

DETAILED PROJECT REPORT (DPR)

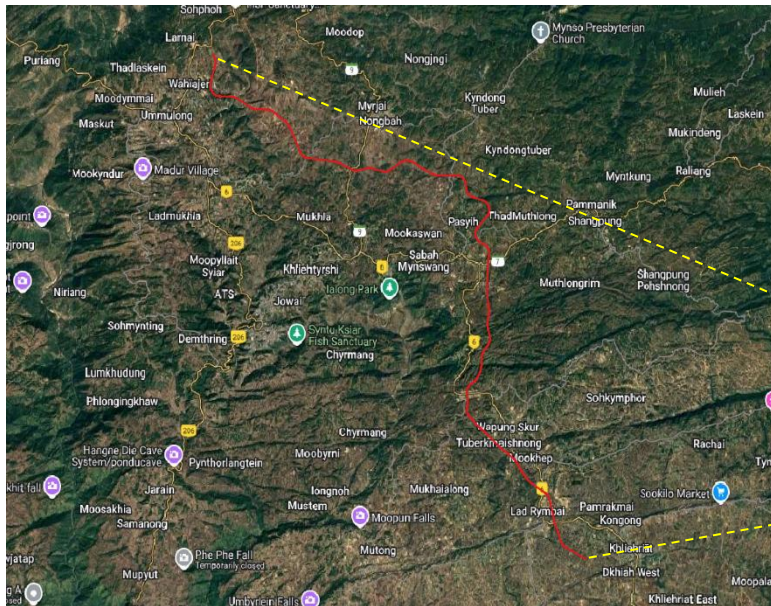
April-2026

VOLUME- I MAIN REPORT

PKG-02 (from 45.645 KM to 78.600 KM (Design Length 32.955 KM), High Speed Corridor (HSC) in Meghalaya

NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Package-2
DESIGN LENGTH – 32.955 Km.



**National Highways & Infrastructure
Development Corporation Ltd.**

(Ministry of Road Transport & Highways)

Government of India

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New Delhi-110001



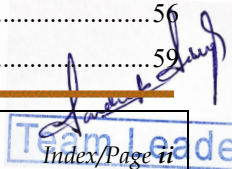
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	DEVELOPMENT, MAINTENANCE, MANAGEMENT AND OPERATION OF GREENFIELD HIGH-SPEED CORRIDOR FROM MAWLYNGKHUNG (NEAR SHILLONG) IN MEGHALAYA TO PANCHGRAM (NEAR SILCHAR) IN ASSAM BY 4-LANING WITH PAVED SHOULDERS ON HYBRID ANNUITY BASIS. (PACKAGE-2: FROM KM 45+645 TO KM 78+600, DESIGN LENGTH – 32.955 KM)	MAIN REPORT (DPR)
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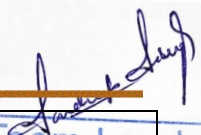
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Appendixes

Sr. No.	Appendix	Content
1	Appendix-I	Improvement Proposal of Structures
2	Appendix-II	Horizontal & Vertical Alignment Report
3	Appendix-III	Typical Cross Sections

CHAPTER-1 INTRODUCTION

1.1 Project Background

The National Highways & Infrastructure Development Corporation Limited (NHIDCL) has been entrusted with the assignment for providing Consultancy services for preparation of DPR for **Development, Maintenance, Management And Operation of Greenfield High-Speed Corridor From Mawlyngkhung (Near Shillong) in Meghalaya To Panchgram (Near Silchar) In Assam By 4-Laning With Paved Shoulders On Hybrid Annuity Basis under Public-Private Partnership (PPP) Mode** for greenfield alignment to Four lane with paved shoulder configuration. The Consultancy Services for this project has been awarded to Global Infra Solutions in JV with Krishna Techno Consultants Pvt. Ltd. in association with Infycons Creative Software Pvt. Ltd.

The Letter of commencement for this assignment was issued by General Manager (Technical), National Highway & Infrastructure Development Corporation Limited, New Delhi vide their letter No. NHIDCL/Bharatmala/DPR/Phase-I/Lot-1/Package 1B/2017/106 dated 02-07-2018.

The name of the Project Highway as per RFP are (1) Dudhnoi-Damra (5 km), (2) Damra-Nengkra (66 km), (3) Nengkra-Williamnagar (16 km), (4) Mawlyngkhung-Mawryngkneng (49 km), (5) Jowai-Ratachera (101 km), (6) Ratachera-Kalain (25 km), (7) Kalain-Panchgram (16 km), (8) Mawryngkneng-West Jaintia Hills (19 km) and (9) West Jaintia Hills- Jowai (7 km) in the states of Assam and Meghalaya. The total length of the project highway is 304 km.

The Alignment has been changed into following since the commencement:

1. Dudhnoi-Damra-Dainadubi (8.60Km.) with ref. Letter BO/SHG/P/BHM/GEN/1201 issued on 28.01.2019 extending the stretch to Dainadubi (PMU Bongaigaon, RO office).
2. Dainadubi-Darugiri (44.4Km.) (PMU Tura, RO office)
3. NH-127B Darugiri-Songsak-Rongrengiri (William Nagar Junction;39.06Km.) with ref. No. NHIDCL/RO-SHG/D-W/507/2021/821, dated 15.07.2021(PMU Tura, RO office).
4. Mawlyngkhung-Mawryngkneng (49 km) (PMU Mawkyrwat, RO office)
5. Mawryngkneng-West Jaintia Hills (19 km) (PMU Mawkyrwat, RO office)
6. West Jaintia Hills-Jowai (7 km) (PMU Mawkyrwat, RO office)
7. Jowai-Ratachera (101 km) (PMU Mawkyrwat, RO office)
8. Ratachera-Kalain (25 km) (PMU Silchar, RO office)
9. Kalain-Panchgram (16 km) (PMU Silchar, RO office).

An index Map of the project corridor of **Mawlyngkhung – Mawryngkneng - West Jaintia - Jowai Bypass – Ratachera (Malidar-Bridge) - Kalain - Panchgram** is shown in **Figure 1.1** Index Map.

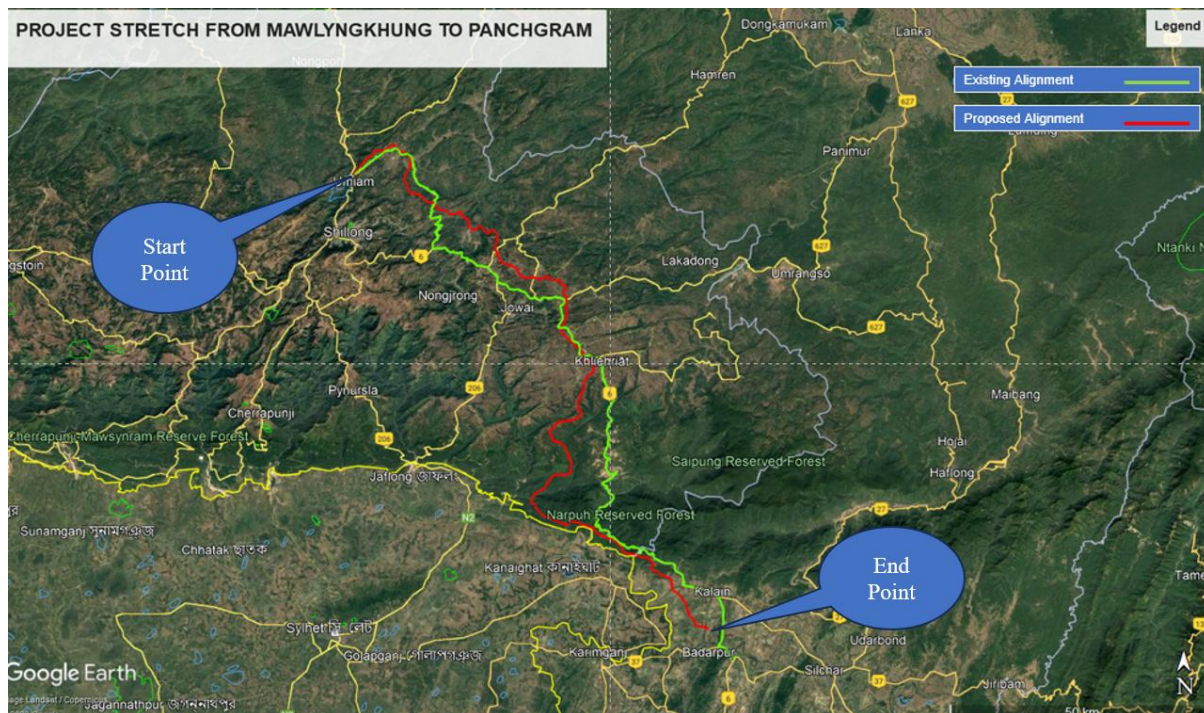


Figure 1.1: Project Stretch Entire Length

1.2 Project Brief and Project Roads

The name of the project highway is “**Development, Maintenance, Management and Operation of Greenfield High-Speed Corridor from Mawlyngkhung (Near Shillong) In Meghalaya to Panchgram (Near Silchar) In Assam by 4-Laning with Paved Shoulders. (Package-02, KM 45.645 near Wahiajer village, West Jaintia Hills District to KM 78.600 near Dkhiah West village, East Jaintia Hills District in State of Meghalaya; Design length-32.955KM) on Hybrid Annuity Mode**”. For the convenience of tendering and execution, project road has been split in 4 packages. The details are mentioned below:

S. No.	From (Km)	To (Km)	Length (Km)	Package's	District
1	0.000	18.830	18.830	Pkg-1	Ri-Bhoi
2	18.830	20.425	1.595		East Khasi Hills
3	20.425	21.635	1.210		Ri-Bhoi
4	21.635	35.140	13.505		East Khasi Hills
5	35.140	45.645	10.505		West Jaintia Hills
6	45.645	66.340	20.695	Pkg-2	West Jaintia Hills
7	66.340	78.600	12.260		East Jaintia Hills
8	78.600	132.400	53.800	Pkg-3	East Jaintia Hills
9	132.400	144.650	12.250	Pkg-4	East Jaintia Hills
10	144.650	164.940	20.290		Cachar
		Total	164.940		

	DEVELOPMENT, MAINTENANCE, MANAGEMENT AND OPERATION OF GREENFIELD HIGH-SPEED CORRIDOR FROM MAWLYNGKHUNG (NEAR SHILLONG) IN MEGHALAYA TO PANCHGRAM (NEAR SILCHAR) IN ASSAM BY 4-LANING WITH PAVED SHOULDERS ON HYBRID ANNUITY BASIS. (PACKAGE-2: FROM KM 45+645 TO KM 78+600, DESIGN LENGTH – 32.955 KM)	MAIN REPORT (DPR)
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The Major villages along the project road are: Wahiajer, Mukhla Umlangshor, Mukhla, Shohshrieh, Mukhla Nongrim, Mookaswan, Nongbah, Pasyih, Thadmuthlong, Pasyih, Thadmuthlong, Tuber Shohshrieh, Tuber Kmaishnong, Wapung Shnong, Wapung Skur, Mookhep, Lad Rymbai Datsympuin, Lad Rymbai B, Dkhiah West. List of all villages is presented in ahead in this report.

The Project Road traverses through the **West Jaintia Hills and East Jaintia Hills** Districts in the State of Meghalaya.

The adopted configuration for the project highway is 4-Laning with paved Shoulder”.

Note: - PKG-02 is a part of High-Speed Corridor (HSC) traversing through the state of Meghalaya and Assam. Entire HSC length has been divided into 4 PKGs for facilitating construction. Reports for each PKG length will be submitted separately.

Since the alignment is entirely greenfield, only proposals are presented in this report. Above mentioned details are shown only to give understanding of whole contract work issued in 2018. However, HSC or High-Speed Corridor is entirely taken up as new project work and will be presented in this report ahead.

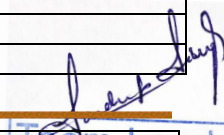
Location is given in the **Table 1.2** below:

Table 1.2: Location of Proposed Project Road

Sr. No	Design Chainage		Design Length (km)	Design Road Coordinate's	
	From (km)	To (km)		Start	End
1	45+645	78+600	32.955	Latitude: 25°32'26.82"N & Longitude: 92°10'28.28"E	Latitude: 25°21'42.51"N & Longitude: 92°20'4.24"E
	Total Length (km)		32.955		

1.3 Executive Summary

S. No.	Features	Description/ Quantity	Remarks / Detailed Description
1	Project name & Package	Development, Maintenance, Management and Operation of Greenfield High-Speed Corridor from Mawlyngkhung (Near Shillong) in Meghalaya to Panchgram (Near Silchar) in Assam by 4-Laning with Paved Shoulders on Hybrid Annuity Basis. PKG-02, KM 45.645 near Wahiajer village, West Jaintia Hills District to KM 78.600 near Dkhiah West village, East Jaintia Hills District in State of Meghalaya; Design length-32.955 Km	
2	Road Name	PKG-02 High Speed Corridor (HSC)	
3	Project District	West Jaintia Hills & East Jaintia Hills.	
4	Project State	Meghalaya	
5	Start Point	Wahiajer village	
6	End Point	Near Dkhiah West village	
7	Proposed	Design Length: 32.955 km	

