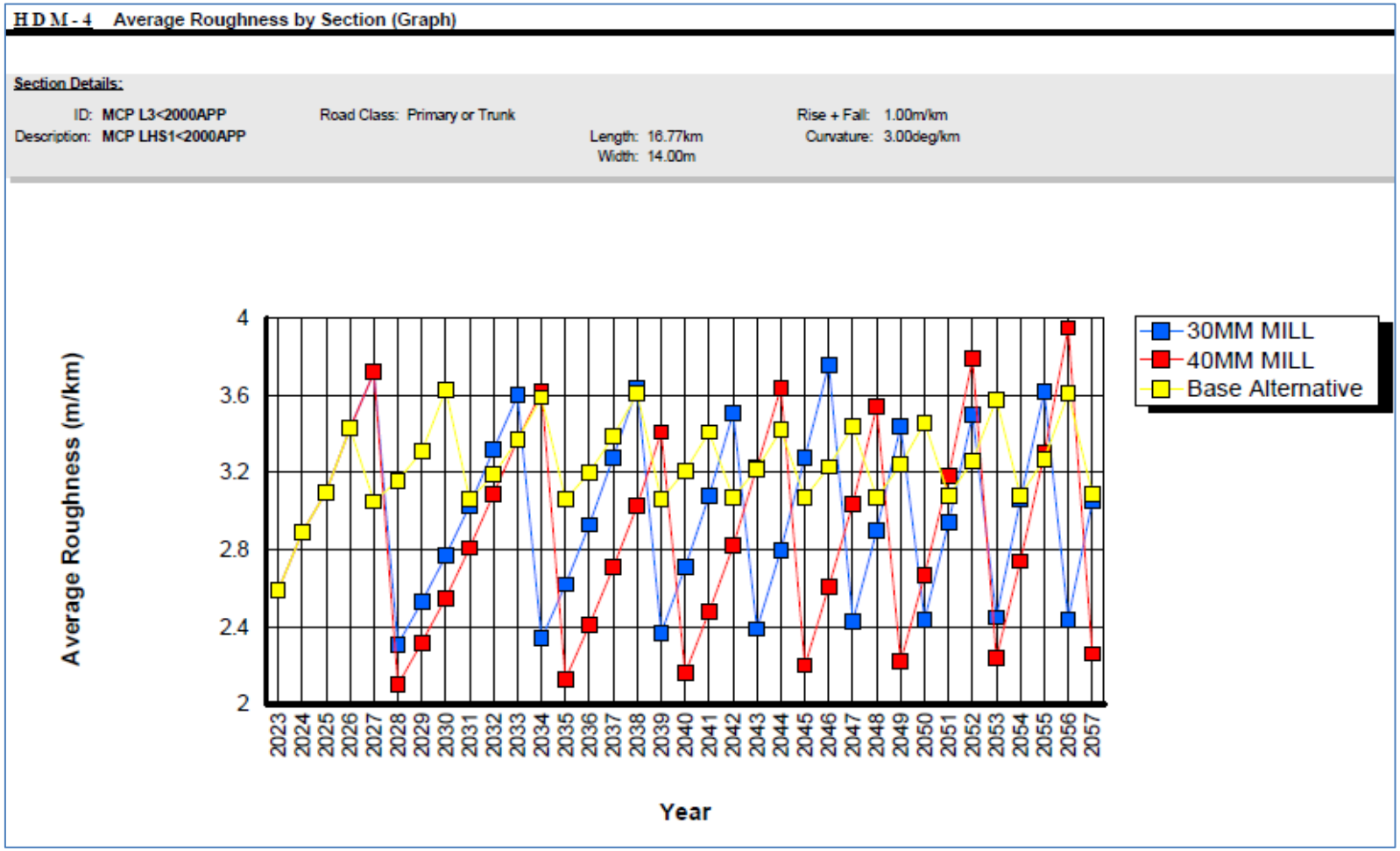


Figure 2: Average Roughness in LHS (UP) Carriageway (Approach Done Section)

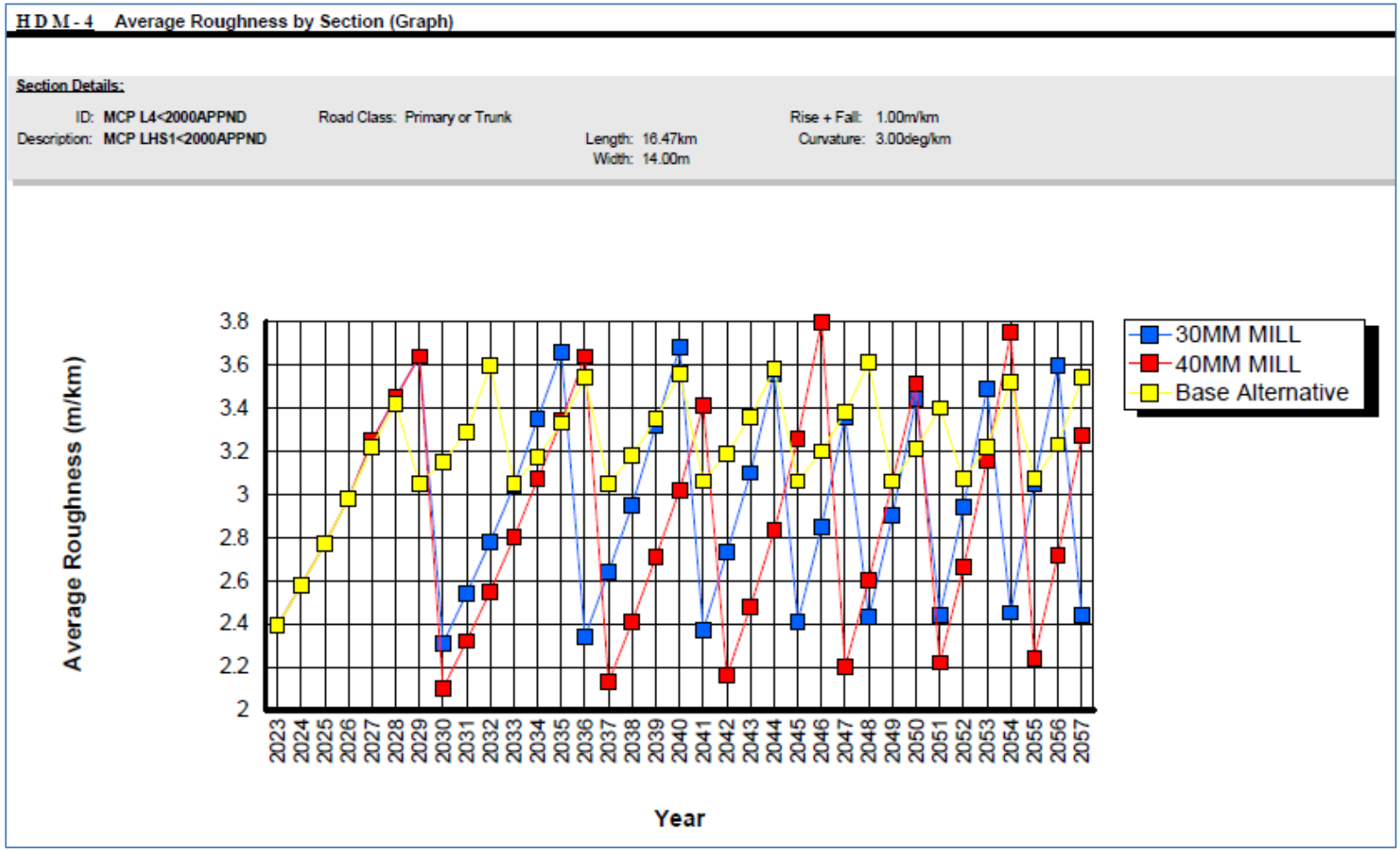


Figure 3: Average Roughness in LHS (UP) Carriageway (Approaches Not Done)

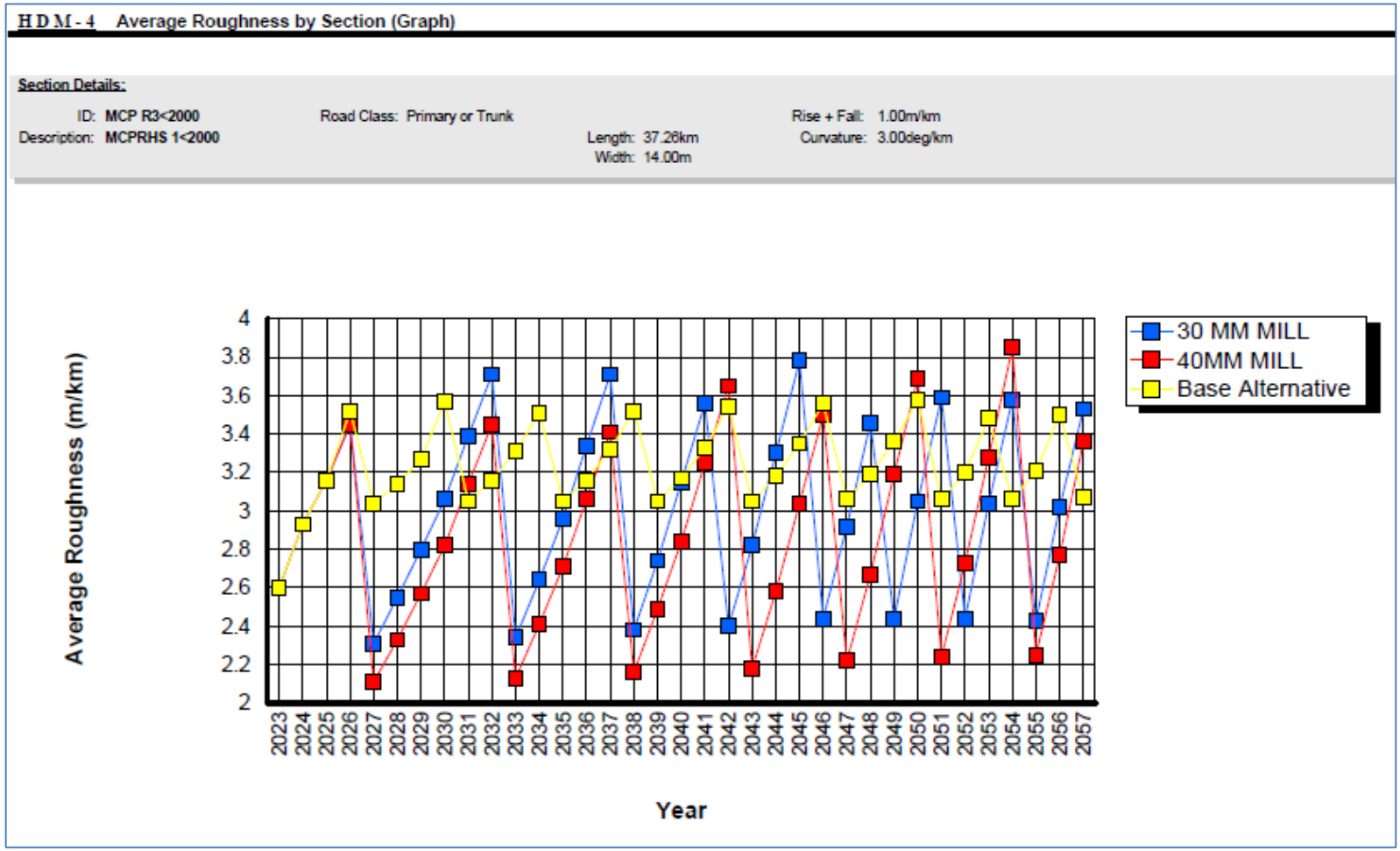


Figure 4: Average Roughness in RHS (DN) Carriageway (Non-Approach Section)

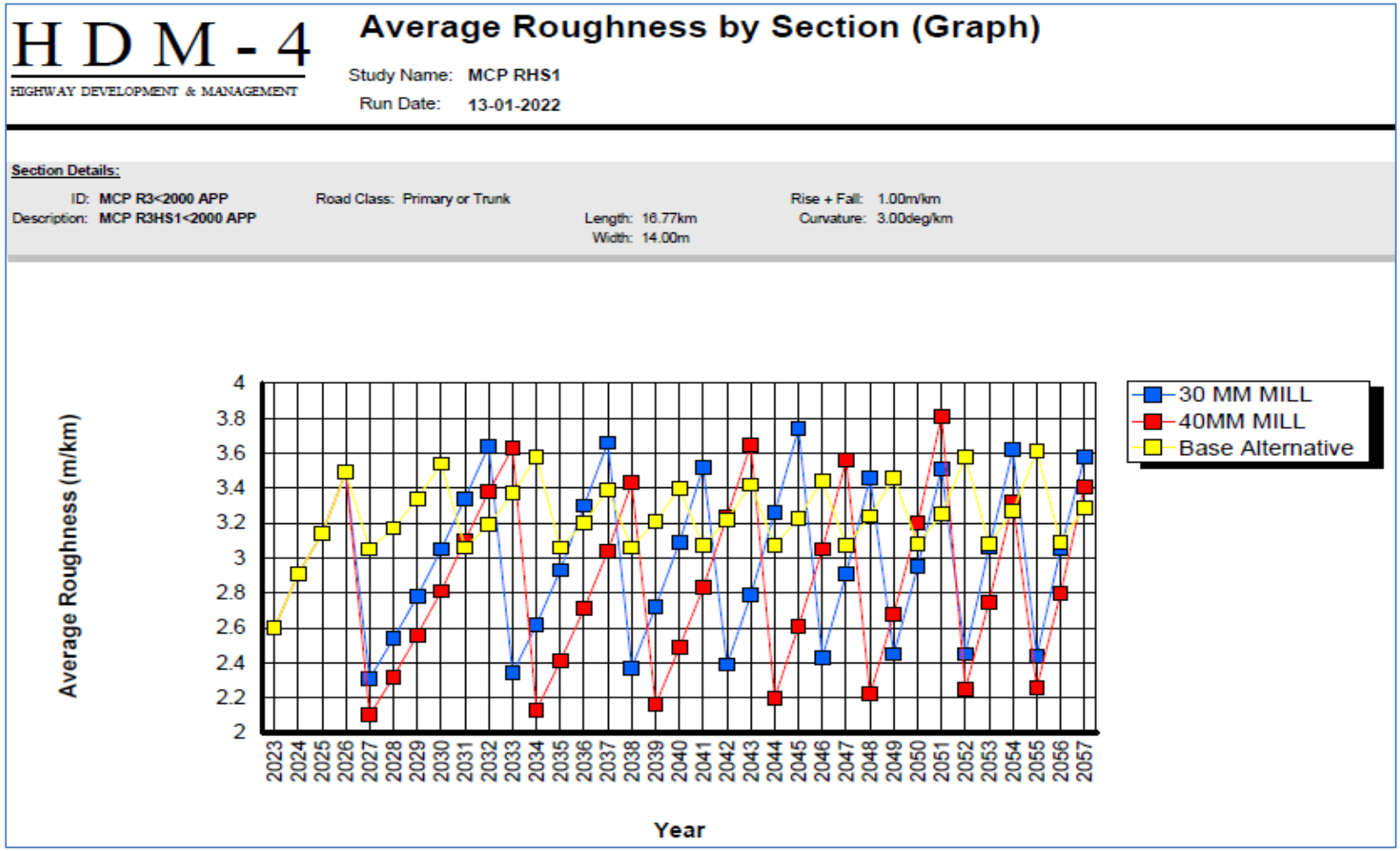


Figure 5: Average Roughness in RHS (DN) Carriageway (Approach Done Section)

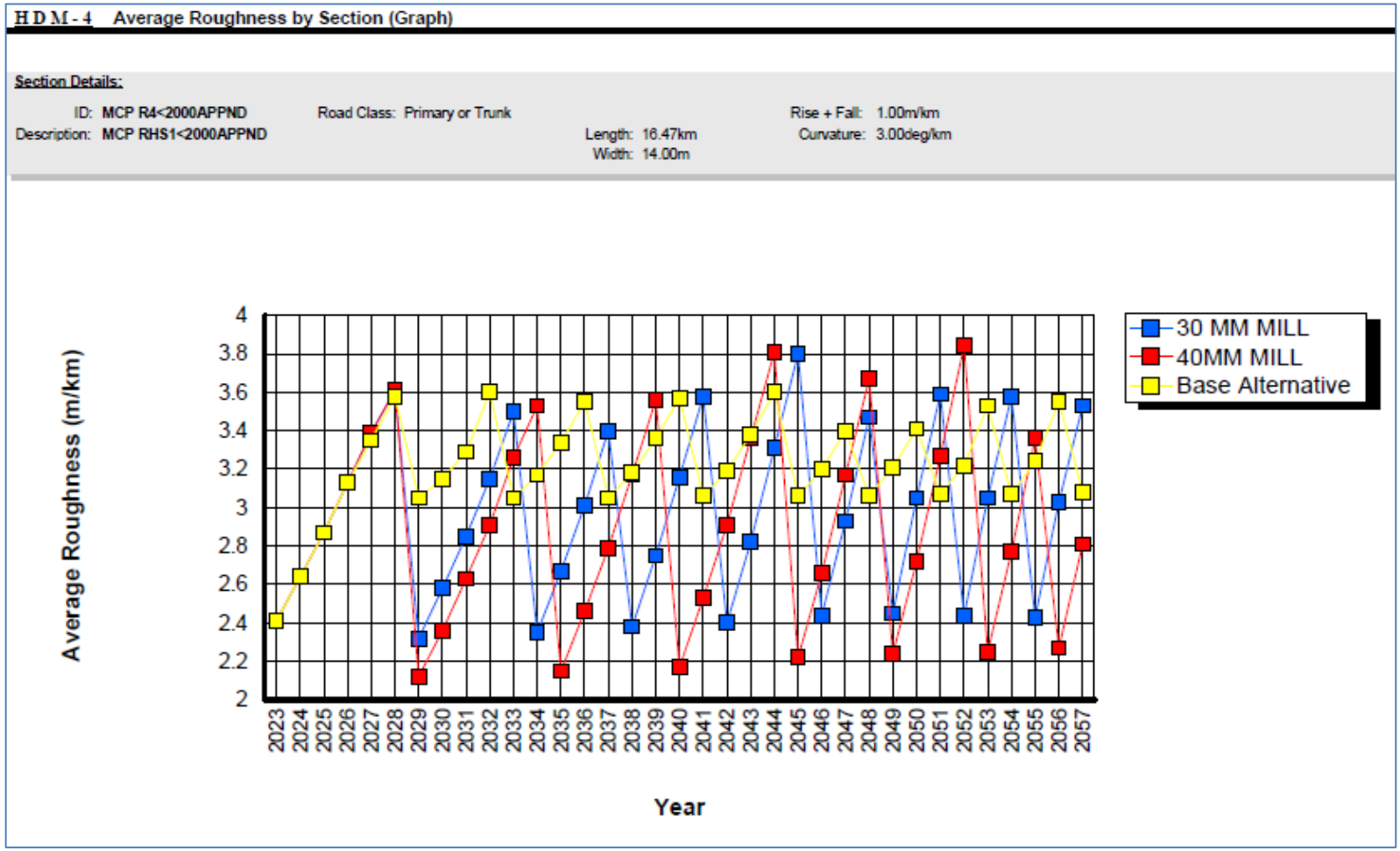


Figure 6: Average Roughness in RHS (DN) Carriageway (Approach Not done Section)

6.5 M&M SCHEDULE

Looking at the present condition and progression of roughness, it is felt prudent to consider the 40mm OL as the preferred option. Adopted MM schedule for the project is as below:

LHS Non-Approach Section - MM Schedule								
	Obtained					Adjusted		
	Option-1 (40mm Mill and OL)					Option-1 (40mm Mill and OL)		
Base Year	Criteria:	IRI<2000	2000-2300	Remarks		IRI<2000	2000-2300	Remarks
	Length:	0	37260			0	37260	
	Year	Case-1	Case-2			Case-1	Case-2	
0	2022							
1	2023							
2	2024							
3	2025							
4	2026							
5	2027		40					
6	2028						40	40mm+10% DBM
7	2029							
8	2030							
9	2031							
10	2032							
11	2033							
12	2034		40					
13	2035						MCS	
14	2036							
15	2037							
16	2038						30	30mm+10% DBM

RHS Non-Approach Section - MM Schedule								
	Obtained					Adjusted		
	Option-1 (40mm Mill and OL)					Option-1 (40mm Mill and OL)		
Base Year	Criteria:	IRI<2000	2000-2300	Remarks		IRI<2000	2000-2300	Remarks
	Length:	0	37260			0	37260	
	Year	Case-1	Case-2			Case-1	Case-2	
0	2022							
1	2023							
2	2024							
3	2025							
4	2026		40					
5	2027						40	40mm+10% DBM
6	2028							
7	2029							
8	2030							
9	2031							
10	2032		40					
11	2033						MCS	
12	2034							
13	2035							
14	2036							
15	2037		40				40	40mm
16	2038							

LHS Approach done Section - MM Schedule								
Obtained						Adjusted		
Base Year	Option-1 (40mm Mill and OL)					Option-1 (40mm Mill and OL)		
	Criteria:	IRI<2000	2000-2300	Remarks		IRI<2000	2000-2300	Remarks
	Length:	0	16770			0	16770	
	Year	Case-1	Case-2			Case-1	Case-2	
0	2022							
1	2023							
2	2024							
3	2025							
4	2026							
5	2027		40					
6	2028						40	40mm+10% DBM
7	2029							
8	2030							
9	2031							
10	2032							
11	2033							
12	2034		40					
13	2035						MCS	
14	2036							
15	2037							
16	2038						30	30mm+10% DBM

RHS Approach Done Section - MM Schedule								
Obtained						Adjusted		
Base Year	Option-1 (40mm Mill and OL)					Option-1 (40mm Mill and OL)		
	Criteria:	IRI<2000	2000-2300	Remarks		IRI<2000	2000-2300	Remarks
	Length:	0	16770			0	16770	
	Year	Case-1	Case-2			Case-1	Case-2	
0	2022							
1	2023							
2	2024							
3	2025							
4	2026		40					
5	2027						40	40mm+10% DBM
6	2028							
7	2029							
8	2030							
9	2031							
10	2032							
11	2033		40				MCS	
12	2034							
13	2035							
14	2036							
15	2037						40	40mm
16	2038		40					

LHS Approach Not done Section - MM Schedule								
Obtained						Adjusted		
Base Year	Option-1 (40mm Mill and OL)					Option-1 (40mm Mill and OL)		
	Criteria:	IRI<2000	2000-2300	Remarks		IRI<2000	2000-2300	Remarks
	Length:	16470	0			16470	0	
	Year	Case-1	Case-2			Case-1	Case-2	
0	2022							
1	2023							
2	2024							
3	2025							
4	2026							
5	2027							
6	2028					40		40mm+10% DBM
7	2029	40						
8	2030							
9	2031							
10	2032							
11	2033							
12	2034							
13	2035					MCS		
14	2036	40						
15	2037							
16	2038					30		30mm+10% DBM

RHS Approach Not done Section - MM Schedule								
Obtained						Adjusted		
Base Year	Option-1 (40mm Mill and OL)					Option-1 (40mm Mill and OL)		
	Criteria:	IRI<2000	2000-2300	Remarks		IRI<2000	2000-2300	Remarks
	Length:	16470	0			16470	0	
	Year	Case-1	Case-2			Case-1	Case-2	
0	2022							
1	2023							
2	2024							
3	2025							
4	2026							
5	2027					40		40mm+10% DBM
6	2028	40						
7	2029							
8	2030							
9	2031							
10	2032							
11	2033					MCS		
12	2034	40						
13	2035							
14	2036							
15	2037					40		40mm
16	2038							

Note: As advised by Actis team, with due considerations of traffic, MM strategies were taken up till FY2038 considering extension of concession period.

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.
- 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.
- 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.
- All Metallic Bearings need to be taken up for servicing.

Wearing Coat:

Since there is a very weak component of the bridge structure which is subjected to severe deterioration due to loading, environment etc. It is necessary to replace the wearing coat at 15years frequency. As of now we have considered sealing of cracks by Fog Seal which does not show any distress than cracking by viz. Pot holes, abrading etc. based on this aspect BOQ is formed.

CHAPTER 7. COST

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:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 26: Summary of Unit Rates (excluding GST)

S. No	Type of Material	Units	Source	Average Lead in Kms	Market Rates Adopted for Rate Analysis
1	**Aggregate**				
a)	40 mm	Cum	Crusher	185.79	2305.29
b)	20 mm	Cum	Crusher	185.79	2314.29
c)	12 mm	Cum	Crusher	185.79	2253.29
d)	6 mm	Cum	Crusher	185.79	2296.29
e)	Dust	Cum	Crusher	185.79	2122.29
2	Gravel/Murrum				
	Embankment	cum	Borrows for Embankment	7.0	167.13
	Subgrade	cum	Borrows for Subgrade	7.0	167.13
3	Other Major Material				
	Bitumen 60/70	tone	Panipat	64.00	35448.00
	Bitumen 80/100	tone	Panipat	64.00	35448.00
	CRMB	tone	Panipat	64.00	35448.00
	Emulsion	tone	Panipat	64.00	44448.00
	Steel	tone	Panipat	64.00	56288.00
	HTS Strands	tone	Panipat	64.00	70288.00
	Cement	tone	Panipat	64.00	7988.00
	Structural Steel	tone	Panipat	64.00	71188.00
	VG-40	tone	Panipat	64.00	For MMR 35448.00 For Capex 51480.00

Table 27: Major material Unit Rates (excluding GST)

Sl.no	Activities	Unit	Rate (Rs) per Unit	Remarks
1	BC	Cum	10792	VG-40
2	Tack Coat	Sqm	13	
3	DBM	Cum	9829	VG-40
4	PC	Sqm	34	
5	WMM	Cum	4074	
6	GSB	Cum	3948	
7	Embankment	Cum	421	
8	Subgrade	Cum	464	
9	Shoulder Filling	Cum	464	
10	Thermoplastic Paint	Sqm	452	
11	Road Studs	Nos	195	
12	DLC	Cum	4971	
13	PQC	Cum	9930	
14	RE panel	Sqm	3838	
15	M-15	Cum	8156.00	
16	M-20	Cum	8743.00	
17	M-25	Cum	9360.00	
18	M-30	Cum	9378.00	
19	M-35	Cum	9506.00	
20	M-40	Cum	10248.00	
21	M-45	Cum	11769.00	
22	M-50	Cum	12484	
23	Reinforcement steel	MT	78502	
24	1.2m Dia pile	Rm	14577f	
25	HT strands	MT	130220	

7.2 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs are estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Items which are not executed as part of scope or in damaged condition have been considered for immediate costs as a part of 1-year capex. Following items are mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works

- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

Summary of Immediate costs are included in table below

Table 28: Summary of immediate Repairs Cost

S.no	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
1	Immediate Repair's (Highway)	LS	1	1,29,24,436	1,29,24,436
2	Immediate Repair's - Structures	LS	1	3,53,07,998	3,53,07,998
3	TMS	LS	1	5,67,479	5,67,479
4	ATMS	LS	1	3,73,84,620	3,73,84,620
Total Cost in Rs.					8,61,84,533
Total Cost including GST (12%) in Rs.					**9,65,26,677**

Table 29: Summary of immediate Repairs Cost-Highways

S.no	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks
1	RCC Covered Drain	sqm	406.43	2535.8	1030609	Only Covered Damage
2	Light Poles	No	7	3000	21000	bulbs not working
3	Median Kerb	m	96	374	35904	Kerb Damage
4	MCB	m	955	2741	2617655	Damage
5	Solar Blinkers	No	12	5000	60000	Blinker not working
6	Km Stones	No	53	2946.00	156138	Not installed
7	Hectometer Stone	No	504	799.00	402696	Not installed
8	Pavement Marking	Sqm	11726	451.00	5288426	
9	Road Signs	No	5	3000.00	15000	Board Damage
10	Fog seal	Sqm	27808	55.00	1529440	
11	Rutting	Sqm	396	781.74	309568	
12	PGRs	m	486	3000	1458000	Damage
				Total Cost	**12924436**	

Table 30: Summary of immediate Repairs Cost-Structures

Item No.	Description	Unit	Quantity	Rate in Rs	Amount in Rs
1	Cleaning and adding rubber sealant near expansion joints	m	479.6	125	59950
2	Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer	Rm	25	2872	71800
3	Provision of an RCC crash barrier (0.35sqm cross	cum	73.7	6617	487673

Item No.	Description	Unit	Quantity	Rate in Rs	Amount in Rs
	sectional area) constructed with M-40 grade concrete including reinforcement				
4	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	18.5	156	2886
5	Repair of Floor Aprons, pitching and other protection works	cum	1294.785	2019	2614171
6	Weed removal (Vegetation)	Man days	8	2075	16600
7	Anti-corrosion paint for Steel 45 microns primer with Zinc bonding coat	Lit	20.8	525	10920
8	Micro Concrete	Cum	0.9	60480	54432
9	Concrete	Cum	4.59	9707	44555
10	HYSD Bars	MT	2.0105	83565	168007
11	Sealing of cracks/porous concrete by injection process through nipples/Grouting complete as per Technical Specification.	Sqm	58.9485	1210	71328
12	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	1402.102	2231	3128090
13	Sealing of crack / porous concrete with Epoxy Grout by injection through nipples complete as per clause 2803.1.	Kg	465.698	1210	563495
14	Providing and laying Filter material underneath pitching in slopes.	cum	18.6226	4914	91511
15	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankments.	cum	37.2452	1861	69313
16	CM (1: 4) mortar 12mm thick	Sqm	427.551	67	28646
17	Repair of Drainage spouts including down take pipe & etc	Rm	2506	208	521248
18	Structural steel	MT	5.67223	70519	400000
19	RC Jacketing	Sqm	1032	312	321984
20	Pointing with cement mortar (1:3) on brick work in substructure as per Technical specifications	Sqm	697.032	1117	778585
21	Incidental Works	LS			475260
22	Repair cost of Culverts protection works	LS			25327544
	Total Amount in (Rs)				35307998

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:

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 VG 40 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	Providing and laying apron/ stone pitching on slopes of guide bunds/ road embankment / other location
12	Providing and laying stone aggregate filter material (150 mm compacted thickness) underneath pitching
13	Unlined drain
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
	(iii) Diagonal Chevrons Markings
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

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per Technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
10. Carrying out 50 to 60 mm thick 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 Concrete

7.3.3 Incident Management Cost

Incident Management & Safety items include the following:

- ✓ ATMS control room operations,
- ✓ Regular patrolling & reaching accident/incident site,
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and

- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, 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 ATMS and TMS

Following table includes the cost of Major Maintenance works for the project:

Table 31: Summary of Periodic Maintenance Costs

Financial Year	Functional +Structural overlay MCW+ S/R	Replacement of ATMS @ every 7 Years	Replacement of TMS @ every 5 years	Structure specified repairs
2023				
2024				-
2025	406.42	-	-	233.80
2026	-	-	-	-
2027	10,441.48	-	391.90	-
2028	10,219.62	516.29	-	-
2029	-	-	-	-
2030	202.84	-	-	-
2031	-	-	-	-
2032	203.58	-	391.90	-
2033	4,103.04	-	-	-
2034	-	-	-	710.84
2035	3,986.67	516.29	-	-
2036	-	-	-	-
2037	9,715.92	-	-	-
2038	8,525.13	-	391.90	-
2039	-			
Total	**47,804.69**	**1,032.58**	**1,175.71**	**944.64**

Note: The cost is inclusive of GST without escalation and the amount is in Lakhs.

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
- IE Fee
- Administrative Cost
- Electricity Bill of lighting

Following table depicts the cost of operations for the project:

Table 32: Summary of 1st year O&M Costs

S No	Description	Amount in Lakhs.
	SPV - Expenditure	
1	SPV staff	248.08
2	Highway lighting	432.20
3	Tolling and HTMS AMC/ Spare Parts	79.62
4	Surveys & Investigations (BBD, Roughness)	13.42
5	IE fees	150.50
6	Insurance Charges	275.86
7	Audit Charges	40.00
8	Admin cost - Board Meeting Expenses, valuation etc.	44.00
	Agency - Expenditure	
9	Toll Operation - Agency	950.48
10	Route patrolling	429.30
11	Routine maintenance	441.47
12	Repair of Road - Boq Items	435.94
12	Repair of Structures	42.65
	1st year O&M Costs in Cr. for FY 2024	3,583.52

Note: The cost is inclusive of GST without escalation and the amount is in lakhs.