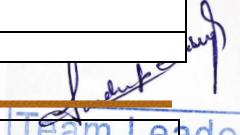
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S. No.	Features	Description/ Quantity	Remarks / Detailed Description																																
	Length (km)																																		
9	Proposed carriageway	Proposed: 4-lane+Paved Shoulder Configuration																																	
10	Terrain	Mountainous and Hilly terrain (without snow)																																	
11	Land Use Pattern	<table><tr><th>Sr. No.</th><th>Land Use</th><th>Length, (Km)</th><th>Percentage</th></tr><tr><td>1</td><td>Agricultural Land</td><td>21.455</td><td>65.10%</td></tr><tr><td>2</td><td>Barren Land</td><td>11.350</td><td>34.44%</td></tr><tr><td>3</td><td>Forest</td><td>0.150</td><td>0.46%</td></tr><tr><td></td><td>Total</td><td>32.955</td><td>100.00%</td></tr></table>		Sr. No.	Land Use	Length, (Km)	Percentage	1	Agricultural Land	21.455	65.10%	2	Barren Land	11.350	34.44%	3	Forest	0.150	0.46%		Total	32.955	100.00%												
Sr. No.	Land Use	Length, (Km)	Percentage																																
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3	Forest	0.150	0.46%																																
	Total	32.955	100.00%																																
12	Built ups/Villages along the alignment.	Wahiajer, Mukhla Umlangshor, Mukhla, Shohshrieh, Mukhla Nongrim, Mookaswan, Nongbah, Pasyih, Thadmuthlong, Pasyih, Thadmuthlong, Tuber Shohshrieh, Tuber Kmaishnong, Wapung Shnong, Wapung Skur, Mookhep, Lad Rymbai Datsympein, Lad Rymbai B, Dkhiah West.																																	
Traffic 2023																																			
20		<table><tr><th>Sr. No.</th><th>Description</th><th>Total PCUs in 2023</th></tr><tr><td>1</td><td>High Speed Corridor (HSC)</td><td>17,800</td></tr></table>		Sr. No.	Description	Total PCUs in 2023	1	High Speed Corridor (HSC)	17,800																										
Sr. No.	Description	Total PCUs in 2023																																	
1	High Speed Corridor (HSC)	17,800																																	
21	Design Period	20 years for Flexible pavement	As per the traffic projection, it is assumed that DPR preparation year 2025-26, Considering three years of construction period (2027-2029), i.e., opening of road in 2030, design period is taken up to 2049 (2030–2049, 20 years).																																
For All Traffic Details – Refer Chapter 5																																			
23	Recommended Traffic Lane:	<table><tr><th>Road</th><th>Lane Requirement</th><th>Lane Proposed</th></tr><tr><td>HSC</td><td>4-Lane+PS</td><td>4-Lane+PS</td></tr></table>		Road	Lane Requirement	Lane Proposed	HSC	4-Lane+PS	4-Lane+PS																										
Road	Lane Requirement	Lane Proposed																																	
HSC	4-Lane+PS	4-Lane+PS																																	
Expected Traffic projection to proposed for year 2049 (After 20 Years)																																			
	HSC	As per the Diverted traffic and growth rate of 5%	Refer Chapter 5 Traffic Analysis																																
24	MSA & Proposed Crust Thickness	<table><tr><th rowspan="2">Section</th><th rowspan="2">Design Period (Years)</th><th rowspan="2">Adopted MSA</th><th rowspan="2">CBR (%)</th><th colspan="5">Pavement Crust Compositions</th></tr><tr><th>BC (mm)</th><th>DBM (mm)</th><th>WMM (mm)</th><th>CTSB (mm)</th><th>Total (mm)</th></tr><tr><td>Main C/w (HSC)</td><td>20</td><td>110</td><td>minimum sub grade CBR of 8% and maximum subgrade CBR of 10%.</td><td colspan="5">As per Technical Schedule</td></tr><tr><td>Ramps/ Approach</td><td>20</td><td>50</td><td>minimum sub grade CBR of 8% and maximum subgrade CBR of 10%.</td><td colspan="5">As per Technical Schedule</td></tr></table>		Section	Design Period (Years)	Adopted MSA	CBR (%)	Pavement Crust Compositions					BC (mm)	DBM (mm)	WMM (mm)	CTSB (mm)	Total (mm)	Main C/w (HSC)	20	110	minimum sub grade CBR of 8% and maximum subgrade CBR of 10%.	As per Technical Schedule					Ramps/ Approach	20	50	minimum sub grade CBR of 8% and maximum subgrade CBR of 10%.	As per Technical Schedule				
Section	Design Period (Years)	Adopted MSA	CBR (%)					Pavement Crust Compositions																											
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25	Viaduct	For Main Carriageway <table><thead><tr><th>S. No.</th><th>Type of Structure</th><th>New Proposed</th></tr></thead><tbody><tr><td>1</td><td>Major Bridge</td><td>1</td></tr><tr><td>2</td><td>Minor Bridge</td><td>20</td></tr><tr><td>3</td><td>Viaduct</td><td>11</td></tr><tr><td>4</td><td>Box Culvert</td><td>123</td></tr><tr><td>5</td><td>VOP</td><td>11</td></tr><tr><td>6</td><td>VUP</td><td>1</td></tr><tr><td>7</td><td>LVUP</td><td>0</td></tr><tr><td>8</td><td>SVUP</td><td>3</td></tr><tr><td>9</td><td>Utility underpass</td><td>1</td></tr><tr><td>10</td><td>Overpass</td><td>20</td></tr><tr><td>11</td><td>Underpass</td><td>5</td></tr><tr><td colspan="2">Total</td><td>196</td></tr></tbody></table> For Interchanges <table><thead><tr><th>S. No.</th><th>Type of Structure</th><th>New Proposed</th></tr></thead><tbody><tr><td>1</td><td>Major Bridge</td><td>Nil</td></tr><tr><td>2</td><td>Minor Bridge</td><td>06</td></tr><tr><td>3</td><td>Viaduct</td><td>07</td></tr><tr><td>4</td><td>Box Culvert</td><td>17</td></tr><tr><td>5</td><td>VOP</td><td>04</td></tr><tr><td>6</td><td>VUP</td><td>03</td></tr><tr><td>7</td><td>LVUP</td><td>Nil</td></tr><tr><td>8</td><td>SVUP</td><td>Nil</td></tr><tr><td>9</td><td>Utility underpass</td><td>Nil</td></tr><tr><td>10</td><td>Overpass</td><td>02</td></tr><tr><td>11</td><td>Underpass</td><td>Nil</td></tr><tr><td colspan="2">Total</td><td>39</td></tr></tbody></table>					S. No.	Type of Structure	New Proposed	1	Major Bridge	1	2	Minor Bridge	20	3	Viaduct	11	4	Box Culvert	123	5	VOP	11	6	VUP	1	7	LVUP	0	8	SVUP	3	9	Utility underpass	1	10	Overpass	20	11	Underpass	5	Total		196	S. No.	Type of Structure	New Proposed	1	Major Bridge	Nil	2	Minor Bridge	06	3	Viaduct	07	4	Box Culvert	17	5	VOP	04	6	VUP	03	7	LVUP	Nil	8	SVUP	Nil	9	Utility underpass	Nil	10	Overpass	02	11	Underpass	Nil	Total		39
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34	ROB																																																																																			
35	Interchanges/ Access points (Major/Minor)	03 nos. (Note: - Direct Access to NH is not allowed. Access points have been proposed on High-speed corridor.)																																																																																		
36	Toll Plaza	As per Closed tolling on Relevant Access Points only																																																																																		
37	Thrie-Beam Crash Barrier	As per Schedules																																																																																		
38	Lined	35049 m. (For Main Carriageway) & 11356 m (For Interchanges)																																																																																		

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	DEVELOPMENT, MAINTENANCE, MANAGEMENT AND OPERATION OF GREENFIELD HIGH-SPEED CORRIDOR FROM MAWLYNGKHUNG (NEAR SHILLONG) IN MEGHALAYA TO PANCHGRAM (NEAR SILCHAR) IN ASSAM BY 4-LANING WITH PAVED SHOULDERS ON HYBRID ANNUITY BASIS. (PACKAGE-2: FROM KM 45+645 TO KM 78+600, DESIGN LENGTH – 32.955 KM)	MAIN REPORT (DPR)
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S. N o.	Features	Description/ Quantity	Remarks / Detailed Description
8	Drain		
Protection Works			
39	Retaining Wall	6032 m. (For Main Carriageway) & 4266 m (For Interchanges)	
40	Composite Breast wall	27350 m. (For Main Carriageway) & 11356m (For Interchanges)	
41	Stone Pitching	13055 m. (For Main Carriageway) & 4266 m (For Interchanges)	
42	Toe Wall	9697 m.	
Land Acquisition			
43	Land details summary:		
		Total Land	241.06
		Status	Total Land required 241.06 Ha. 3A Status- Published in the Gazette 3D Status - Under Progress
Cost Estimate			
44	Project Civil Cost- As per RFP		

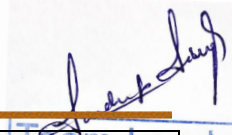
1.4 Objectives of the Project

The main objective of the project is to establish technical feasibility of the project alignment while analysing the traffic, need, economic benefits and then prepare all relative documents for arriving at final length, cost summary of various works with detailed drawings and diagrams for any proposal summary. The objectives of the project are decided not only in terms of connectivity but also in terms of expenditures required for completing the project construction, benefits to society/economy derived on basis of economic evaluation, firmness of the proposals with respect to financial aspects etc.

All the objectives of the project are summarized below: -

The main objective of the project is to establish technical feasibility of the project alignment while analysing the traffic, need, economic benefits and then prepare all relative documents for arriving at final length, cost summary of various works with detailed drawings and diagrams for any proposal summary. The objectives of the project are decided not only in terms of connectivity but also in terms of expenditures required for completing the project construction, benefits to society/economy derived on basis of economic evaluation, firmness of the proposals with respect to financial aspects etc.

All the objectives of the project are summarized below: -

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- A. This road stretch is a vital Economic corridor & lifeline for state of Meghalaya, Mizoram, Tripura, Manipur & the Barak valley of Assam as it provides the shortest connectivity from regional commercial centre (Guwahati) and rest of India.
- B. The road also plays vital role in vigilance of international border along Bangladesh.
- C. Possibilities for economic development of surrounding villages/towns and generate employment (direct and indirect) opportunities of villages/towns in Ri Bhoi, East Khasi Hills, West Jaintia Hills, East Jaintia Hills districts of Meghalaya & Cachar District of Assam directly and other districts indirectly.
- D. Connectivity to major coalfields and many cement factories in EJH district.
- E. To provide better access to markets and industrial locations ultimately providing improvements in living standards.
On completion and/ or during progress of the proposed services, the NHIDCL will be able to:
 - Upgrade/ reconstruct/ widen or rehabilitate selected roads as applicable;
 - Carry out road safety enhancement work;
 - Do planning, budgeting and program to strengthen the project highway, asset and financial management;

1.5 Scope of Services

The services will be undertaken in different parts and is broadly as below;

Part A: As far as possible, the construction work of four lanes with paved shoulders shall be within the existing right of way avoiding land acquisition. Special circumstances land acquisition can be made.

Part B: The Consultant shall study the possible locations and design of toll plaza (If any). Wayside amenities required on tolled highway shall also be planned.

Part C: All ready to implement “good for construction” drawings shall be prepared.

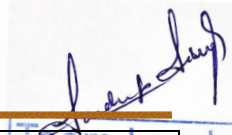
Part D: Environmental Impact Assessment and Environmental Management Plan shall be carried out by the Consultant meeting the requirements of the Government of India

Part E: The consultant shall also suggest alternate traffic movement plan during construction.

1.6 Organization of Detailed Project Report

Reports

(i) **Volume - I, Main Report:** This report will present the project background, social analysis of the project, details of surveys and Investigations carried out, analysis and Interpretation of survey and investigation data, traffic studies and demand forecasts designs, cost estimation, environmental aspects, economic and commercial analyses and conclusions. The report shall include Executive Summary giving brief accounts of the findings of the study and recommendations.

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	DEVELOPMENT, MAINTENANCE, MANAGEMENT AND OPERATION OF GREENFIELD HIGH-SPEED CORRIDOR FROM MAWLYNGKHUNG (NEAR SHILLONG) IN MEGHALAYA TO PANCHGRAM (NEAR SILCHAR) IN ASSAM BY 4-LANING WITH PAVED SHOULDERS ON HYBRID ANNUITY BASIS. (PACKAGE-2: FROM KM 45+645 TO KM 78+600, DESIGN LENGTH – 32.955 KM)	MAIN REPORT (DPR)
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The Report shall also include maps, charts and diagrams showing locations and details of existing features and the essential features of Improvement and upgrading. The Environmental Impact Assessment (EIA) Report for contract package shall be submitted as a part of the main report.

The basic data obtained from the field studies and investigations and input data used for the preliminary design shall be submitted in a separate volume as an Appendix to Main Report.

(ii) Volume-II, Design Report: This volume shall contain design calculations, supported by computer printout of calculations wherever applicable. The Report shall clearly bring out the various features of design standards adopted for the study. The design report will be in two parts. Part-I shall primarily deal with the design of road features and pavement composition while Part-II shall deal with the design of bridges, tunnels and cross-drainage structures. The sub-soil exploration report including the complete details of boring done, analyses and Interpretation of data and the selection of design parameters shall be included as an Appendix to the Design Report.

The detailed design for all features should be carried out as per the requirements of the Design Standards for the project. However, there may be situations wherein it has not been possible to strictly adhere to the design standards due to the existing site conditions, restrictions and other considerations. The report should clearly bring out the details of this aspect and the standards adopted.

(iii) Volume III, Material Report: The Materials Report shall contain details concerning the proposed borrow areas and quarries for construction materials and possible sources of water for construction purposes. The report shall include details on locations of borrow areas and quarries shown on maps and charts and also the estimated quantities with mass haul diagram including possible end use with leads involved, the details of sampling and testing carried out and results in the form of important Index values with possible end use thereof.

The materials Report shall also include details of sampling, testing and test results obtained in respect physical properties of subgrade soils. The information shall be presented in tabular as well as in graphical representations and schematic diagrams. The Report shall present soil profiles along the alignment.

The material Report should also clearly indicate the locations of areas with problematic soils Recommendations concerning the improvement of such for use in the proposed construction works, such as stabilization (cement, lime, mechanical) should be Included in the Report.

(iv) Volume IV, Environmental Assessment Report Including Environmental Management Plan (EMP) & Resettlement Action Plan (RAP): The Report shall be

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prepared conforming to the Guidelines of the Government of India, State Government and World Bank/ADB as appropriate for construction package.

(v) Volume-V, Technical Specifications: The MORT&H's Technical Specifications for Road and Bridge works shall be followed for this study. However, Volume IV: Technical Specifications shall contain the special technical specifications which are not covered by MOST Specifications for Roads and Bridges (latest edition/revision) and also specific quality control norms for the construction of works.

(vi) Volume-VI, Rate Analysis: This volume will present the analysis of rates for all items of works. The details of unit rate of materials at source, carriage charges, any other applicable charges, labour rates, machine charges as considered in arriving at unit rates will be included in this volume.

(vii) Volume VII, Cost Estimates: This volume will present the contract package wise cost of each item of work as well as a summary of total cost.

(viii) Volume VIII, Bill of Quantities: This volume shall contain the package-wise detailed Bill of Quantities for all items of works.

(ix) Volume IX, Drawing Volume: All drawings forming part of this volume shall be 'good for construction' drawings. All plan and profile drawings will be prepared in scale 1:250V and 1:2500H scale to cover one km in one sheet. In addition, this volume will contain 'good for construction' drawings for the following:

- Horizontal Alignment and Longitudinal Profile.
- Detailed Working Drawings for Individual Culverts and Cross Drainage Structures.
- Detailed Working Drawings for Individual Bridges, tunnels and Structures.
- Detailed Drawings for Improvement of At-Grade and Separated.
- Intersections and Interchanges.
- Drawings for Road Sign, Markings, Toll Plazas, and other Facilities.
- Schematic Diagrams (linear chart) Indicating but not limited to be following:
 - Widening scheme;
 - Locations of median openings, intersections, interchanges, underpasses, overpasses, bypasses;
 - Locations of service roads;
 - Location of traffic signals, traffic signs, road markings, safety features; and,
 - Locations of toll plaza, parking areas, weighing stations, bus bays, rest areas, if any.
- Drawings for toll plaza, Bus Bays, Parking areas, Rest areas, weighing stations etc. All drawings will be prepared in different sheets. The format for plan, cross section and profile drawings shall be finalized in consultation with

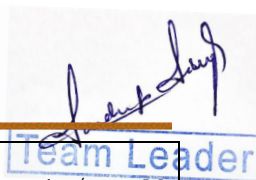
	DEVELOPMENT, MAINTENANCE, MANAGEMENT AND OPERATION OF GREENFIELD HIGH-SPEED CORRIDOR FROM MAWLYNGKHUNG (NEAR SHILLONG) IN MEGHALAYA TO PANCHGRAM (NEAR SILCHAR) IN ASSAM BY 4-LANING WITH PAVED SHOULDERS ON HYBRID ANNUITY BASIS. (PACKAGE-2: FROM KM 45+645 TO KM 78+600, DESIGN LENGTH – 32.955 KM)	MAIN REPORT (DPR)
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the concerned -NHIDCL officers. The drawings shall also include details of all BM and reference pillars, HIP and VIP. The co-ordinates of all points should be referenced to a common datum, preferably GTS referencing system. The drawings shall also include the locations of all traffic safety features including traffic signals, signs, markings, crash barriers, delineators etc.

- Digital drawings of proposed highway and features.

1.7 Alignment/Project Approvals

The Project (in thorough length including all packages in Meghalaya and Assam state) was in-principally approved by the PMO on 29.04.2025.

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CHAPTER-2 PROJECT ROADS DESCRIPTION

2.0 Introduction

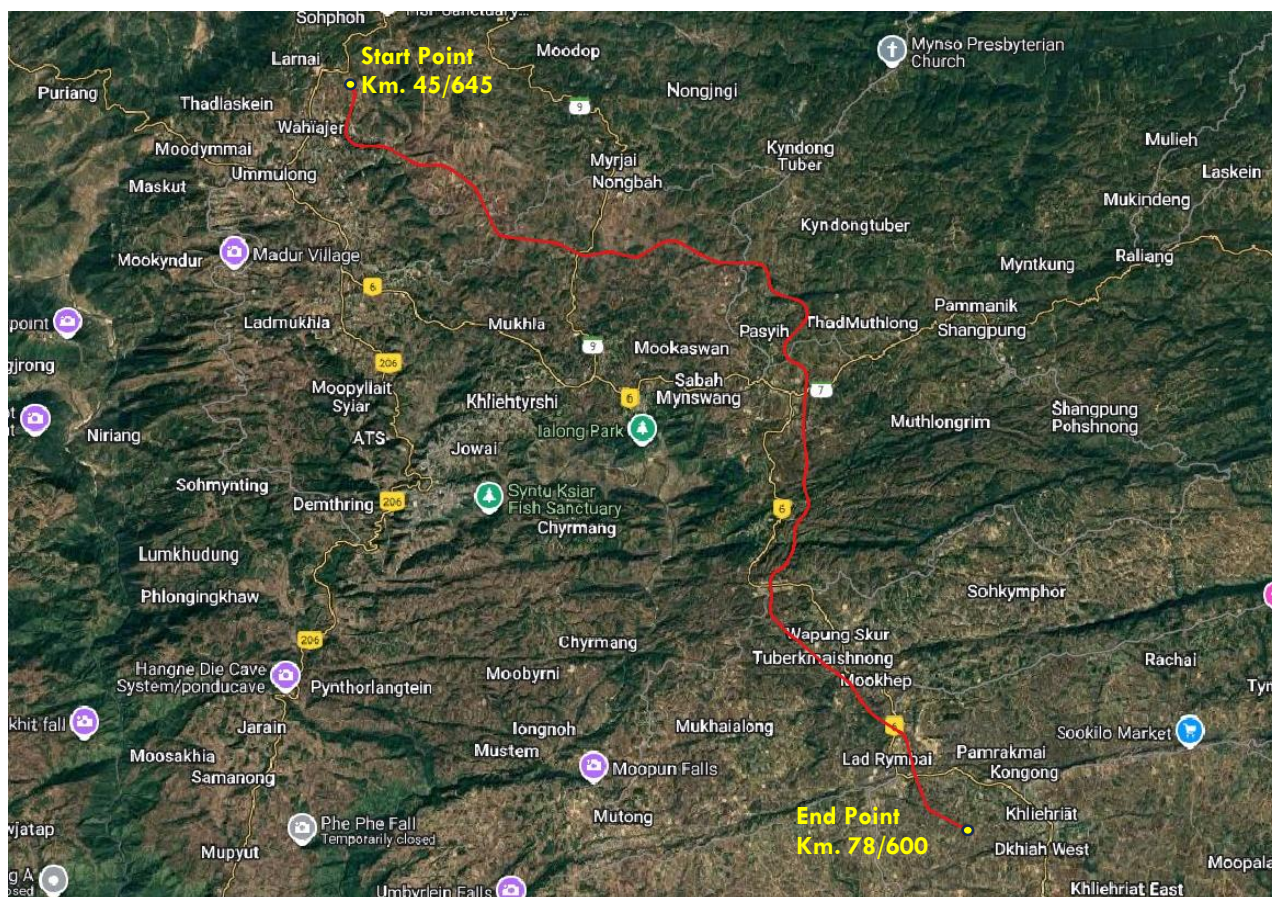
This chapter deals with the existing features of project road, topographic details, site features, important structures, junctions, pavement characteristics and road safety requirements etc.

The name of the project highway is PACKAGE-02 From Km. 45/645 in near Wahiajer village in West Jaintia Hills District and end at km 78/600, in near Dkhiah West village, in East Jaintia Hills District of Meghalaya. The total design length of stretch is 32.955 km.

2.1 Project Location

The Pkg-02, Km 45.645 near Wahiajer village (Latitude: 25°32'26.82"N & Longitude: 92°10'28.28"E, West Jaintia Hills District to Km 78.600 near Dkhiah West village (Latitude: 25°21'42.51"N & Longitude: 92°20'4.24"E), East Jaintia Hills District in State of Meghalaya. Design length - 32.955 Km.

Figure 2.1: PKG-02 Satellite Map



The Project Road traverses through the **West Jaintia Hills & East Jaintia Hills** Districts in the State of Meghalaya.

2.2 Carriageway

No Existing Features observed

2.3 Terrain

The project highway passes entirely through Hilly/Mountainous terrain.



Figure 2.2: Photographs of Terrain

2.4 Land Use

The land use pattern along the project highway comprises mostly dense vegetation whereas agricultural, barren land and forest types of land are intermittent. The details are as given in the table below. Ribbon development along settlements has been observed at many locations on project road.

Table 2.2 (a): Land Use Details

Sr. No.	Land Use	Length, (Km)	Percentage
1	Agricultural Land	21.455	65.10%
2	Barren Land	11.350	34.44%
3	Forest	0.150	0.46%
	Total	32.955	100.00%

Note- The length of the forest stretch has been identified based on preliminary analysis. The final chainage will be confirmed and incorporated upon completion of the Joint Measurement Survey (JMS) with the Forest Department.

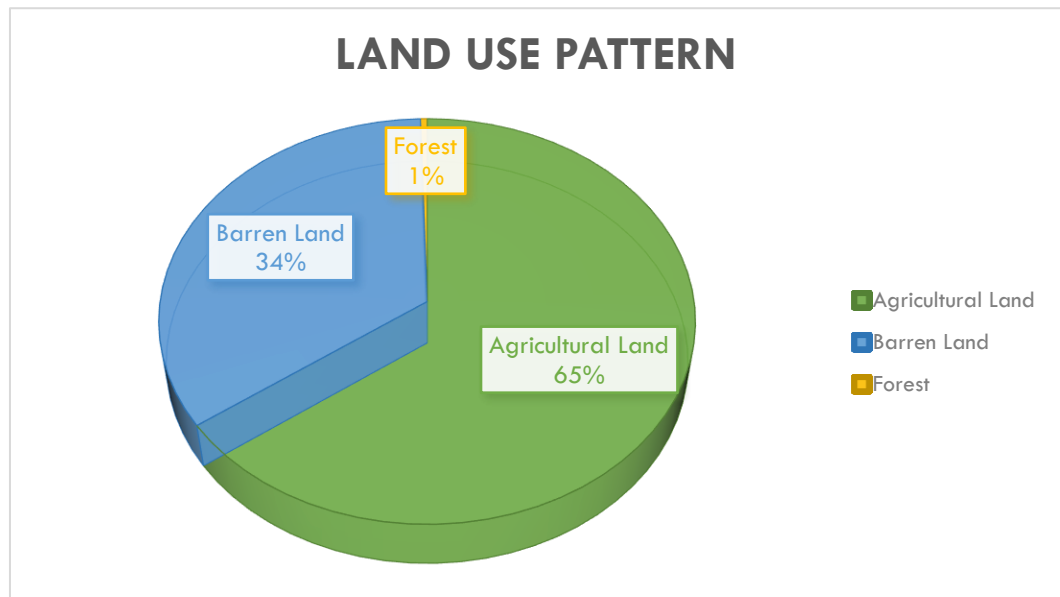


Figure 2.2 (a): Photograph of Land Use

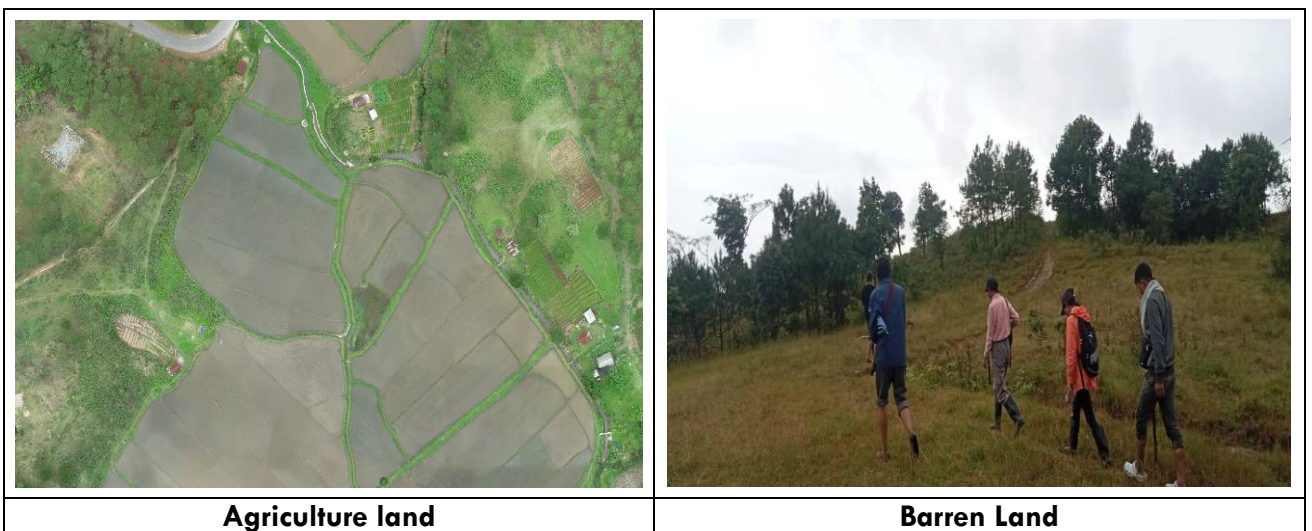


Table 2.3: List of Villages

PACKAGE-2 High Speed Corridor from Shillong to Silchar					
Sl. No	District	Name of Village	Chainage (Km)		Length (m)
			From	To	
1	West Jaintia Hills	Wahiajer	45.645	48.258	2.613
2		Mukhla Umlangshor	48.258	49.220	0.962
3		Mukhla Shohshrieh	49.220	50.000	0.780
4		Mukhla Nongrim	50.000	53.400	3.400
5		Mookaswan	53.400	55.120	1.720
6		Nongbah	55.120	58.850	3.730
7		Pasyih	58.850	61.300	2.450
8		Thadmuthlong	61.300	62.800	1.500
8a		Pasyih and Thadmuthlong	62.800	63.660	0.860
8b		Thadmuthlong	63.660	66.120	2.460
8		Thadmuthlong and Tuber Shohshrieh	66.120	66.340	0.220
1	East Jaintia Hills	Tuber Shohshrieh	66.340	67.330	0.990
2		Tuber Kmaishnong	67.330	69.100	1.770
2a		Tuber Kmaishnong and Wapung Shnong	69.100	70.600	1.500
3		Wapung Shnong	70.600	73.200	2.600
4		Wapung Skur	73.200	75.510	2.310
5		Mookhep	75.510	76.100	0.590
6		Lad Rymbai Datsympain	76.100	76.950	0.850
7		Lad Rymbai B	76.950	77.500	0.550
8		Dkhiah West	77.500	78.600	1.100
				Total	32.955

2.5 Pavement

No Existing Pavement

2.6 Junctions

No Existing Junctions

2.7 At Grade Structures

No Existing Grade structure.

2.8 Cross-drainage Structures

No Existing structures

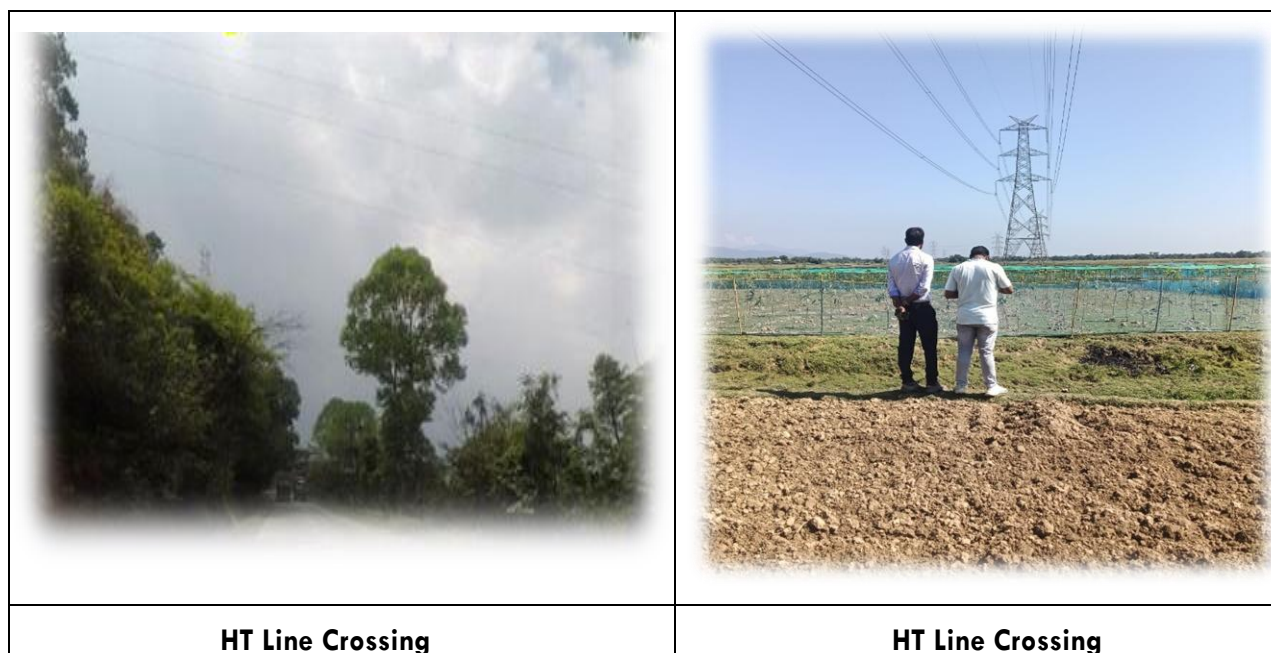
2.9 Public Facilities

No Existing facilities

2.10 Utilities

Utilities are found within ROW at many locations. Electric lines are crossing at few locations on the project stretches. Similarly PHE and Gas pipeline are also observed.

Figure 2.6: Photograph of Utilities



2.11 Road Furniture/Traffic Control Devices

Not Observed

2.12 Side Drain along the project Road

Not Observed

CHAPTER-3

ENGINEERING SURVEYS AND INVESTIGATIONS

3.1 Preliminary Surveys

The relevant engineering surveys and investigations have been carried out along the project roads conforming to IRC Specification. These Surveys have been conducted as per TOR to generate adequate database for preparing the most appropriate Improvement proposal for strengthening and upgrading the existing carriageway.

The various engineering surveys and investigations apart from the traffic surveys, which have been carried out for the project roads, are listed below:

- Road Inventory
- Road Pavement and Condition Survey
- Structure Inventory and Condition Survey
- Topographical Survey
- Pavement Investigations
- Soil and Material Investigations

Note: Being an entirely greenfield alignment throughout, only details of terrain/utility etc. are listed in this chapter since no other details were present along the alignment.

3.2 Road Inventory

Road Inventory covers all the existing physical features such as terrain, land-use, roadway, carriageway width and type, shoulder width and type, Horizontal and Vertical alignments and design speed of existing road, type of cross-section (cut or fill), general drainage conditions, ROW boundaries, Sub-grade/Local soil type, location of water bodies and retaining structures, utility lines passing along or crossing the project roads, and all other features that may have influence on the project roads widening/improvement works. Being an entirely greenfield alignment throughout, only details of terrain/utility etc. are listed in this chapter since no other details were present along the alignment.

3.3 Terrain

The Project Road traverses through the **West Jaintia Hills & East Jaintia Hills** Districts in the State of Meghalaya. The details of terrain are listed in the **earlier sections**.

3.4 Land use

The land use pattern along the project highway comprises mostly dense vegetation whereas agricultural, barren land and forest types of land are intermittent there. The details are as given in the **earlier sections**.

The Structure inventory and condition survey had been carried out on the following basis.

- Details of existing bridges/culverts such as type of structure, Clear span, vent height, hydraulic adequacy and condition have been measured at site and recorded.
- The condition of existing structures is based on visual observation. Design chainage in proposed road corridors have been considered taken for reference.