7.6 TOTAL OPERATION & MAINTENANCE COSTS

Year on year operation cost is summation of following:

- ✓ Immediate Costs
- ✓ Routine Maintenance & Incident Management
- ✓ Periodic Maintenance
- ✓ Operations Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 33: Summary of Total cost

Financial Year	SUMMARY OF VARIOUS EXPENSES in Rs. Lakhs				
	Immediate Repair's Cost	Toll Collection Expenses and Patrolling expenses	Routine Maintenance Expenses	Periodic Maintenance (Functional +Struc. Overlay+ Toll collection system)	Total Cost
2021-2022		-	-	-	-
2022-2023					
2023-2024	-	950.48	2,651.88	-	3,602.36
2024-2025	965.27	950.48	2,651.88	640.21	5,207.84
2025-2026		950.48	2,672.02	-	3,622.49
2026-2027		950.48	2,651.88	10,833.39	14,435.75
2027-2028		950.48	2,651.88	10,735.91	14,338.27
2028-2029		950.48	2,651.88	-	3,602.36
2029-2030		950.48	2,651.88	202.84	3,805.20
2030-2031		950.48	2,672.02	-	3,622.49
2031-2032		950.48	2,651.88	595.48	4,197.84
2032-2033		950.48	2,651.88	4,103.04	7,705.39
2033-2034		950.48	2,651.88	710.84	4,313.20
2034-2035		950.48	2,651.88	4,502.96	8,105.32
2035-2036		950.48	2,672.02	-	3,622.49
2036-2037		950.48	2,651.88	9,715.92	13,318.28
2037-2038		950.48	2,651.88	8,917.03	12,519.39
2038-2039		416.65	1,217.19	-	1,633.83
Total Cost:	**965.27**	**14,673.79**	**41,055.83**	**50,957.62**	**1,07,652.51**

Note: The cost is inclusive of GST without escalation and the amount is in lakhs.

ANNEXURE V – TRAFFIC CONSULTANT REPORT

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Traffic and Revenue Study – Project Walter

Final Report

Actis Highway Infra Limited

December 2023

steer

Disclaimer

This report has been produced for the sole benefit of **Actis Highway Infra Limited** This Report (the "Report") is confidential and disclosed only for information purposes, and it may not be relied upon by any party other than the Client or a Party to a Reliance Letter, and Steer: a) makes no warranty, expressed or implied, with respect to the use of any information or methods disclosed in this Report; and b) assumes no liability with respect to the use of any information or methods disclosed in this document. Any such party by its acceptance or use of this Report releases Steer from any liability for direct, indirect, consequential, or special loss or damage whether arising in contract, warranty, express or implied, tort or otherwise.

The Report is based on standard professional efforts, and information available to us at the time the review took place and is subject to time and budget constraints of the Report's scope of work. This Report, information and statements contained herein, are all based on third party data provided to us, or sourced by us, and Steer has not sought to establish the reliability of the data, except as specifically stated in the Report. Steer bears no responsibility for the results of any actions taken based on third-party data.

Certain forward-looking statements in the Report are estimates based on interpretations or assessments of information available at the time of writing. The Report is thus to be viewed as an assessment that is time-relevant, specifically referring to conditions at the time of the review. Steer undertakes no obligation to update the Report for any reason.

While the estimates contained in the Report are not precise forecasts, they do represent, in our view a reasonable expectation of the future, based on information we have been provided with or sourced.

However, the estimates necessarily rely on numerous assumptions and judgements, and circumstances may occur over the timeframe of the project that go counter to these assumptions and judgements and that affect the project's realized revenues. Actual events may differ from those assumed, and events are subject to change. Therefore, Steer makes or provides no warranty, whether implied or otherwise, as to the accuracy of forward-looking information presented. Further, it is important to note that forecasts presented represent long term growth profiles; the results for individual time periods may vary from forecasted values.

Traffic Consultant developed the relationships in the models used to produce the forecasts for the projects based on data available through November 2023. This report does not consider variations in traffic performance due to changing macro and force majeure events such (but not limited to) as global wars, economic uncertainty (high inflation, global recession), and changes in the regulatory environment. The situation remains dynamic and is subject to significant change in the short and medium term. In this challenging context, Traffic Consultant has produced base forecasts with a view on a possible scenario for the traffic forecasts. 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 such macro-economic/force majeure events. 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 scenario, Traffic Consultant advises that all readers of the Report consider the Report in the context of their own assessment of the impact of such events

Prepared by	Prepared for	Steer project ref	Project reference	Version	Issue Date	Authorised Signatory
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		Main authors	**Reviewer**			
		SBH, MRK	VGU			

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Glossary

2A	2-Axle
3A	3-Axle
AADT	Annual Average Daily Traffic
CAGR	Compound Annual Growth Rate
COD	Commercial Operations Date
CP	Concession Period
CPI	Consumer Price Index
Cr	Crore
Del	Delhi
ETC	Electronic Toll Collection via FASTag
EUR	Euro
FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
Har	Haryana
LCV	Light Commercial Vehicle
LPG	Liquified Petroleum Gas
HCV	Heavy Commercial Vehicle
IE	Independent Engineer
IHMCL	Indian Highway Management Company Limited
INR	Indian Rupee
IAOI	Immediate Area of Influence
IT	Information Technology
kms	Kilometres
kph	Kms per hour
MADT	Monthly Average Daily Traffic
MAV	Multi-Axle Vehicle
NH	National Highway
NHAI	National Highways Authority of India
OD	Origin Destination
O&M	Operations & Maintenance
OSV	Over Sized Vehicle
PCOD	Provisional Commercial Operations Date
PCU	Passenger Carrying Unit
POL	Petroleum, Oil, Lubricants
POS	Point Of Sale
QADT	Quarterly average daily traffic
RNP	Registration Number Plate
SCF	Seasonality Correction Factor
TMS	Toll Management System
TP	Toll Plaza
TP1	Toll Plaza 1/ Bhagan
TVC	Traffic Volume Count
UP	Uttar Pradesh
WADT	Weekly Average Daily Traffic
WIM	Weigh In Motion
WPI	Wholesale Price Index
YTD	Year To Date

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8. Network Overlays
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The Assignment

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The Assignment

Actis Highway Infra Limited (the "Client") has commissioned Steer Davies Gleave, India ("Steer") for a traffic and revenue (T&R) due diligence to be carried out on Mukarba Chowk - Panipat section of NH44 (old NH1) (the "Asset") which runs in the State of Haryana

Asset details

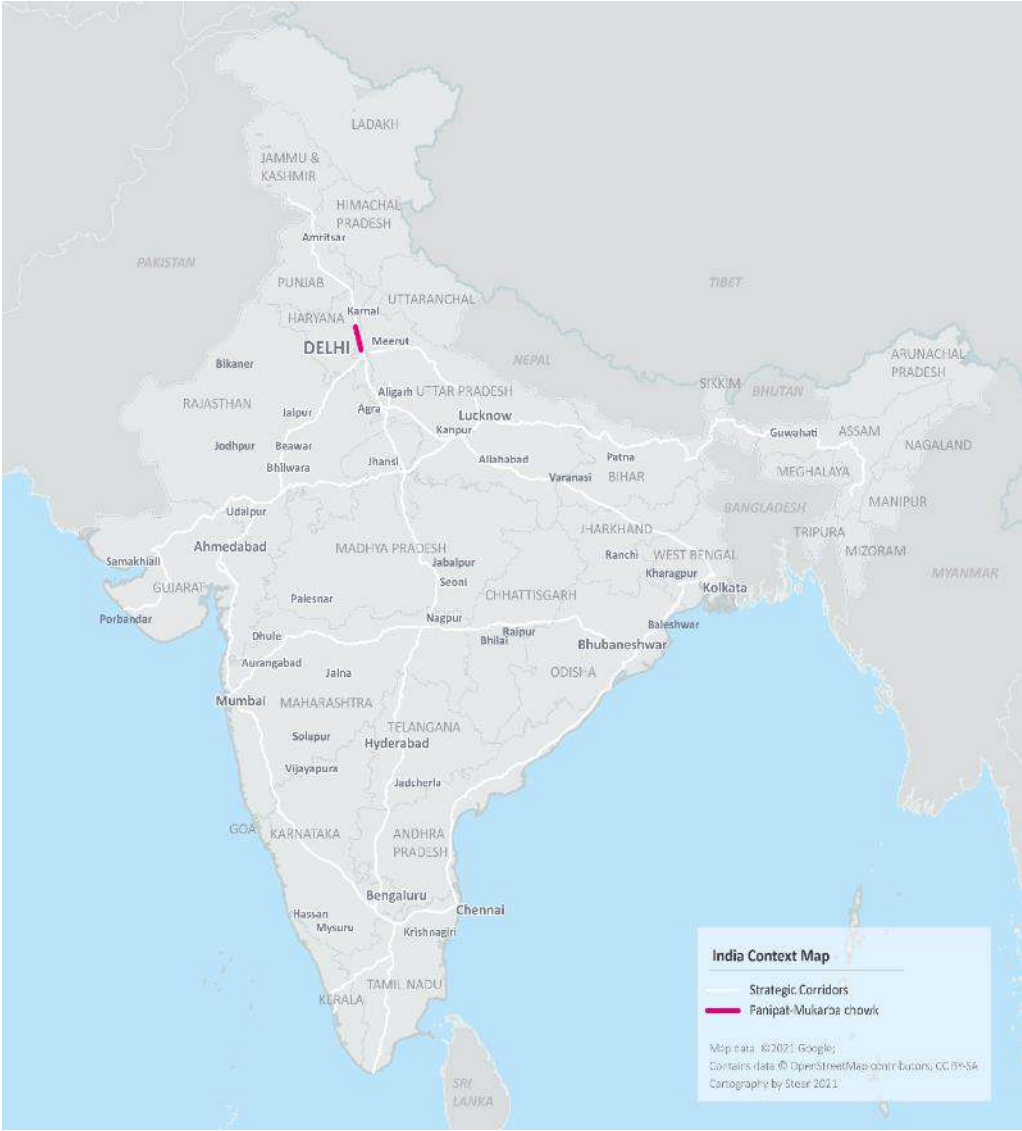
Name	State	NH	Length (Km)	Concession Period	Toll plaza
Mukarba Chowk - Panipat section of NH44	Haryana	NH44 (old NH1)	71.389	17 Years	At Bhagan (TP1) Km 53.600

The broad scope of the work of this assignment is as follows:

- Review of available data and concession agreement;
- Site visit and stakeholder consultation;
- Historical data analysis;
- Traffic survey and analysis (TVC and OD survey);
- Estimate the base traffic and revenue position;
- Estimating underlying growth elasticities;
- Assessing impacts from exogenous factors, including network change impacts;
- Traffic and revenue estimation for balance concession period.

This draft final report contains our understanding of the Asset, historical performance, primary survey data analysis, impact analysis and draft final traffic and revenue forecasts.

Asset location map



Source: Steer cartography based on OpenStreetMap data

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Asset context

The Asset

The Asset forms part of NH44 which is a north south corridor connecting Srinagar in Jammu and Kashmir to Kanyakumari in Kerela.

The Asset connect the states of Delhi and Haryana and is a direct feeder into the National Capital - Delhi. It passes through the urban settlements of Delhi, Sonipat and Panipat. The Asset is currently being upgraded to 8 lanes and full PCOD is expected by Oct'23.

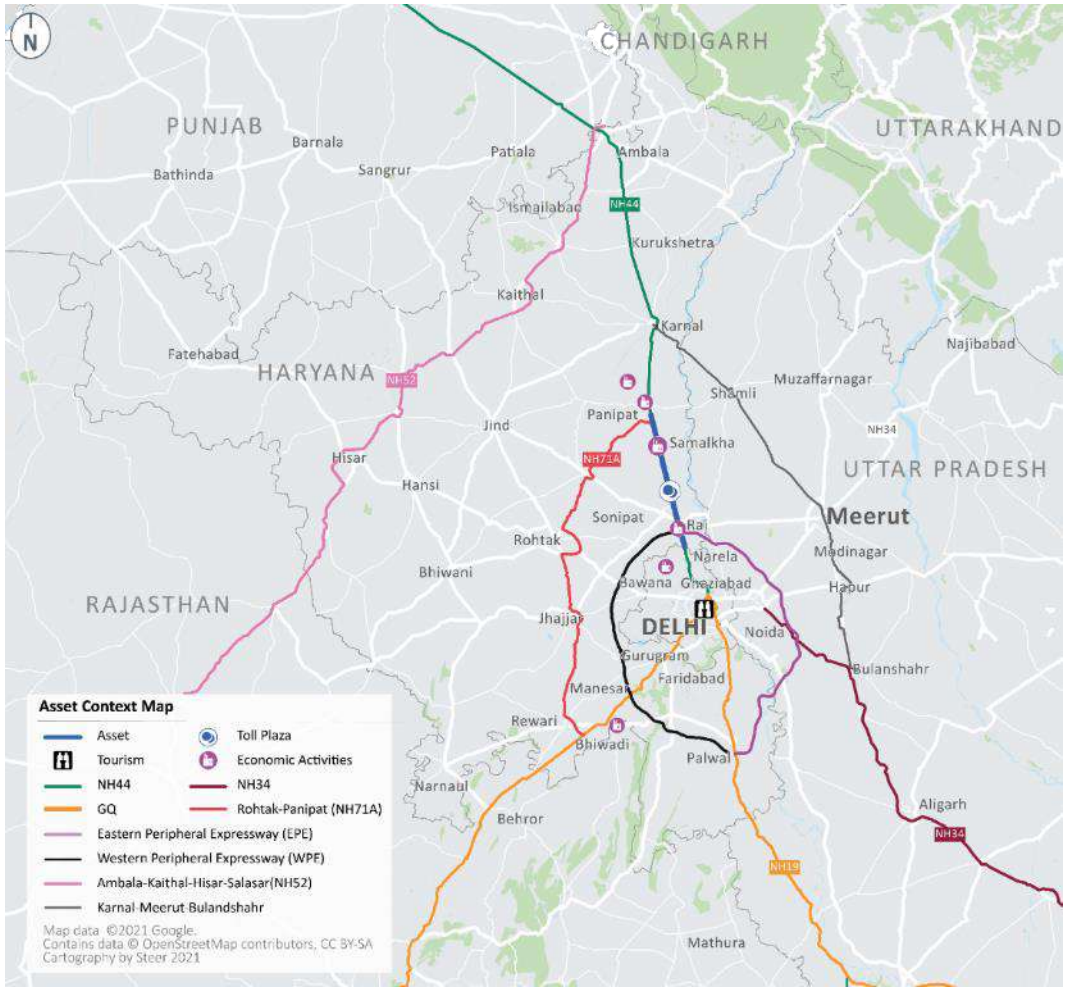
The map on right shows locations of the toll plaza on the Asset and alignments of two key feeder routes for long-distance traffic bypassing Delhi: Western Peripheral Expressway (WPE) (also known as KMP Expressway) and Eastern Peripheral Expressway (EPE).

Asset details

Particulars	Details
Length	71.389 km
Tollable length	78.495 km
Chainage	km 15.500 to km 86.000
Toll plaza locations	Bhagan (km 53.600)
Tolling history	• Operate, Maintain and Transfer (OMT) contracts under NHAI upto 25th Nov'2020 • Tolling was suspended from 26th November 2020 due to farmers' protest. Resumption of tolling by NHAI on 21st Dec'2021 upto March'2023. • Welspun takeover of tolling in April'23 with a new toll plaza operator. June'23: New toll plaza operator appointed • FY24 tolls: 100% of base fee rate is used for 66.910km, 75% of base fee rate for the 4.479km for which PCOD yet to be issued.
Concession period	17 years

Source: Steer research

Asset context



Source: Steer cartography based on OpenStreetMap data

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Main Features of the Asset: Key Metrices

Asset	Source of Info.	TP1 Bhagan Toll Plaza
State	Concession Agreement	Haryana/Delhi Border
Highway		NH44
Lanes		8 Lanes divided
Length (km)		71.389 km
Concession length		17 Years
Appointed date		27th October 2016
PCOD/FCOD		31st March 2022 (53.763km), 28 April 2023 (70.269km)
Concession end		7th February 2034 + extension (target traffic, Covid-19 related)
Target traffic		1,32,197 PCU
Target date		1st April 2025
AADT FY23*	Toll Plaza (TMS data)	67,545
PCU FY23*		101,415
% 3A+MAV (AADT FY23)		9.5%
Revenue FY23 (INR Crores)	Toll Plaza (TMS data)	299.8 Cr
Contextual drivers of traffic evolution	Car	The Asset attracts high volume of passenger traffic on daily basis due to its function as a key road connection between a large urban centre in Delhi to several industrial towns in the North such as (e.g., Kundli, Panipat, Sonepat, Chandigarh). This is alongside catering for strong tourism demand to attractors in states such as Himachal Pradesh, and the establishment of well-known commercial, entertainment, and educational attractors located along the Asset. Passenger traffic from the region dominates, driven by some of India's highest rates of car ownership in Delhi (28%) and Haryana (22%).
	Bus	
	LCV	Light and medium sized commercial vehicles cater to consumer demand of the urban centers and carry industrial goods. Panipat is well known for its production of textiles, while Delhi has several industrial hubs like Narela, which exist along the Asset. There are also significant movements of Compressed Natural Gas (CNG) trucks supplying demand for these commodities in Delhi and nearby industrial centers.
	2A	
	3A	Heavy commercial vehicles demand is driven by the movement of commodities from strong producer states in the northern regions of the country, such as Agriculture distribution from states such as Punjab and Haryana. The Asset enables medium to long distance trips to industrial centers in and around Delhi and also further south of the country through access to the Western Peripheral Expressway (WPE) (also called as KMP Expressway) and Eastern Peripheral Expressway (EPE)
	MAV	

Source: Steer analysis, *Jun'22-Mar'23 Avg

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Linkages and connectivity

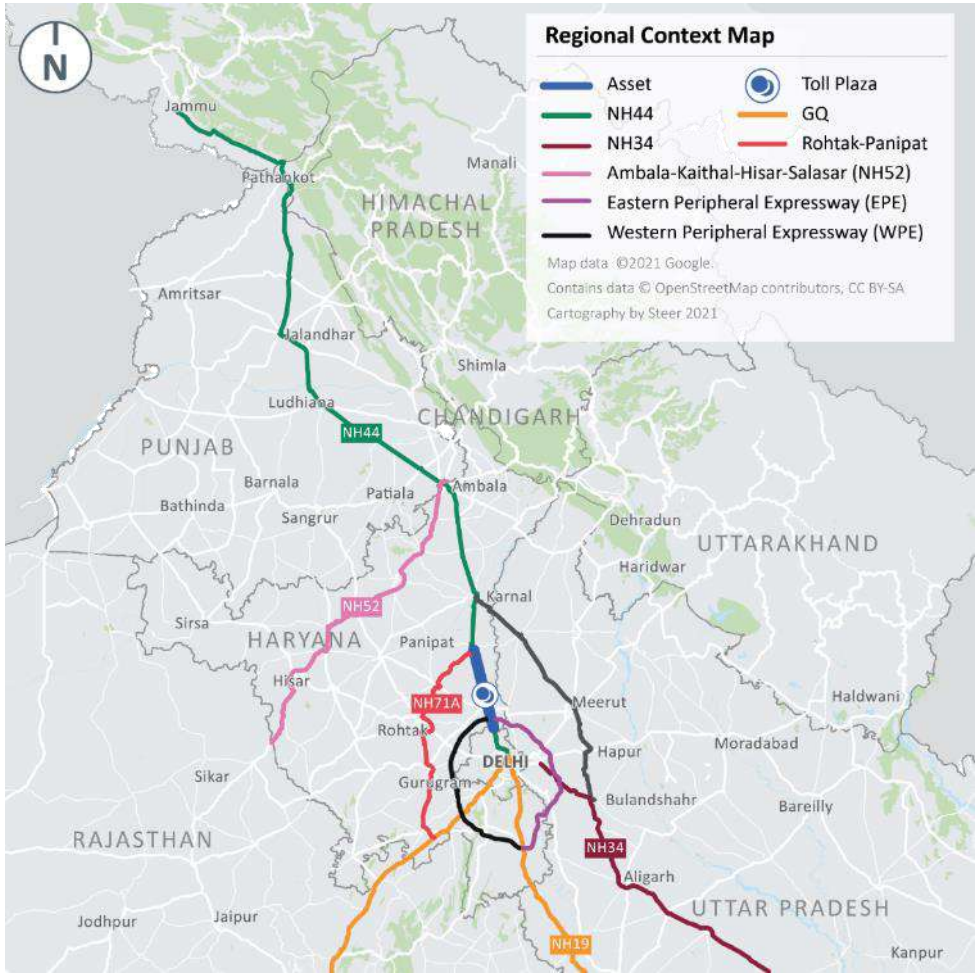
National linkages (long-distance traffic):

- The Asset acts as a national connector being part of the NH44 north-south long-distance strategic corridor connecting Jammu to Kanyakumari. This is the shortest and the most direct route connecting the Northern parts of India to entire country via Delhi/NCR as strategic junction and transport hub.
- Two key feeder routes of the Asset, Western Peripheral Expressway (WPE) (also called as KMP Expressway) and Eastern Peripheral Expressway (EPE), establish direct connectivity to western and eastern states of the country in addition to southside movement to Delhi through NH44.

Regional and local connectivity (medium/short-distance traffic):

- The Asset directly connects northern states of Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir with the national capital Delhi.
- It functions as the key social and economic highway linkage within northern India.
- Delhi/NCR, being key attractor in the northern India for all journey purposes ranging from business, employment, social, academic, religious, shopping, healthcare, the Asset has significant traffic of passenger movement across Punjab, Haryana and NCR.
- The Asset provides fair condition round the year connectivity to various urban/ semi-urban centres located on the Asset, and with district headquarters for businesses and industrial hubs in Haryana namely Karnal, Panipat, Sonipat, Kundli.

Network context



Source: Steer cartography based on OpenStreetMap data

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Economic activity

The Asset serves a mix of **urban, industrial and agriculture** movements, directly connecting Delhi and Panipat, and is dominated by traffic from the passenger segment (~60%).

Agriculture traffic from various parts of the northern region is seen on the Asset moving various goods. Taraori which is located at about 50 km from Panipat (to the North of the Asset) is a rice processing cluster supplying rice to the entire country. Agriculture markets (mandis) attracts commercial traffic round the year.

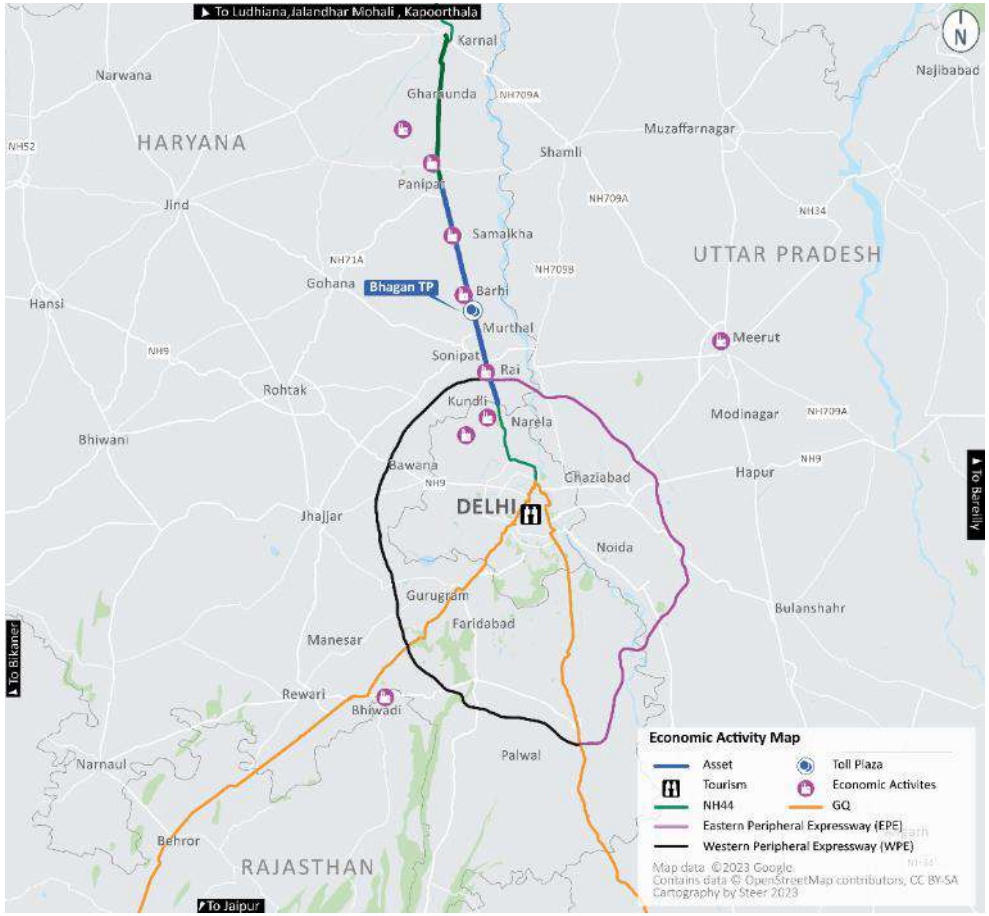
Travelers commute daily between Panipat and Delhi or Panipat and Sonipat. The Asset also forms a key connection between Delhi and Chandigarh, which is about 160 km north of Panipat. NH44 further establishes connectivity to Punjab and Himachal Pradesh.

The Asset attracts high volume of passenger traffic on daily basis because of establishment of well-known wayside amenities/eatery places around Murthal, marriage/banquets halls, amusement parks, educational institutes/ universities and sports complexes located along the Asset on both sides of the toll plaza.

Passenger traffic from the region dominates the Asset, driven by some of the highest rates of car ownership in Delhi (28%) and Haryana (22%).

Due to high dependence between Delhi/NCR and its suburbs (up to Panipat), the Asset observes heavy daily commuting traffic and hence Regional Rapid Transport System (RRTS) connectivity is being planned between Delhi and Panipat which we have considered in our analysis of potential alternates choices to the Asset.

Network context



Source: Steer cartography based on OpenStreetMap data

Commercial vehicles cater to consumer demand of the urban centers and carry industrial goods. Panipat is well known for its production of textiles, while Delhi has several industrial hubs like Narela, which exist along the Asset. In addition to this, Kundli, Rai, Sonipat, Barhi and Samalkha are industrial clusters along the Asset.

Ludhiana, Jalandhar Mohali, Kapoorthala in Punjab and Baddi in Himachal Pradesh are also well-established industrial clusters.

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Asset photographs

Typical cross-section of the highway

Bhagan Toll Plaza / OD survey

Key Asset Connections

Source: Steer site visit

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Historical traffic analysis

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Historical traffic

- This section outlines historical traffic on the asset to understand the past trends of traffic and relation with specific events in the catchment region.
- For T&R Study, the data provided by Client from Apr'22 till 26th November'23 is the typical key source of establishing Asset's:
  - Historical performance in terms of growth trends by vehicle type.
  - Traffic characteristics like seasonality correction factors, toll frequencies etc.
  - Base position in terms of vehicle level AADT and PCU levels.
- The Asset under consideration has a history of change in toll plaza operators, suspension of Tolls due to the farmer protests and new operator coming in place from June'22.
- As a result, a more stable data collection regime has been operational and first full year data is available only for FY23.

Particulars	Data Point
FY23 and up to 26th Nov FY24 Traffic	Client Data
FY23 and up to June 2023 Revenue	Client Data

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Historical traffic

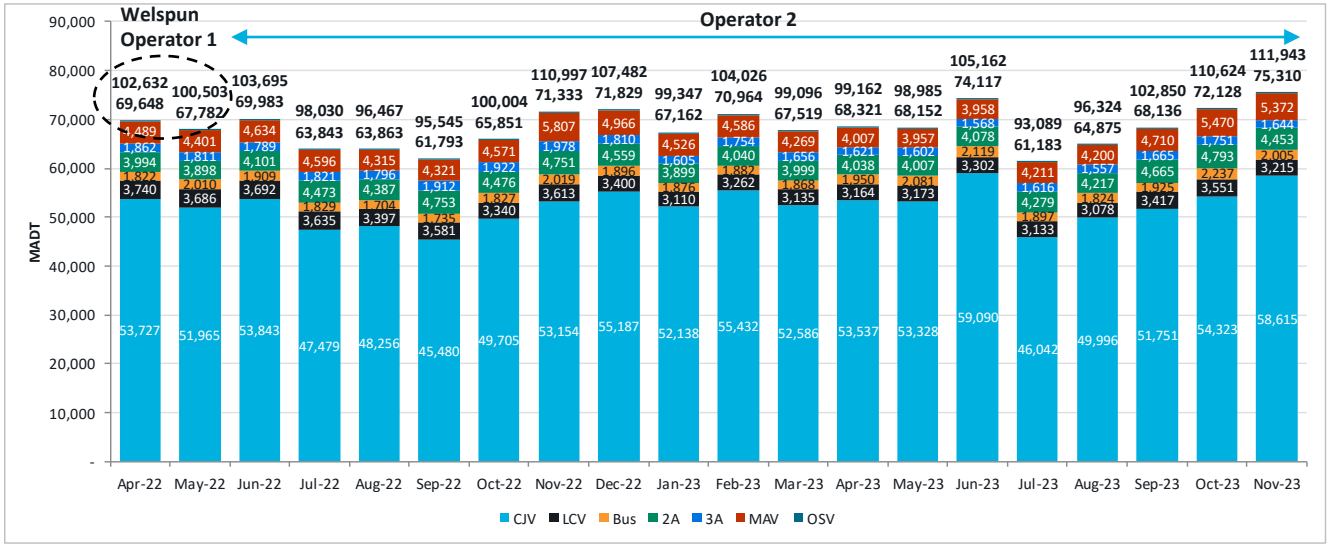
The Asset caters to large volumes of traffic as it connects key urban and industrial centres to Delhi. The Asset currently caters to more than 100,000 PCUs of daily traffic, which is contributed to equally by CJV/buses, and commercial traffic

- The historical TMS data has been provided for Bhagan toll plaza from April'22 to November'23 on a monthly basis. The toll plaza observed an average **101,415 PCUs** in FY23 where the traffic mix was dominated by 56% CJVs, 5% LCVs, 6% Bus, 5% 3As and 21% MAVs.
- In terms of volume CJV category contributes to the highest to traffic. The LCV, Bus, 2A category contributed almost 10,000 AADT signifying the consumption, and urban nature of the Asset, since a majority of these vehicles cater to the regional urban movement on the Asset
- 3A and MAV contribute almost 6,500 AADT. These are a mix of local and medium/long distance commodity movements between the industrial clusters along the Asset as well those originating from the wider Haryana region and other states such as Punjab and Himachal Pradesh. This is in addition to the urban consumption demand generated within the Delhi/NCR region. Access to EPE and KMP, and therefore highway access to movements South of Delhi, also contribute to heavy vehicle traffic on the Asset. We observe a reduction in commercial vehicle demand in Q1 FY24 compared to FY23 but see an increase in this traffic in the most recent months.