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- The flow direction is indicated w.r.t the increasing chainage. In the entire stretch, no sign of river overtopping could be found on any existing structure.

CHAPTER-4 SOCIO-ECONOMIC PROFILE

4.1 General

This Chapter provides a socio-economic profile of the state and the relative status of the project influence area within the state. The aspects covered include demography, employment pattern, state income, and major economic sectors including transport infrastructure. The profile discusses the past performance and the present scenario and, also presents a broad assessment of the perspective growth of the economy as a basis for estimating the future growth in transport demand.

4.2 Project Influence Area (PIA)

The Project Influence Area (PIA) is the relative importance of the project road in terms of the share of traffic contributed by various states/districts. The broad influence area of the project road is taken as the State of Meghalaya since majority of the traffic served by the road is from the state. The immediate influence area consists of the districts of West Jaintia Hills & East Jaintia Hills Districts through which the corridor passes and hence the areas directly served by the project road.

The Major villages along the project road are: Wahiajer, Mukhla Umlangshor, Mukhla, Shohshrieh, Mukhla Nongrim, Mookaswan, Nongbah, Pasyih, Thadmuthlong, Pasyih, Thadmuthlong, Tuber Shohshrieh, Tuber Kmaishnong, Wapung Shnong, Wapung Skur, Mookhep, Lad Rymbai Datsympuin, Lad Rymbai B, Dkhiah West. The design length of the Pkg-2 project road is 32.955 Km.

A detailed accounting of the socio-economic profile of the Project Influence Area (PIA) has been prepared which covers the PIA's economic performance of the past and establishes the likely growth prospects of the future. The output of this Chapter is the economic growth prospects of the PIA with respect to certain selected economic variables and serves as the basis for arriving at a realistic traffic growth rate.

4.3 Demographic Profile of PIA

As per the census of India 2011, the total population of Meghalaya is 29,67,000 out of which 79.93% and 20.07% are rural and urban population, respectively. Further details of the Rural and Urban areas are mentioned respectively in Table below.

Figure 4.1: Location Map of Meghalaya



Table 4.1: Demographic Profile of Project Region

State/ District	Year	Population			% Of Urban Population	Avg. Density (pop./sq.km)
		Total	Rural	Urban		
Meghalaya	2021	38,64,559	30,88,950	7,75,619	20.07	172
PROJECT AREA DISTRICTS						
West Jaintia Hills	2021	2,70,352	2,41,932	28,420	10.51	159.69
East Jaintia Hills	2021	3,95,124	3,66,694	28,430	7.20	103

West Jaintia Hills District - West Jaintia Hills District is one of the 11 (eleven) districts of the state of Meghalaya. With the bifurcation of the erstwhile Jaintia Hills District into East and West Jaintia Hills District, West Jaintia Hills District came into existence on 31st July 2012 with its Head Quarter at Jowai. Jowai is the host of all the heads of important governmental offices and establishments, educational institutions, hospitals, banking institutions, etc. The total area of the district is 1693 Sq.kms. The district comprises of 1(one) Civil Sub-Division Viz. Amlarem Civil Sub-Division and 3(three) Community and Rural Development Blocks viz. Amlarem C & RD Block, Laskein C&RD Block and Thadlaskein C&RD Block with the following boundaries: -

North – Assam

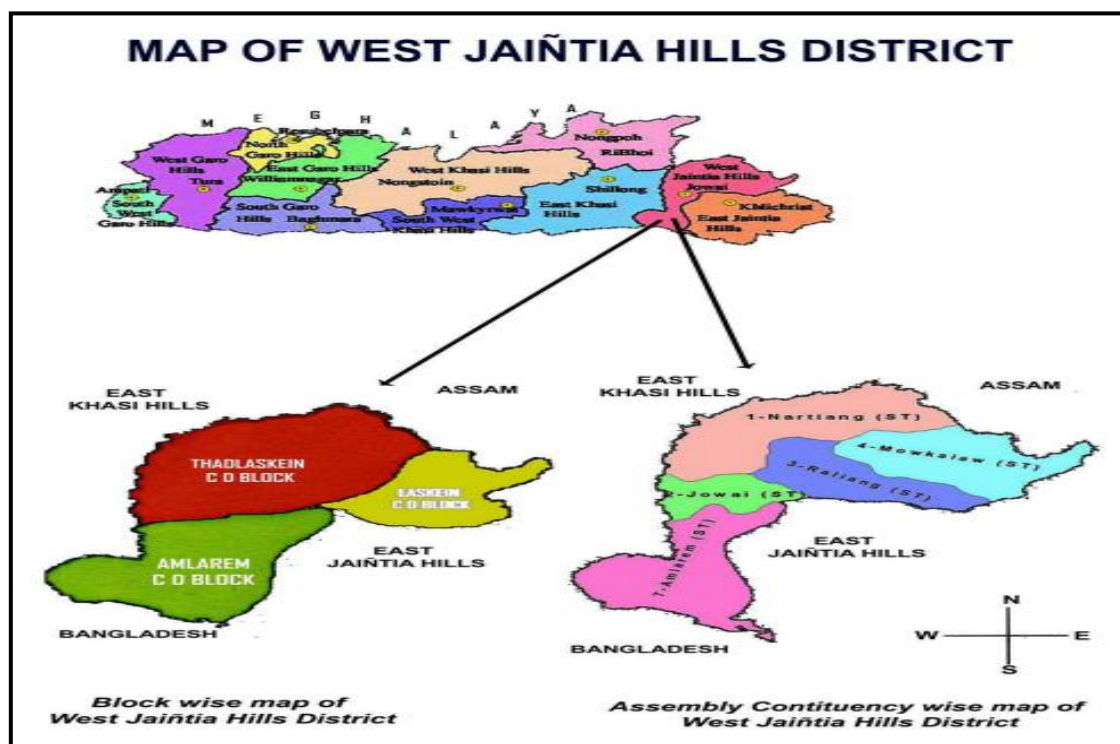
South – Bangladesh and East Jaintia Hills District

East – Assam

West – East Khasi Hills District

The district has a total population of 2,70,352, of which 1,34,406 are males and 1,35,946 are females. The density of Population is 159.69 per sq. km.

Figure 4.1(b): Location Map of West Jaintia Hills District



East Jaintia Hills District – East Jaintia Hills District is one of the 11 (eleven) districts of the state of Meghalaya. With the bifurcation of the erstwhile Jaintia Hills District into East and West Jaintia Hills Districts, East Jaintia Hills District came into existence on 31st July 2012 with its headquarter at Khliehriat. East Jaintia Hills is the home of one of the major tribes of the state of Meghalaya popularly known as the ‘Jaintias’ or the ‘Pnars’ and other sub tribes like the ‘Wars’ and the ‘Biates.

The district comprises all the villages of two Community and Rural Development Blocks viz. Saipung community & Rural Development Block and Khliehriat Community & Rural Development Block with the following boundaries: - North – West Jaintia Hills District and Assam, South – Bangladesh and Assam, East- Assam and West- West Jaintia Hills District.

Jowai is the District Headquarter of Jaintia Hills District. It is a hill stations with unique natural scenic beauty which is an ideal resort throughout the year. The district is well connected with motorable roads throughout the length and breadth.

Figure 4.1(b): Location Map of East Jaintia Hills District



4.3.1 Settlements/Villages

There are settlements/villages along the road. The main villages are given in table below.

PACKAGE-2 High Speed Corridor from Shillong to Silchar					
Sl. No	District	Name of Village	Chainage (Km)		Length (m)
			From	To	
1	West Jaintia Hills	Wahiajer	45.645	48.258	2.613
2		Mukhla Umlangshor	48.258	49.220	0.962

PACKAGE-2 High Speed Corridor from Shillong to Silchar					
Sl. No	District	Name of Village	Chainage (Km)		Length (m)
			From	To	
3		Mukhla Shohshrieh	49.220	50.000	0.780
4		Mukhla Nongrim	50.000	53.400	3.400
5		Mookaswan	53.400	55.120	1.720
6		Nongbah	55.120	58.850	3.730
7		Pasyih	58.850	61.300	2.450
8		Thadmuthlong	61.300	62.800	1.500
8a		Pasyih and Thadmuthlong	62.800	63.660	0.860
8b		Thadmuthlong	63.660	66.120	2.460
8		Thadmuthlong and Tuber Shohshrieh	66.120	66.340	0.220
1	East Jaintia Hills	Tuber Shohshrieh	66.340	67.330	0.990
2		Tuber Kmaishnong	67.330	69.100	1.770
2a		Tuber Kmaishnong and Wapung Shnong	69.100	70.600	1.500
3		Wapung Shnong	70.600	73.200	2.600
4		Wapung Skur	73.200	75.510	2.310
5		Mookhep	75.510	76.100	0.590
6		Lad Rymbai Datsympain	76.100	76.950	0.850
7		Lad Rymbai B	76.950	77.500	0.550
8		Dkhiah West	77.500	78.600	1.100
				Total	32.955

4.4 Employment Structure

As per 2011 Census, the state has a total workforce of 29,66,889 consisting of 14,91,832 male workers, 14,75,057 female workers and total non-workers are 17,81,270.

As per 2011 Census, the details of the Work force Participation in State and PIA are given in **Table 4.2.**

Table 4.2: Workforce Participation in State and PIA

STATE/PIA	Total Workers	Males	Females	Non workers
Meghalaya	29,66,889	14,91,832	14,75,057	17,81,270
<u>PROJECT INFLUENCED AREA</u>				
West Jaintia Hills	1,02,057	63,145	42,002	1,00,352
East Jaintia Hills	1,54,180	74,215	79,965	2,40,944

*Source: Census, 2011

Table 4.3: Distribution of workers by Economic Activity (%)

State/District's	Cultivators	Agricultural laborer's	Household Industry
Meghalaya	16.67	6.68	0.69
PROJECT INFLUENCED AREA			
West Jaintia Hills	52.55	15.63	1.32
East Jaintia Hills	32.98	23.20	1.30

*Source: Census, 2011

4.5 State Income

The per capita income during 2019-20 at constant 2011-12 prices (NSDP) is estimated at Rs. 66,153 while the per capita income of Rs. 62,458 was registered in financial year 2018-19. The per capita income during 2019- 20 at current prices is estimated at Rs. 92,174 while per capita income during 2018-19 stood at Rs. 84,725 at current Prices. The projected per capita income at current and constant 2011-12 prices for the year 2020-21 are roughly estimated at Rs. 99,623 and Rs. 68,848, respectively. Prices are presented in **Table 4.4**.

Table 4.4: Trends of Per Capita Income

Year	Constant Prices	Current Prices
2011-12	60,013	60,013
2012-13	59,703	64,036
2013-14	58,681	65,118
2014-15	55,880	64,638
2015-16	56,039	68,836
2016-17	57,752	73,753
2017-18	58,493	77,504
2018-19	62,458	84,725
2019-20	66,153	92,174
2020-21	69,848	99,623

*Source: Reserve Bank of India

4.6 Sectorial Growth Rate

The overall view of sectorial composition of the state economy at constant prices for 1999-2000 to 2007-08 is tabulated in **TABLE 4.5**.

Table 4.5: Sector wise Percentage Contribution of GSDP at Constant Prices (In Crores)

Components	FY02	FY05	FY07
Primary	22.99	22.58	21.94
Secondary	23.70	24.24	25.70
Tertiary	53.31	53.18	52.36

Components	FY02	FY05	FY07
Total GSDP	100.00	100.00	100.00

*Source: Directorate of Economics and Statistics, Meghalaya

Tertiary sector contributes around 52% in GSDP followed by the secondary and primary sectors both at 28% AND 22% in FY2008. Share of secondary sector in the GSDP has also shown growth, it has grown from 24% in FY2002 to 26% in the FY2007. However, the share of primary sector has come down from 23% to 21% during the same period.

4.7 Main Economic Sectors

Agriculture and allied sector

The economy of the state has been divided into three broad sectors, viz. Agriculture and Allied Activities which include Agriculture proper, livestock, fishing activities and forestry & logging; Industrial sector which includes Manufacturing, Mining and Quarrying, Construction; and Services sector. On analysing the three sectors, though Meghalaya is primarily an agriculture economy with agricultural activities engaging nearly 63% of the total workforce, yet the contribution of this sector towards the economy of the state during 1999-2000 to 2007-08 is between 18.70% and 23.96% according to NSDP estimates at current prices. The share of the Industrial sector being in the range of 21.09% to 26.42%. On the other hand, the share of service sector in terms of percentage contribution during the same periods, have been between 53.21% at the lowest and 54.95% at the highest. The summary is shown in Table below.

Table 4.6: Summary of Agro Statistics

S. No	Component	Growth/Ratio/Production
1	Agriculture GSDP at Current prices (FY2020-21)	Rs. 6,91,070 Lakhs
2	Agricultural sector's contribution to State's GDP (FY 2020)	20.17 %
3	Food Grains Production (FY2019)	360.8 (Thousand Tonnes)
4	State's contribution to national food grain production (FY2019)	0.09%
5	State's rank in national food grains production (FY2018)	26
6	Cropping Intensity (FY2018-19)	122.4%
7	Gross area Irrigated (FY 2018-19)	142.0 (Thousand Hectare)
8	Gross sown area (FY2018-19)	312.0 (Thousand Hectare)
9	Population dependent on agriculture	70%
10	Rice Production (FY 2019)	303.4 (Thousand Tonnes)
11	Wheat Production (FY2019)	0.9 (Thousand Tonnes)
12	Coarse Cereals (FY2019)	44.5 (Thousand Tonnes)
13	Pulses (FY2019)	8.3 (Thousand Tonnes)
14	Oilseeds (FY 2019)	15.1 (Thousand Tonnes)
15	Fruits (FY2019)	393.5 (Thousand Tonnes)
16	Raw Jute & Mesta (FY2019)	95.0 (Thousand Tonnes)

*Source: Ministry of Agriculture and Farmers Welfare, Government of India

Meghalaya's food grain production has shown good growth during the last decade. It has grown more than 23% between FY2009 and FY2019. During FY2009, food grain production of Meghalaya was 236.3 thousand tonnes, which has increased to 260.7 thousand tonnes in the FY2019 as shown in **Table below**.

Table 4.7: Food Grain Production in Meghalaya (Thousand Tones)

Year	Meghalaya	India	Share of Meghalaya in India (%)
FY 2009	236.3	234466.2	0.10
FY 2010	239.2	218107.4	0.10
FY 2011	239.0	244491.8	0.09
FY 2012	249.1	259286.0	0.09
FY 2013	265.0	257124.7	0.10
FY 2014	320.0	265047.7	0.12
FY 2015	353.8	252025.0	0.14
FY 2016	357.7	251541.6	0.14
FY 2017	260.1	275111.7	0.09
FY 2018	361.8	285013.2	0.12
FY 2019	260.7	285209.4	0.09
FY 2020	353.8	252025.0	0.14
FY 2021	360.8	297504.5	0.12

**Source: - Ministry of Agriculture and Farmers Welfare, Government of India*

Due to hilly terrain, food grains cannot be cultivated on large areas in Meghalaya, more over the yield per hectare is also relatively low in the state, as a result the production of food grains in the state is low and share of Meghalaya in India's food grain production is stagnant at around 0.1% over the last few years.

Industries

Keeping in view the fact that the state of Meghalaya lags in industrial development, a need had been felt for structured interventionist strategies to accelerate industrial development of the state and boost investor's confidence. The industrial policy of 2012 was instituted with this view and it has been extended till 20 December 2022 to sustain the process of industrial progress with additional MIIPS 2016 Scheme. The state had laid great stress on ensuring that the incentives and subsidies reached the genuine industrialists without much loss of time. The new initiatives would provide the required incentives as well as an enabling environment for industrial development; it would improve availability of capital and increase market access to provide a fillip to the private investment in the state.