Traffic volumes observed on the Asset

	FY23	April 23	May 23	June 23	July-23	Aug-23	Sep-23	Oct-23	Nov-23*
CJV	51,493	53,537	53,328	59,090	46,042	49,996	51,751	54,323	58,615
LCV	3,459	3,164	3,173	3,302	3,133	3,078	3,417	3,551	3,215
Bus	1,866	1,950	2,081	2,119	1,897	1,824	1,925	2,237	2,005
2A	4,285	4,038	4,007	4,078	4,279	4,217	4,665	4,793	4,453
3A	1,808	1,621	1,602	1,568	1,616	1,557	1,665	1,751	1,644
MAV	4,625	4,007	3,957	3,958	4,211	4,200	4,710	5,470	5,372
Total (Nos.)	**67,545**	**68,321**	**68,152**	**74,117**	**61,183**	**64,875**	**68,136**	**72,128**	**75,310**
Total (PCU)	**101,415**	**99,162**	**98,985**	**105,162**	**93,089**	**96,324**	**102,850**	**110,624**	**111,943**
LCV+Bus+2A	9,610	9,151	9,261	9,498	9,309	9,119	10,006	10,580	9,673
3A+MAV	6,433	5,628	5,559	5,526	5,827	5,757	6,375	7,221	7,016

Note: Sept 2023 data excludes the four days of traffic restrictions due to the G20 summit, and *Nov 2023 data is available to the 26th



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Historical Revenue

- FY23 is the first year for which the full year traffic and revenue data is available.
- In FY23, we observe spikes in revenue in November and December 23 due to the holiday season.
- CJVs are the largest contributors with a share of 46% followed by MAVs which contribute 22-25% to the total collection.
- Overall, the revenue grew 9.6% between Q1 FY24 and FY23. This growth can be attributed to the increase in toll rates at the end of April 2023 and change in tollable lengths based on the PCOD status.

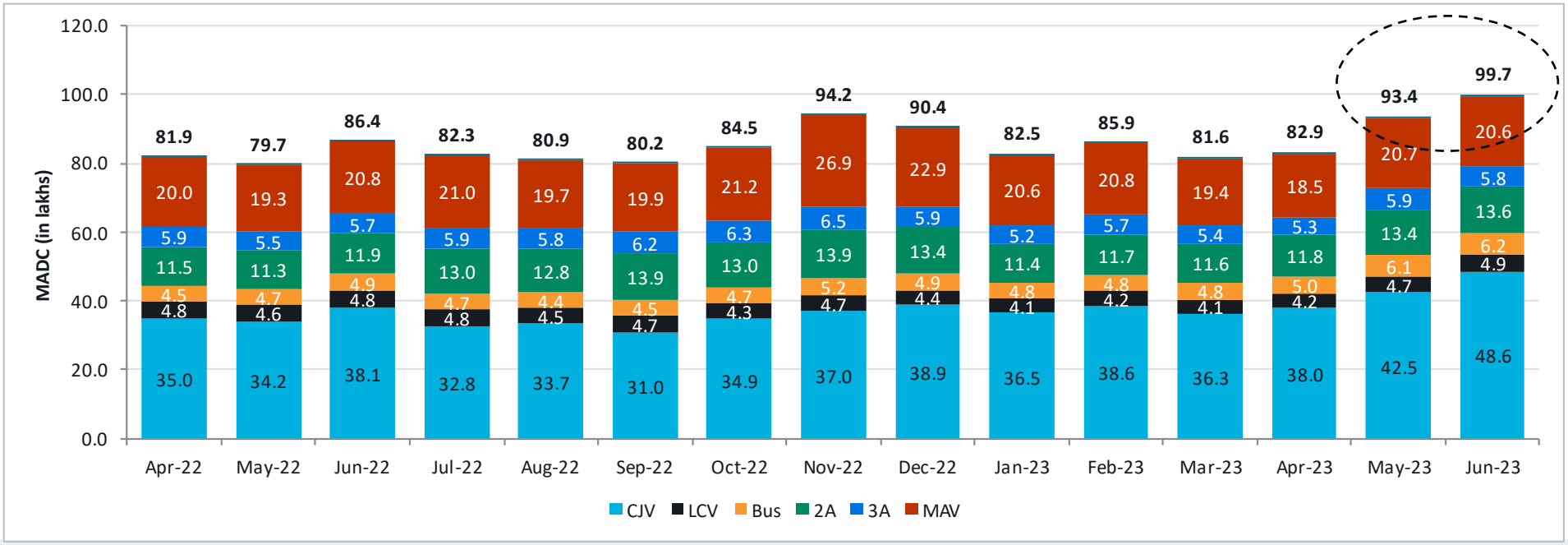
AADC Evolution (lakhs)

AADC	FY23	Apr-23	May-23	June-23
CJV	34.7	38.0	42.5	48.6
LCV	4.4	4.2	4.7	4.9
Bus	4.6	5.0	6.1	6.2
2A	12.2	11.8	13.4	13.6
3A	5.7	5.3	5.9	5.8
MAV	20.5	18.5	20.7	20.6
Total (Lakhs)	**82.1**	**82.9**	**93.4**	**99.7**
Total Collection (Crores)	**299.8**	**24.9**	**28.9**	**29.9**

Note: Steer Analysis of Client Data

Monthly Revenue Profile: Average Daily Collection (INR Lakhs)

Revised toll length applicable



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Revenue : Ticket Type Segmentation

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Ticket Type Segmentation/Frequency

Toll Segmentation

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, some assets offer custom made 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.

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
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.
Violation	Failure or refusal to pay the toll fee

Understanding the toll frequency gives insights into the nature of traffic. CJVs generally have higher shares of return passes or monthly passes, while heavy trucks mostly have single tickets since they travel long distance. However, 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.

In addition to the above ticket categories, a special category pass of "Local Monthly" is also being sold on the Asset. This pass has been issued by the toll plazas individually and the toll plaza is deciding on the toll for such special passes.

FASTag implementation

Government of India has introduced (and more recently, mandated) Electronic Toll Collection (ETC) across National Highways in India, collected via "FASTag". The timeline of ETC implementation is presented in the following table.

Timeline of national ETC implementation

Date	ETC Development
2014	FASTag system set up as a pilot on the Ahmedabad to Mumbai stretch of the Golden Quadrilateral, in November 2014 it was also implemented on the Delhi to Mumbai stretch of the Quadrilateral.
December 2019	FASTag is made mandatory on all National Highways with only one lane on either side keep as a Cash lane, cash users entering ETC lanes were charged double the toll.
February 2021	FASTag is made mandatory for all vehicles at every toll plaza in the country starting 15th Feb 2021

Generally, over the period the shares of single/return/monthly tickets tend to stabilise within 2-3 years of asset operations. Only in the cases where trip patterns are expected to change significantly due to urban expansion is where we expect these shares to change over the period or due to some external events impacting the trip patterns. During the last two years, two key events impacted the traffic patterns throughout the country: Covid19 and FASTag implementation.

With the FASTag implementation in December 2020, 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. However, with the increase in proportion in transaction via FASTag, it was observed that traffic patterns have begun to return to their initial segmentation.

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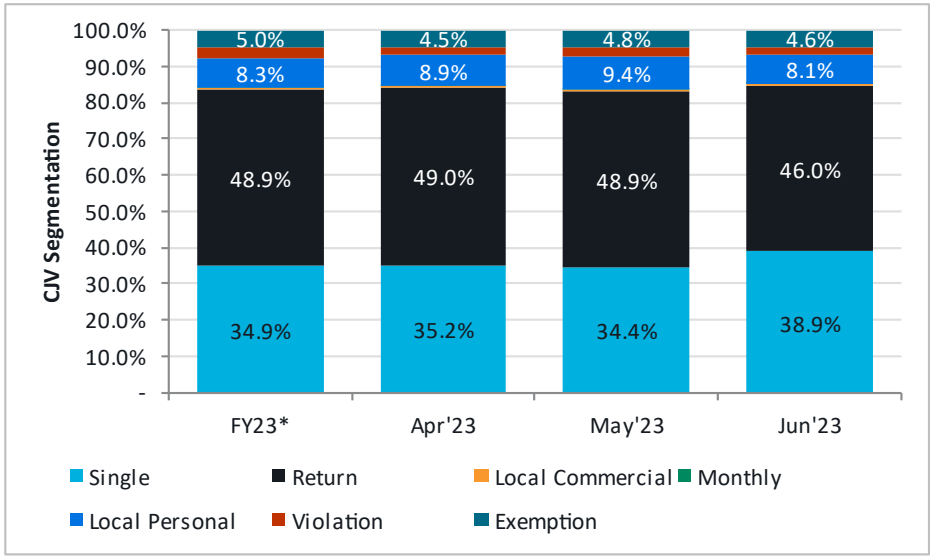
Historical Segmentation: CJV, Bus

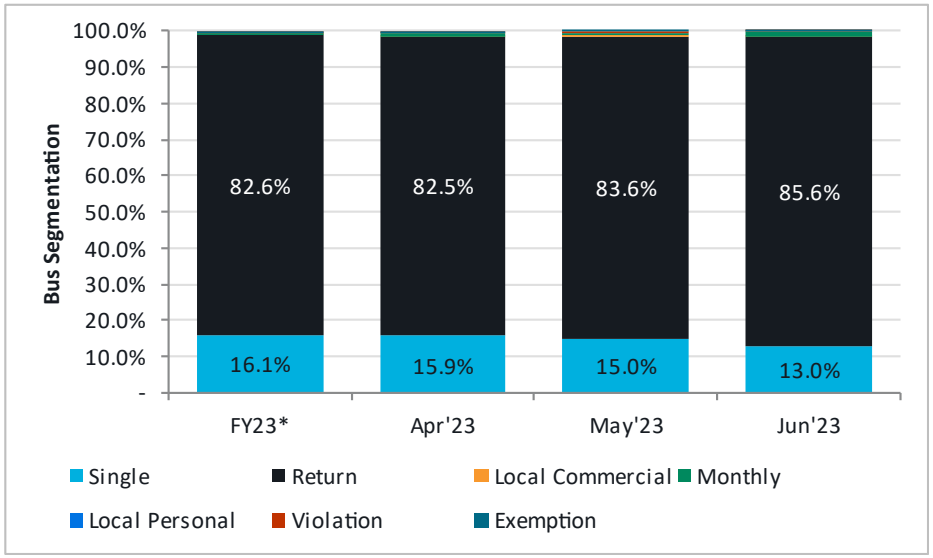
- Segmentation has remained uniform across all vehicle categories in the past 12 months.
- Return trips are the most common ticket types for both passenger vehicle categories but especially dominate Bus travel.
- CJV segmentation shows a high proportion of return and local personal trips in addition to 5% exempted traffic due to the local nature of the traffic.
- Single trips are the most common ticket types for the three biggest goods vehicle categories.
- Overall, FY23 segmentation is consistent with the segmentation observed in Q1 FY24.



Note: *FY23 is June 2022 to March 2023 due to change in operator

Type of tickets sold on Asset

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
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.



Note: *FY23 is June 2022 to March 2023 due to change in operator

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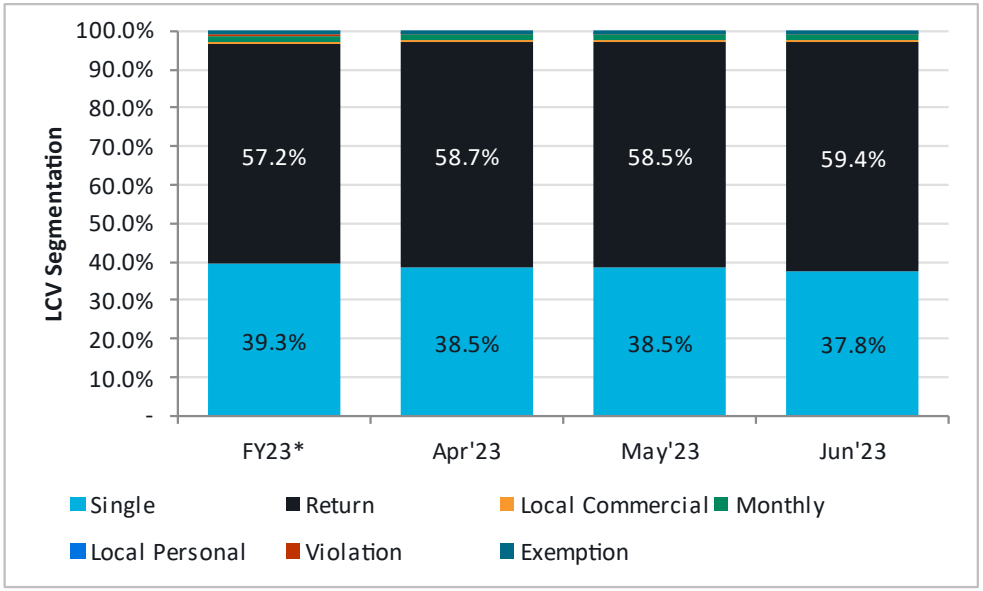
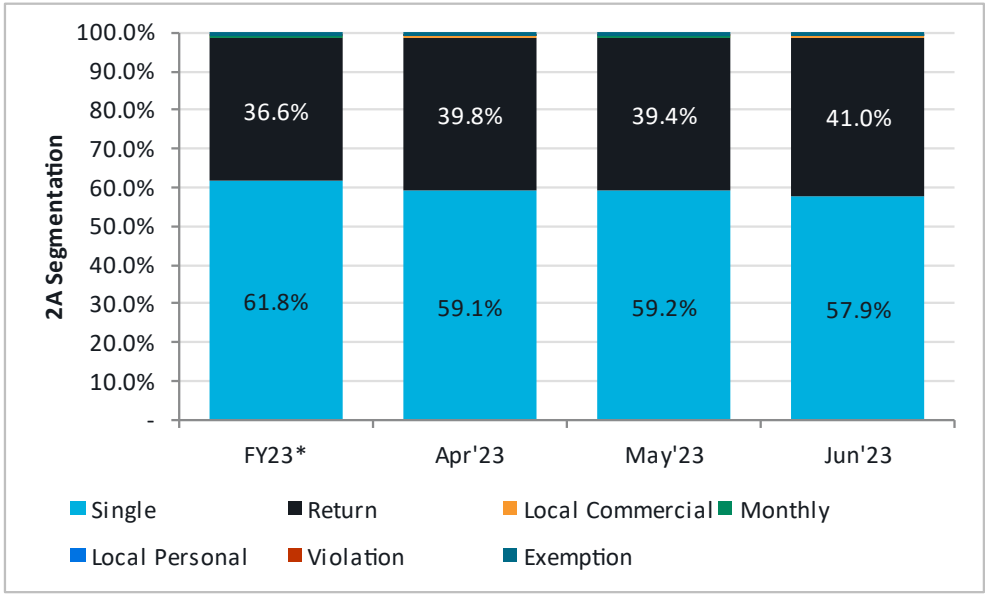
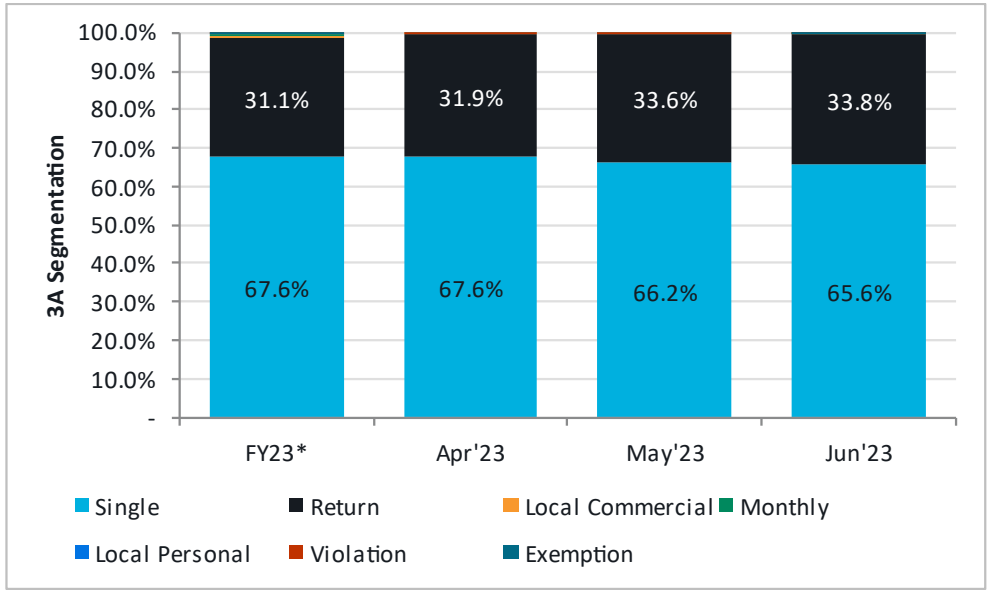
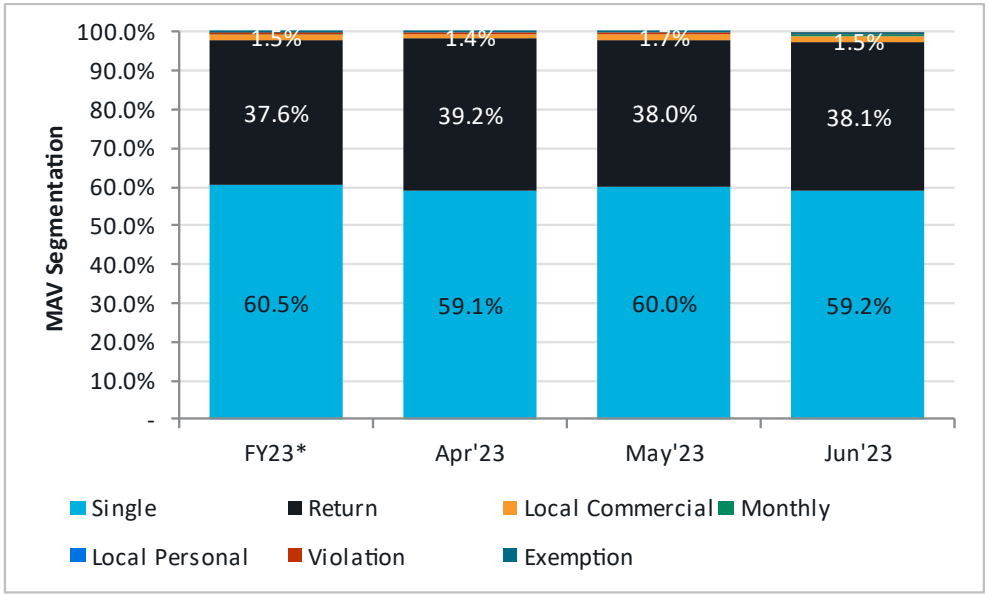
Historical Segmentation: Commercial Vehicles









Note: *FY23 is June 2022 to March 2023 due to change in operator

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Summary

- The asset functions as the key social and economic highway linkage within northern India.
- It serves a mix of urban, industrial and agriculture movements, **directly connecting Delhi and Panipat**, and is dominated by traffic from the passenger segment (~60%).
- The toll plaza observed an average **101,415 PCUs** in FY23 where the traffic mix was dominated by 56% CJVs, 5% LCVs, 6% Bus, 5% 3As and 21% MAVs.
- In terms of volume CJV category contributes to the highest to traffic. The LCV, Bus, 2A category contributed almost 10,000 AADT signifying the consumption activities driven by the urban proximity of the Asset, with a large majority of these vehicles catering to the regional urban movement on the Asset
- 3A and MAV contribute almost 6,500 AADT. These are a mix of local and medium/long distance commodity movements between the industrial clusters along the Asset as well those originating from the wider Haryana region and other states such as Punjab and Himachal Pradesh. This is in addition to the urban consumption demand generated within the Delhi/NCR region. We observe that there is a decline in commercial traffic on the asset in the available months of data in FY24 when compared to FY23 traffic, which is detailed in further slides.
- **CJVs are the largest revenue contributors with a share of 46%** followed by MAVs which contribute 22-25% to the total revenue collection.
- Overall, the revenue grew 9.6% between Q1 FY24 and FY23. In April 2023, another PCOD was achieved and as a result, 100% of a tollable length of 66.910km plus 75% of 4.479km which is equivalent to 72.69km in total has now been commissioned, and the final PCOD is expected to take place in October 2023. This increase in tollable length along side WPI increases has contributed to increases in revenue for the Asset in FY24.
- We observe consistent segmentation of Asset traffic by ticket type across FY23 and Q1 FY24, with CJV, LCV, and Bus vehicles having Return ticket types as the most common ticket type, especially dominating Bus trips, which highlight the significant local share of traffic on the Asset for these vehicle types. For larger commercial vehicles, Single ticket types are consistently the most common ticket types, used on about 60% of trips.

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Traffic surveys and data analysis

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Data collection schedule

TVC and OD surveys were conducted on all the toll plazas. TVC analysis helps validate the TMS data being recorded, and historical data reported by the plaza. OD analysis primarily helps in answering WHAT, WHY, WHERE and HOW FAR questions about traffic.

Discussion with the **toll plaza manager**

- Key traffic movements, any unusual traffic events
- Toll ticketing, exemptions & violations, overloading, FASTag, local passes,
- Local issues, most prominent commodities & modes on asset

Understanding the network

- Economic activities and growth drivers
- Potential alternatives, competing routes, toll plaza leaks
- Upcoming developments & road upgrades
- Key OD movements and commodities carried
- Local and strategic diversions

Supervising the **surveys**

- Making sure safety guidelines are followed and enumerators should have necessary equipment
- Scrutinize OD sheets - Check if enumerators are able to identify vehicle categories, if they are asking the right questions
- Monitor sample rates - Decision on additional surveys if required

Interviewing **road users**

- Speaking to the locals about traffic movement and commodities
- Interview truck drivers on which routes they prefer and why

Survey Schedule

Toll plaza	TVC	OD dates	Status
Bhagan Toll Plaza (The Asset)	7th July – 9th July 2023	7th July 2023 (24 hours)	Completed

Mode type	Sampling Rate
CJV	10%
LCV	40%
2 Axle	62%
3 Axle	60%
MAV	75%

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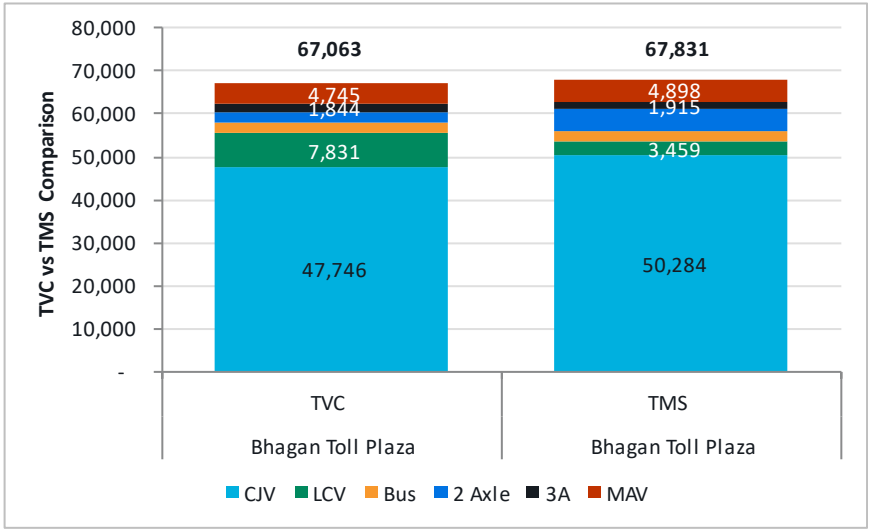
TVC-TMS Comparison

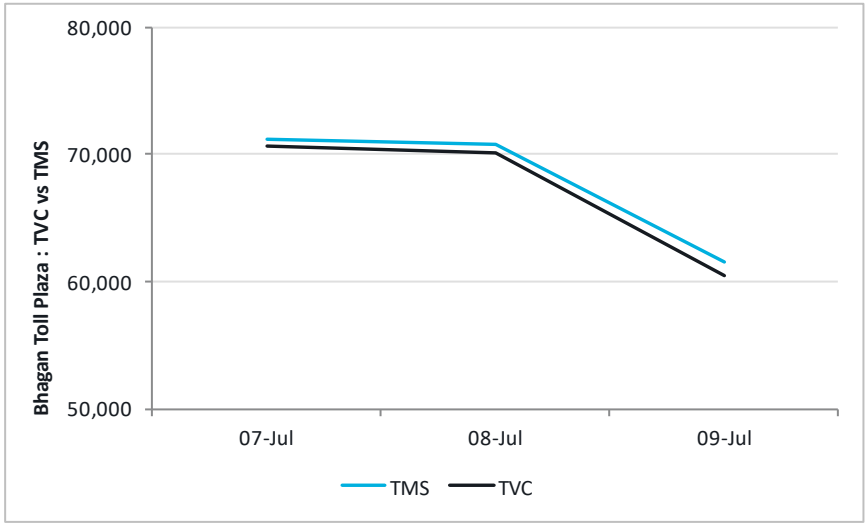
- Camera based Total Vehicle Counts (TVC) forms a key part of our primary data collection exercise. Using the TVC data and taking a simple average of three days TVC counts, we obtained Average Daily Traffic (ADT) for the toll plaza.
- This ADT excludes non-tollable vehicles such as tractors, two-wheelers, etc., but includes officially exempt vehicles such as police cars, ambulances, emergency response vehicle etc.
- TVC-TMS comparison suggests the differences between the actual volume counts and data reported by the TMS at a total level are within our confidence thresholds, and do not warrant any further adjustment to the base or segmentation.
- The difference in CJV, LCV and 2A often happens due to classification issues, as some of the Mini LCV are counted as LCV, some LCV being counted as 2As. This is due to the similar look and size between these categories. However, the comparison of combined traffic of CJV, LCV, 2A vehicles is within an acceptable range.
- Overall, Steer independent TVC and the vendor TMS are within our confidence thresholds. Therefore, we are not adjusting the Base traffic numbers, or the forecast segmentation in our study.

TVC vs TMS Comparison



Source: Steer analysis

TVC vs TMS Comparison



Source: Steer analysis

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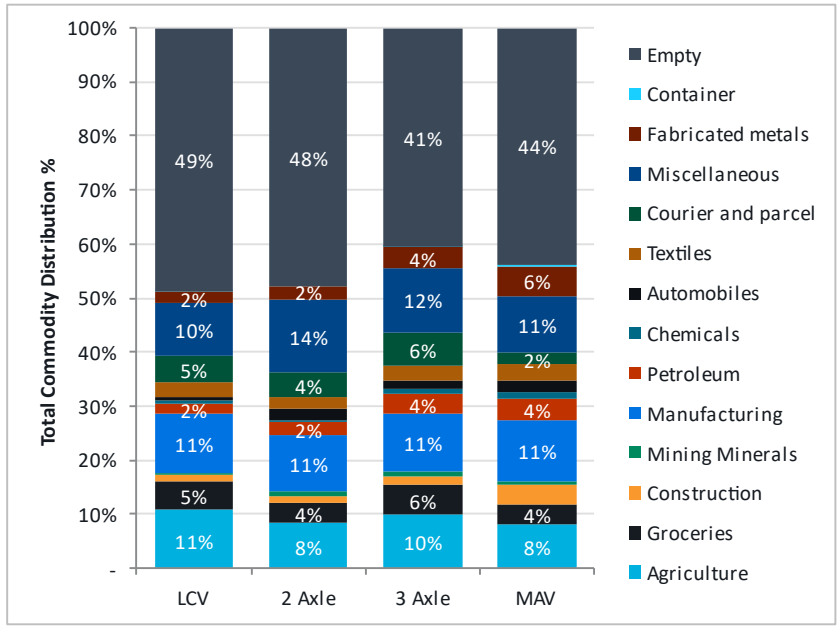
Origin Destination (1): Commodity distribution

- Agriculture is one of the key contributing sectors to the economy in the states of Haryana and Punjab, with both of these states contributing a significant share of the total wheat and rice produced/procured and then redistributed in the country, and the same can be seen on the Asset with 8-11% of the total commodity share driven by agriculture.
- Manufacturing, with around an 11% share, is another significant commodity carried on the Asset due to being close to Delhi and Uttar Pradesh which has a strong presence of manufacturing industries.
- Across all vehicle categories, miscellaneous goods hold a considerable share of 10-14%. These goods are mainly being transported from warehouses and industries between Haryana, Punjab and Delhi/NCR.
- Another major contributing commodity is Groceries Items which holds a 4-6% share across all categories, highlighting the use of the Asset in moving fresh produce to the urban centers of Delhi and Panipat.
- The Asset has substantial movement of empty vehicles with more than 40% share across all vehicle categories. This indicates the return trips of goods vehicles using the Asset to deliver goods to urban centers in the region.

Bhagan: Direction wise Commodity distribution

Sonipat to Panipat					Panipat to Sonipat			
LCV	2 Axle	3 Axle	MAV	Commodity	LCV	2 Axle	3 Axle	MAV
6%	6%	4%	6%	Agriculture	15%	11%	14%	11%
4%	3%	4%	3%	Groceries	7%	4%	7%	5%
1%	1%	1%	1%	Construction	1%	2%	2%	6%
0%	0%	2%	1%	Mining Minerals	0%	1%	0%	1%
11%	9%	11%	10%	Manufacturing	11%	12%	10%	12%
2%	2%	3%	3%	Petroleum	2%	2%	4%	6%
1%	1%	1%	1%	Chemicals	1%	0%	1%	1%
0%	2%	1%	3%	Automobiles	1%	2%	2%	1%
2%	2%	3%	3%	Textiles	3%	2%	3%	3%
6%	5%	9%	2%	Courier and parcel	4%	4%	4%	2%
10%	12%	11%	8%	Miscellaneous	9%	15%	13%	13%
3%	2%	4%	7%	Fabricated metals	2%	3%	4%	4%
55%	55%	46%	52%	Empty	44%	42%	36%	34%
100%	**100%**	**100%**	**100%**	**Total**	**100%**	**100%**	**100%**	**100%**



Source: Steer Analysis

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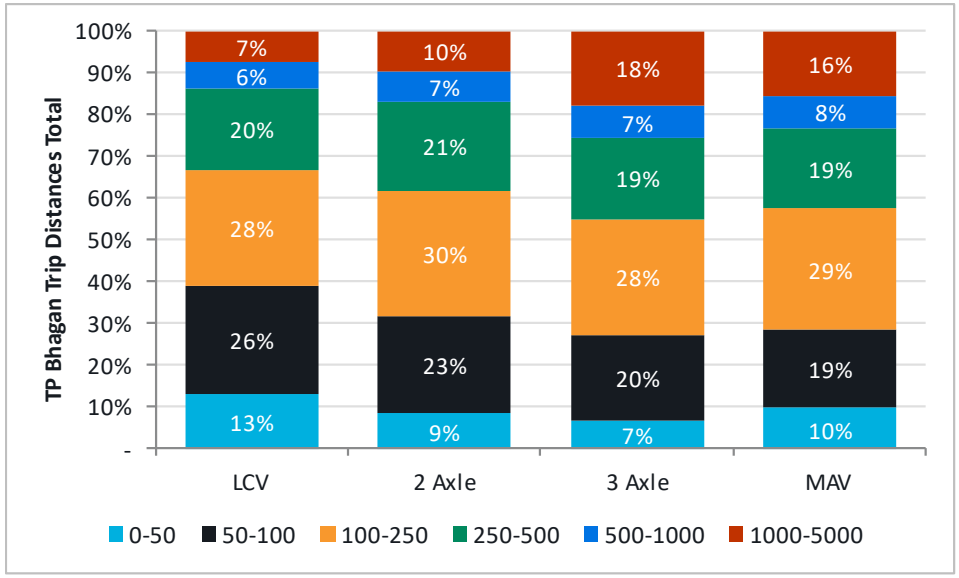
Origin Destination (2): Zonal influence and trip distances

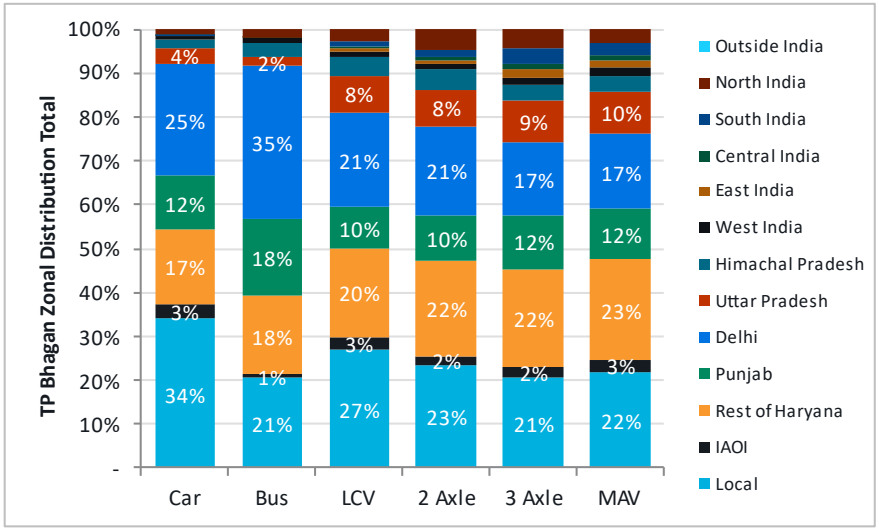
- In terms of zonal influence, the 2A/3A/MAV vehicles observe a significant share of Delhi, Haryana, Uttar Pradesh and Punjab trips. These trips are primarily medium-distance in nature.
- We observe significant long-distance trips for goods vehicles, with the average trip length for LCV/2A being around 300-350km while it is around 450km for 3A/MAVs.
- The asset has a 27% share of External-External trips, showing the significance of trips within the Local and Haryana region on the asset.

Trip Length Distribution

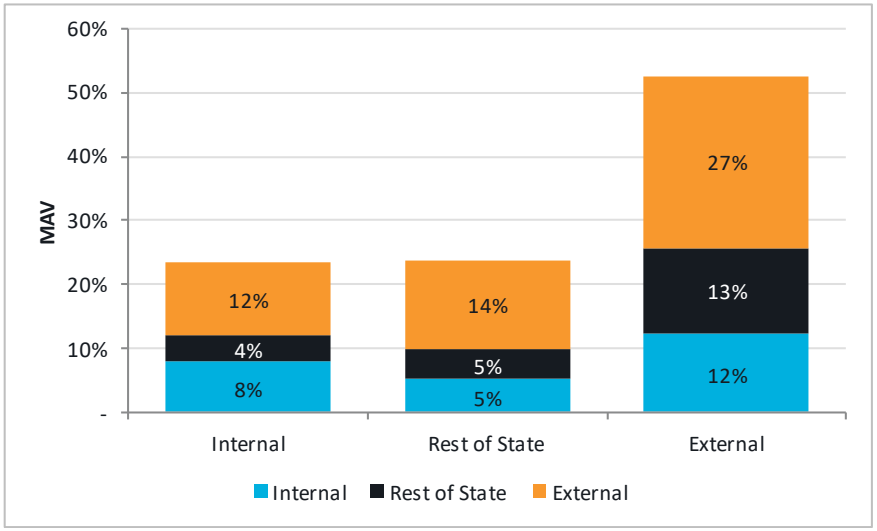


	Car	Bus	LCV	2A	3A	MAV
Average trip length Km	179	206	300	352	478	438

Zonal distribution



Internal External Trips



Source: Steer analysis

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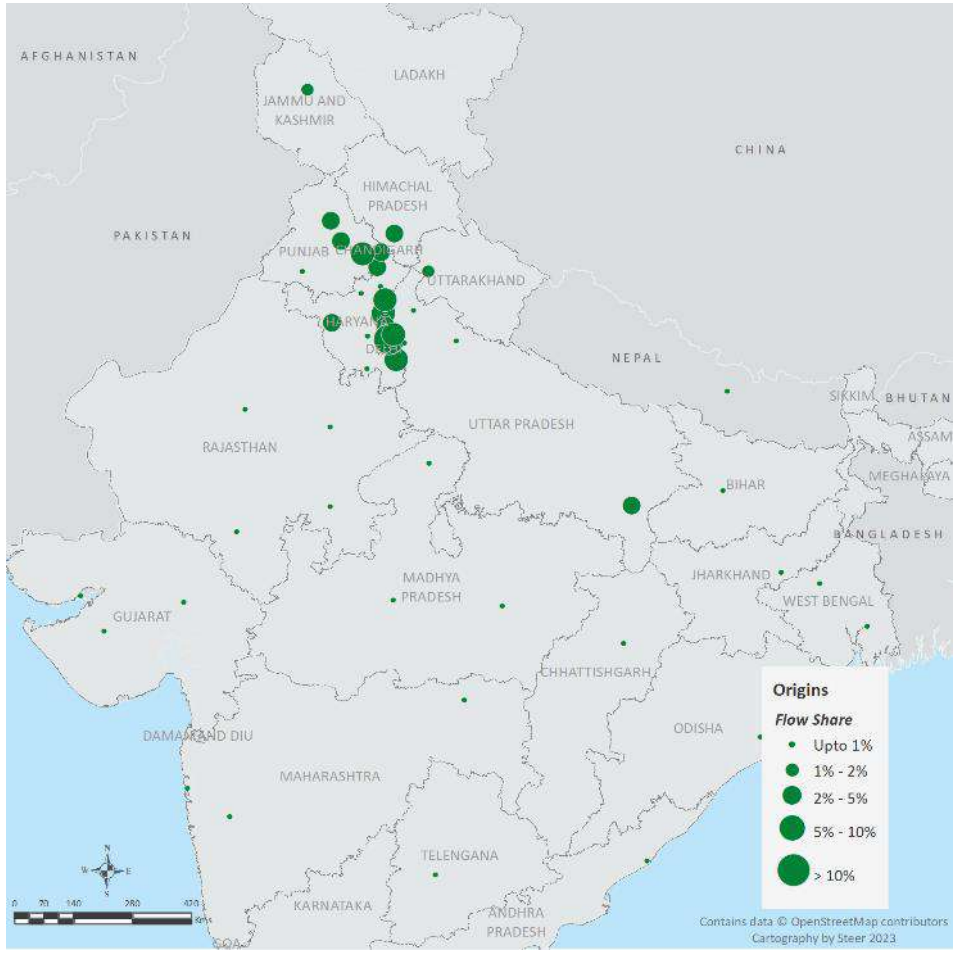
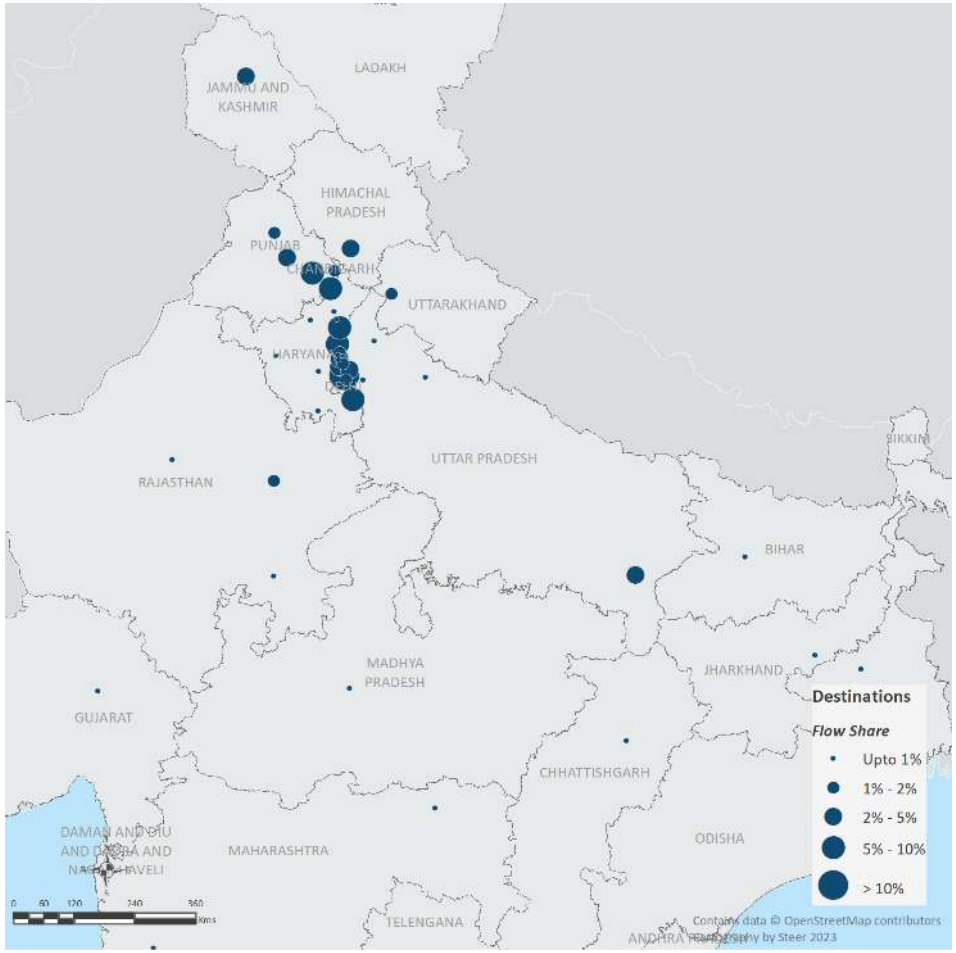
Origin Destination (3): Regions contributing to heavy commercial traffic

Origins



Destinations



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Origin Destination (4): Top OD Pairs

CJV

Origin	Destination	% of grand total
Delhi	Patiala, Sangrur, Fatehgarh Sahib, SAS Nagar, Rupnagar	11.9%
Delhi	Panipat, Panipat Refinery	11.1%
Sonepat, Ashok Nagar	Panipat, Panipat Refinery	6.3%
Delhi	Karnal	5.8%
Delhi	Ambala	3.8%
Delhi	Ganaur	3.3%
Delhi	Ludhiana	3.0%
Ganaur	Sonepat, Ashok Nagar	2.8%
Himachal Pradesh	Delhi	2.8%
Delhi	Samalkha	2.1%

LCV + 2A

Origin	Destination	% of grand total
Delhi	Project Corridor	9.3%
Delhi	Karnal	5.1%
Delhi	South East Punjab	4.3%
Project Corridor	Project Corridor	3.8%
Himachal Pradesh	Delhi	3.7%
Delhi	Ambala	3.5%
Delhi	Punjab	2.7%
Delhi	Project Corridor	2.3%
Karnal	Project Corridor	1.8%
Ghaziabad/Noida	Project Corridor	1.7%

3A + MAV

Origin	Destination	% of grand total
Delhi	Panipat, Panipat Refinery	6.3%
Delhi	Karnal District	4.8%
Delhi	South East Punjab	4.0%
Delhi	Ambala District	3.0%
Project Corridor	Project Corridor	2.4%
Delhi	Project Corridor	2.4%
Himachal Pradesh	Delhi	2.4%
Delhi	Punjab	2.2%
Jhajjar, Gurgaon, Faridabad, Palwal, Mewat, Mahendragarh	Project Corridor	2.1%
Ghaziabad, Baghpat, Noida, Greater Noida, Gautam Buddh Nagar	Project Corridor	1.6%

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Network-related Observations

steer

Network-related Observations: Introduction

- We observe from our historical traffic analysis that there has been a decline in the different vehicle categories for the observed months of FY24 when compared to FY23 traffic.
- Because of this, the following factors have been investigated to determine the extent of impact to be expected over the course of the Asset concession:
  - Significant network developments around the asset that have emerged to influence route choice. Network developments include:
    - Trans Haryana Expressway
    - Upgradation of NH709A (Karnal-Shamli-Meerut)
    - Route combination of NH709A (Karnal-Shamli) with NH709B (Shamli-Baghpat)
  - Natural phenomenon such as rainfall and how this impacts tourism travel and local commodity movements
  - Agricultural procurement decline and impacts to their corresponding distribution
- The decline in traffic due to the above impacts are detailed in the consequent slides.

	FY23	April 23	May 23	June 23	July-23	Aug-23	Sep-23	Oct-23	Nov-23*
CJV	51,493	53,537	53,328	59,090	46,042	49,996	51,751	54,323	58,615
LCV	3,459	3,164	3,173	3,302	3,133	3,078	3,417	3,551	3,215
Bus	1,866	1,950	2,081	2,119	1,897	1,824	1,925	2,237	2,005
2A	4,285	4,038	4,007	4,078	4,279	4,217	4,665	4,793	4,453
3A	1,808	1,621	1,602	1,568	1,616	1,557	1,665	1,751	1,644
MAV	4,625	4,007	3,957	3,958	4,211	4,200	4,710	5,470	5,372
Total (Nos.)	**67,545**	**68,321**	**68,152**	**74,117**	**61,183**	**64,875**	**68,136**	**72,128**	**75,310**
Total (PCU)	**101,415**	**99,162**	**98,985**	**105,162**	**93,089**	**96,324**	**102,850**	**110,624**	**111,943**
LCV+Bus+2A	9,610	9,151	9,261	9,498	9,309	9,119	10,006	10,580	9,673
3A+MAV	6,433	5,628	5,559	5,526	5,827	5,757	6,375	7,221	7,016

Source: Steer Analysis of Client TMS Data, *data upto 26th Nov 2023

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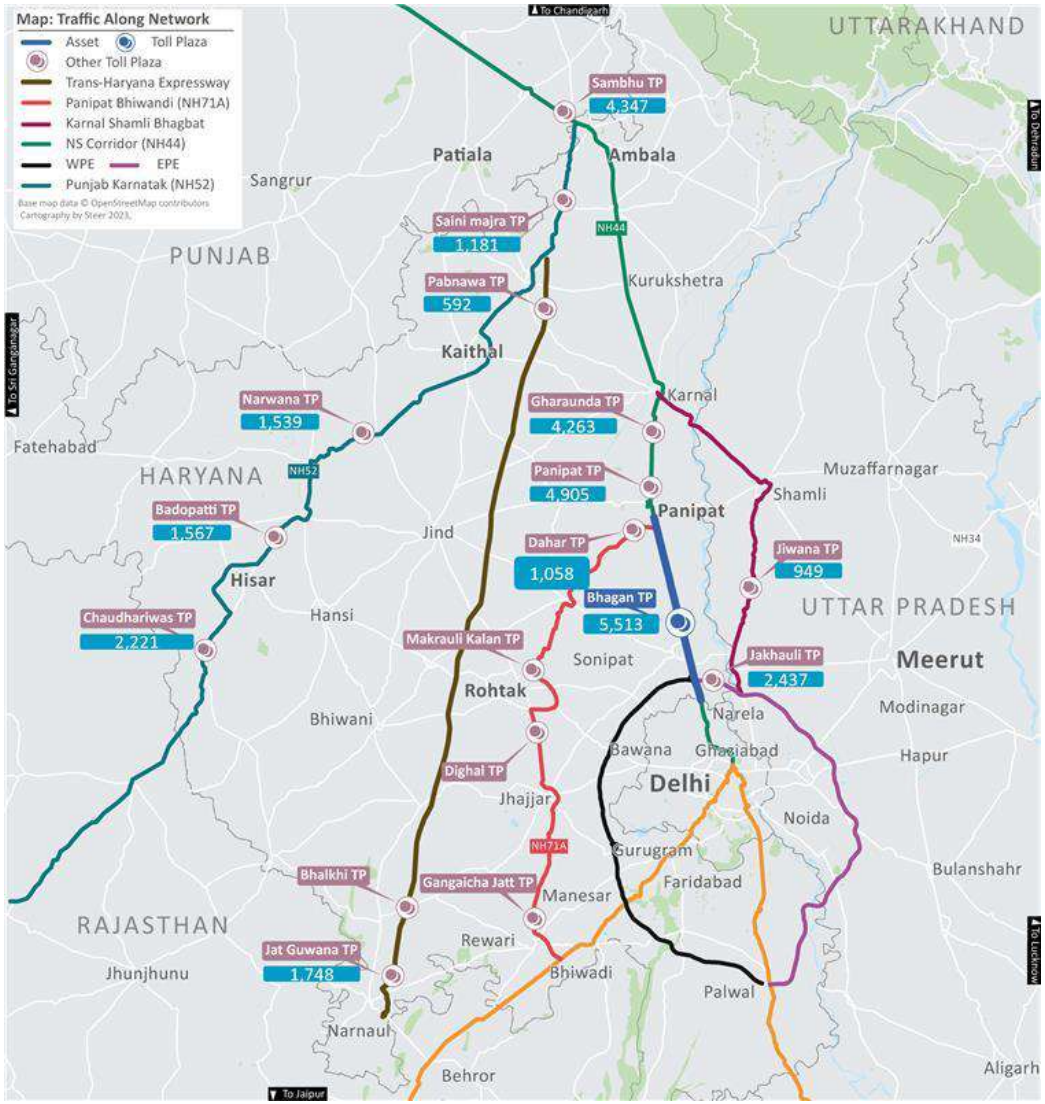
Network-related Observations (1): Traffic flow (3A+MAV)

- To further evaluate the decline in commercial traffic in Q1 FY24, we have carried out the entire Network Analysis of various developments that happened as using IHMCL data (as released by IHMCL on a monthly basis).
- The following table shows the Toll Plazas and Highway Corridors considered for the analysis.

Highway No	Name/Section	Toll Plazas
NH 44	Asset Corridor	Sambhu, Gharonda, Panipat, Bhagan
NH152	Highway feeding to Trans Haryana	Saini Majra
NH152 D	Trans Haryana Expressway	Pabnawa, Jat Gunawa
NH 52	Kaithal- Hisar	Narwana, Badopatti, Chaudhariwas
NH709B	Shamli-Baghpat	Jiwana

- The map shows us the sum of 3 Axles and MAV traffic, as observed in April 23. Similar trends are observed for 2 Axle traffic with traffic numbers provided for those in the Appendix.

April 2023 3A + MAV MADT



Source: Steer cartography based on OpenStreetMap data

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Network-related Observations (2): Traffic flow (3A+MAV)

The adjacent map shows how the average MADT for months April to June has changed (traffic increases in green and decreases in red) when comparing 2022 to 2023.

Asset Corridor (NH44):

- The Northern most plaza on the asset corridor i;e;, Sambhu TP near Ambala has seen a growth in traffic, however the same growth is not being visible at the other three toll plazas (Panipat, Gharounda & Bhagan). Instead, the traffic across these three TPs have declined.

NH 152, NH 52 and Trans Haryana Expressway (NH 152D):

- Saini Majara TP which is present on NH 152 which feeds into the Trans Haryana Expressway has also seen a growth in traffic, the same growth can be seen on the Pabnawa TP which is the mainline plaza on the Trans Haryana Expressway while there is a decline in the traffic on the NH 52 (Kaithal – Hisar section).

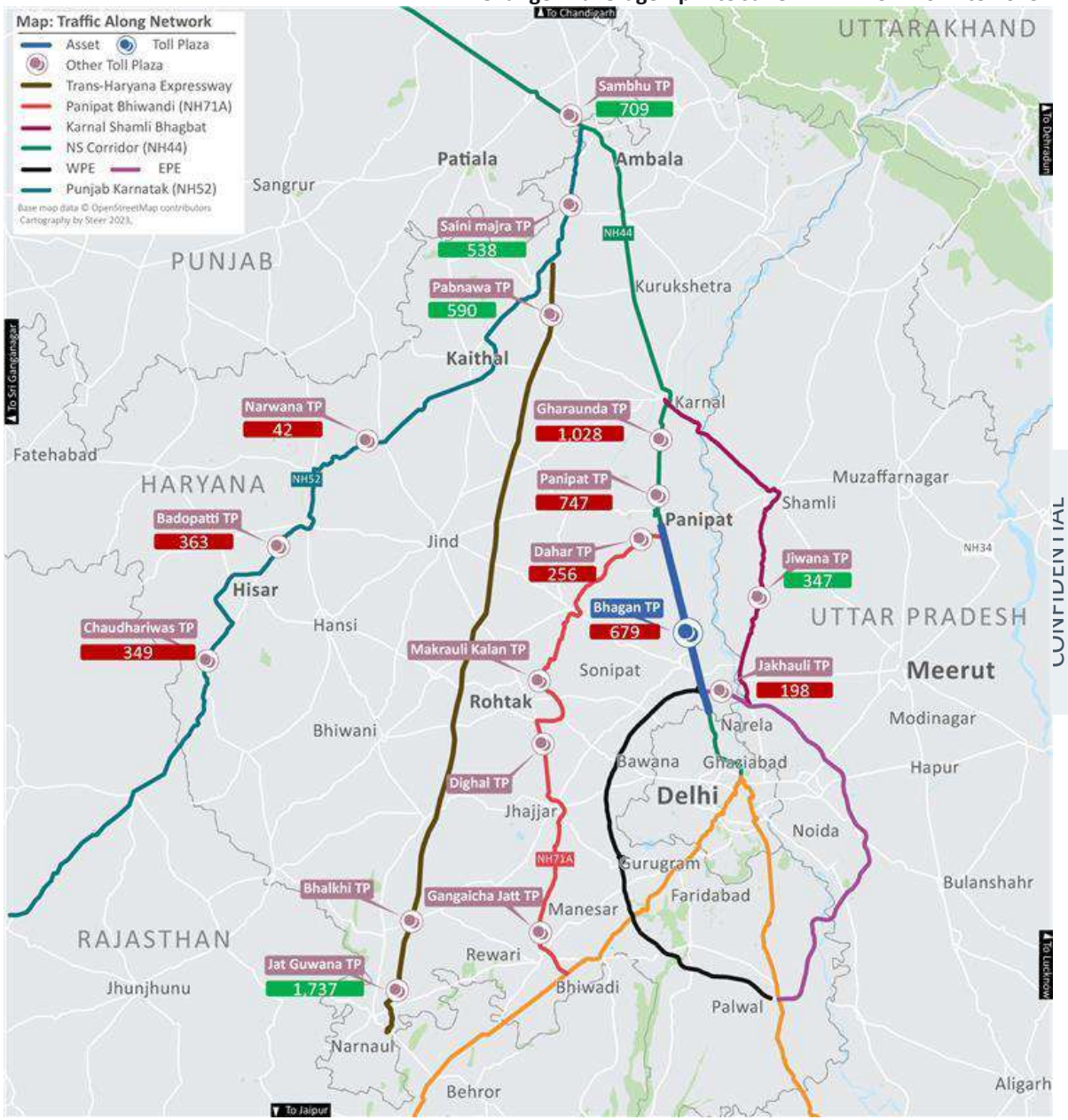
NH 709A and NH 709B:

- 80% of the upgradation works on Karnal-Meerut section of NH709A are completed, however there are no operational toll plazas.
- The Shamli- Baghpat section of NH 709B is a four lane well maintained highway with a Toll Plaza present at Jiwani which has also seen a growth in Traffic.

Asset Impact:

- Based on the above analysis, it is evident that the asset corridor has lost traffic to Trans Haryana Expressway & NH709.
- To understand, Network development of NH709A and Trans Haryana Expressway, we have conducted a site visit to further understand the traffic movements on these highways, which are explained in the next slides.

Change in average April to June MADT from 2022 to 2023



Source: Steer cartography, IHMCL ETC Data April-June 2022/2023

Network-related Observations (3): Traffic flow (2A, 3A+MAV)

The tables below outlines the traffic data illustrated in maps in the previous slides, further highlighting recent commercial vehicle traffic trends. We estimate that some of the traffic increase observed at Jiwana plaza should redistribute back on to the asset once tolling operations begin on NH709A.

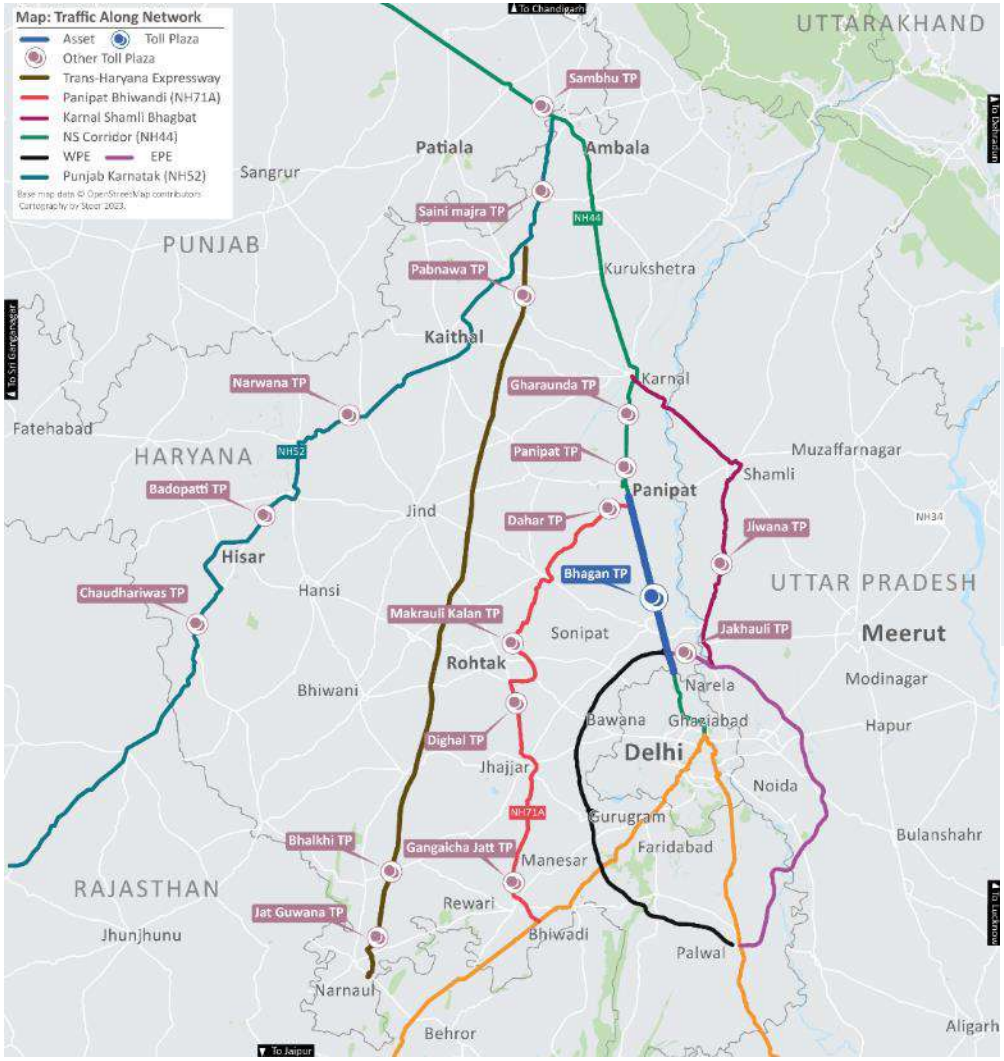
3A + MAV MADT

Toll Plaza	April 2023 MADT	Change in average April to June MADT from 2022 to 2023
Sambhu	4,347	709
Saini Majra	1,181	538
Pabanawa	592	590
Gharonda	4,263	(1,028)
Panipat	4,905	(747)
Bhagan	5,513	(679)
Jakhauli (EPE entry)	2,437	(198)
Bilakbarpur (EPE exit)	1,229	76
Dahar	1,058	(256)
Narwana	1,539	(42)
Badopatti	1,567	(363)
Chaudhariwas	2,221	(349)
Jat Guwana	1,748	1,737
Jiwana	949	347

2A MADT

Toll Plaza	April 2023 MADT	Change in average April to June MADT from 2022 to 2023
Sambhu	3,192	337
Saini Majra	618	282
Pabanawa	318	320
Gharonda	3,617	(106)
Panipat	3,649	(52)
Bhagan	3,977	92
Jakhauli (EPE entry)	1,140	(3)
Bilakbarpur (EPE exit)	513	44
Dahar	438	(93)
Narwana	431	(84)
Badopatti	420	(132)
Chaudhariwas	486	(120)
Jat Guwana	317	311
Jiwana	900	325

Source: IHMCL ETC Data April-June 2022/2023



Source: Steer Cartography

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Network-related Observations (4): Karnal to North Delhi

- Traffic from Karnal to North Delhi can take two routes:
  - NH44 (through the Asset)
  - NH709A/B & NH334B (Karnal – Shamli - Baghpat) via Jiwana TP
- A 109km section of NH709A between Karnal and Meerut is being upgraded to 4 lane with 80% of construction works completed. With the improved level of service, the combination of NH709A and NH709B offers an alternative to traffic originating from Karnal/North and destined towards North Delhi and vice versa.
- During our Site Visit and interaction with truckers, it is observed that the attractiveness of this route currently is because of the current temporary absence of tolls, even though it requires a longer journey.
- There are two toll plazas under construction, one each at Bhuni (towards Meerut) and Lakshmanpura (towards Karnal).
- There is an increase in goods traffic recorded on Jiwana Toll Plaza which is on the Shamli-Baghpat section of NH709B. This increase validates the transfer of traffic between Karnal/North and Delhi from the Asset to this alternative. The impact of this on Asset Traffic is detailed in the Impacts section.