Highlights of Industrial policy

- Developing world class infrastructure is essential for speedy industrial development. The policy lays emphasis on inviting private sector to participate in infrastructure development.
- With a view to encourage industrialization of the backward blocks of the state, the Capital Investment Subsidy (CIS) under state's incentive package shall be extended to these blocks. The CIS of the state is attractive, and it makes provision for a 30% subsidy subject to a limit of Rs. 100 lakhs and the definition of investment is more comprehensive.

- Enterprises will be reimbursed 100% on the amount of GST actually paid on purchases of such machinery and equipment's which are genuinely required as is installed up to the date of commissioning of the unit subject to a ceiling of Rs.100.00 lakhs. The above said concession shall be extended to State GST only.
- Subsidy on interest payments to Banks/Financial Institutions will be provided at the rate of 4 % (four percent) with a ceiling of Rs.30000.00 per month on term loans (excluding working capital loans) availed by an entrepreneur for setting up of approved enterprises for a period of 3 (three) years from the date of disbursement of the loan.
- 50 % of the cost of approved pollution control measures will be reimbursed up to a maximum of Rs.25.00 lakhs per unit.
- Export Oriented Units exporting minimum 25% of its installed capacity for at least 3 consecutive years, shall be given additional 15% capital investment subsidy subject to a maximum of Rs.50 lakhs.
GSDP for industrial sector.

Transport

Transport plays a vital role in the economic and social development of the state. The state is served by road, rail, and air. Road is the predominant mode with a network spread over the entire state and plays an important mode for inter-city and inter-regional movement, as also the most economic for short and medium haul traffic.

Table 4.8: Net State Domestic Product by Industry of Origin: 2011-12 to 2016-17 at Constant (2011-12) Prices in Lacs

SL. No	Industry	2011-12	2012-13	2013-14	2014-15 (P)	2015-16 (Q)	2016-17 (Adv)
1	Agriculture	204717	234615	244101	250679	262835	276484
2	Forestry & Logging	55478	54078	55209	55665	55947	56512
3	Fishing	3602	4353	4678	4942	9281	11121
Sub-total (Agriculture and allied activity)		263797	293046	303988	311286	328063	344117
4	Mining & Quarrying	122605	100061	140983	61928	63315	64492
5	Manufacturing	426023	422228	338181	356714	381478	405157
6	Construction	108427	91971	93689	109384	111810	112844
7	Electricity, Gas, Water Supply & Utilities Services	37234	31555	36781	34197	34496	35596
Subtotal		694289	645815	609634	562223	591099	618089

SL. No	Industry	2011-12	2012-13	2013-14	2014-15 (P)	2015-16 (Q)	2016-17 (Adv)
8	Transport, Storage and Communication	70884	79030	77804	79609	90714	107013
9	Trade, Hotel and Restaurant	252217	292209	320980	320476	349648	379902
10	Banking and Insurance	54943	54468	54513	60309	64022	67373
11	Real Estate, Ownership of Dwellings and Business Services	94498	94995	96137	99190	105174	107412
12	Public Administration	137555	130380	136201	150551	149481	158580
13	Other Services	135067	137905	146575	164375	182066	201596
Subtotal		745123	788986	832210	874509	941105	1021876
14	Net State Domestic Product	1703209	1727848	1745831	1748018	1860267	1984083
15	Population (Projected Mid-Year figure as per 2011 Census)	3004	3069	3135	3202	3271	3341
16	Per Capita Income (in Rs.)	56698	56300	55688	54591	56872	59386

*Source: - Directorate of Economics and Statistics, Meghalaya.

Road Transport

Meghalaya has a road network of around 7,633 km, out of which 3,691 km is black-topped and the remaining 3,942 km is gravelled. Meghalaya is also connected to Silchar in Assam, Aizawl in Mizoram, and Agartala in Tripura through national highways. The Meghalaya State Transport Corporation operates public bus services in the state owned by the state government. It operates hundreds of buses connecting different parts of the state even to small villages due to presence of huge network of roads. The central government has attached high priority to the development and up-gradation of its vital road network. is shown in **Table below**.

National Highways that pass-through Meghalaya include NH 6, NH 106, NH 206 & NH 217.

Table 4.9: Road length (km) by category of road in Meghalaya

Category of Road	Length in KM
National Highways	1205.338
State Highways	751.59
Major district Roads	1433.904

Category of Road	Length in KM
Other District Roads	3299.237
Village Roads (State)	2072.207
Village Roads (P.M.G.S.Y)	549.221
Urban Roads	355.351
Total	9666.848

*Source: - As on 31-03-2015, Meghalaya P.W.D.(Roads)

Economic Perspective-Project Area Economies

Meghalaya is predominantly an agrarian economy. Agriculture and allied activities engage nearly two-thirds of the total workforce in Meghalaya. However, the contribution of this sector to the State's NSDP is only about one-third. Agriculture in the state is characterized by low productivity and unsustainable farm practices. Despite the large percentage of the population engaged in agriculture, the state imports food from other Indian states. Infrastructural constraints have also prevented the economy of the state from creating high-income jobs at a pace commensurate with that of the rest of India. Meghalaya's gross state domestic product for 2012 was estimated at Rs.16,173 crore in current prices. As of 2012, according to the Reserve Bank of India, about 12% of total state population is below poverty line, with 12.5% of the rural Meghalaya population is below the poverty line; while in urban areas, 9.3% are below the poverty line.

Meghalaya, being part of the Northeast India, also has some unique economic disadvantages arising out of remoteness and poor connectivity, hilly and often inhospitable terrain, vulnerability to natural disasters, a weak resource base, poor infrastructure, and shallow markets. Taken together, all these factors have resulted in low economic activity, low employment and low-income generation. These economic disadvantages have substantial implications for the size and nature of the development problem and for the approach to be adopted.

Gross fiscal deficit of Meghalaya was close to Rs. 978 Crores in FY2014 and then it rose to Rs. 1151 Crores (Revised Estimates) in FY2018. In the FY2019, it has gone to Rs 1323 Crores (Budget Estimates).

Meghalaya has taken a fast leap in providing a conducive investment environment it offers boundless investment opportunities to the prospective investors. It has attracted industrial investment proposals of more than Rs. 468.55 crores in the fourth census (2006-07). State has rich resources of water, agro, forests, herbal and minerals in addition to its unparalleled natural beauty with tremendous potential for investment in tourism sector.

CHAPTER-5

TRAFFIC SURVEY AND ANALYSIS

5.1 Traffic Surveys – Background & Prologue

Traffic surveys have been conducted previously at various locations and after analysis of various data simulated from traffic surveys on ground, final traffic on project corridor and existing counterpart has been prepared. It is also highlighted that PMO has accorded the approval of project work with Lane-configuration, future prospects and other features of the flow of traffic. To avoid data misinterpretation and ambiguities in this reference, traffic established for finalisation of various project related proposals, is presented in sections ahead in this chapter. All data pertaining to various traffic surveys has already been presented and submitted at all levels of NHIDCL. It is therefore relevant to include the most relevant data features at this stage.

5.2 Traffic Surveys Analysis

5.2.1 AADT or Annual Average Daily Traffic

AADT or Annual Average daily traffic which forms the basis of all projections and relevant design for project work is presented below for year of 2023, 2025 (present year) and 2030 (year considered for road opened to traffic flow). Table below can be referred for AADT break-up considered for High-Speed Corridor or HSC. It is evident that traffic quantum upto 2029 year will undoubtedly include total traffic and from 2030 and onwards, traffic will be bifurcated for HSC and existing NH-06 alignment. Therefore, 2030-year data presents the traffic volume on HSC along with that plying on existing alignment after opening of project facility in this year.

Table 5.1: PCU Factors as per IRC 64

Sr. No.	Vehicle Type		PCU Factor
1	Two-Wheeler		0.50
2	Car/Jeep/ Van/Taxi/ Auto		1.00
3	BUS	Mini	1.50
4		Standard	3.00
5	LCV		1.50
6	Truck	2-Axle	3.00
7		3 -Axle	3.00
8		Multi-Axle/ with Trailer	4.50
9	Agricultural	With Trailer	4.50
10	Tractor	Without Trailer	1.50
11	Cycle		0.50
12	Cycle Rickshaw		2.00
13	Hand Cart		3.00
14	Animal Drawn	Bullock Cart	8.00
15		Horse	4.00

The summary of AADT, as observed on the Project Road, in terms of numbers of vehicles and PCU are given in the **Table 5.3**.

Table 5.2: Summary of Annual Average Daily Traffic AADT (Nos) and AADT (PCU) (Year-2023 & 2025)

Traffic Composition	AADT (Nos)	AADT (PCU)	AADT (Nos)	AADT (PCU)
	Year 2023		Year 2025	
Two-Wheeler	164	82	181	91
Three-Wheeler/ Auto	1	1	1	1
Car/Jeep/Van/ Taxi	4637	4637	5112	5112
Mini Bus	13	19	14	21
Bus	32	96	35	106
LCV	657	986	725	1087
2-Axle Truck	1369	4108	1510	4529
3-Axle Truck	421	1263	464	1392
M-Axle Truck	1466	6598	1617	7275
Tractor With Trailer	1	2	1	3
Tractor Without Trailer	2	2	2	3
Total Fast-Moving Vehicles (FMV)	8763	17795	9661	19619
Cycle	10	5	11	5
Cycle Rickshaw	0	0	0	0
Hand Cart	0	0	0	0
Bullock Cart	0	0	0	0
Horse Cart	0	0	0	0
Total Slow-Moving Vehicles (SMV)	10	5	11	5
Total	8773	17800	9672	19624
CVPD	3959	—	4364	—
Toll-able Traffic	8595	17707	9476	19522

Table 5.3: Summary of Annual Average Daily Traffic AADT (Nos) and AADT (PCU) on Existing NH-06 (Year-2030)

Traffic Composition	AADT (Nos)	AADT (PCU)	AADT (Nos)	AADT (PCU)
	Year 2030 (Existing NH-06)		Year 2030 (High Speed Corridor)	
Two-Wheeler	46	23	185	93
Three-Wheeler/ Auto	0	0	1	1
Car/Jeep/Van/ Taxi	1305	1305	5219	5218

Traffic Composition	AADT (Nos)	AADT (PCU)	AADT (Nos)	AADT (PCU)
	Year 2030 (Existing NH-06)		Year 2030 (High Speed Corridor)	
Mini Bus	4	5	14	22
Bus	9	27	36	108
LCV	185	277	740	1110
2-Axle Truck	385	1156	1542	4625
3-Axle Truck	118	355	474	1422
M-Axle Truck	413	1857	1651	7428
Tractor With Trailer	0	1	1	3
Tractor Without Trailer	0	1	2	4
Total Fast-Moving Vehicles (FMV)	2466	5008	9864	20032
Cycle	3	1	11	6
Cycle Rickshaw	0	0	0	0
Hand Cart	0	0	0	0
Bullock Cart	0	0	0	0
Horse Cart	0	0	0	0
Total Slow-Moving Vehicles (SMV)	3	1	11	6
Total	2469	5009	9875	20037
CVPD	1114	—	4456	—
Toll-able Traffic	2419	4983	9676	19932

5.2.2 Vehicle Damage Factor

Values of the VDF for different sections are presented below:

Table 5.4: VDF observed on the Project Road

TYPE OF VEHICLES	Vehicle Damage Factor
	Adopted
M-Axle	10.00
3-Axle Truck	7.00
2-Axle Truck	3.00
Bus	0.40
Mini Bus	0.02
LCV	0.01



5.3.6 Traffic Projections

AADT has been projected adopting a growth of 5% from this instance and table below can be referred for yearly data summary.

Table 5.4: Traffic Forecasts for HSC (from 2030 Onwards)

Year	FAST MOVING VEHICLES											SLOW MOVING VEHICLES					Total (No)	Total (PCU)	Design Year/ Remark
	Two-Wheeler	Three-Wheeler/ Auto	Car/ Jeep/ Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	Tractor With Trailer	Tractor Without Trailer	Cycle	Cycle Rickshaw	Hand Cart	Bullock Cart	Horse Cart			
2030	185	1	5219	14	36	740	1542	474	1651	1	2	11	0	0	0	0	9875	20037	1
2034	225	1	6344	17	44	899	1874	576	2006	1	2	13	0	0	0	0	12003	24355	5
2039	287	2	8097	22	56	1148	2391	735	2561	1	3	17	0	0	0	0	15320	31084	10
2044	367	2	10334	28	71	1465	3052	938	3268	1	4	22	0	0	0	0	19552	39672	15
2049	468	3	13189	36	91	1870	3895	1198	4171	2	5	28	0	0	0	0	24954	50633	20

Table 5.11: MSA CALCULATION SHEET.

Year	Mini Bus	Bus	LCV	2 Axle	3 Axle	M Axle	Total yearly CVs (nos.)	Cumulative yearly CVs (nos.)	Yearly Design ESA	Cumulative Design ESA	MSA	Design year
VDF	0.022	0.403	0.013	3.000	7.000	10.000						
Considering 50% of CPVD in each direction												
2030	7	18	370	771	237	825	813262	813262	3349620	3349620	3	1
2034	9	22	450	937	288	1003	988525	4493787	4071484	18508763	19	5
2039	11	28	574	1196	368	1280	1261637	10229124	5196360	42131157	42	10
2044	14	36	732	1526	469	1634	1610203	17549029	6632018	72279982	72	15
2049	18	45	935	1948	599	2085	2055073	26891290	8464322	110758372	110	20

5.3.8 Pavement Crust Thickness of Flexible Pavement for New Construction

As per Pavement Design Catalogue of IRC 37: 2018, flexible pavement thickness required is as follows:

Table 5.12: Proposed Flexible Pavement Composition

Section	Design Period (Years)	Adopted MSA	CBR (%)	Pavement Crust Compositions				
				BC (mm)	DBM (mm)	WMM (mm)	CTSB (mm)	Total (mm)
Main C/w (HSP)	20	110	minimum sub grade CBR of 8% and maximum subgrade CBR of 10%.	As per Technical Schedule				
Ramps/ Approach Roads	20	50	minimum sub grade CBR of 8% and maximum subgrade CBR of 10%.	As per Technical Schedule				

Note: Design MSA adopted for Service Roads/Ramps/Approach Roads as per NHAI Policy Circular No. 11.54/2023, dtd.30.10.2023

Calculation of Elastic Modulus values for Layers has been presented below:

S. No.	Layers	Elastic Modulus (MPa)	References
1.	BC with modified with bitumen	1600	Table 9.1 of IRC 37-2018
2.	DBM	350	Table 11.1 of IRC 37-2018
3.	WMM	600	Table 11.1 of IRC 37-2018
4.	CTSB	3000	Table 11.1 of IRC 37-2018
5.	Subgrade	71.82	Derived as per IRC 37- 2018

The calculated pavement thicknesses have been checked by **IIT-PAVE** software.

Note: All calculations have been done as per IRC-37.

CHAPTER-6

IMPROVEMENT PROPOSALS

6.1 General

As discussed earlier in this report, high speed corridor will be developed as a 4-lane facility throughout the length. This chapter deals with proposals such culverts, CD structure, crossing/access facilities, cross sections along length, flyovers, protection measures etc are presented ahead in this chapter.

This corridor will be developed having controlled access at pre-determined places only and no direct merging/diverging is provided throughout. Suitable length provision for service roads/ramps etc. has been proposed near access points.

For the ease of traffic movement and construction of the project road alignment has been designed in way that the project road packages traffic movement of proposed section can access the existing road. This arrangement will help in traffic movement while construction of adjacent packages. Public facilities have also been provisioned at appropriate locations.

Design of the project roads includes following design components:

- Present traffic and future projections;
- Analysis and design of pavement;
- Determination of requirements for the new pavement;
- Determination of adequacy of the hydraulic capacity and structural parameters of the existing structures;
- Determination of adequacy of the road's geometry (horizontal as well as vertical)
- Determination of adequacy of intersections and improvement measures; and
- Ensuring road safety aspects and these are addressed through provision of traffic control devices, roadside furniture and project facilities.