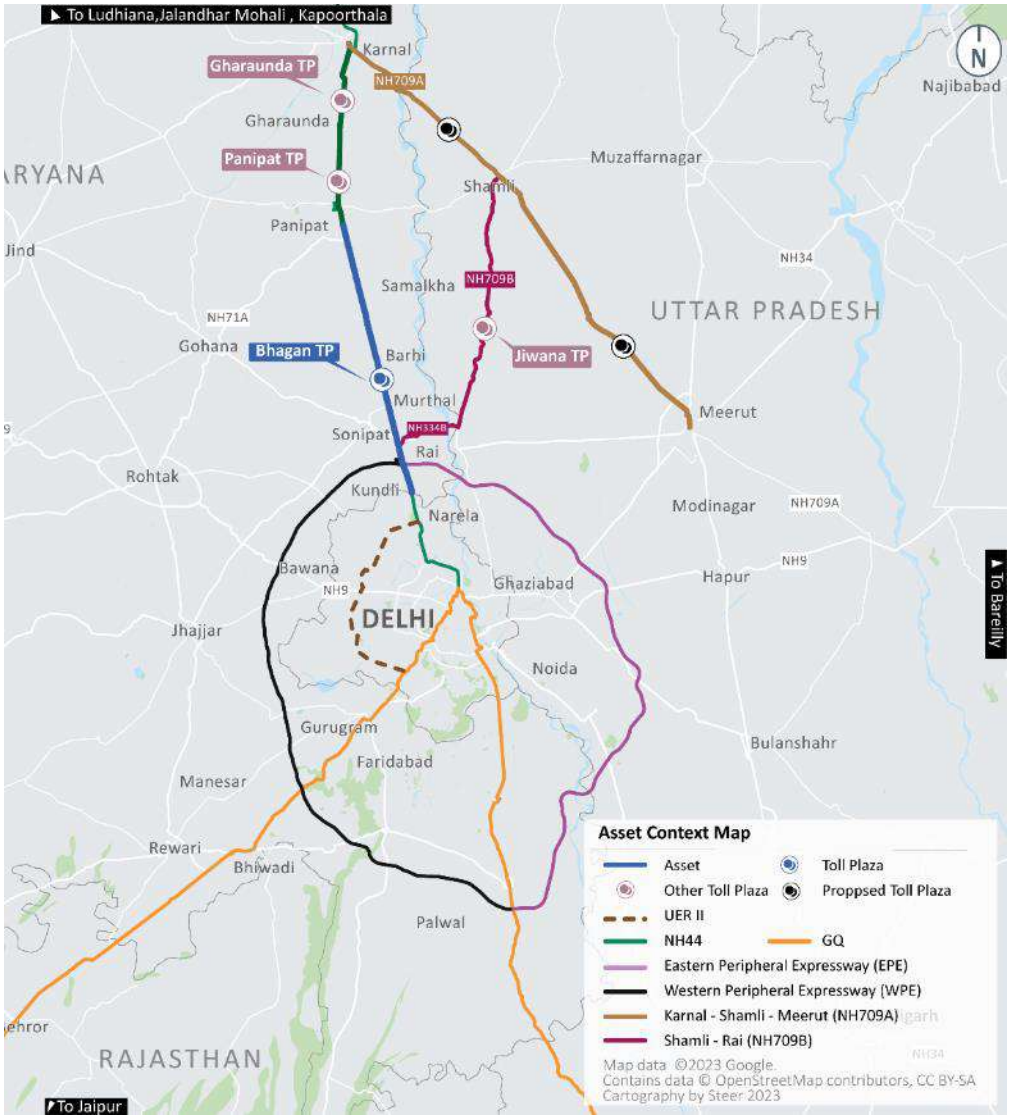
Karnal - Rai Route Comparison

	Via Asset	Via NH709A
Distance (in km)	87	114
Tolls (in ₹)	1880	475
Time (in hours)	2.2	3.3

Jiwana Toll Plaza 3A + MAV Traffic

Month	2022	2023	Delta
Mar	356	872	516
April	390	949	559
May	504	836	332
June	671	819	148
Q1 Avg	521	868	347

Source: Steer analysis



Source: Steer cartography

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Network-related Observations (5):– NH 709A & B

T: Road Section of NH 709 A
B: Road Section of NH 709 B

T: Under Construction Toll Plaza on NH 709A
B: Jiwana Toll Plaza on NH 709 B

T: Shamili Bypass in making on NH 709A
B: Sign boards on NH 709 B

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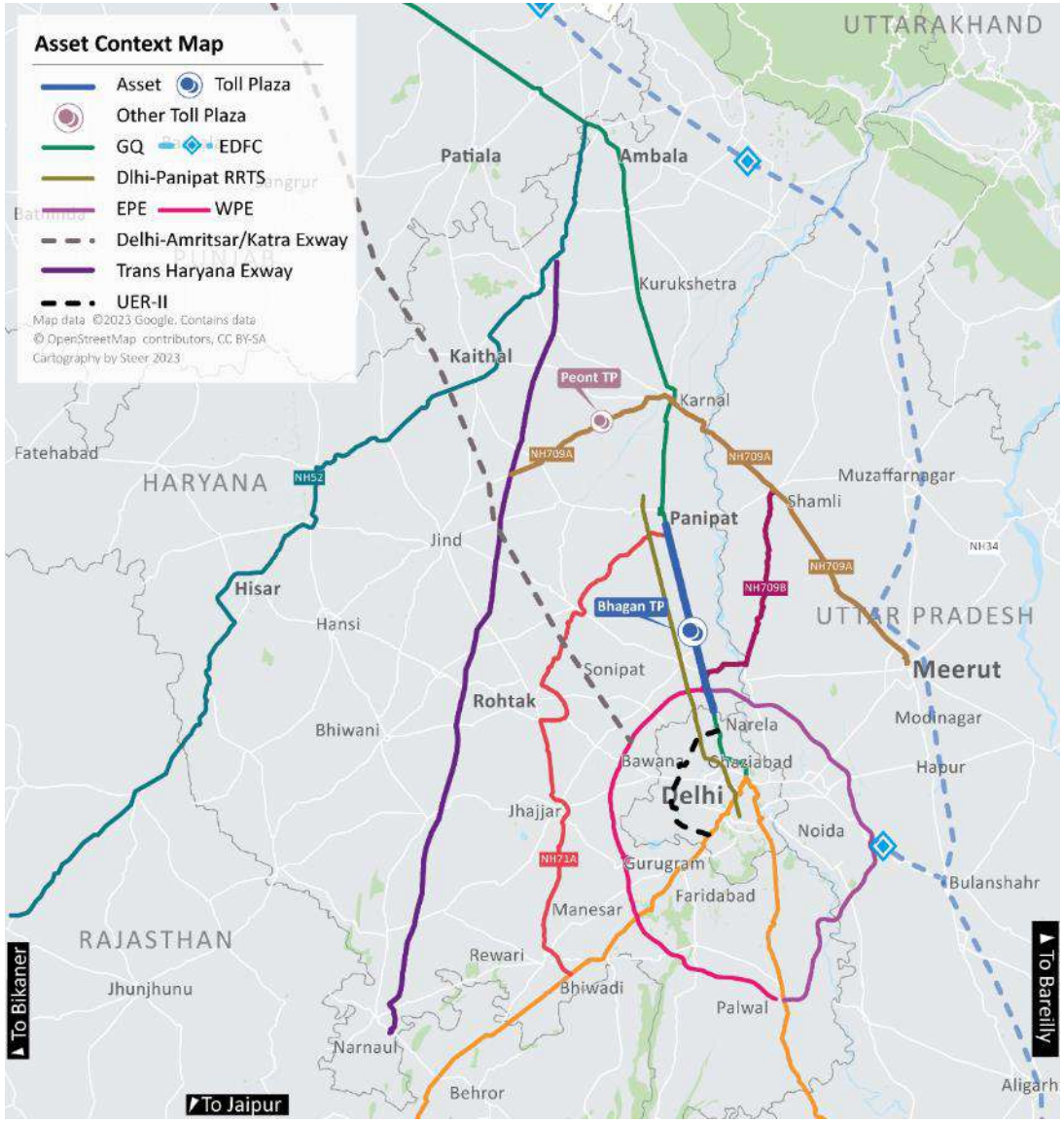
Network-related Observations (6):– Trans Haryana Expressway

- Trans Haryana Expressway (NH-152 D) is a 227km six-lane access-controlled expressway between Ambala and Narnaul and has been operational since Aug'22.
- This expressway attracts traffic from the Asset due to the reduction in distance and travel time for the journeys between Ambala and South Haryana and Western India trips.
- Traffic originating/destined to Karnal passes through Peont Toll Plaza in order to access Trans Haryana Expressway.
- During site visit, it was observed that traffic to/from Panipat Petroleum Refinery, Ambala, Jaipur, Indore and Gujarat is using this expressway.
- Based on site visit observations and the IHMCL traffic data, we believe that the impact of Trans Haryana Expressway has already played out and we believe that the traffic lost to Trans Haryana Expressway is very unlikely to return to our asset.



Source: Steer cartography

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Network-related Observations (7)– Trans Haryana Expressway

T: Road Section of NH 709 A (Karnal – Bahari)
B: Trans Haryana Expressway

T: Peont Toll Plaza on NH 709A
B: Trans Haryana Expressway

T: Assandh Town Limits
B: Trans Haryana Expressway

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Rainfall (1): Significant rains north of the Asset in June/July 2023

- The northern region of influence on the Asset saw higher than usual rainfall in June and July 2023. Such variations in the rainfall pattern influence the road traffic.
- Widespread monsoon-related disruptions in several economic activities such as mining, construction, and poor road accessibility due to floods in the region of influence results in subdued traffic levels in this period. However, on an annual level such variations balance out with days of higher/lower than usual traffic.
- Below tables from IMD Website describes the rainfall patterns over two months, districts like Ludhiana, Jalandhar in Punjab saw a very high rainfall during the start of June and continued to see high rainfall till July end. Karnal and Panipat in Haryana, and Delhi districts began with lower rainfall at the start of June'23 but saw a significant increase in rainfall against the long period average in the end of June through to July'23 period.

Rainfall deviation from long-period average (LPA) June/July 2023

India Meteorological Department
Hydromet Division, New Delhi

DISTRICT - WEEK BY WEEK DEPARTURES(CUMULATIVE)
Period :01-06-2023 To 26-07-2023

S NO.	MET. SUBDIVISION/UT/ STATE/DISTRICT	Week End 7-6-2023	Week End 14-6-2023	Week End 21-6-2023	Week End 28-6-2023	Week End 5-7-2023	Week End 12-7-2023	Week End 19-7-2023	Week End 26-7-2023
	STATE : HARYANA								
1	AMBALA	-48	-78	-66	-40	-51	89	66	51
2	BHIWANI	-10	-67	-72	-44	-23	64	52	35
3	CHARKHI DADRI	6	-5	-16	138	95	90	71	64
4	FARIDABAD	44	-18	19	63	65	91	54	27
5	FATEHABAD	470	121	29	13	-14	26	4	-4
6	GURGAON	96	-44	63	169	105	119	76	38
7	HISAR	-66	-26	-55	-59	-59	-28	-24	-31
8	JHAJJAR	212	-7	-20	307	143	142	83	54
9	JIND	-4	-5	-52	-50	-48	-24	-27	-15
10	KAITHAL	10	-73	-66	-58	-46	78	56	61
11	KARNAL	-53	-79	-83	34	32	108	67	94
12	KURUKSHETRA	-19	-31	19	85	69	281	236	226
13	MAHENDRAGARH	-18	8	10	65	52	87	93	63
14	NUH	-17	-68	106	130	72	146	103	60
15	PALWAL	61	-29	58	94	56	40	16	-5
16	PANCHKULA	38	-37	-64	-45	-44	153	121	103
17	PANIPAT	-69	-82	-82	142	130	165	124	134
18	REWARI	-45	-74	-9	48	13	73	95	63
19	ROHTAK	34	-61	-70	76	51	52	22	43
20	SIRSA	402	124	-15	84	37	49	38	34
21	SONIPAT	170	-20	-55	178	159	186	129	122
22	YAMUNANAGAR	34	-65	-71	1	-18	144	112	99

India Meteorological Department
Hydromet Division, New Delhi

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	STATE : DELHI (UT)								
1	CENTRAL DELHI	95	-41	-7	244	154	271	185	130
2	EAST DELHI	-32	-74	-51	27	43	158	93	87
3	NEW DELHI	-50	-76	-42	37	37	154	114	80
4	NORTH DELHI	-35	-70	-69	21	2	170	103	65
5	NORTH EAST DELHI	-19	-75	-73	-63	-65	-24	-46	-51
6	NORTH WEST DELHI	81	-23	46	126	64	134	73	56
7	SOUTH DELHI	141	-22	-20	99	143	129	79	49
8	SOUTH WEST DELHI	-35	-58	-49	92	64	111	79	51
9	WEST DELHI	-44	-74	-14	132	42	22	-8	-22
	SUBDIVISION : PUNJAB								
1	AMRITSAR	511	133	319	328	245	184	110	119
2	BARNALA	603	131	29	-7	-9	-20	-37	-39
3	BATHINDA	819	186	37	29	-2	25	7	-8
4	FARIDKOT	227	90	-16	0	-38	55	23	110
5	FATEHGARH SAHIB	160	-19	102	45	50	194	120	104
6	FAZILKA	411	6	-39	-18	-33	-20	-45	-48
7	FIROZPUR	583	152	48	205	149	255	207	181
8	GURDASPUR	316	158	133	156	109	183	120	98
9	HOSHIARPUR	134	36	6	-23	-3	109	75	62
10	JALANDHAR	310	34	37	-4	-8	62	39	35
11	KAPURTHALA	177	72	111	51	13	124	69	68
12	LUDHIANA	289	32	17	-22	-18	68	32	16
13	MANSA	256	215	63	27	-8	-10	-29	-25
14	MOGA	353	139	22	10	-19	23	4	-3
15	MUKTSAR	32	-9	-60	-17	-50	-39	-52	-55
16	PATHANKOT	548	131	103	124	62	110	90	61
17	PATIALA	197	-21	12	8	27	111	74	59
18	RUPNAGAR	187	17	-28	-28	-20	186	124	90
19	SANGRUR	257	-12	-37	-52	-60	-34	-46	-47
20	SAS NAGAR	-41	-71	-82	-35	-27	120	72	91
21	SBS NAGAR	118	-41	-61	-60	-60	121	77	53
22	TARN TARAN	887	197	151	264	188	312	192	189

Flooded paddy fields in Punjab, Haryana to depress crop yields

4 min read • 19 Jul 2023, 11:16 PM IST

Puja Das

Punjab and Haryana have witnessed rainfall in large excess of 96% and 91% above the long period average (LPA), respectively during 1 June to 12 July

About 250,000 hectares of paddy fields in 14 districts of Punjab and 150,000 hectares in seven districts of Haryana are submerged in water, according to people associated with local farm associations. (PTI)

Legend

	Very Higher than Avg Rainfall
	Higher than Avg Rainfall
	Lower than Avg Rainfall
	Very Lower than Avg Rainfall

THE TIMES OF INDIA

100mm of rain: Delhi's wettest June in 6 years

TNN / Updated: Jun 30, 2023, 04:41 IST

Delhi breaks 41-year rainfall record, several areas waterlogged, more showers likely for next 2 days

ANI • Last Updated: Jul 09, 2023, 07:38 PM IST

SHARE FONT SIZE SAVE

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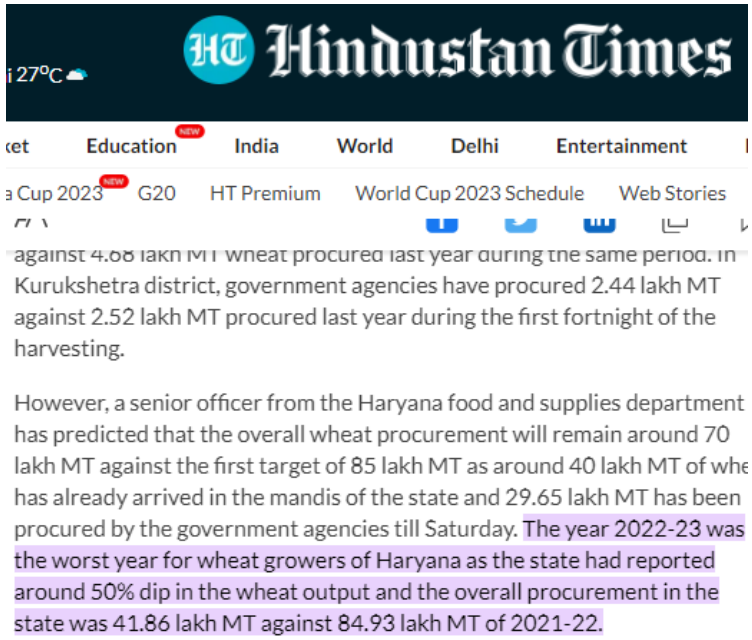
Agriculture (1): Agricultural Procurement of wheat and rice

- Agriculture contributes to a major part of Haryana state Economy. 70%-90% of Wheat procurement in India are catered by the states of Punjab and Haryana. , India is world's second largest wheat producer.
- As per the Department of Food & Public Distribution, Ministry of Consumer Affairs, Govt of India report, the wheat procurement saw a massive dip in FY23, which led to a national ban of wheat exports. This reduction in wheat production had significant negative impact on goods traffic in FY23 on the Asset.
- However, significant increases observed in Q1 procurement numbers have already surpassed last year levels. If the trend is maintained, the upcoming year procurement is likely to also surpass FY22 levels.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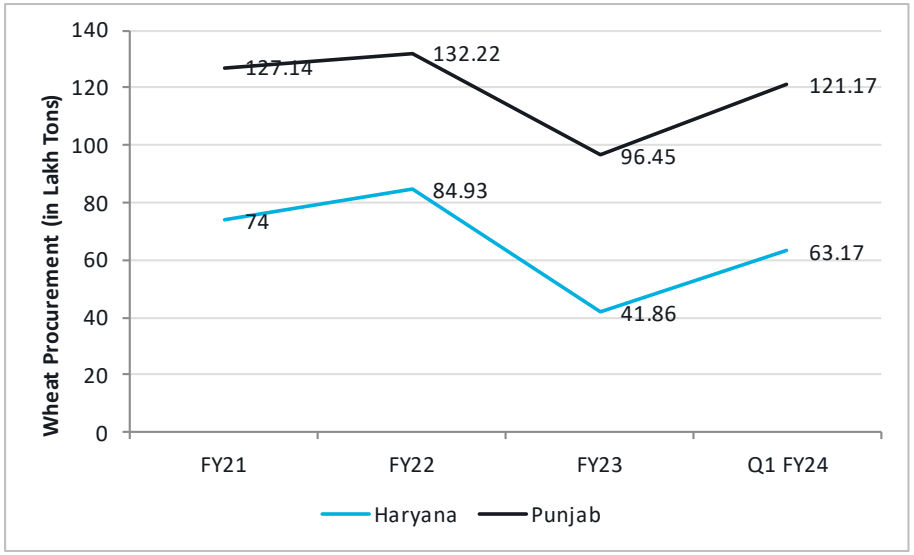
against 4.68 lakh MT wheat procured last year during the same period. In Kurukshetra district, government agencies have procured 2.44 lakh MT against 2.52 lakh MT procured last year during the first fortnight of the harvesting.

However, a senior officer from the Haryana food and supplies department has predicted that the overall wheat procurement will remain around 70 lakh MT against the first target of 85 lakh MT as around 40 lakh MT of whe has already arrived in the mandis of the state and 29.65 lakh MT has been procured by the government agencies till Saturday. The year 2022-23 was the worst year for wheat growers of Haryana as the state had reported around 50% dip in the wheat output and the overall procurement in the state was 41.86 lakh MT against 84.93 lakh MT of 2021-22.



Source: Department of Food & Public Distribution (DPFD), Government of India, June'23 Report.

Poor Produce, Less MSP Impact Haryana Mustard Farmers

Newsclick Report | 06 Mar 2023

'Expected rain delay': Farmers upset over crop procurement in Haryana

TNN / Updated: Sep 24, 2022, 08:30 IST

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How Himachal Deluge Hits Tomato Producers - And Consumers

In Himachal's Mandi district is Balh Ghati, which accounts for the major portion of the tomato supply to north India.

India News | NDTV News Desk | Updated: July 10, 2023 11:59 am IST

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Summary

- There is a decline in commercial traffic on the asset in Q1 FY24 when compared to FY23 traffic.
- This could be due to the combination of natural phenomenon such as rainfall or due to significant network developments around the asset that have come into play.
- Based on the site visit observations, the IHMCL traffic data and above analysis, it is evident that **the asset corridor has lost traffic to Trans Haryana Expressway & NH709.**
- During our Site Visit and interaction with truckers, it is observed that the attractiveness of NH709 route currently is because of the temporary absence of tolls during toll plaza construction, even though it requires a longer journey.
- The impact of Trans Haryana Expressway has already played out, and this expressway attracts traffic from the Asset due to the reduction in distance and travel time for the journeys between Ambala and South Haryana and Western India trips. We believe that **the traffic lost to Trans Haryana Expressway is very unlikely to return to our asset**.
- **Widespread monsoon-related disruptions** in several economic activities such as mining, construction, and poor road accessibility due to floods in the region of influence resulted in subdued traffic levels in this period. However, the **traffic is expected to recover in the upcoming months.**
- 70%-90% of Wheat procurement in India are catered by the states of Punjab and Haryana. As per the Department of Food & Public Distribution, Govt of India report, the wheat procurement saw a massive dip in FY23, which led to a national ban of wheat exports. This **reduction in wheat production among reductions in other agricultural activities have had significant negative impact on goods traffic** in FY23 on the Asset.
- These impacts to Asset traffic due to rainfall and decline in agricultural activities are expected to be temporary, and we expect gradual traffic recovery on the Asset between FY25 and FY27.

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Forecasting Assumptions

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Base Year Estimation

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Approach to estimate traffic and revenue

Key stages to arrive at traffic and revenue forecasts

Historical analysis and review of reports

- Analysis of historical toll plaza data

Validation of base position: traffic and revenue

- Traffic is validated by undertaking an independent 3 Day TVC counts and comparing them with toll plaza data
- Validation of base traffic and segmentation through revenue comparison against reported by toll plazas

Traffic surveys : OD, TVC, and Site Visits

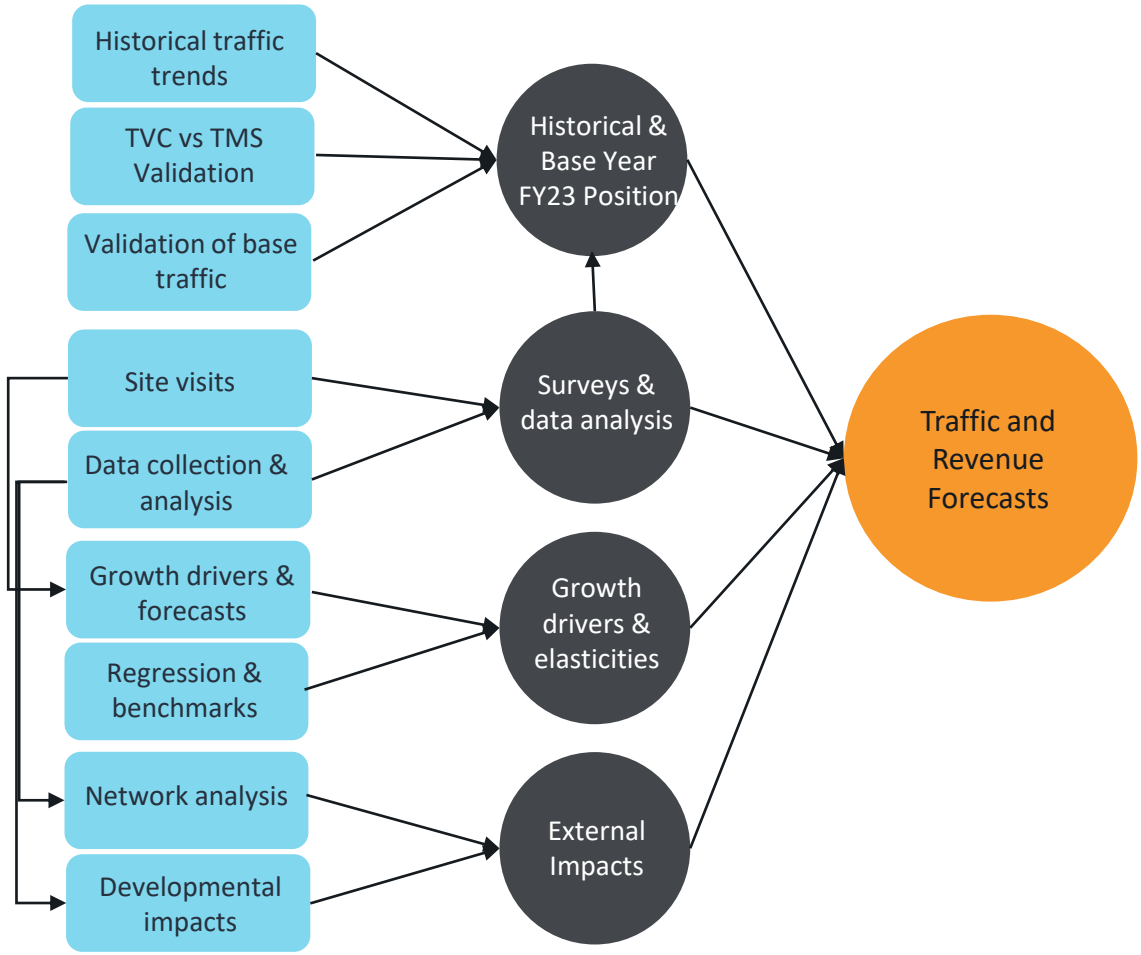
- Site reconnaissance helps in undertaking the key growth drivers and local economic situation

Estimation of elasticities and growth drivers

- Regression analysis wherever data is available
- Where long time series historical data is unavailable/ or regression results are insignificant or in case of numerous exogenous impacts throughout the period, a combination of benchmarks (experience of working in the corridor on other Assets and working on over 250+ toll roads in India), OD analysis, site visits is used to arrive at the relationships.

Network impacts

- Detailed GJC based analysis to analyse the impact of new network and development planning in the region
- Capacity augmentation requirement



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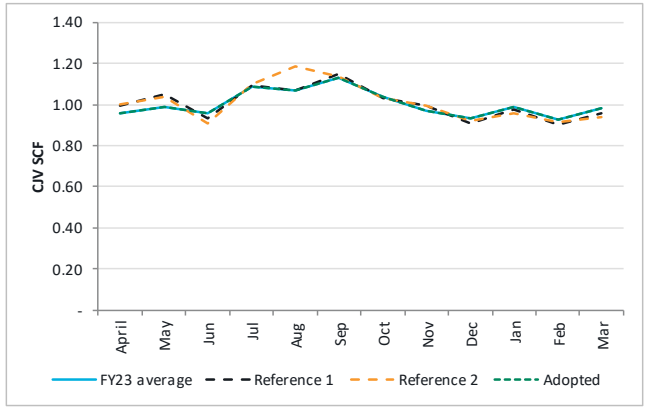
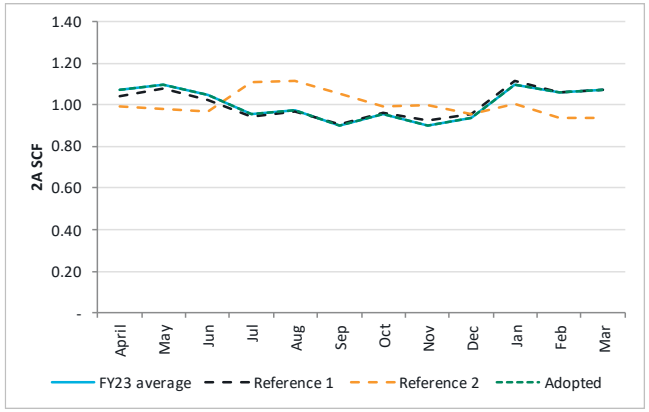
Seasonality Correction Factors

- Seasonality Correction Factor(SCF) 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.
- Since the travel patterns are impacted by external events, we have benchmarked the SCF to a reference asset in the vicinity.
- FY23 SCF shown in the graphs are calculated through the historical data of our asset, whereas Reference 1 SCFs are calculated using the IHMCL data of the Panipat Toll Plaza and the reference 2 is taken from a Steer benchmark asset which is north of the Asset on the same NH44 corridor.
- Using these two data points the adopted SCF has been calculated for the Asset.

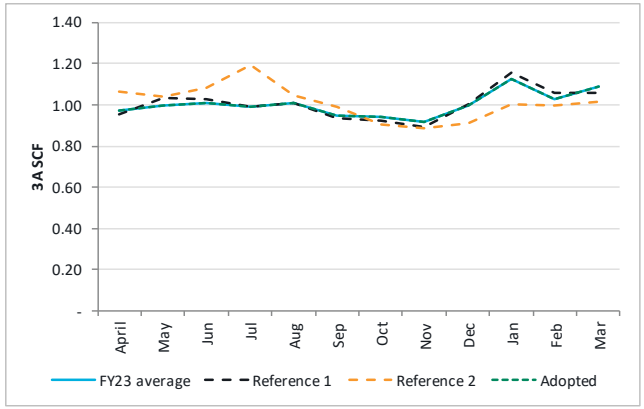
Historical trend of CJV



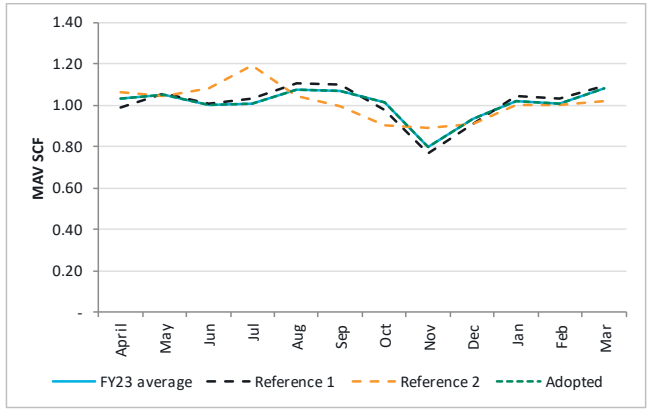
Historical trend of 2A



Historical trend of 3A



Historical trend of MAV



Source: Steer analysis based on historical TMS data provided; *benchmarked asset

Adopted SCF for Bhagan toll plaza

	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
CJV	0.96	0.99	0.96	1.08	1.07	1.13	1.04	0.97	0.93	0.99	0.93	0.98
LCV	0.92	0.94	0.94	0.95	1.02	0.97	1.04	0.96	1.02	1.11	1.06	1.10
Bus	1.02	0.93	0.98	1.02	1.10	1.08	1.02	0.92	0.98	0.99	0.99	1.00
2A	1.07	1.10	1.04	0.96	0.98	0.90	0.96	0.90	0.94	1.10	1.06	1.07
3A	0.97	1.00	1.01	0.99	1.01	0.95	0.94	0.91	1.00	1.13	1.03	1.09
MAV/OSV	1.03	1.05	1.00	1.01	1.07	1.07	1.01	0.80	0.93	1.02	1.01	1.08

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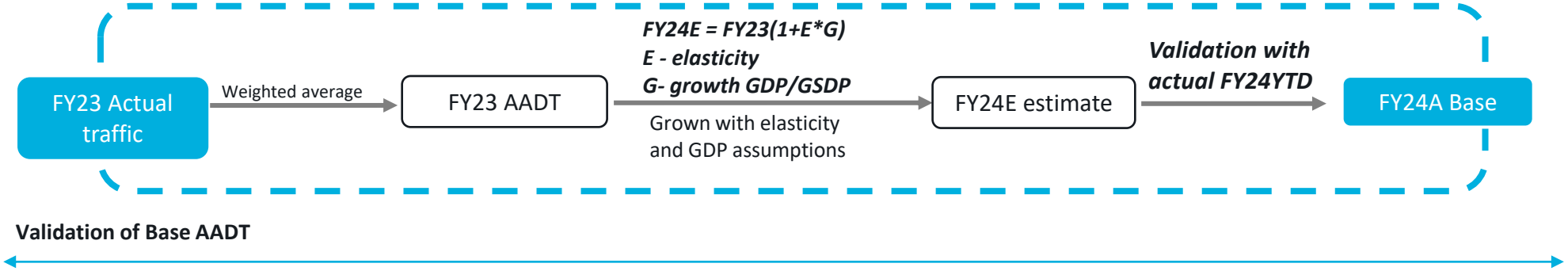
Base year FY24 AADT: Estimation and validation methodology

Base year is the year on which long-term background forecast growth rates are applied to derive year-wise AADT estimates for forecast years. Base year traffic is, therefore, an important input in our forecasting approach. The forecasted base traffic and revenue forecasts are estimated based on economic growth (GSDP/GDP) and elasticity assumptions applied on base year traffic estimates. We have used FY24 as the base year for traffic forecasts.

FY23 data	• Asset data from April'22 – Mar'23 is considered for estimation.
Weighted average	• A weighted average is taken with respect to the number of days in each month to arrive at the FY23 base year traffic
Growth Assumptions	• Growth Assumption (GSDP or GDP & Cement production) – GSDP, and GDP growth rates determines growth of good traffic in future years. Traffic of different vehicle categories either depends on GDP or GSDP • Elasticities – Elasticity assumptions (discussed later) are used to arrive at FY24E



Validation of FY24 estimated AADT	• The estimated FY24E AADT based on FY23 AADT, Growth rate (GDP/GSDP), and Elasticities is validated against the actual traffic observed in FY24 (up to Nov'23) • Less variation between the estimated and the actual establishes the robustness of the estimated AADT for vehicle classes

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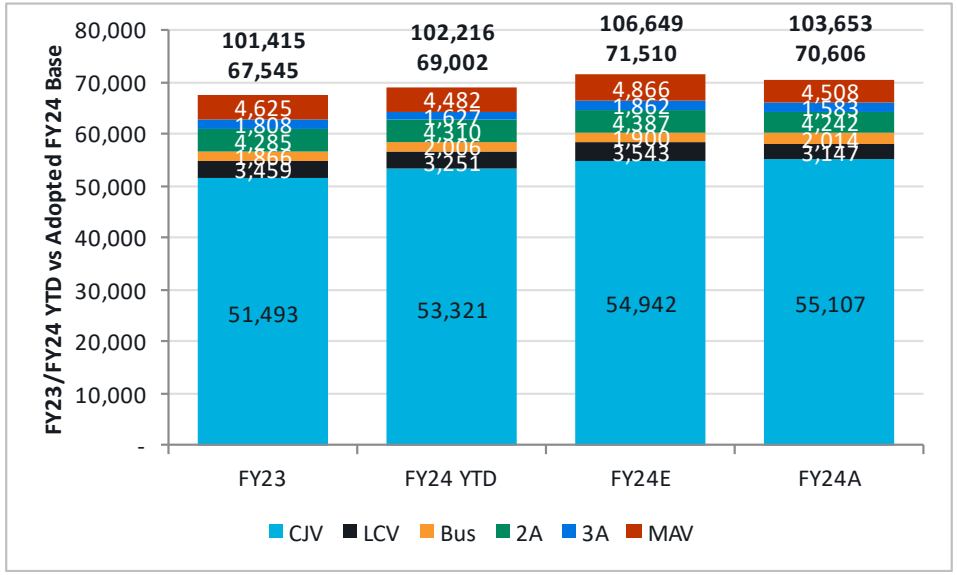
FY24 Base Year Estimates

- The methodology to arrive at FY24 base year estimates is detailed in the previous slide.
- The Asset's recent performance and trends have been applied over FY23 traffic numbers as provided by the Client to arrive at the actual FY24 position.
- To estimate FY24, we have applied GDP and GSDP based elasticity over FY23 normalised base numbers. The corresponding FY24 AADT was converted to a monthly profile using the SCFs.
- Assumptions around GDP, GSDP, Elasticity, and SCF have been taken from benchmark assets where long-term historical data can be found and relied upon.
- To determine the FY24 estimated full year position, FY23 IS grown to FY24E -- then adjusted with respect to traffic observed in FY24 YTD.
- FY24A of 103,653 PCU represents the adopted AADT for FY24, which is based on Apr-Nov of actual data and Dec'23-Mar'24 of estimated traffic.