6.2 Alignment and Geometry

Table 6.1: Summary of Horizontal Geometric Alignment

Sr. No.	Radius (m)	Design Speed (Km/hr.)	Detail of Horizontal Curves. (Nos.)	Length (m)	Percentage (%)
1	75-399	Below 80	0	0	0.00%
2	400-500	80	22	7320	22.21%
3	501-600	80	6	1463	4.44%
4	601-700	80	1	318	0.97%
5	>701	80	14	2190	6.65%
	Transition Length			3740	11.35%
	Straight Length			17923	54.39%
	Total			32955	100.00%

Table 6.2: Summary of Vertical Geometric Alignment

Sr. No.	Gradient (%)	Length (m)	Percentage (%)
1	<3%	15606	47.36%
2	3-4%	1586	4.81%
3	4-5%	391	1.19%
4	5-6%	0	0.00%
5	More than 6%	0	0.00%
	Curve Length (m)	15373	46.65%
	Total (m)	32955	100.00%

Note: It may also be mentioned that complete vertical profile has been duly designed as per IRC SP 23 specifications by adopting adequate length, sight distance etc. and no unrequired curve (Horizontal/Vertical) has been proposed in geometry.

6.3 Proposed Right of Way (ROW)

PROW has been worked out considering a uniform length of a single PROW, otherwise it would change at every 10 m interval and thereby making the field JMS processes very cumbersome. This has been duly finalized with consensus and directives of the authority. Proposed ROW will be as per the table given below:

Table 6.3: Proposed Right of Way (ROW)

For Main Carriageway

As per Schedules

1. Interchange At Ch. 54+750 Km (SH -09 Crossing)

S. No.	Chainage (m)		Length (m)	RoW Width (m)		Total Width (m)
	From	To		Left	Right	
1	0	100	100	25	25	50
2	230	350	120	25	25	50
3	350	530	180	17	17	34

2. Interchange At Ch. 64+970 Km (SH-07 Crossing)

S. No.	Chainage (m)		Length (m)	Row Width (m)		Total Width (m)
	From	To		Left	Right	
1	0	110	110	15	15	30
2	110	200	90	29	29	58
3	360	460	100	29	29	58
4	460	570	110	20	20	40

3. Interchange At Ch. 77+750 Km (NH-06 Crossing)

S. No.	Chainage (m)		Length (m)	Row Width (m)		Total Width (m)
	From	To		Left	Right	
1	100	170	70	20	20	40

2	170	220	50	27	34	61
3	390	470	80	28	39	67
4	470	585	115	20	24	44

6.4.0 Cross Section Details

Proposed configuration is 4-lane with paved shoulder proposed pavement is flexible type. The Project Highway shall involve the new construction of a four-lane configuration with paved shoulders. It will be a controlled-access facility, with entry and exit points strategically limited to prevent congestion and ensure a high-speed corridor. Typical cross sections required to be developed in different sections of the Project Highway are given below:

Typical Cross section for the project road section has been provided in the Appendix-VII.

Table 6.4: Summary of proposed Typical Cross-sections

As per Schedule B

Above listed TCS are provided appropriately at various locations for the length of PKG-02 corridor. Chainage wise details of each type of TCS are presented in Annexure-01.

Interchanges (IC)

Sr. No.	Design Chainage (km)	Name of Structure	Span Arrangement (m)	Total Width (m)	Typical Cross Section	Remarks
1	54+780	Elongated Elevated Rotary	As Per GAD			Interchange-01
2	65+010	Elongated Elevated Rotary	As Per GAD			Interchange-02
3	77+705	Elongated Elevated Rotary	As Per GAD			Interchange-03

Note: Layout, Geometric Design and Typical Cross Sections of Interchange are included in Annexure to Schedule-B.

Interchanges have been provided at following locations-

Sr. No.	Junction Chainage/Type	Ramps/Loop	Direction (From-To)	Design Speed (Km/hr.)	Gradient	Remark
1.	54.760/Grade Separated with	Ramp-01	Barapani-SH-09	40	0.32% - 1.82%	Minimum speed as per



Sr. No.	Junction Chainage/Type	Ramps/Loop	Direction (From-To)	Design Speed (Km/hr.)	Gradient	Remark
	SH-09.					code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Ramp-02	SH-09 Towards Silchar	40	0.30%- 0.62%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Ramp-03	Silchar towards SH-09	40	0.43% to 6.69%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Ramp-04	SH-09 towards Barapani	40	0.32% to 6.69%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Existing SH-09		40	0.30% to 6.62%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Rotary Interchange		30	0.30% to 0.37 %	Minimum speed as per code is 30 kmph. Elongated Elevated



Sr. No.	Junction Chainage/Type	Ramps/Loop	Direction (From-To)	Design Speed (Km/hr.)	Gradient	Remark
						Rotary type design recommended.
2.	64.970/Grade Separated with SH-07	Ramp-01	Barapani to SH-07 & NH-06	40	0.56% to 3.30%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Ramp-02	SH-07 & NH-06 to Silchar	40	0.30% to 3.79%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Ramp-03	Silchar to SH-07 & NH-06	40	0.48% to 5.20%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Ramp-04	SH-07 & NH-06 to Barapani	40	0.43% to 4.11%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Existing SH-09		40	0.38% to 5.84%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Rotary		30	0.30% to	Minimum

[Signature]
Team Leader



Sr. No.	Junction Chainage/Type	Ramps/Loop	Direction (From-To)	Design Speed (Km/hr.)	Gradient	Remark
		Interchange			0.32%	speed as per code is 30 kmph. Elongated Elevated Rotary type design recommended.
3.	77.705/Grade Separated with NH-06	Ramp-01	NH-06 towards Barapani	40	0.33% to 3.95%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended.
		Ramp-02	Barapani towards NH-06	40	0.34% to 4.50%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended
		Ramp-03	NH-06 towards Silchar	40	0.51% to 0.97%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended
		Ramp-04	Silchar towards NH-06	40	0.43% to 1.44%	Minimum speed as per code is 40 kmph. Elongated Elevated Rotary type design recommended
		Existing SH-09		40	0.19% to 5.99%	Minimum speed as per code is 40 kmph. Elongated

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Team Leader

Sr. No.	Junction Chainage/Type	Ramps/Loop	Direction (From-To)	Design Speed (Km/hr.)	Gradient	Remark
						Elevated Rotary type design recommended.
		Rotary Interchange		30	0.30% to 0.33%	Minimum speed as per code is 30 kmph. Elongated Elevated Rotary type design recommended.

6.4.1 Lane Width

The width of a basic traffic lane is 3.5 m.

6.4.2 Shoulders

The shoulder width as per meeting held in RO Shillong in presence of all level field authorities on dtd. 18.07.2025. Latest available MoRT&H circulars were also apprised during the meeting for adoption of Shoulder and Median width. Cost and safety issues were thoroughly discussed with respect to shoulder and median.

The width adopted is presented in table below with relevant reference:

Table 6.6: Width of shoulders

Sr. No.	Width of shoulder (m)		
	Paved Shoulder	Earthen Shoulder	Median Width including Shyness (m)
1.	1.50 m	1.50 m	5.0 m

Note: Shoulder width finalized as per discussion and directives from the authority.

6.4.2.1 Side Slopes

The side slopes shall not be steeper than 2H:1V. In case, there is a ROW constraint than, suitable soil retaining structures shall be provided.

For stability of slope upto 3 metre height the turfing can be adapted. For the slope from 3-6 metre suitable, geocell, geo-grid, geo-green etc. can be provided with suitable drainage chutes and suitable energy dissipaters as per IRC 56. For the slope more than 6 metre height, a complete slope stability analysis as per IRC:75 shall be done, and the slopes shall be compulsory protected with stone pitching within stone

masonry grid structure of 4x4 metre and suitable drains/chutes and energy dissipaters etc. shall be provided for effective drainage of the water.

Where pond ash is used for embankment construction, the embankment shall be designed and constructed in accordance with IRC: SP: 58 (Clause No. 4.2.4 & 4.4.4.i (d) IRC: SP: 84- 2019).

For fill sections, the following side slopes are proposed:

- Embankment height up to 3.0 m - 2.0H: 1V
- Embankment height from 3.0 m to 6.0 m - 2.0H: 1V
- Embankment height exceeding 6.0 m-To be designed based on IRC-75.

6.4.3 Camber/Cross-fall

Each carriageway will have unidirectional cross-fall. The cross-fall for the flexible pavement/paved shoulder is 2.5% and for earthen shoulders the cross-fall is 3.0 %.

6.5 Pavement Design

Refer traffic report for details. Recommended thickness of Flexible pavement is summarized in table below: -

Section	Design Period (Years)	MSA	CBR (%)	Flexible Pavement Crust Composition				
				BC (m)	DBM (m)	WMM (m)	CTSB (m)	Total (m)
Main C/w (HSC)	20	110	minimum sub grade CBR of 8% and maximum subgrade CBR of 10%.	As per Technical Schedules				
Ramps/ Approach Roads	20	50	minimum sub grade CBR of 8% and maximum subgrade CBR of 10%.	As per Technical Schedules				

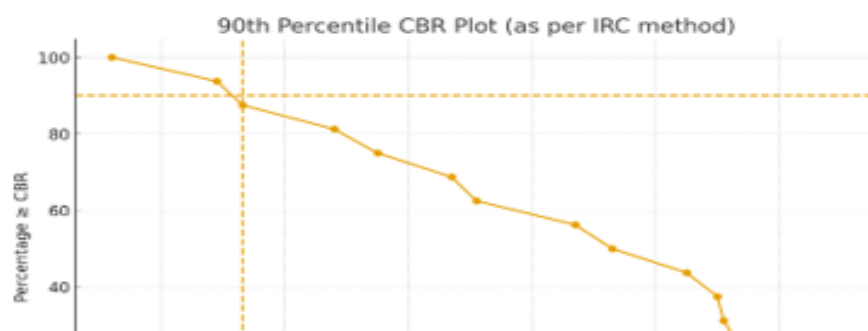
Calculation of the 90th percentile CBR values for Subgrade:

Prepare a plot with CBR values on the horizontal axis and the percentage of samples having CBR $\geq$ that value on the vertical axis. Then, locate the point where the curve intersects the 90% level on the vertical axis. The corresponding CBR value on the horizontal axis will be taken as the 90th-percentile design CBR. If this point falls between two data values, you may determine the CBR by linear interpolation.

Given 16 average CBR values:

3.6, 5.4, 8.5, 6.35, 8.95, 4.45, 6.55, 4.66, 9.5, 5.75, 8.55, 8.25, 7.35, 8.67, 8.85, 7.65

Sorted ascending and computing $\% \geq$ for each value and plotting yields the 90th percentile CBR $\approx$ 4.56% (IRC example)



Calculation of Elastic modulus for various layers have been presented below –

S. No.	Layer	Modulus	Reference
1.	BC with Modified Bitumen	1600	Table 9.1 of IRC 37-2018
2.	DBM	3000	Table 11.1 of IRC 37-2018
3.	WMM	350	Table 11.1 of IRC 37-2018
4.	CTSB	600	Table 11.1 of IRC 37-2018
5.	Subgrade	71.82	Subgrade-derived as per IRC 37-2018

6.5.1 Design CBR Value

Effective CBR value minimum sub grade CBR of 8% and maximum subgrade CBR of 10%.

6.6 Interchanges/Access Provisions

Typical Interchanges access provision's locations for PKG-02 are as follows: -

Table 6.11: List of Access Points

Sr. No.	Chainage (Km)	State	Remark
1	Interchange At Ch 54.760 Km	Meghalaya	Access to SH
2	Interchange At Ch 64.970 Km	Meghalaya	Access to SH
3	Interchange At Ch 77.705 Km	Meghalaya	Access to NH

Details of Ramps, Crossroads and Connecting Roads at Interchanges (IC)

Sr.No.	Carriageway Widths including Kerb Shyness (m)	Length (m)	Description of Ramps, Crossroads and Connecting Roads	Remarks
1	9.5	660	Ramp-01	Interchange-01
2	9.5	543	Ramp-02	
3	9.5	684	Ramp-03	
4	9.5	632	Ramp-04	
5	10	529	Existing Road SH-09 including Rotary	
6	12	541	Rotary	Interchange-02
7	12	541	Rotary	
8	9.5	780	Ramp-01	
9	9.5	960	Ramp-02	
10	9.5	879	Ramp-03	
11	9.5	819	Ramp-04	Interchange-03
12	10	572	Existing Road SH-07 including Rotary	
13	12	541	Rotary	
14	9.5	842	Ramp-01	
15	9.5	813	Ramp-02	
16	9.5	595	Ramp-03	Interchange-03
17	9.5	629	Ramp-04	
18	10	585	Existing Road NH-06 including Rotary	

6.7 Preconstruction Activities (Land Acquisition, Tree Felling & Utility Shifting)

Assessment of quantum of land that has to be acquired for development of PKG-02 is presented ahead in this article. Cost of land acquisition has been calculated as per circle rates available by now from various districts by adopting a multiplication factor of 2. However, the cost of structures/buildings, utilities, tree felling etc. has been adopted as per experience.

Note- The Land Circle rates of the villages were obtained from the DC's office, Revenue Division. The basic calculation was performed by multiplying the land area to be acquired by the Land Circle rate of the respective village. The multiplication factor was adopted from the notification issued by the Government of Meghalaya, Revenue and Disaster Management Department, dated 10th September 2014 (Letter No. RDA.27/2014/5). Further details are provided in Main Report of the DPR. (Actual compensatory amount is under preparation by state administration).

Land Acquisition, Tree Felling & Utility Shifting summary is tabulated below:

Table 6.12(A): Cost Abstract of Preconstruction Activities

SI. NO.		ITEM	Unit	Quantity
1	1.a	Land Acquisition (Greenfield)	Hect.	241.06
2	2.a	Environmental Impact Mitigation measures Tree Plantation with tree guard and maintenance	LS	
	2.b	Utility Shifting	LS	

Note: Actual amount for LA etc. and Utility Shifting is in process and will be presented by respective stakeholders.

Table 6.12(B): Cost Abstract of Land Acquisition

Actual amount for LA etc. is in process and will be presented by respective stakeholders.

6.8 Proposal for structures

The detail of proposal of structures is provided in the table below:

Table-6.13: Summary of CD Structure on the proposed alignment

For Main Carriageway

S. No.	Type of Structure	New Proposed
1	Major Bridge	1
2	Minor Bridge	20
3	Viaduct	11
4	Box Culvert	123
5	VOP	11
6	VUP	1

S.	Type of Structure	New Proposed
7	LVUP	0
8	SVUP	3
9	Utility underpass	1
10	Overpass	20
11	Underpass	5
Total		196

For Interchanges

S. No.	Type of Structure	New Proposed
1	Major Bridge	Nil
2	Minor Bridge	06
3	Viaduct	07
4	Box Culvert	17
5	VOP	04
6	VUP	03
7	LVUP	Nil
8	SVUP	Nil
9	Utility underpass	Nil
10	Overpass	02
11	Underpass	Nil
Total		39

VUP- Vehicular Underpass

VOP – Vehicular Overpass

SVUP-Small VUP

MNB- Minor Bridge

MJB- Major Bridge

LVUP-Light VUP

Table 6.14: Proposal of Structures

As per Schedules

6.9 Road Furniture and other Wayside Amenities

The road furniture's, traffic safety features and other facilities included in the design are:

- Road Markings
- Kilometer stones & hectometer stones
- Road signs (Cautionary, Mandatory and Informatory Signs)
- Crash Barrier

6.9.1 Road Markings

Road markings perform the important function of guiding and controlling traffic on a highway. The markings serve as psychological barriers and signify the delineation of

traffic paths and their lateral clearance from traffic hazards for safe movement of traffic. Road markings are therefore essential to ensure smooth and orderly flow of traffic and to promote road safety. The Code of Practice for Road Markings, IRC: 35 has been used in the study as the design basis. The location and type of marking lines, material and colour is followed using IRC: 35 – “Code of Practice for Road Markings”.