	FY23	FY24 E	FY24 YTD	FY24 A	FY23 vs FY24A %
CJV	51,493	54,942	53,321	55,107	7.0%
LCV	3,459	3,543	3,251	3,147	(9.0%)
Bus	1,866	1,900	2,006	2,014	8.0%
2A	4,285	4,387	4,310	4,242	(1.0%)
3A	1,808	1,862	1,627	1,583	(12.5%)
MAV	4,625	4,866	4,482	4,508	(2.5%)
Total (Nos.)	**67,545**	**71,510**	**69,002**	**70,606**	**4.5%**
Total (PCU)	**101,415**	**106,649**	**102,216**	**103,653**	**2.2%**

Source: Steer Analysis. FY23 is observed traffic. FY24E is estimates (normlaised scenario) , FY24 YTD is observed traffic April 2023 to November 2023, FY24A (Base) is the estimated full year FY24 AADT.

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Traffic growth parameters and elasticities

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Elasticities: Estimation of background growth relationships (1)

Economic growth variations have a direct effect on road traffic. The magnitude of the impact of a slowdown or a ramp up varies for different toll roads. A key driver of the traffic growth can be attributed to the nature of the asset and the different commodities it carries. If the asset connects with an industrial corridor or is driven by consumer demand, then the effect of an economic variation on the asset's traffic performance is much more; whereas assets which carries predominantly agriculture produce are lesser impacted.

We have identified four main categories in which different road assets can be divided into on the basis of predominant commodity carried: Industrial, agricultural, consumption and port related.

From our experience with working on 200+ toll roads across the country in the last six years, we have observed varied growth patterns across assets of different categories

- Assets carrying primarily industrial dominated commodities have shown a stronger level of relationship with the national GDP. Traffic level on such road assets typically witness high level of fluctuations in response to variations in national economy
- However, assets carrying predominantly agri-based commodities exhibit a much weaker relationship to the growth levels and variations in national economy. Such assets are more prone to local/regional agricultural productivity which are highly dependent upon the monsoon cycles.
- Assets carrying consumption related commodities are largely dependent upon local economic factors and since a bigger component of such commodities fall under necessity/daily consumption items, variations due to the national economy are limited.
- The assets falling under the port category are effectively subset of traffic linked to the industrial corridor. However, the fluctuation in traffic levels are considerably higher than the industrial assets due to a direct dependency on the import/export and global trade.

Category	*Predominant commodity*
Industrial	Manufacturing Automobiles Metal/Mining
Agricultural	Agriculture/Farm Dairy products
Consumption	Groceries Parcel General merchandise
Port related	Containers Bulk

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Elasticities: Estimation of background growth relationships (2)

- Elasticities of different vehicle categories are usually estimated using historical traffic data, based on econometric analysis. However, historical data often includes varying traffic trends owing to either external impacts or variation in data recording and limited historical data like in this case. This causes the econometric analysis to not provide robust enough results. In such cases we rely on supporting data, like primary surveys and benchmarks from other studied assets in the neighboring region.
- Since there is limited data is available for the Asset, we have adopted the approach of benchmarking elasticities to the nearby Assets.

Adopted elasticities for the Asset

Vehicle Category	Proposed Elasticity	Growth Driver	Comments
CJV	1.2 tapered to 1.1 by FY29	50% GSDP of Delhi and Haryana blended	This is in line with the observation that in fast-growing economies such as India with relatively low car ownership levels, car traffic growth rates are often in line with/slightly higher than growth in GDP.
Buses	0.3	50%/50% GSDP of Delhi and Haryana blended	Lower elasticities for Buses and LCVs, given they serve a very local market with limited external drivers. Therefore, GSDP of Haryana and Delhi is assumed to be the key driver of traffic growth, as these vehicles tend to serve local movements, as confirmed by our observations and the analysis of data from OD surveys, with Buses having a lower elasticity due to a mature passenger transit market in the corridor.
LCV	0.4	50%/50% GSDP of Delhi and Haryana blended	
2A	0.6	50% GDP 50% GSDP of Delhi and Haryana blended	For 2A and 3A, we have assumed GDP and GSDP of Haryana-Delhi blended to be an equal grouped driver because these trucks are driven by factors beyond those of the local zones, more like larger MAVs. For 3A we have a slightly lower elasticity of 0.4, relative to 0.6 for 2As, which has been considered due to more recent national growth trends for these vehicle types observed across benchmarks.
3A	0.4	50% GDP 50% GSDP of Delhi and Haryana blended	
MAV	0.9	GDP	There are several industries in Panipat and other producer regions in the north, and larger trucks carry a mix of commodities towards the national capital and beyond; we have, therefore, assumed a higher elasticity for larger trucks due to the national trend towards using MAVs as they are cheaper to operate at a per-unit level.

Source: Steer analysis

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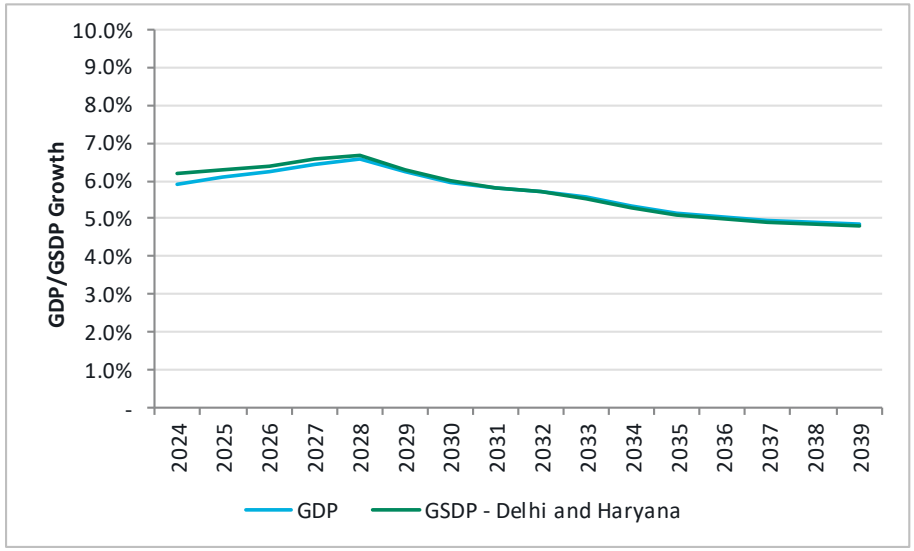
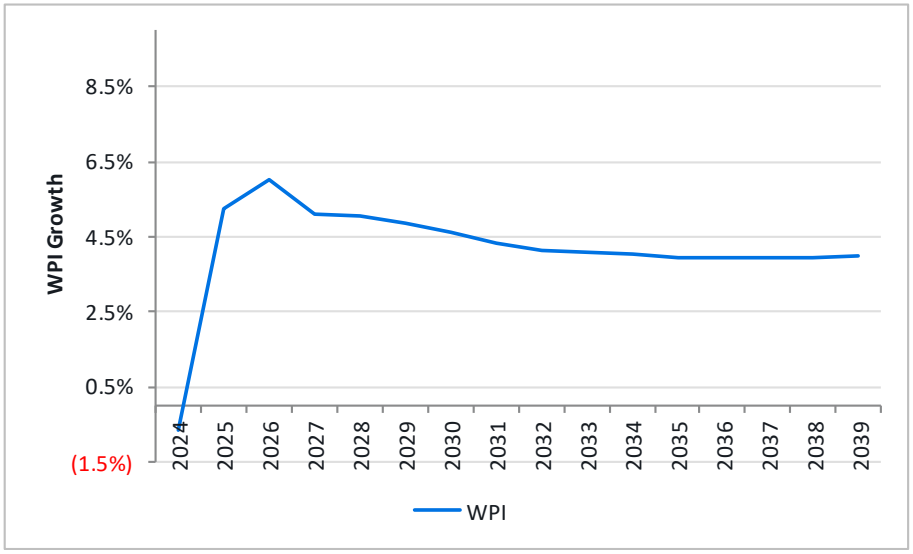
GDP and GSDP Growth

- National GDP forecasts for the Concession timeline have been provided by the client and have been sourced by the client from S&P Global Market Intelligence.
- GSDP forecasts for the same timeline are determined via Steer analysis of historical trends of state-wise growth relative to national GDP growth. We have established GSDP projections for each state with the assumption that as the Indian economy grows, the states which have historically grown at a faster pace will, over 10 years, see a slowdown in GSDP growth, tending to the national average, whereas the states that have grown slower than the national GDP will begin to pick up and grow faster.

Growth Driver	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36	FY37	FY38	FY39
GDP	5.9%	6.1%	6.2%	6.4%	6.6%	6.2%	6.0%	5.8%	5.7%	5.6%	5.3%	5.1%	5.1%	5.0%	4.9%	4.9%
GSDP - Delhi and Haryana	6.2%	6.3%	6.4%	6.6%	6.7%	6.3%	6.0%	5.8%	5.7%	5.5%	5.3%	5.1%	5.0%	4.9%	4.8%	4.8%
WPI	(0.7%)	5.3%	6.0%	5.1%	5.0%	4.9%	4.6%	4.3%	4.1%	4.1%	4.0%	3.9%	3.9%	3.9%	4.0%	4.0%





Source: Client Data of S&P, Steer Analysis

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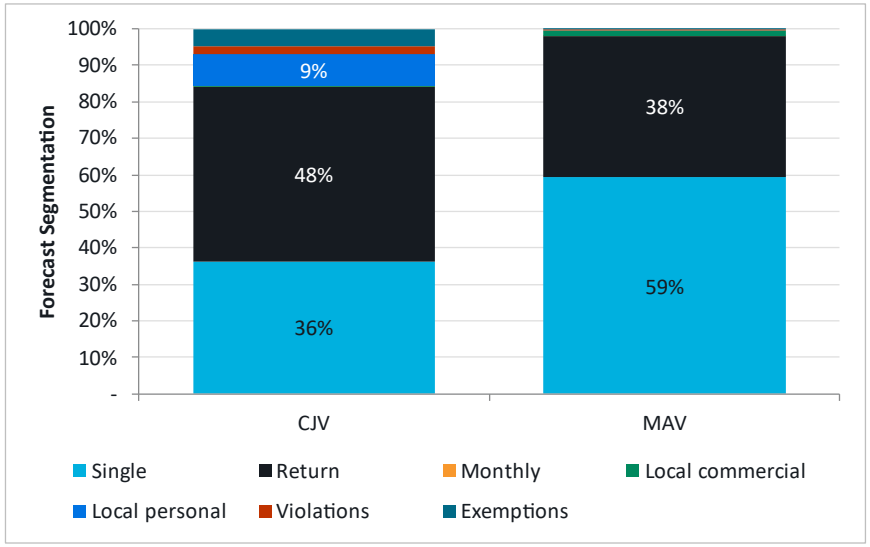
Forecast traffic segmentation & Trip factors

Bhagan Toll Plaza – Forecast Segmentation



Source: Steer analysis

Bhagan Toll Plaza – Trip factors

	CJV/Mini LCV	LCV	Bus	2A	3A/MAV/OSV
Single	1.0	1.0	1.0	1.0	1.0
Return	2.0	2.0	2.0	2.0	2.0
Monthly	43.5	47.0	48.3	50.1	47.5
Local commercial	1.0	1.0	1.0	1.0	1.0
Local personal	21.5	40.0	1.0	1.0	1.0
Violations	1.0	1.0	1.0	1.0	1.0
Exemptions	1.0	1.0	1.0	1.0	1.0

Source: Steer analysis

Trip factors form an important part of our forecasting methodology, as it allows us to calculate the conversion factor to convert traffic (trips) to the number of tickets sold.

Trip factors are used to calculate the revenue for the trips made on passes such as return, local personal, monthly passes. The trip factors assumed are based on the latest FY24 data available.

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Network Overlays

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Impacts Summary

Impact	In-scope	Probability of shift/ Scale	Direction of impact	Year of Impact	Magnitude of the Impact
Diversion due to Eastern Dedicated Freight Corridor (EDFC)	Commodities moving over distance more than 500km	Low	↓	FY25	2A: (0.1%) 3A: (0.1%) MAV: (0.4%)
Recovery in Agricultural Procurement	MAV	Medium	↑	FY25	MAV: 1.1%
NH709A: Karnal-Meerut Section	On Commercial Trucks (3A and MAV)	Medium	↑	FY25	2A: 3.5% 3A: 4.7% MAV: 2.8%
Tourism Recovery	Himachal Pradesh Trips	Low	↑	FY25	CJV : 1.0%
Addition due to Completion of the Asset (LOS improvement)	Local trips doing up to 75 km distance across all categories	Medium	↑	FY25	CJV: 2.1% LCV: 0.8% 2A: 1.3% 3A: 1.1% MAV: 1.3%
Diversion due to Delhi-Amritsar-Katra expressway	Traffic between Ludhiana, Amritsar, North and Delhi/south	High	↓	FY28	CJV: (4.9%) LCV: (3.4%) 2A: (7.5%) 3A: (8.4%) MAV: (7.6%)
Diversion due to RRTS	On passenger traffic between Delhi NCR and Panipat (CJV and Bus)	High	↓	FY31	CJV : (9.5%) Bus : (16.6%)
Urban Extension Road	Gurgaon, South Delhi, Panipat	Medium	↑	FY26	CJV : 1.8% Bus : 0.4%

Source: Steer Analysis

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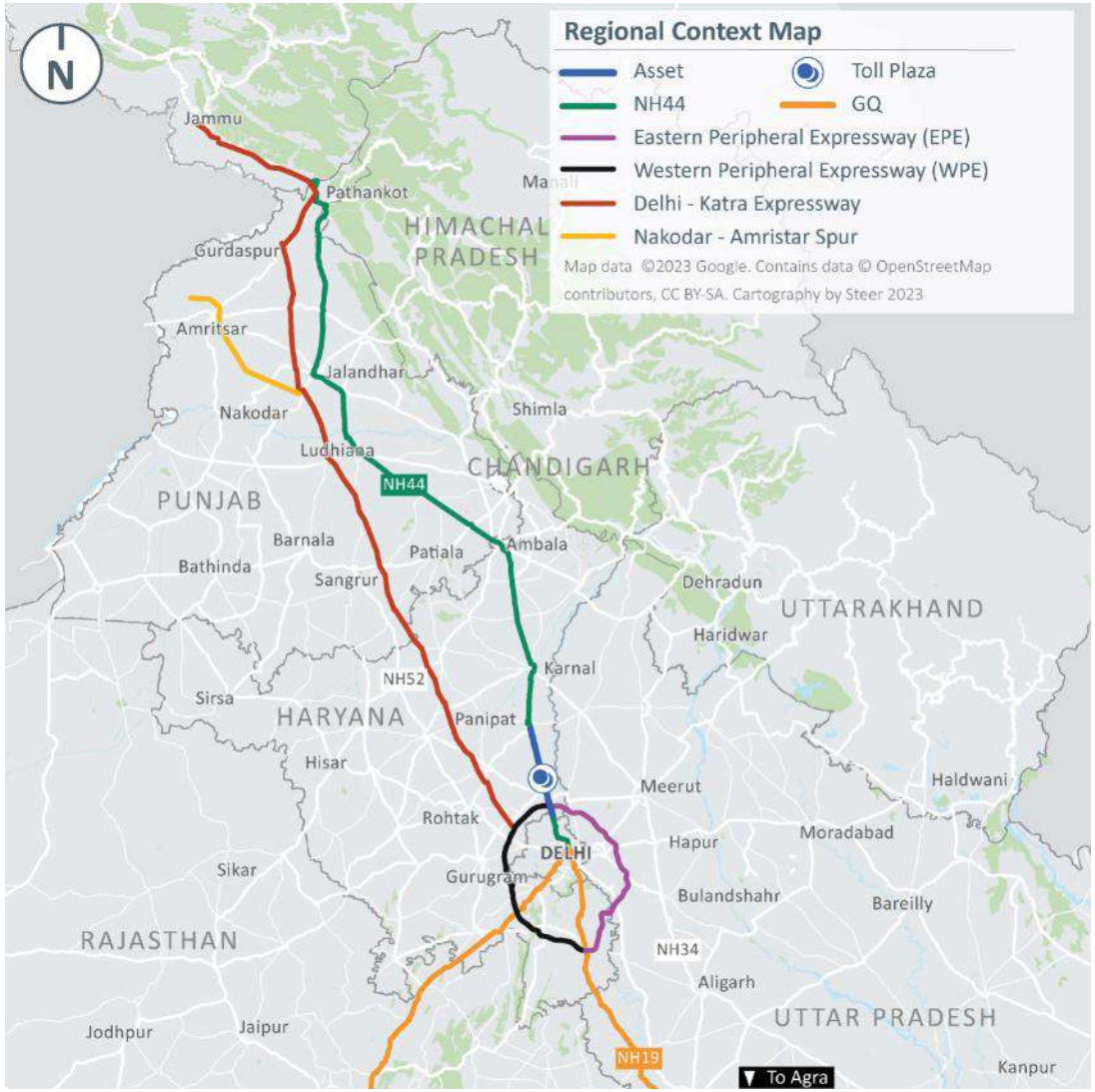
Impacts: Delhi-Amritsar-Katra expressway (1)

- A 650 km Delhi – Amritsar – Katra (DAK) expressway project (NE-5 & NE-5A) is an under construction 4-lane access-controlled road executed by National Highway Authority of India (NHAI) with a route alignment connecting Jasaur Kheri, Jhajjar District near Delhi with Katra north of Jammu city.
- Key events:
  - Project was announced in 2016
  - DPR completed in 2019
  - Land acquisition started in January 2020
- Phase 1 of development:
  - Involves the construction of 397.7 km greenfield expressway between Delhi – Ludhiana – Gurdaspur and a 99 km spur connecting Nakodar – Amritsar.
  - Divided into 18 tenders / sections for construction with a two-year deadline.
  - Overall status: land acquisition ongoing and under bidding for various packages
- Phase 2 of development:
  - Gurdaspur – Pathankot – Jammu – Katra connectivity
  - Will be a brownfield expansion of the existing NH-54 (old NH-15) and NH-44 (old NH-1) highway
- Mode of development:
  - Hybrid Annuity Model for packages in Haryana
  - HAM and EPC mode for packages in Punjab and J&K

Network development



Source: Steer cartography

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Impacts: Delhi-Amritsar-Katra expressway (2)

In-scope:

- It will reduce distance and travel time between Ludhiana/North India and Delhi/West and South India, and therefore will be more attractive for the long-distance traffic currently moving on the Asset.
- In-scope includes:
  - **Part I:** Traffic between Ludhiana and Delhi/West and South India
  - **Part II:** Traffic between North of Ludhiana and Delhi/West and South India and travel distance approx. >300km
- An approach based on Generalized Journey Cost (GJC) is taken to estimate the impact. The methodology is further explained in the Appendix.
- The project was supposed to be completed by Dec'25, however as per the latest estimates, expected completion timeline is by the end of 2026. Therefore, we have considered this impact in a staged manner from FY28 Onwards.

Summary of GJC analysis – Part I

	CJV	LCV	2A	3A	MAV
via Asset					
Toll rates (INR)	380	640	1,295	1,815	1,995
Length (Km)	277	277	277	277	277
Time (mins)	4.6	5.5	5.8	6.2	6.2
Existing GJC (INR)	**2,339**	**4,847**	**8,306**	**10,079**	**11,910**
via Delhi Katra Expressway					
Toll rates (INR)	707	1,125	2,382	2,604	3,743
Length (Km)	286	286	286	286	286
Time (mins)	4.6	5.5	5.8	5.8	5.8
Improved GJC (INR)	**2,665**	**5,338**	**9,466**	**10,543**	**13,380**

Summary of GJC analysis – Part II

	CJV	LCV	2A	3A	MAV
via Asset					
Toll rates (INR)	1,110	1,840	3,770	4,790	5,905
Length (Km)	605	605	605	605	605
Time (mins)	11.5	14.2	14.9	16.2	16.2
Existing GJC (INR)	**5,734**	**11,691**	**21,169**	**25,656**	**30,448**
via Delhi Katra Expressway					
Toll rates (INR)	1,303	2,070	4,386	4,798	6,895
Length (Km)	571	571	571	571	571
Time (mins)	9.6	11.6	12.1	12.1	12.1
Improved GJC (INR)	**5,328**	**10,674**	**19,043**	**21,247**	**26,748**

Summary of impact

	CJV	LCV	2A	3A	MAV
Outputs					
AADT	54,264	3,114	4,234	1,609	4,457
Impact volume	2,644	107	319	134	337
Impact %	(4.9%)	(3.4%)	(7.5%)	(8.4%)	(7.6%)

Source: Steer analysis

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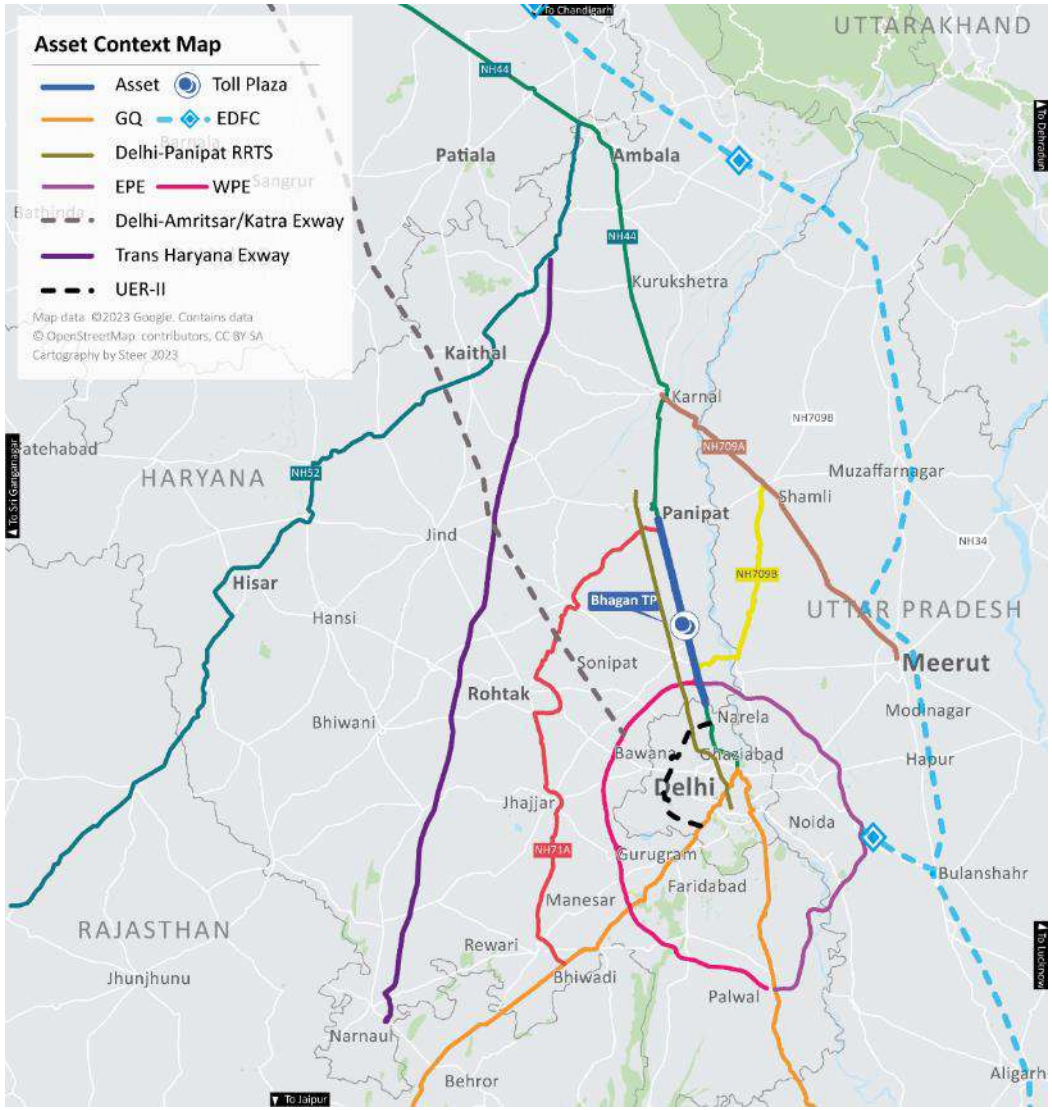
Impacts: Eastern Dedicated Freight Corridor(EDFC)

- Government of India has plans to develop the Eastern Dedicated Freight Corridor (EDFC) linking Ludhiana to Dankuni in West Bengal. It is targeted to be completed by FY24.
- Once the EDFC construction completes, some medium to long distance traffic is expected to be lost to the rail freight corridor.
- Potential divertible traffic include goods traffic which are plying more than 650 km between Punjab/North and Uttar Pradesh/East carrying commodities (bulk) including agricultural, coal, chemicals, fertilizers, iron, steel and petroleum products. We have assumed an 80% shift to EDFC.
- The impact is applied on the Asset starting from FY25.

Summary of Impact:

Vehicle type	AADT	Impact %
2A	4,234	(0.1%)
3A	1,609	(0.1%)
MAV	4,457	(0.4%)

Source: Steer analysis



Source: Steer cartography based on OpenStreetMap data

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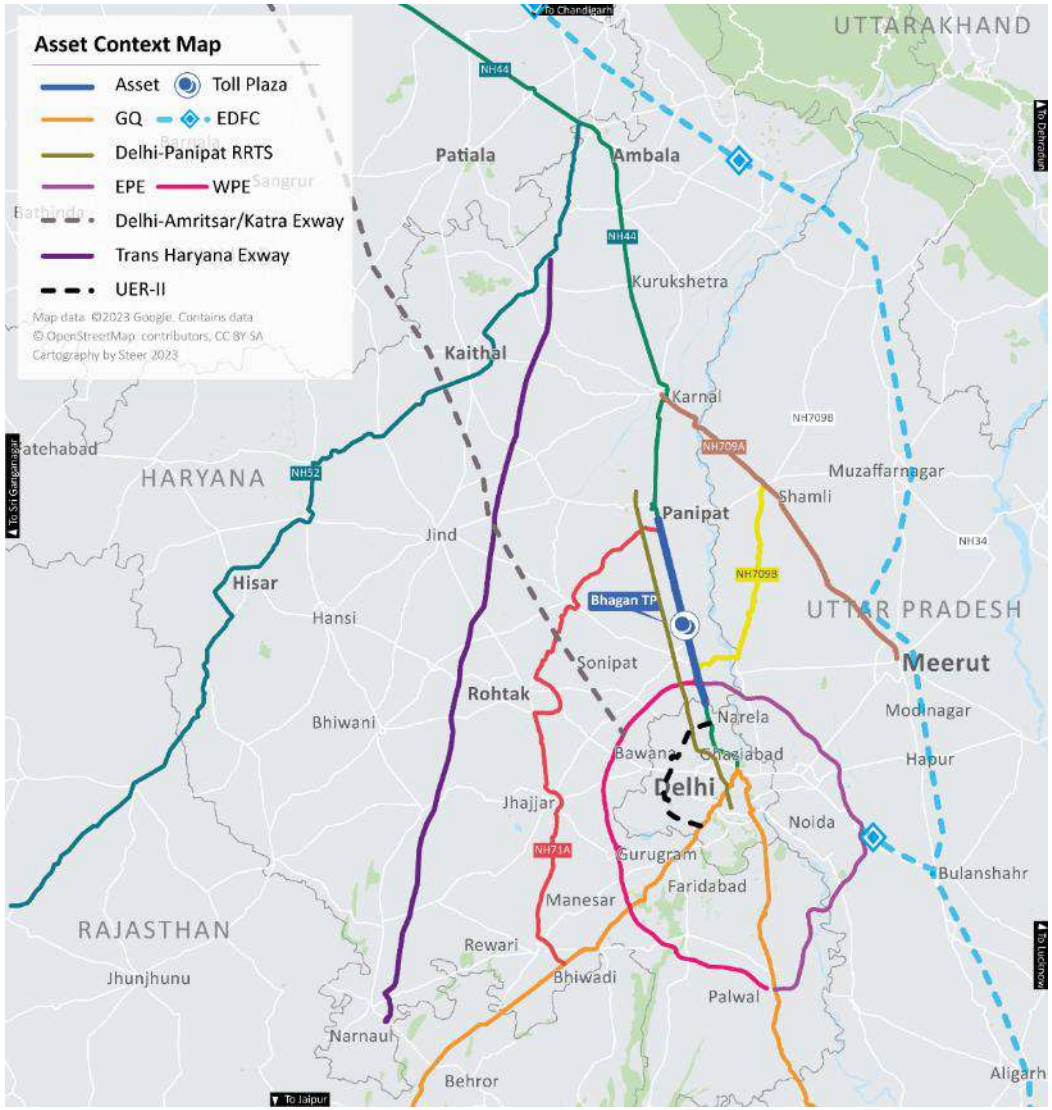
Impacts: Delhi – Panipat RRTS(1)

- Delhi-Panipat Regional Rapid Transit System (RRTS) Line is a 103 km long proposed semi-high speed rail line connecting Delhi – Sonipat – Panipat through a series of tunnels and elevated viaducts as part of the Regional Rapid Transit System (RRTS).
- This will connect Sarai Kale Khan in Delhi to Panipat traversing along NH44 connecting Sonipat, Ganaur, Samalkha in Haryana.
- A Detailed Project Report was approved by state government in December 2020 and is currently awaiting approval from Delhi and Central governments.
- It will reduce the distance and travel time for all the local trips having both trips ends on the Asset doing trips shorter than 80 kms. This will only be applicable to passenger traffic currently moving on asset.
- The impact is applied on the Asset starting from FY31.
- The methodology used to determine the impact is illustrated in the next slide, with further detail provided in the Appendix.



Source: Steer cartography based on OpenStreetMap data

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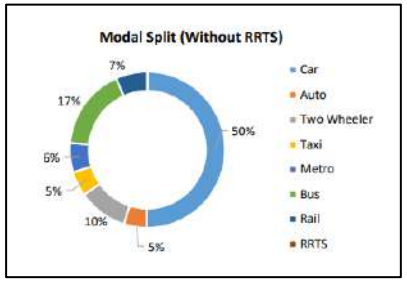
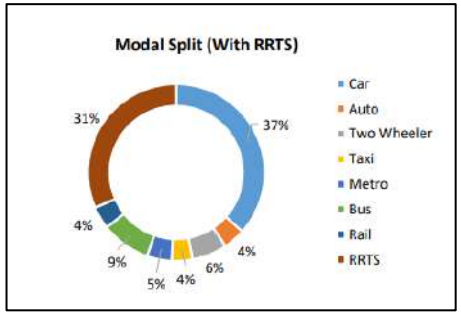
Impacts: Delhi Panipat RRTS(2)

- Modal split of the demand pre and post RRTS along with induced demand from the DPR is used to calculate the shift of the traffic from Asset Route to RRTS.
- Occupancy factors and the Inscopes between Delhi-Panipat are determined from the OD Data.
- Based on the percentage expected to shift to RRTS from our asset and the occupancy factors that are derived from the DPR and OD respectively, impact is calculated.