Edge Marking: Continuous 0.15m wide white strip both side at road edge throughout the length.

6.9.2 Road Signs (Cautionary, Mandatory and Informatory Signs)

Cautionary, mandatory, and informatorily signs have been provided depending on the situation and function they perform in accordance with the IRC: 67 guidelines for Road Signs and MoRT&H circular No. 602.58 File No. RT-25035/07/2023-RS (Part) (221534) dtd. 24.12.2024 - Guidelines For Provision of Signages on Expressways and National Highways.

Table 1: Size and Dimension of Mandatory Sign

Design Speed	Diameter (mm)	Border (mm)	Oblique Bar (mm)
81-120 kmph	1200	100	100
121-150 kmph	1500	125	125

*Oblique Bar will come to indicate in prohibition

6.9.3 Kilometer Stone Details

The details of kilo-meter stones are in accordance with IRC:8-1980 guidelines. Kilo-meter stones are located on the left-hand side of the road as one proceeds from the station from which the Kilo-meter count starts. Kilo-meter stones shall be fixed at right angles to the Centre line of the carriageway.

6.9.6 Proposed Slip/Service Road Section

Proposed Service Road Section have been proposed at access locations in form of ramps/loops. Details of Interchanges Section can be referred Table-6.14.

6.9.7 Metal Beam Crash Barriers

The safety measures shall be provided at all hazardous/sinking/land slide locations. The safety barriers (Thrie-beam Crash barriers) shall also be provided at the following hazardous structure (Bridges, culverts) locations where the embankment height is greater than 3.0m. semi-rigid barriers are not provided on valley side of the road at such locations where valley is present immediately next to carriageway.

The Thrie-Beam Crash Barrier is proposed along the median, with its front face aligned flush with the face of the raised median. Additional crash barriers are provided at locations where the embankment height exceeds 3m, at sharp curves, and near structure approaches. The chainage-wise locations of these barriers are provided Details are tabulated below.

Table 6.16: Proposed location of Metal Beam Crash Barrier

As per modified schedules

6.9.9 Lined drain

Lined drain has been proposed in cut sections. Due to high design speed of the project corridor, all length of lined drain has been covered. various locations of proposed covered lined drain are given below:

Table 6.17: Proposed Locations of Lined drain

LEFT			RIGHT			Min bottom Width x Min Depth of Drain (m)
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)	
45+645	46+440	795	45+645	46+440	795	1.2X1.2
47+100	47+240	140	46+560	46+600	40	1.2X1.2
47+280	47+320	40	46+640	46+840	200	1.2X1.2
47+500	47+660	160	47+040	47+080	40	1.2X1.2
47+740	47+940	200	47+100	47+320	220	1.2X1.2
48+160	48+180	20	47+400	47+660	260	1.2X1.2
48+220	48+274	54	47+700	47+920	220	1.2X1.2
48+780	49+020	240	48+060	48+100	40	1.2X1.2
49+360	50+040	680	48+120	48+274	154	1.2X1.2
50+080	50+100	20	48+800	49+040	240	1.2X1.2
50+140	50+572	432	49+380	50+060	680	1.2X1.2
50+620	50+880	260	50+180	50+542	362	1.2X1.2
51+180	51+220	40	50+620	50+880	260	1.2X1.2
51+240	51+380	140	51+140	51+400	260	1.2X1.2
51+740	51+820	80	51+860	52+280	420	1.2X1.2
51+860	52+240	380	52+360	52+420	60	1.2X1.2
52+360	52+460	100	52+500	52+780	280	1.2X1.2
52+500	52+740	240	52+860	52+900	40	1.2X1.2
52+840	52+880	40	52+980	53+280	300	1.2X1.2
52+960	53+260	300	53+560	53+800	240	1.2X1.2
53+600	53+640	40	53+880	53+920	40	1.2X1.2
53+720	53+800	80	53+980	54+280	300	1.2X1.2
53+880	53+920	40	54+340	54+360	20	1.2X1.2
54+000	54+120	120	54+460	54+625	165	1.2X1.2
54+140	54+220	80	55+360	55+420	60	1.2X1.2
54+460	54+625	165	55+480	55+500	20	1.2X1.2
55+340	55+420	80	55+540	55+580	40	1.2X1.2
55+560	55+580	20	55+620	55+840	220	1.2X1.2
55+660	55+760	100	55+920	55+980	60	1.2X1.2
55+780	55+800	20	56+100	56+500	400	1.2X1.2
56+080	56+260	180	56+720	56+840	120	1.2X1.2
56+300	56+520	220	57+160	57+256	96	1.2X1.2
57+160	57+256	96	57+440	57+540	100	1.2X1.2
57+320	57+340	20	57+580	57+660	80	1.2X1.2
57+420	57+540	120	57+700	57+880	180	1.2X1.2
57+580	57+660	80	58+860	58+920	60	1.2X1.2
57+700	57+880	180	59+040	59+220	180	1.2X1.2
57+940	58+020	80	59+360	59+420	60	1.2X1.2
58+300	58+420	120	59+480	59+620	140	1.2X1.2
58+900	58+920	20	59+680	59+740	60	1.2X1.2
59+340	59+720	380	59+800	60+000	200	1.2X1.2
59+760	60+020	260	60+180	60+300	120	1.2X1.2
60+240	60+280	40	60+780	60+820	40	1.2X1.2
60+620	60+680	60	60+940	61+020	80	1.2X1.2



LEFT			RIGHT			Min bottom Width x Min Depth of Drain (m)
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)	
60+760	60+820	60	61+380	62+240	860	1.2X1.2
60+880	61+040	160	62+420	62+460	40	1.2X1.2
61+400	61+640	240	62+540	62+580	40	1.2X1.2
61+660	62+260	600	62+660	62+680	20	1.2X1.2
62+280	62+320	40	62+840	62+920	80	1.2X1.2
62+360	62+480	120	63+040	63+080	40	1.2X1.2
62+560	62+700	140	63+340	63+400	60	1.2X1.2
62+880	63+080	200	63+440	63+620	180	1.2X1.2
63+180	63+240	60	63+680	64+020	340	1.2X1.2
63+280	63+300	20	64+080	64+140	60	1.2X1.2
63+360	63+420	60	64+180	64+540	360	1.2X1.2
63+440	63+580	140	64+640	65+060	420	1.2X1.2
63+680	63+940	260	65+220	65+260	40	1.2X1.2
64+180	64+200	20	65+300	65+340	40	1.2X1.2
64+220	64+560	340	65+360	65+420	60	1.2X1.2
64+700	65+100	400	65+460	65+500	40	1.2X1.2
65+220	65+240	20	65+620	65+680	60	1.2X1.2
65+280	65+320	40	65+700	65+860	160	1.2X1.2
65+360	65+380	20	65+960	65+980	20	1.2X1.2
65+460	65+480	20	66+020	66+040	20	1.2X1.2
66+380	66+780	400	66+280	66+300	20	1.2X1.2
66+800	66+820	20	66+380	66+760	380	1.2X1.2
67+040	67+280	240	66+840	66+940	100	1.2X1.2
67+420	67+520	100	67+040	67+300	260	1.2X1.2
67+560	67+680	120	67+420	67+520	100	1.2X1.2
67+760	68+020	260	67+560	67+700	140	1.2X1.2
68+060	68+160	100	67+760	68+040	280	1.2X1.2
68+220	68+460	240	68+080	68+160	80	1.2X1.2
68+480	68+540	60	68+260	68+560	300	1.2X1.2
68+560	68+610	50	68+680	68+940	260	1.2X1.2
68+640	68+920	280	69+310	69+460	150	1.2X1.2
68+980	69+020	40	69+480	69+600	120	1.2X1.2
69+340	69+600	260	69+640	69+900	260	1.2X1.2
69+620	69+800	180	69+920	70+000	80	1.2X1.2
69+820	69+880	60	70+180	70+280	100	1.2X1.2
70+145	70+200	55	70+320	70+420	100	1.2X1.2
70+300	70+380	80	70+460	70+540	80	1.2X1.2
70+440	70+560	120	70+860	70+880	20	1.2X1.2
70+980	71+180	200	70+980	71+400	420	1.2X1.2
71+220	71+400	180	71+420	71+520	100	1.2X1.2
71+420	71+660	240	71+580	71+640	60	1.2X1.2
71+680	71+740	60	71+840	71+860	20	1.2X1.2
71+880	71+920	40	71+880	71+935	55	1.2X1.2
72+160	72+220	60	72+180	72+220	40	1.2X1.2
72+360	72+420	60	72+880	73+100	220	1.2X1.2
72+500	72+600	100	73+580	73+620	40	1.2X1.2
72+640	72+660	20	73+820	73+900	80	1.2X1.2
72+760	72+780	20	74+040	74+060	20	1.2X1.2
72+840	72+860	20	74+080	74+400	320	1.2X1.2
72+880	73+020	140	74+460	75+000	540	1.2X1.2
73+140	73+180	40	75+060	75+460	400	1.2X1.2
73+540	73+640	100	75+580	75+905	325	1.2X1.2
73+700	73+740	40	75+960	76+060	100	1.2X1.2
73+820	73+920	100	76+080	76+120	40	1.2X1.2
74+040	74+400	360	76+200	76+340	140	1.2X1.2
74+420	75+020	600	76+480	76+580	100	1.2X1.2

	DEVELOPMENT, MAINTENANCE, MANAGEMENT AND OPERATION OF GREENFIELD HIGH-SPEED CORRIDOR FROM MAWLYNGKHUNG (NEAR SHILLONG) IN MEGHALAYA TO PANCHGRAM (NEAR SILCHAR) IN ASSAM BY 4-LANING WITH PAVED SHOULDERS ON HYBRID ANNUITY BASIS. (PACKAGE-2: FROM KM 45+645 TO KM 78+600, DESIGN LENGTH – 32.955 KM)	MAIN REPORT (DPR)
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LEFT			RIGHT			Min bottom Width x Min Depth of Drain (m)
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)	
75+060	75+460	400	76+700	77+120	420	1.2X1.2
75+580	75+880	300	77+300	77+420	120	1.2X1.2
75+960	76+060	100	77+730	78+160	430	1.2X1.2
76+080	76+120	40	78+180	78+220	40	1.2X1.2
76+180	76+400	220	78+280	78+300	20	1.2X1.2
76+420	76+540	120	78+320	78+440	120	1.2X1.2
76+700	77+080	380				1.2X1.2
77+300	77+340	40				1.2X1.2
77+360	77+420	60				1.2X1.2
77+730	78+160	430				1.2X1.2
78+400	78+440	40				1.2X1.2
78+540	78+600	60				1.2X1.2
		17157	Total		17892	

Details of RCC Drain for Interchanges

Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
Interchange at km 54+760		1877	Interchange at km 54+760		1877
Interchange at km 65+010		1501	Interchange at km 65+010		1501
Interchange at km 77+705		2300	Interchange at km 77+705		2300
		5678			5678

Additionally, chute drains are proposed on both sides along the entire length where the embankment height exceeds 3.0 m

6.9.9.1 Turfing/Coir blanket

Steep side slopes are more likely to be washed away by flowing water. Provision for Coir blanket as part of the slope protection/erosion control measures is to be made for the exposed face of the cut in the entire project stretch wherever height of cutting is more than 1.5m (Length Considered 10000 m). The locations of turfing are given below:

Table 6.18: Proposed Turfing locations

Length (m)	Side	Avg. Height(m)
As Above		

6.9.10 Retaining Wall

Retaining walls are provided throughout the fill sections. The adopted retaining wall heights range from 1.5 m to 10 m, with an average height of 6 m. A fill slope of 1H:2V has been adopted. The locations of retaining wall are given below:

Table 6.18(a): Proposed Retaining Wall & RCC Crash Barrier with Friction Slab

S. No.	Item	LHS		RHS		Total Length (m)	Location	Remarks
		Design Chainage (From)	Design Chainage (To)	Design Chainage (From)	Design Chainage (To)			
1	RCC Crash Barrier with Friction Slab for Main Carriageway	46+955	46+961	46+955	46+961	12	At the top of RE wall	At the top of RE wall (Structure length shall be deducted)
		46+969	47+040	46+969	47+040	142		
		48+386	48+570	48+386	48+570	368		
		48+590	48+640	48+590	48+640	100		
		49+160	49+214	49+160	49+214	108		
		49+226	49+340	49+226	49+340	228		
		51+060	51+096	51+060	51+096	72		
		51+104	51+140	51+104	51+140	72		
		54+625	55+024	54+625	55+024	798		
		55+036	55+080	55+036	55+080	88		
		56+560	56+616	56+560	56+616	112		
		56+624	56+720	56+624	56+720	192		
		57+264	57+320	57+264	57+320	112		
		66+940	67+000	66+940	67+000	120		
		67+010	67+040	67+010	67+040	60		
		67+550	67+560	67+550	67+560	20		
		67+740	67+760	67+740	67+760	40		
		70+600	70+650	70+600	70+650	100		
		70+687	70+740	70+687	70+740	106		
		72+220	72+312	72+220	72+312	184		
		72+320	72+360	72+320	72+360	80		
		73+740	73+780	73+740	73+780	80		
		73+790	73+820	73+790	73+820	60		
		76+600	76+654	76+600	76+654	108		
		76+666	76+676	76+666	76+676	20		
		76+684	76+700	76+684	76+700	32		
		77+420	77+560	77+420	77+560	280		
		77+700	77+730	77+700	77+730	60		
		78+220	78+236	78+220	78+236	32		
		78+244	78+280	78+244	78+280	72		
		Total Length (m)				3858		
2	RCC Crash Barrier with Friction Slab for Ramps and Loops	Interchange at Km 54+766				Nil	At the top of RE wall	At the top of RE wall (Structure length shall be deducted)
		Interchange at Km 65+010				1144		
		Interchange at Km 77+705				720		
		Total Length (m)				1864		

RCC Retaining Wall- (For Main Carriageway)

Left Side	Right Side
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	DEVELOPMENT, MAINTENANCE, MANAGEMENT AND OPERATION OF GREENFIELD HIGH-SPEED CORRIDOR FROM MAWLYNGKHUNG (NEAR SHILLONG) IN MEGHALAYA TO PANCHGRAM (NEAR SILCHAR) IN ASSAM BY 4-LANING WITH PAVED SHOULDERS ON HYBRID ANNUITY BASIS. (PACKAGE-2: FROM KM 45+645 TO KM 78+600, DESIGN LENGTH – 32.955 KM)	MAIN REPORT (DPR)
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Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
46+560	46+955	395	47+340	47+360	20
47+040	47+100	60	48+640	48+700	60
47+240	47+260	20	49+060	49+160	100
47+340	47+360	20	49+340	49+380	40
47+400	47+500	100	50+600	50+620	20
47+680	47+700	20	50+920	51+060	140
48+020	48+060	40	51+680	51+720	40
48+100	48+120	20	54+380	54+420	40
48+640	48+720	80	55+080	55+180	100
49+100	49+140	40	55+440	55+460	20
50+600	50+620	20	56+900	56+940	40
50+920	50+980	60	57+320	57+380	60
51+160	51+180	20	58+200	58+400	200
51+220	51+240	20	59+340	59+360	20
51+680	51+720	40	60+060	60+100	40
53+820	53+840	20	60+120	60+140	20
54+380	54+420	40	61+080	61+140	60
55+080	55+160	80	62+480	62+540	60
55+440	55+480	40	62+580	62+640	60
55+880	55+920	40	62+700	62+720	20
56+540	56+560	20	62+960	63+020	60
56+780	56+940	160	63+140	63+180	40
57+040	57+100	60	63+200	63+220	20
58+260	58+280	20	63+260	63+320	60
60+080	60+100	20	63+420	63+440	20
60+120	60+140	20	64+580	64+594	14
61+340	61+360	20	65+860	65+900	40
62+540	62+560	20	66+100	66+120	20
64+606	64+680	74	67+391	67+420	29
65+160	65+180	20	68+580	68+610	30
65+340	65+360	20	68+620	68+680	60
65+440	65+460	20	68+940	69+000	60
65+520	66+120	600	69+620	69+640	20
66+260	66+360	100	70+145	70+180	35
66+880	66+940	60	70+300	70+320	20
67+300	67+379	79	70+440	70+460	20
68+940	68+980	40	70+580	70+600	20
69+310	69+340	30	70+740	70+820	80
69+800	69+820	20	70+900	70+940	40
69+880	70+025	145	71+700	71+820	120
70+220	70+280	60	71+975	72+094	119
70+400	70+420	20	72+106	72+140	34
70+740	70+920	180	72+380	72+420	40
71+780	71+860	80	72+460	72+500	40