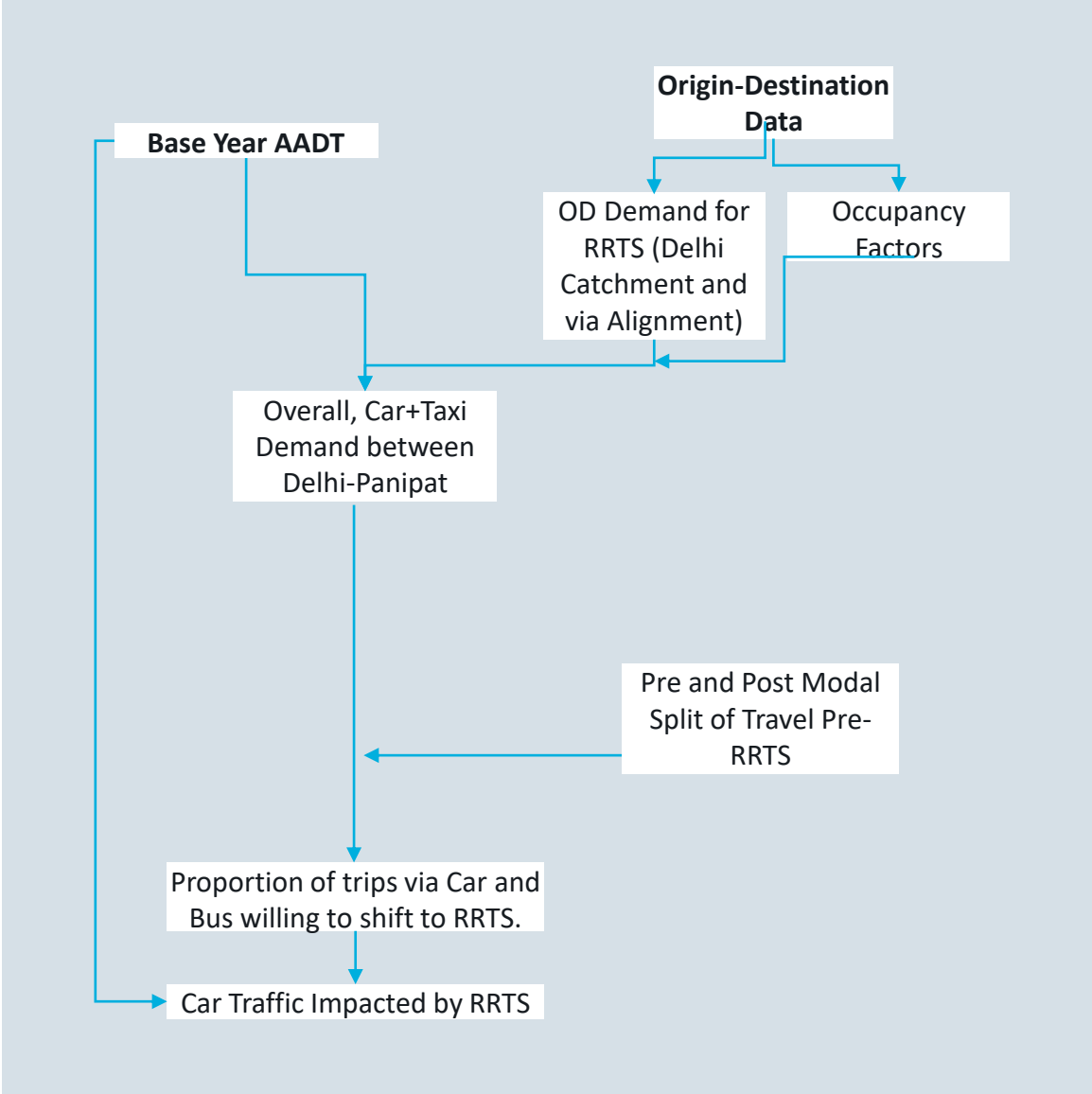


Summary of Impact Of RRTS:

Vehicle type	AADT	Impact %
CJV	54,264	(9.5%)
Bus	2,012	(16.6%)

Source: Steer analysis of RRTS DPR and Asset OD data

RRTS Asset impact Calculation Methodology



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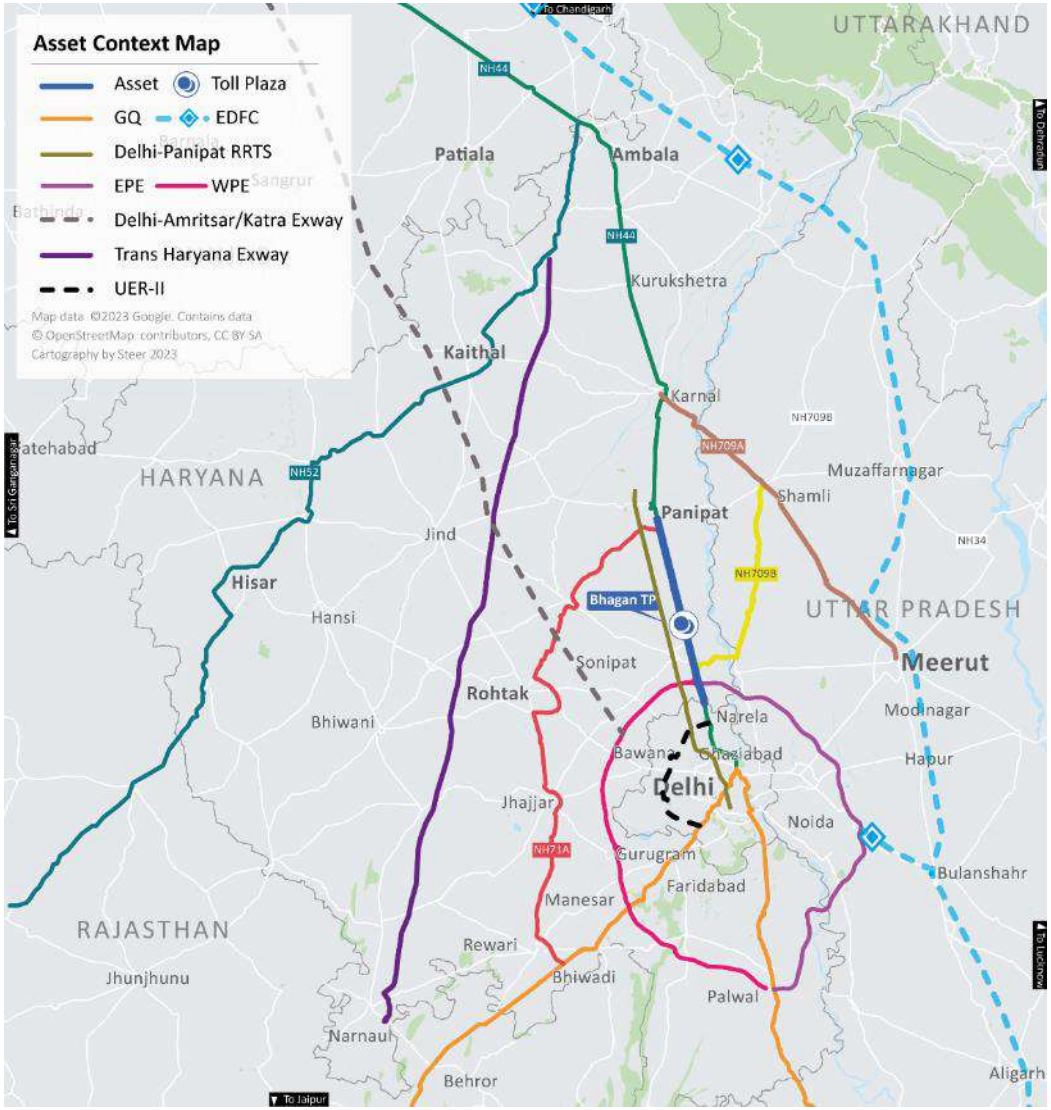
Impacts: Level of Service (LoS) Improvement

- The Asset is part of north-south NH44 corridor and is getting eight laned which is expected to be completed by end of FY24. There is some Level of Service (LoS) improvement observed on the Asset and will improve further once the pending sections are completed.
- Once the construction in completed, the Asset would provide improved level of service with reduced travel times for all the local trips moving between Delhi and Panipat having both ends on the Asset.
- The impact is included starting FY25.

Summary of Impact

Vehicle type	AADT	Impact %
CJV	54,264	2.1%
LCV	3,114	0.8%
2A	4,234	1.3%
3A	1,609	1.1%
MAV	4,457	1.3%

Source: Steer analysis



Source: Steer cartography based on OpenStreetMap data

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Impacts: Urban Extension Road II (UER-II)

- Delhi Urban Extension Road (UER II) is 75km under construction expressway undertaken by NHAI, in which 38.11km of Phase I will form a 3rd orbital road for Delhi.
- Once the construction is completed, UER II will provide easier and quicker access to the traffic between Asset Corridor and Delhi Airport, South Delhi, Gurugram.
- As UER II is an access controlled 6 lane expressway, the speeds on this road are going be higher, as a result, the travel time will be cut short for CJVs and Buses.
- UER II will therefore add attractiveness to our asset for the trips as mentioned above and create an induced demand.
- The impact of this induced is included from FY26.

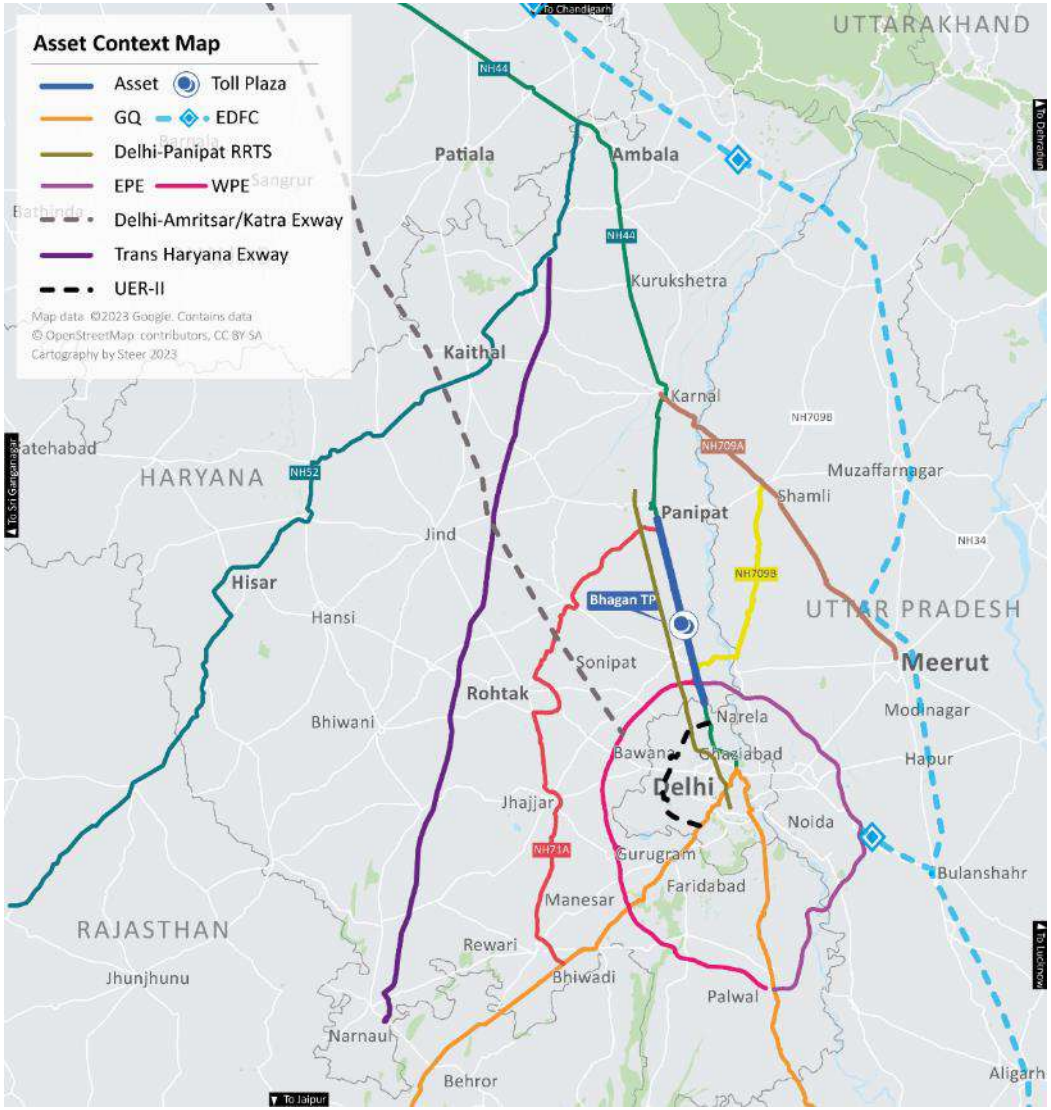
Summary of Generalised Journey Cost (GJC) analysis for CJV

Vehicle type	Via NH44	Via UER II
Travel Time (in hours)	1.3	0.7
GJC	442	276

Summary of Impact

Vehicle type	AADT	Impact %
CJV	54,264	1.8%
Bus	2,012	0.4%

Source: Steer analysis



Source: Steer cartography based on OpenStreetMap data

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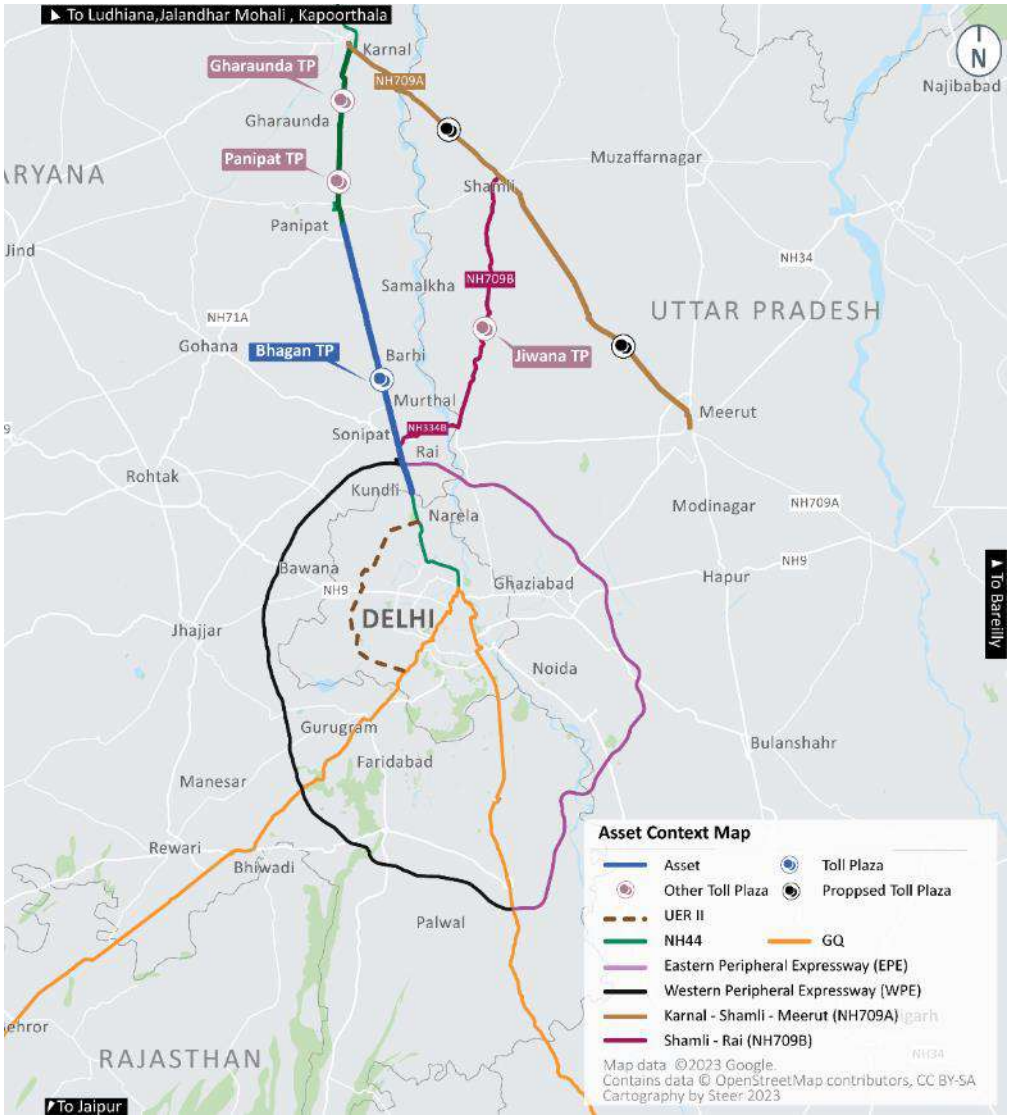
Tolling on NH709A Karnal-Meerut

- Karnal Meerut section of NH709A is currently being upgraded to 4-lanes with almost 80% work completion, currently this section has no operational Toll Plazas, improved quality of the road along with absence of toll plazas have led to increase in the attractiveness of the alternate route compared to our Asset.
- As a part of the upgrade, the bridge on the river Yamuna (Haryana-UP border) and Shamli bypasses are also being constructed, which will add up to the tollable length.
- This upgraded section will have two toll plazas: one each at Bhuni (towards Meerut) and Lakshmanpura (towards Karnal). Once tolling starts on this section, long distance traffic currently using NH709A is expected to come back as our asset provides better level of service and less travel time.
- The positive impact is included from FY25 and is estimated as a proportion of the traffic increase observed on Jiwana toll plaza April to June 2023.

Summary of Impact:

Vehicle type	AADT	Impact %
2A	4,234	3.5%
3A	1,609	4.7%
MAV	4,457	2.8%



Source: Steer cartography based on OpenStreetMap data

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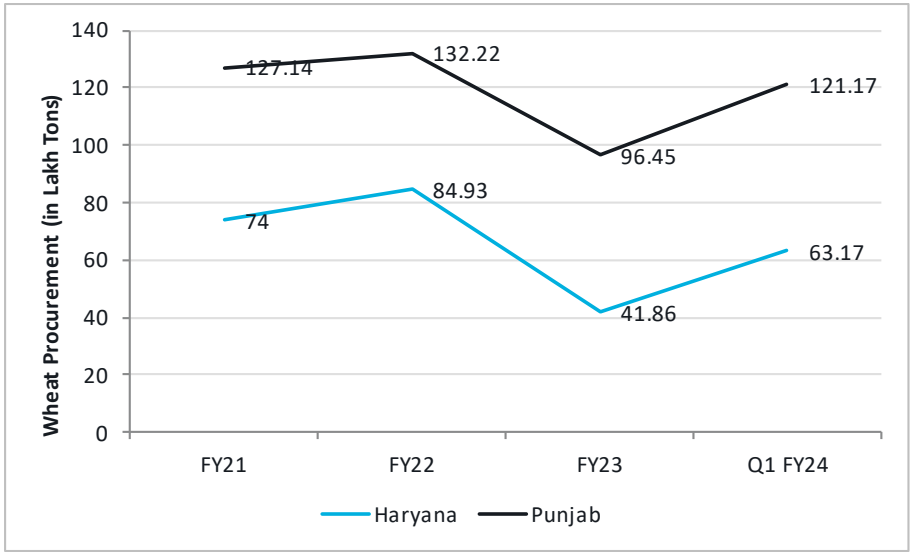
Impacts: Recovery of Agricultural Procurement

- Agriculture contributes to a major part of Haryana state Economy. 70%-90% of Wheat procurement in India are catered by the states of Punjab and Haryana. , India is world's second largest wheat producer.
- As per the Department of Food & Public Distribution, Ministry of Consumer Affairs, Govt of India report, the wheat procurement saw a massive dip in FY23, which led to a national ban of wheat exports. This reduction in wheat production had significant negative impact on goods traffic in FY23 on the Asset.
- However, significant increases observed in Q1 procurement numbers have already surpassed last year levels. If the trend is maintained, the upcoming year procurement is likely to also surpass FY22 levels.
- Therefore, the decline in MAV traffic due to low procurement of Wheat in FY23 is expected to come back in a phased manner starting from FY25.



Source: Department of Food & Public Distribution (DPFD), Government of India, June'23 Report.

Summary of Impact:

Vehicle type	AADT	Impact %
MAV	4,457	1.1%

Source: Steer analysis

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Impacts: Recovery of Tourism Traffic

- The incessant rainfall has triggered flash floods and landslides in the state of Himachal Pradesh due to which many people have lost the lives and many of the roads have been cut off to the rest of the country.
- As a result, the tourism to the state has taken a huge setback. The same has been observed in our Monthly traffic data where in huge dips in the CJV traffic can been seen (as discussed in the Historical section).
- The relief works have been carried out and the restoration works are in progress, however it is expected to take a few more months before the Tourism Industry is revived. Therefore, the recovery in CJV traffic has been considered from FY25.

Summary of Impact:

Vehicle type	AADT	Impact %
CJV	54,264	1.0%

Source: Steer analysis

Flood fury washes away Himachal tourism industry's hopes of revival

By Gaurav Bisht , Shimla

Read this news in brief form

Jul 23, 2023 09:52 PM IST

Hoping to emerge from pandemic's shadow this year, hoteliers, taxi drivers and business owners left dejected as tourist footfall fails to hit desired numbers

Himachal rains: Monsoon affects tourism industry in the hilly state; 187 lives lost till now. Check top updates

3 min read • 30 Jul 2023, 06:28 AM IST

Edited By Karishma Pranav Bhavsar

The tourism industry in Himachal Pradesh has been badly hit due to heavy rains this year. The National Highway from Dharamshala to Mcleodganj is severely damaged at several places.

Monsoon hits Himachal's tourism industry, hotel occupancy drops to all-time low

Hotel occupancy in Himachal Pradesh has dropped to below 10 per cent as tourists cancel their trips due to the torrential rains in the hill state.

Himachal rains: Roads blocked, educational institutions shut

PTI • Last Updated: Aug 23, 2023, 03:59 PM IST

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Source: Mint, Economic Times, India Today

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Traffic and Revenue forecasts

steer

Forecasting methodology and assumptions

Input	Methodology/Source	Output
Base-Year traffic	YTD traffic extended to full year using elasticities and GDP/GSDP projections for FY24.	FY24 AADT,PCUs TP1- 69,694; 1,02,575
Growth drivers and projection:		
1. GDP	Client Data of S&P Global Market Intelligence	5.9% in FY24, 6% and above till FY29, 5.6% 5.8%-5% from FY30-37, 4.9% in FY38, 39.
2. GSDP Delhi	Steer Analysis	5.8% in FY24, 5.9% in FY25, 6.1-6.4% between FY26-29, 5.8-5% in FY30-35, 4.9-4.7% in FY36-39.
3. GSDP Haryana	Steer Analysis	6.7% in FY24-26, 6.9-6% in FY27-31, 5.9-5% in FY32-37, 4.9% in FY38,39.
Elasticities	Based on historical and network assessment	CJV: 1.1 (GSDPs), LCV: 0.4 (GSDPs), Buses: 0.3 (GSDPs) 2A: 0.4 (GSDP, GDP), 3A: 0.5 (GSDP,GDP), MAV: 0.9 (GDP)
Exogenous Impacts:		
1. Diversion due to Delhi-Amritsar-Katra expressway.	New expressway providing a faster alternative for long distance Amritsar/ Jammu bound traffic	Negative impact
2. Eastern Dedicated Freight Corridor (EDFC)	Commodities including coal, finished steel, food grains, Petroleum products and fertilizers moving over distance more than 500km	Negative impact
3. Diversion due to RRTS	CJV & Bus traffic along the asset corridor will get affected.	Negative impact
4. Tolling on NH709A: Karnal-Meerut Section	New expressway providing a faster alternative for long distance Chennai/ south bound traffic	Positive impact
5. Recovery in Agricultural Procurement	With increase in wheat procurement, a recovery in MAV traffic is expected.	Positive impact
6. Urban Extension Road II	New semi outer ring road providing a faster alternative for Delhi Airport/South Delhi & Gurugram bound traffic	Positive impact
7. Recovery in Tourism	Recovery in Tourism, the CJV Traffic is expected to grow.	Positive impact
Revenue parameters:		
1. Toll segmentation	As observed based on historical data	Presented in separate slide – to remain unchanged for future years
2. WPI	Consensus	(0.7%) in FY24, 5.3% in FY25, 6% in FY26, 5.1-4% in FY27-34, 3.9% in FY35-37, 4% in FY38, FY39.

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Traffic forecasts: Bhagan Toll Plaza

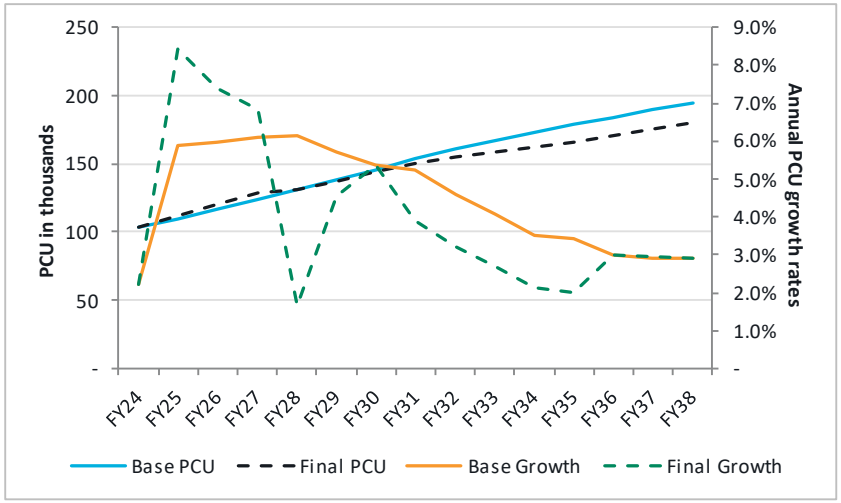
AADT

Vehicle category	FY24	FY25	FY26	FY27	FY28	FY30	FY34	FY38
CJV	55,107	60,804	66,594	71,990	74,572	84,155	94,775	105,011
LCV	3,147	3,254	3,337	3,425	3,421	3,567	3,897	4,216
Bus	2,014	2,052	2,098	2,142	2,185	2,266	2,102	2,145
2A	4,242	4,517	4,720	4,972	4,873	5,158	5,887	6,624
3A	1,583	1,669	1,727	1,804	1,735	1,786	1,921	2,047
MAV	4,508	4,880	5,209	5,570	5,557	6,059	7,132	8,220
Total	**70,606**	**77,180**	**83,689**	**89,907**	**92,349**	**102,996**	**115,720**	**128,271**
PCU	**103,653**	**112,378**	**120,695**	**128,967**	**131,114**	**144,426**	**162,475**	**180,810**

Growth rates (CAGR)

	FY24-FY25	FY25-FY26	FY26-FY27	FY27-FY28	FY28-FY30	FY30-FY34	FY34-FY38	FY24-FY38
CJV	10.3%	9.5%	8.1%	3.6%	6.2%	3.0%	2.6%	4.7%
LCV	3.4%	2.6%	2.6%	(0.1%)	2.1%	2.2%	2.0%	2.1%
Buses	1.9%	2.2%	2.1%	2.0%	1.8%	(1.9%)	0.5%	0.4%
2A	6.5%	4.5%	5.3%	(2.0%)	2.9%	3.4%	3.0%	3.2%
3A	5.5%	3.5%	4.5%	(3.9%)	1.5%	1.8%	1.6%	1.9%
MAV	8.2%	6.7%	6.9%	(0.2%)	4.4%	4.2%	3.6%	4.4%
Total	**9.3%**	**8.4%**	**7.4%**	**2.7%**	**5.6%**	**3.0%**	**2.6%**	**4.4%**
PCU	**8.4%**	**7.4%**	**6.9%**	**1.7%**	**5.0%**	**3.0%**	**2.7%**	**4.1%**

PCU



Source: Steer analysis

The overall PCU traffic is estimated to grow at a CAGR of 4.1% from FY24 to FY38, while the CJV would grow by 4.7% and MAV by 4.1%. The 2A+3A+MAV growth over the concession is estimated to be at CAGR 3.7% and is considered to be reasonable. The Forecasts starts to taper to a slower growth scenario when the Asset hits 130,000 PCU's in FY28/FY29; with the CJV and Truck categories registering a slower growth as the Assets starts reaching peak capacity and also the feeder Assets to the Assets also start to peak out in terms of capacity. The Asset is expected to trend at 180,000 PCU's by FY38 which is the design capacity of the Asset.

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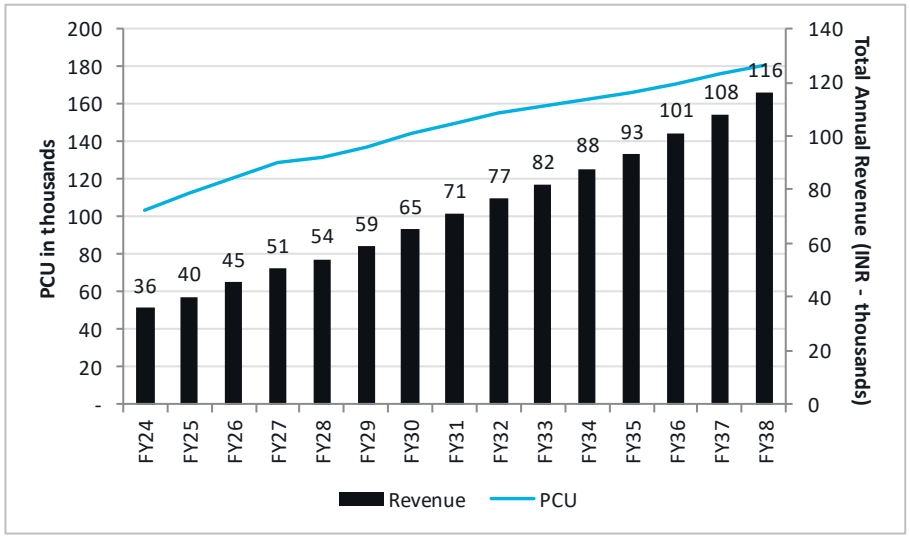
Revenue forecasts: Bhagan Toll Plaza

Revenue (in INR Lakhs)

Vehicle category	FY24	FY25	FY26	FY27	FY28	FY30	FY34	FY38
CJV	16,313	18,618	21,436	24,304	26,410	32,921	44,281	57,989
LCV	1,717	1,806	1,977	2,134	2,243	2,549	3,331	4,300
Bus	2,156	2,244	2,420	2,593	2,794	3,173	3,521	4,273
2A	5,177	5,595	6,204	6,858	7,076	8,214	11,203	15,046
3A	2,147	2,314	2,536	2,797	2,817	3,190	4,103	5,191
MAV	8,606	9,535	10,762	12,073	12,704	15,193	21,369	29,297
Total	**36,129**	**40,126**	**45,350**	**50,775**	**54,063**	**65,265**	**87,842**	**1,16,145**

Growth rates (CAGR)

	FY24-FY26	FY26-FY28	FY28-FY30	FY30-FY32	FY32-FY34	FY34-FY36	FY36-FY38	FY24-FY38
CJV	14.1%	15.1%	13.4%	8.7%	11.6%	7.7%	7.0%	9.5%
LCV	5.2%	9.5%	7.9%	5.1%	6.6%	6.9%	6.6%	6.8%
Buses	4.1%	7.8%	7.1%	7.8%	6.6%	2.6%	5.0%	5.0%
2A	8.1%	10.9%	10.5%	3.2%	7.7%	8.1%	7.7%	7.9%
3A	7.8%	9.6%	10.3%	0.7%	6.4%	6.5%	6.1%	6.5%
MAV	10.8%	12.9%	12.2%	5.2%	9.4%	8.9%	8.2%	9.1%
Total	**11.1%**	**13.0%**	**12.0%**	**6.5%**	**9.9%**	**7.7%**	**7.2%**	**8.7%**



Source: Steer analysis

The total Revenue is estimated to grow at a CAGR of 8.7% from FY24 to FY38, while the CJV would grow by 9.5% and MAV by 9.1%.

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Traffic and Revenue forecasts – Upside and Downside Scenario

Upside and Downside cases

- We have developed our base case scenario considering a balanced view on the risks associated with input assumptions around GDP growth, WPI growth and traffic growth elasticities. There is always a risk that outturn values of these inputs will vary as compared to the assumptions taken due to external economic aspects, e.g., GDP growth could be influenced both positively and negatively by the impact of monsoons, export-import balances, political changes etc.
- Similarly, traffic growth elasticities could be influenced by increased efficiencies achieved by technology, large shifts in commodity prices globally, changes in local manufacturing practices.
- Impact magnitude could be influenced by various aspects like land acquisition, construction progress, financing etc. To account for the possible variations in the growth drivers, we are also presenting forecasts for an upside and a downside scenario.
- **However, at this stage, we consider that the base case represents a central case scenario given the risks of variation of input assumptions.**

Summary of Macro Assumptions for upside and downside cases

Input	Upside	Downside
GDP	+1% every year	-1% every year
Elasticities	Incremental 10%	Decremental 10%
WPI	+1% every year	-1% every year
Impacts (Magnitude)	Reducing the Negative Impacts by 25% and Increasing the Positive Impacts by 25%.	Increasing the Negative Impacts by 25% and reducing the Positive Impacts by 25%.

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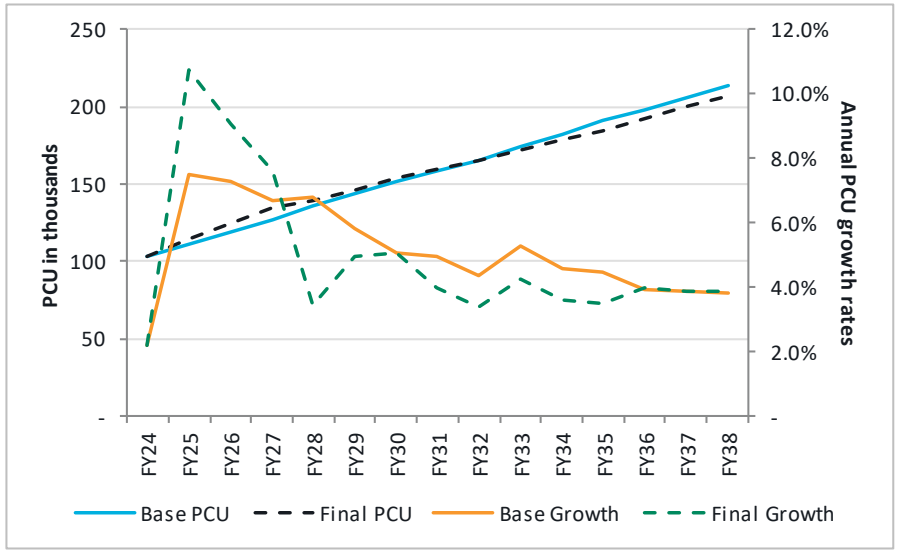
Traffic forecasts: Bhagan Toll Plaza- Upside Case

AADT

Vehicle category	FY24	FY25	FY26	FY27	FY28	FY30	FY34	FY38
CJV	55,107	62,366	69,517	75,486	79,342	88,734	1,02,655	1,18,955
LCV	3,147	3,282	3,389	3,502	3,548	3,755	4,209	4,669
Bus	2,014	2,063	2,121	2,177	2,233	2,339	2,296	2,415
2A	4,242	4,593	4,856	5,183	5,213	5,651	6,701	7,826
3A	1,583	1,693	1,767	1,861	1,827	1,896	2,078	2,259
MAV	4,508	4,992	5,420	5,856	5,983	6,601	8,093	9,749
Total	**70,606**	**78,993**	**87,076**	**94,071**	**98,151**	**1,08,981**	**1,26,041**	**1,45,883**
PCU	**1,03,653**	**1,14,818**	**1,25,246**	**1,34,779**	**1,39,430**	**1,53,756**	**1,78,652**	**2,07,376**

Growth rates (CAGR)

	FY24-FY25	FY25-FY26	FY26-FY27	FY27-FY28	FY28-FY30	FY30-FY34	FY34-FY38	FY24-FY38
CJV	13.2%	11.5%	8.6%	5.1%	5.8%	3.7%	3.8%	5.7%
LCV	4.3%	3.3%	3.3%	1.3%	2.9%	2.9%	2.6%	2.9%
Buses	2.4%	2.8%	2.6%	2.5%	2.4%	(0.5%)	1.3%	1.3%
2A	8.3%	5.7%	6.7%	0.6%	4.1%	4.4%	4.0%	4.5%
3A	6.9%	4.4%	5.3%	(1.8%)	1.9%	2.3%	2.1%	2.6%
MAV	10.7%	8.6%	8.0%	2.2%	5.0%	5.2%	4.8%	5.7%
Total	**11.9%**	**10.2%**	**8.0%**	**4.3%**	**5.4%**	**3.7%**	**3.7%**	**5.3%**
PCU	**10.8%**	**9.1%**	**7.6%**	**3.5%**	**5.0%**	**3.8%**	**3.8%**	**5.1%**



Source: Steer analysis

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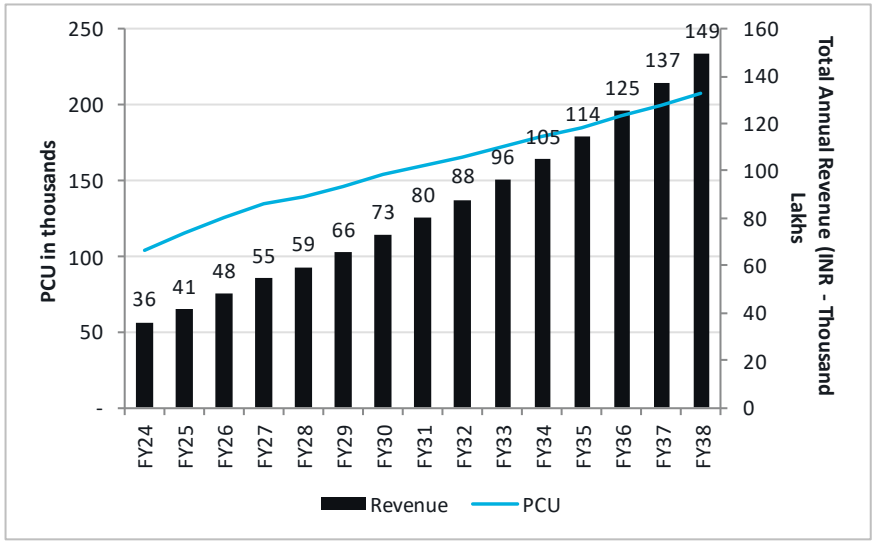
Revenue forecasts: Bhagan Toll Plaza- Upside Case

Revenue (in INR Lakhs)

Vehicle category	FY24	FY25	FY26	FY27	FY28	FY30	FY34	FY38
CJV	16,313	19,106	22,692	26,325	28,994	36,109	51,865	73,408
LCV	1,717	1,863	2,028	2,246	2,390	2,819	3,908	5,333
Bus	2,156	2,299	2,508	2,715	2,960	3,451	4,176	5,382
2A	5,177	5,821	6,540	7,337	7,834	9,469	13,841	19,838
3A	2,147	2,398	2,653	2,952	3,084	3,571	4,816	6,408
MAV	8,606	9,916	11,454	13,075	14,154	17,412	26,240	38,876
Total	**36,129**	**41,417**	**47,891**	**54,668**	**59,437**	**72,858**	**1,04,889**	**1,49,310**

Growth rates (CAGR)

	FY24-FY26	FY26-FY28	FY28-FY30	FY30-FY32	FY32-FY34	FY34-FY36	FY36-FY38	FY24-FY38
CJV	17.1%	18.8%	16.0%	10.1%	11.6%	9.5%	9.1%	11.3%
LCV	8.5%	8.8%	10.8%	6.4%	8.6%	8.5%	8.1%	8.4%
Buses	6.6%	9.1%	8.3%	9.0%	8.0%	4.9%	6.5%	6.8%
2A	12.5%	12.3%	12.2%	6.8%	9.9%	10.0%	9.4%	10.1%
3A	11.7%	10.7%	11.3%	4.5%	7.6%	7.8%	7.4%	8.1%
MAV	15.2%	15.5%	14.1%	8.3%	10.9%	10.8%	10.3%	11.4%
Total	**14.6%**	**15.6%**	**14.2%**	**8.7%**	**10.7%**	**9.5%**	**9.2%**	**10.7%**



Source: Steer analysis

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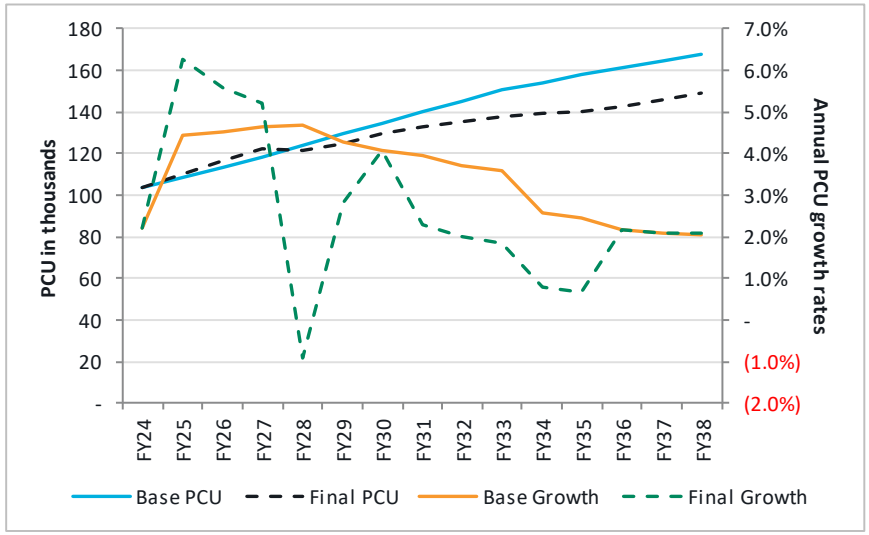
Traffic forecasts: Bhagan Toll Plaza- Downside Case

AADT

Vehicle category	FY24	FY25	FY26	FY27	FY28	FY30	FY34	FY38
CJV	55,107	59,390	63,665	67,598	68,152	74,326	78,969	83,993
LCV	3,147	3,227	3,290	3,356	3,309	3,403	3,633	3,846
Bus	2,014	2,043	2,078	2,111	2,143	2,203	1,931	1,915
2A	4,242	4,446	4,598	4,783	4,572	4,734	5,222	5,687
3A	1,583	1,647	1,690	1,748	1,639	1,663	1,759	1,841
MAV	4,508	4,777	5,020	5,284	5,117	5,439	6,163	6,830
Total	**70,606**	**75,536**	**80,345**	**84,885**	**84,937**	**91,774**	**97,684**	**1,04,119**
PCU	**1,03,653**	**1,10,159**	**1,16,308**	**1,22,358**	**1,21,228**	**1,29,731**	**1,38,918**	**1,48,860**

Growth rates (CAGR)

	FY24-FY25	FY25-FY26	FY26-FY27	FY27-FY28	FY28-FY30	FY30-FY34	FY34-FY38	FY24-FY38
CJV	7.8%	7.2%	6.2%	0.8%	4.4%	1.5%	1.6%	3.1%
LCV	2.6%	1.9%	2.0%	(1.4%)	1.4%	1.7%	1.4%	1.4%
Buses	1.4%	1.7%	1.6%	1.5%	1.4%	(3.2%)	(0.2%)	(0.4%)
2A	4.8%	3.4%	4.0%	(4.4%)	1.8%	2.5%	2.2%	2.1%
3A	4.1%	2.6%	3.4%	(6.2%)	0.7%	1.4%	1.1%	1.1%
MAV	6.0%	5.1%	5.3%	(3.2%)	3.1%	3.2%	2.6%	3.0%
Total	**7.0%**	**6.4%**	**5.6%**	**0.1%**	**3.9%**	**1.6%**	**1.6%**	**2.8%**
PCU	**6.3%**	**5.6%**	**5.2%**	**(0.9%)**	**3.4%**	**1.7%**	**1.7%**	**2.6%**



Source: Steer analysis

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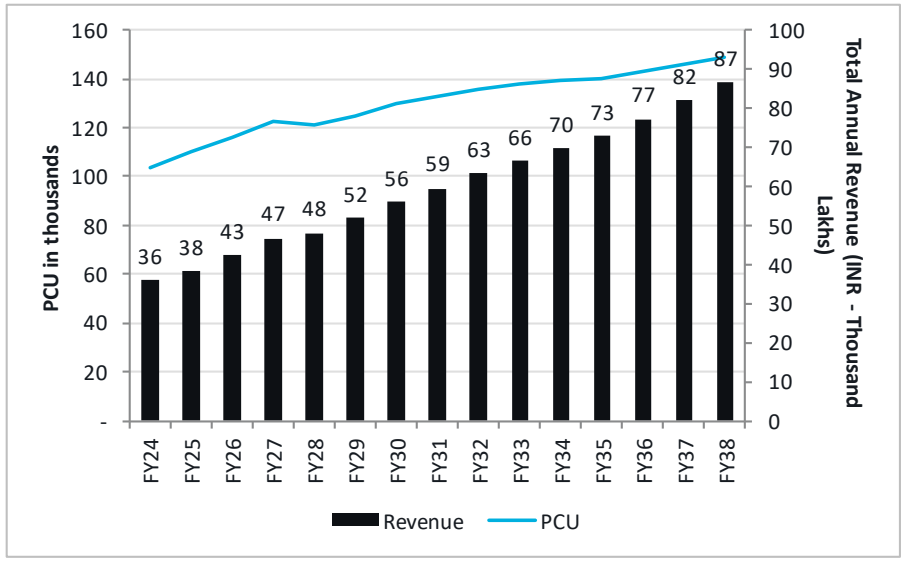
Revenue forecasts: Bhagan Toll Plaza- Downside Case

Revenue (in INR Lakhs)

Vehicle category	FY24	FY25	FY26	FY27	FY28	FY30	FY34	FY38
CJV	16,313	17,528	19,789	22,065	23,076	27,584	33,897	41,874
LCV	1,717	1,774	1,909	2,008	2,086	2,328	2,884	3,522
Bus	2,156	2,197	2,337	2,489	2,641	2,936	3,000	3,428
2A	5,177	5,427	5,894	6,392	6,406	7,163	9,239	11,561
3A	2,147	2,253	2,425	2,624	2,578	2,830	3,468	4,206
MAV	8,606	9,180	10,136	11,109	11,270	13,009	17,062	21,898
Total	**36,129**	**38,372**	**42,505**	**46,703**	**48,074**	**55,871**	**69,578**	**86,526**

Growth rates (CAGR)

	FY24-FY26	FY26-FY28	FY28-FY30	FY30-FY32	FY32-FY34	FY34-FY36	FY36-FY38	FY24-FY38
CJV	7.5%	12.9%	11.5%	4.6%	9.3%	5.3%	5.4%	7.0%
LCV	3.3%	7.6%	5.2%	3.9%	5.6%	5.5%	5.1%	5.3%
Buses	1.9%	6.4%	6.5%	6.1%	5.4%	0.5%	3.4%	3.4%
2A	4.8%	8.6%	8.4%	0.2%	5.7%	6.6%	5.8%	5.9%
3A	4.9%	7.6%	8.2%	(1.8%)	4.8%	5.2%	4.9%	4.9%
MAV	6.7%	10.4%	9.6%	1.4%	7.4%	7.0%	6.4%	6.9%
Total	**6.2%**	**10.8%**	**9.9%**	**2.9%**	**7.8%**	**5.6%**	**5.6%**	**6.4%**



Source: Steer analysis

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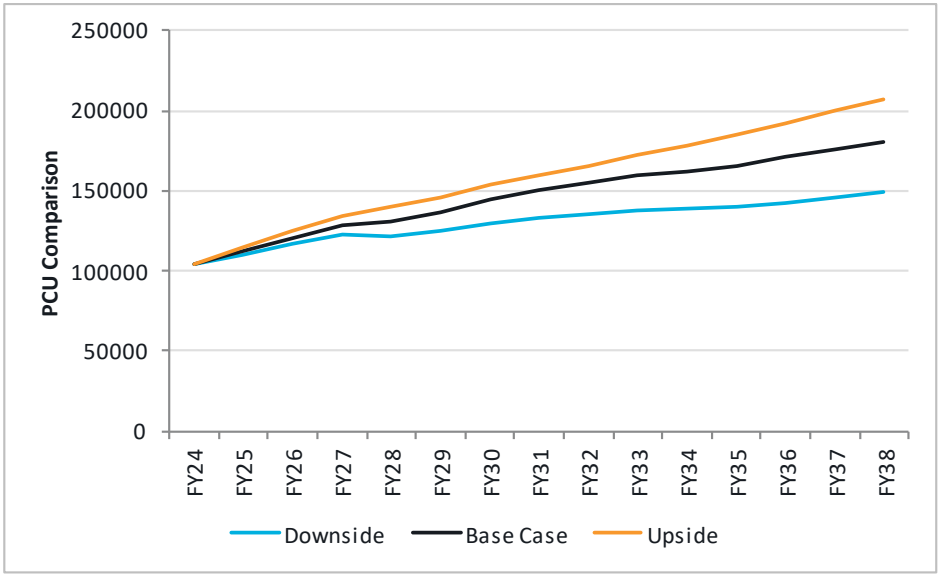
Scenario Analysis – Summary

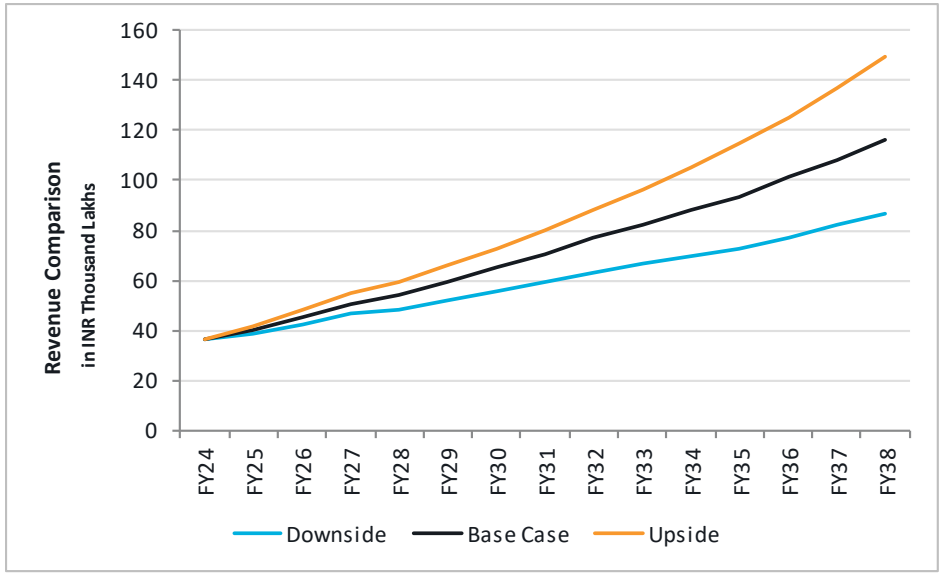
- Based on the assumptions discussed in the previous slides, we have modelled the traffic and revenue forecasts for the forecast period for the Asset.
- The table beside presents the CAGRs for the asset in the various scenarios and the graphs below represent the PCU and Revenue Comparisons for Downside, Base and Upside Case.

	Base	Upside	Downside
CAGR (FY24-38) – AADT	4.4%	5.3%	2.8%
CAGR (FY24-38) – PCU	4.1%	5.1%	2.6%
CAGR (FY24-38) – Revenue	8.7%	10.7%	6.4%

Source: Steer analysis



Source: Steer analysis



Source: Steer analysis

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Appendix: Additional information and forecasts

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Agricultural Procurement

- Additional evidence of significant reductions in agricultural production in the northern states in recent months

Govt Confident Higher Production in August will Bring Down Tomato Prices

Harvest from Himachal Pradesh expected to jump from 2,000 MT in July to 30K MT in Aug

Shambhavi.Anand
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New Delhi: The central government is expecting the produce of tomatoes to increase from 2,23,000 MT in July to 5,44,000 MT in August in major producer states, bringing down prices of the vegetable and providing respite to consumers.

"As the production in major growing areas especially in Himachal Pradesh go up, we will see cooling down of prices," according to a senior official from the Ministry of Consumer Affairs, Food and Public Distribution.

The harvest in Himachal Pradesh, which is the main source of tomatoes in the national capital region and other northern markets, is expected to jump from 2,000 MT in July to 30,000 MT in August, providing relief to consumers.

The production in other states such as Karnataka, Tamil Nadu, Maharashtra, Telangana, Madhya Pradesh and Andhra Pradesh are also expected to rise significantly in August, September and October. It is expected to touch 9,56,000 MT in September and 13,33,000 MT in October.

Excessive rains and floods in northern and northwestern states in July inundated fields and damaged standing crops, affecting the supply of tomatoes pushing the retail prices beyond the ₹200 mark in Delhi market. The arrival in Himachal Pradesh in July was reduced to 1505 MT compared to 10875 MT in July 2022.

"There is an area damage of 7800 hectare out of the total sown area of 14500 hectare of kharif tomatoes in Himachal Pradesh resulting in reduced production," the official said.

According to a report by CRISIL, the cost of a vegetarian thali rose 28% month-on-month on account of high tomato prices. "Of the rise in the cost of a vegetarian thali, 25% can be attributed solely to the price of tomato, which rose 233% on-month to ₹110 per kg in July from ₹33 per kg in June," the report said.

To check the soaring prices of tomatoes, the central government had directed National Agricultural Cooperative Marketing Federation (NAFED) and National Cooperative Consumers Federation (NCCF) to procure tomatoes from mandis in Andhra Pradesh, Karnataka and Maharashtra and distribute them in major consumption centres where retail prices have recorded maximum increase.

However, with limited supply, the prices have gone up again after a brief respite.

Tomato is produced almost in all the states in India, though in varying quantities. Maximum production is in southern and western regions of India, contributing 56%-58% of all India production. Southern and Western regions being surplus states, feed to other markets depending on production seasons. The production seasons are also different across regions. The peak harvesting season occurs from December to February.

Source: Steer secondary research
Economic Times: 08-08-2023

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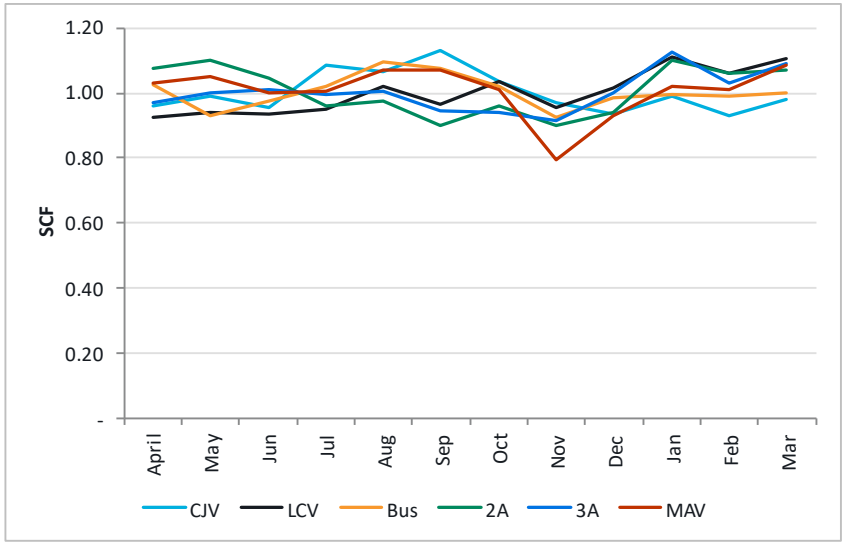
Seasonality and Seasonality Correction Factors

- 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.
- Widespread monsoon-related disruptions in several economic activities such as mining, construction, alongside poor road accessibility due to floods in certain parts of the country result in subdued traffic levels in this period.
- The second half of the financial year (October-March) typically shows a gradual pick up in truck traffic volumes. This is due to increased economic activity as the monsoon recedes and construction, mining and agricultural activities start ramping up. This increases demand for freight movements due to the agricultural harvest season during the winters coupled with the festive season around Diwali, which means typically truck traffic levels are higher in the second half of the financial year.
- Light vehicle traffic (CJVs) tend to follow a similar pattern but are more influenced by local factors such as festivals and local events and are therefore observed to have a higher variation across the year while still exhibiting a similar trend. There are also very local factors such as elections, local religious events, commute and leisure travel patterns that are often unique for each asset depending upon its location, which also influences CJV traffic seasonality.
- As per the trends described above, SCFs tend to be higher than 1 during the first half of the financial year and less than 1 for the second half for most truck traffic (2A, 3A, MAVs). There are always deviations in particular years, and for specific traffic movements which are impacted due to exogenous events such as demonetisation (November 2016), GST linked disruptions (June/July 2018), and Diwali shifting between October/November result in these typical trends being disrupted. Therefore, when estimating SCFs for any asset, it is essential to assess which years to include in calculating the SCFs that are to be adopted.

Adopted SCF



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Delhi-Amritsar-Katra expressway

- The project has been divided into 21 packages which includes 18 sections of main expressway and 3 sections of the spur:

Package	Section start point / chainage	Section end point / chainage	Length (km)	Appointed / lowest bidder
Phase 1 (Greenfield)				
1	Jasaur Kheri on KMP Expressway (Km 0.000)	Junction with Rohtak Panipat road (NH709) near Rukhi Paani village (Km 34.000)	34	KCC Buildcon Pvt Ltd
2	Junction with Rohtak Panipat road (NH709) near Rukhi Paani village (Km 34.000)	Junction with Jind Panipat road (NH352A) near Gangana village (Km 60.800)	26.8	CDS Infra Projects Ltd
3	Junction with Jind Panipat road (NH352A) near Gangana village (Km 60.800)	Junction with Jind Karnal road NH709A near Alewa village (Km 91.400)	30.6	KCC Buildcon Pvt Ltd
4	Junction with Jind Karnal road NH709A near Alewa village (Km 91.400)	Junction with Ambala Kaithal Hissar road NH152 near Kharak Pandwa village (Km 120.250)	28.85	NKC Projects Pvt Ltd
5	Junction with Ambala Kaithal Hissar road NH152 near Kharak Pandwa village (Km 120.250)	Junction with Patiala Samana Patran road SH10 (Km 157.920)	37.67	CDS Infra Projects Ltd
6	Junction with Patiala Samana Patran road SH10 (Km 157.920)	Junction with Patiala-Bathinda road (NH-7) near Bhawanigarh (Km 188.830)	30.91	Shiv Build India-Mehta Constructions JV
7	Junction with Patiala-Bathinda road (NH-7) near Bhawanigarh (Km 188.830)	Junction with Ludhiana-Malerkotla road (SH-11) near Bhogiwal village (Km 225.770)	36.94	Ceigall India
8	Junction with Ludhiana-Malerkotla road (SH-11) near Bhogiwal village (Km 225.770)	Junction with Ludhiana Moga road NH-5 near Mullanpur Dakha (Km 260.860)	35.09	Evrascon-MKCIL JV
9	Junction with Ludhiana Moga road NH-5 near Mullanpur Dakha (Km 260.860)	Junction with Jalandhar Moga road NH 703 near Kang Sahibu village (Km 303.900)	43.04	Evrascon-MKCIL JV
10	Junction with Jalandhar Moga road NH 703 near Kang Sahibu village (Km 303.900)	Junction with Jalandhar Kapurthala road (NH703A) near Khojewal village (Km 319.400)	15.5	Evrascon-MKCIL JV

Source: Steer secondary research and stakeholder consultation
https://themetrorailguy.com/nhai-delhi-amritsar-katra-expressway-information-route-map-status/ and https://bhoomirashi.gov.in

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Delhi-Amritsar-Katra expressway (3)

Package	Section start point / chainage	Section end point / chainage	Length (km)	Appointed / lowest bidder
Phase 1 (Greenfield) …. Contd.				
11	Junction with Jalandhar Kapurthala road (NH703A) near Khojewal village (Km 319.400)	Junction with Amritsar-Tanda road NH-503A near Sri Hargobindpur (Km 362.420)	43.02	Evrascon-MKCIL JV
12	Junction with Amritsar-Tanda road NH-503A near Sri Hargobindpur (Km 362.420)	Junction with Pathankot-Gurdaspur road (NH-54) near Gurdaspur (Km 397.700)	35.28	Evrascon-MKCIL JV
Spur 1	Nakodar (Km 0.000)	MDR Junction at ch.40.900 Dhunda Village-Junction with NH3 near Goindwal Sahib (Km 40.900)	40.9	SP Singla is the lowest bidder.
Spur 2	MDR Junction near Dhunda Village-Junction with NH3 near Goindwal Sahib (Km 40.900)	Junction with NH3 and Taran Taran Bypass near Mannawalla village (Km 70.950)	30.05	Ceigall India-Krishna Constructions JV
Spur 3	Junction with NH3 and Taran Taran Bypass near Mannawalla village (Km 70.950)	NH354 Ajanala road near Harsh china village (Km 99.020)	28.07	Joint Stock Vozrozhdenie
Phase 2 (Greenfield and brownfield upgrade)				
13	Revised alignment under finalization	Revised alignment under finalization	25.8	-
14	Junction with Pathankot Gurdaspur Rd NH54 near Balsua (Km 423.500)	Junction with Hiranagar Rd near Gurha Baildaran (Km 468.100)	44.6	Megha Engineering
15	Junction with Hiranagar Rd near Gurha Baildaran (Km 468.100)	Junction with Jammu Ring Rd NH244A near Jakh village (Km 503.250)	35.15	Vishwa Samudra
16	Junction with Jammu Ring Rd NH244A near Jakh village (Km 503.250)	6-lane Expressway standards and Spur connectivity to Jammu Airport (Km 515.000)	11.75	Shivalaya Construction
17	Kunjwani (km 515.0) Domel (km 550.9)	Sidhra (km 528.3) Katra (km 566.52)	13.3 + 15.62	APCO Infratech
18	Sidhra (km 530.00)	Ban Village (km 545.3)	15.3	Gawar Constructions Ltd.

Source: Steer secondary research
https://themetrorailguy.com/nhai-delhi-amritsar-katra-expressway-information-route-map-status/

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Traffic & Revenue forecasts-Base Case

Traffic forecasts

Vehicle type	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36	FY37	FY38
CJV	55,107	60,804	66,594	71,990	74,572	78,952	84,155	87,829	90,836	93,181	94,775	96,234	99,132	102,048	105,011
LCV	3,147	3,254	3,337	3,425	3,421	3,483	3,567	3,650	3,733	3,816	3,897	3,976	4,056	4,136	4,216
Bus	2,014	2,052	2,098	2,142	2,185	2,226	2,266	2,229	2,190	2,148	2,102	2,052	2,083	2,114	2,145
2A	4,242	4,517	4,720	4,972	4,873	4,980	5,158	5,338	5,521	5,705	5,887	6,068	6,251	6,436	6,624
3A	1,583	1,669	1,727	1,804	1,735	1,748	1,786	1,823	1,856	1,889	1,921	1,953	1,984	2,016	2,047
MAV	4,508	4,880	5,209	5,570	5,557	5,779	6,059	6,344	6,605	6,869	7,132	7,396	7,666	7,939	8,220
AADT	**70,606**	**77,180**	**83,689**	**89,907**	**92,349**	**97,173**	**102,996**	**107,219**	**110,748**	**113,614**	**115,720**	**117,687**	**121,182**	**124,697**	**128,271**
PCU	**103,653**	**112,378**	**120,695**	**128,967**	**131,114**	**137,068**	**144,426**	**150,050**	**154,888**	**159,071**	**162,475**	**165,736**	**170,707**	**175,713**	**180,810**

Revenue forecasts (in Lakhs)

Vehicle type	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36	FY37	FY38
CJV	16,313	18,618	21,436	24,304	26,410	29,301	32,921	35,734	39,091	41,460	44,281	46,473	50,664	53,622	57,989
LCV	1,717	1,806	1,977	2,134	2,243	2,383	2,549	2,740	2,925	3,125	3,331	3,543	3,799	4,041	4,300
Bus	2,156	2,244	2,420	2,593	2,794	2,973	3,173	3,272	3,366	3,437	3,521	3,599	3,821	4,031	4,273
2A	5,177	5,595	6,204	6,858	7,076	7,588	8,214	8,925	9,636	10,383	11,203	12,117	13,038	13,991	15,046
3A	2,147	2,314	2,536	2,797	2,817	2,974	3,190	3,406	3,636	3,851	4,103	4,360	4,641	4,909	5,191
MAV	8,606	9,535	10,762	12,073	12,704	13,822	15,193	16,643	18,141	19,686	21,369	23,125	25,146	27,122	29,297
Total (in INR Lakhs)	**36,129**	**40,126**	**45,350**	**50,775**	**54,063**	**59,062**	**65,265**	**70,746**	**76,823**	**81,973**	**87,842**	**93,253**	**1,01,150**	**1,07,760**	**1,16,145**

Source: Steer Analysis

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