	DEVELOPMENT, MAINTENANCE, MANAGEMENT AND OPERATION OF GREENFIELD HIGH-SPEED CORRIDOR FROM MAWLYNGKHUNG (NEAR SHILLONG) IN MEGHALAYA TO PANCHGRAM (NEAR SILCHAR) IN ASSAM BY 4-LANING WITH PAVED SHOULDERS ON HYBRID ANNUITY BASIS. (PACKAGE-2: FROM KM 45+645 TO KM 78+600, DESIGN LENGTH – 32.955 KM)	MAIN REPORT (DPR)
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<u>Left Side</u>			<u>Right Side</u>		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
72+080	72+094	14	72+660	72+680	20
75+500	75+520	20	72+700	72+760	60
75+540	75+560	20	73+640	73+660	20
76+560	76+600	40	75+480	75+520	40
77+100	77+280	180	76+140	76+200	60
78+200	78+220	20	76+360	76+380	20
78+280	78+340	60	76+400	76+440	40
			77+180	77+300	120
			78+486	78+520	34
		3417			2615

RCC Retaining Wall- (For Interchanges)

<u>Left Side</u>			<u>Right Side</u>		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
Interchange at km 54+760		1397	Interchange at km 54+760		1397
Interchange at km 65+010		260	Interchange at km 65+010		260
Interchange at km 77+705		476	Interchange at km 77+705		476
		2133			2133

6.9.11 Toe Wall

A toe wall has been proposed along the toe line of the embankment to maintain the right-of-way limits. Toe walls are provided to stabilize embankment slopes and to control erosion in fill sections or in locations vulnerable to scouring. A toe wall height of 1.3 m has been adopted. Locations of toe wall is given below:

Table 6.19: Proposed Toe Wall

RCC Toe Wall

<u>Left Side</u>			<u>Right Side</u>		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
47+360	47+400	40	47+320	47+340	20
47+660	47+680	20	47+680	47+700	20
47+700	47+740	40	48+000	48+060	60
47+980	48+020	40	48+100	48+120	20
48+120	48+140	20	48+700	48+720	20
48+720	48+740	20	49+040	49+060	20
49+060	49+100	40	50+100	50+120	20
49+140	49+160	20	50+140	50+160	20

Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
49+340	49+360	20	50+572	50+600	28
50+572	50+600	28	50+920	50+980	60
50+900	51+060	160	51+420	51+450	30
51+140	51+160	20	51+490	51+580	90
51+420	51+450	30	51+620	51+680	60
51+490	51+520	30	51+740	51+780	40
51+580	51+640	60	52+300	52+360	60
51+660	51+680	20	52+440	52+480	40
52+300	52+320	20	52+800	52+860	60
52+340	52+360	20	52+920	52+980	60
52+880	52+920	40	53+340	53+450	110
53+340	53+450	110	53+475	53+540	65
53+475	53+560	85	53+820	53+840	20
53+800	53+820	20	54+280	54+320	40
53+840	53+860	20	55+180	55+300	120
54+240	54+380	140	55+460	55+480	20
55+160	55+280	120	55+860	55+920	60
55+500	55+540	40	56+010	56+080	70
55+580	55+640	60	56+520	56+540	20
55+860	55+880	20	56+840	56+900	60
55+980	56+000	20	56+940	56+975	35
56+010	56+060	50	57+000	57+100	100
56+720	56+780	60	57+380	57+400	20
56+940	56+975	35	58+020	58+200	180
57+000	57+040	40	58+400	58+680	280
57+100	57+120	20	58+700	58+860	160
57+380	57+400	20	58+960	58+980	20
58+140	58+260	120	59+260	59+340	80
58+280	58+300	20	59+640	59+660	20
58+520	58+680	160	59+740	59+780	40
58+700	58+880	180	60+040	60+060	20
58+960	59+320	360	60+140	60+160	20
59+720	59+740	20	60+320	60+340	20
60+060	60+080	20	60+420	60+435	15
60+100	60+120	20	60+445	60+480	35
60+140	60+200	60	60+500	60+520	20
60+320	60+435	115	60+540	60+580	40
60+840	60+860	20	60+660	60+700	40
61+040	61+200	160	60+860	60+920	60
61+215	61+300	85	61+060	61+080	20
61+310	61+340	30	61+140	61+200	60
61+360	61+400	40	61+215	61+300	85
62+480	62+540	60	61+310	61+380	70

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Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
62+700	62+760	60	62+360	62+400	40
62+820	62+840	20	62+640	62+660	20
63+100	63+180	80	62+720	62+740	20
63+260	63+280	20	62+760	62+800	40
63+300	63+340	40	62+940	62+960	20
63+420	63+440	20	63+120	63+140	20
64+060	64+100	40	63+180	63+200	20
64+140	64+180	40	63+320	63+340	20
64+580	64+594	14	63+620	63+680	60
64+680	64+700	20	64+606	64+640	34
65+120	65+160	40	65+160	65+200	40
65+180	65+220	40	65+340	65+360	20
65+260	65+280	20	65+440	65+460	20
65+400	65+440	40	65+520	65+620	100
65+480	65+520	40	65+680	65+700	20
65+960	65+980	20	65+900	65+960	60
66+120	66+180	60	65+980	66+020	40
66+200	66+260	60	66+040	66+100	60
66+360	66+380	20	66+120	66+180	60
67+391	67+420	29	66+200	66+280	80
68+160	68+220	60	66+300	66+380	80
68+620	68+640	20	66+760	66+780	20
68+920	68+940	20	67+300	67+379	79
69+600	69+620	20	68+060	68+080	20
70+260	70+300	40	68+180	68+260	80
70+740	70+820	80	68+560	68+580	20
70+920	70+980	60	69+900	69+920	20
71+740	71+780	40	70+000	70+025	25
71+975	72+080	105	70+740	70+820	80
72+106	72+140	34	70+880	70+900	20
72+440	72+500	60	71+660	71+680	20
72+660	72+680	20	71+820	71+840	20
72+700	72+760	60	71+860	71+880	20
73+100	73+120	20	72+140	72+160	20
73+200	73+234	34	72+440	72+460	20
73+246	73+280	34	72+540	72+580	40
73+300	73+380	80	72+620	72+660	40
73+640	73+660	20	72+680	72+700	20
73+960	73+994	34	72+760	72+780	20
74+006	74+040	34	72+800	72+840	40
75+020	75+040	20	73+200	73+234	34
75+480	75+500	20	73+246	73+280	34
75+560	75+580	20	73300	73380	80
76+140	76+180	40	73400	73420	20

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Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
76+400	76+420	20	73500	73540	40
77+280	77+300	20	73920	73960	40
78+180	78+200	20	73980	73994	14
78+360	78+400	40	74060	74080	20
78+440	78+474	34	75000	75060	60
78+486	78+520	34	75460	75480	20
			75520	75580	60
			75940	75960	20
			76060	76080	20
			76580	76600	20
			77120	77180	60
			78300	78320	20
		4884			4813

6.9.12 Stone Pitching

Stone Pitching has been proposed for side slope protection along the embankment at appropriate locations. Details of Stone pitching proposed are given in the table below:

Table 6.20: Proposed Locations of Stone Pitching

Stone Pitching for Main Carriageway

Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
46+560	46+580	20	47+320	47+360	40
46+600	46+955	355	47+680	47+700	20
47+040	47+100	60	48+000	48+060	60
47+240	47+260	20	48+100	48+120	20
47+340	47+500	160	48+640	48+720	80
47+660	47+680	20	49+040	49+060	20
47+700	47+740	40	49+100	49+140	40
47+980	48+020	40	50+100	50+120	20
48+120	48+140	20	50+140	50+160	20
48+640	48+700	60	50+572	50+620	48
48+720	48+740	20	50+920	50+980	60
49+060	49+160	100	51+420	51+450	30
49+340	49+360	20	51+490	51+580	90
50+572	50+620	48	51+620	51+720	100
50+900	51+060	160	51+740	51+780	40
51+140	51+180	40	52+300	52+360	60

Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
51+420	51+450	30	52+440	52+480	40
51+490	51+520	30	52+800	52+860	60
51+580	51+640	60	52+920	52+980	60
51+660	51+720	60	53+340	53+450	110
52+300	52+320	20	53+475	53+540	65
52+340	52+360	20	53+820	53+840	20
52+880	52+920	40	54+280	54+320	40
53+340	53+450	110	54+380	54+420	40
53+475	53+560	85	55+080	55+160	80
53+800	53+820	20	55+180	55+300	120
53+840	53+860	20	55+440	55+480	40
54+240	54+420	180	55+860	55+920	60
55+080	55+280	200	56+010	56+080	70
55+440	55+460	20	56+520	56+560	40
55+500	55+540	40	56+900	56+975	75
55+580	55+640	60	57+000	57+040	40
55+860	55+880	20	57+380	57+400	20
55+980	56+000	20	58+020	58+200	180
56+010	56+060	50	58+260	58+280	20
56+720	56+780	60	58+300	58+680	380
56+900	56+975	75	58+700	58+860	160
57+000	57+040	40	58+960	58+980	20
57+100	57+120	20	59+260	59+360	100
57+340	57+400	60	59+640	59+660	20
58+140	58+300	160	59+740	59+780	40
58+520	58+680	160	60+040	60+060	20
58+700	58+880	180	60+080	60+100	20
58+960	59+320	360	60+120	60+160	40
59+720	59+740	20	60+320	60+340	20
60+060	60+200	140	60+420	60+435	15
60+320	60+435	115	60+445	60+480	35
60+840	60+860	20	60+500	60+520	20
61+040	61+200	160	60+540	60+580	40
61+215	61+300	85	60+660	60+700	40
61+310	61+340	30	60+860	60+920	60

Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
61+360	61+400	40	61+060	61+080	20
62+480	62+560	80	61+140	61+200	60
62+700	62+760	60	61+215	61+300	85
62+820	62+840	20	61+310	61+380	70
63+100	63+180	80	62+360	62+400	40
63+260	63+280	20	62+580	62+660	80
63+300	63+340	40	62+720	62+740	20
63+420	63+440	20	62+760	62+800	40
64+060	64+100	40	62+940	63+020	80
64+140	64+180	40	63+120	63+140	20
64+580	64+594	14	63+180	63+220	40
64+640	64+700	60	63+280	63+300	20
65+120	65+160	40	63+320	63+340	20
65+180	65+220	40	63+620	63+680	60
65+260	65+280	20	64+606	64+640	34
65+400	65+440	40	65+160	65+200	40
65+480	65+520	40	65+340	65+360	20
65+620	65+680	60	65+440	65+460	20
65+700	65+900	200	65+520	65+620	100
65+960	65+980	20	65+680	65+700	20
66+020	66+040	20	65+860	65+960	100
66+100	66+180	80	65+980	66+020	40
66+200	66+260	60	66+040	66+180	140
66+280	66+300	20	66+200	66+280	80
66+360	66+380	20	66+300	66+380	80
66+880	66+940	60	66+760	66+780	20
67+391	67+420	29	67+300	67+379	79
68+160	68+220	60	68+060	68+080	20
68+620	68+640	20	68+180	68+260	80
68+920	68+980	60	68+560	68+610	50
69+310	69+340	30	68+640	68+680	40
69+600	69+620	20	68+940	69+000	60
69+800	69+820	20	69+620	69+640	20
69+880	69+900	20	69+900	69+920	20
69+920	70+000	80	70+000	70+025	25

Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
70+220	70+300	80	70+145	70+180	35
70+400	70+420	20	70+300	70+320	20
70+580	70+600	20	70+440	70+460	20
70+740	70+880	140	70+740	70+860	120
70+900	70+980	80	70+880	70+920	40
71+740	71+820	80	71+660	71+680	20
71+840	71+860	20	71+700	71+740	40
71+975	72+094	119	71+780	71+840	60
72+106	72+140	34	71+860	71+880	20
72+440	72+500	60	72+080	72+094	14
72+660	72+680	20	72+140	72+160	20
72+700	72+760	60	72+380	72+420	40
73+100	73+120	20	72+440	72+460	20
73+200	73+234	34	72+540	72+580	40
73+246	73+280	34	72+620	72+660	40
73+300	73+380	80	72+680	72+700	20
73+640	73+660	20	72+760	72+780	20
73+960	73+994	34	72+800	72+840	40
74+006	74+040	34	73+200	73+234	34
75+020	75+040	20	73+246	73+280	34
75+480	75+520	40	73+300	73+380	80
75+560	75+580	20	73+400	73+420	20
76+140	76+180	40	73+500	73+540	40
76+400	76+420	20	73+920	73+960	40
76+560	76+580	20	73+980	73+994	14
77+100	77+120	20	74+060	74+080	20
77+180	77+300	120	75+000	75+060	60
78+180	78+220	40	75+460	75+480	20
78+280	78+300	20	75+500	75+580	80
78+320	78+340	20	75+940	75+960	20
78+360	78+400	40	76+060	76+080	20
78+440	78+474	34	76+180	76+200	20
78+486	78+520	34	76+360	76+380	20
			76+420	76+440	20
			76+580	76+600	20

	DEVELOPMENT, MAINTENANCE, MANAGEMENT AND OPERATION OF GREENFIELD HIGH-SPEED CORRIDOR FROM MAWLYNGKHUNG (NEAR SHILLONG) IN MEGHALAYA TO PANCHGRAM (NEAR SILCHAR) IN ASSAM BY 4-LANING WITH PAVED SHOULDERS ON HYBRID ANNUITY BASIS. (PACKAGE-2: FROM KM 45+645 TO KM 78+600, DESIGN LENGTH – 32.955 KM)	MAIN REPORT (DPR)
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<u>Left Side</u>			<u>Right Side</u>		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
			77+120	77+280	160
		7003			6052

Stone Pitching for Interchanges

<u>Left Side</u>			<u>Right Side</u>		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
Interchange at km 54+760		1397	Interchange at km 54+760		1397
Interchange at km 65+010		260	Interchange at km 65+010		260
Interchange at km 77+705		476	Interchange at km 77+705		476
		2133			2133

6.9.13 Composite Breast Wall

A composite breast wall with an average height of 4.0 m has been proposed. Breast walls are provided throughout the cut sections where the cutting depth is 2 m or more, with an adopted average height of 4.0 m. A cut slope of 1H:1V has been adopted. The locations of breast wall are given below:

Table 6.21: Proposed Composite Breast Wall
Breast wall (For Main Carriageway) (of appropriate type)

<u>Left Side</u>			<u>Right Side</u>		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
45+645	45+960	315	45+645	46+440	795
45+980	46+420	440	46+560	46+580	20
47+120	47+240	120	46+640	46+840	200
47+280	47+320	40	47+040	47+080	40
47+500	47+660	160	47+100	47+320	220
47+740	47+940	200	47+400	47+660	260
48+240	48+260	20	47+700	47+900	200
48+820	49+020	200	48+060	48+080	20
49+380	50+000	620	48+120	48+274	154
50+200	50+520	320	48+880	49+040	160
50+620	50+860	240	49+380	50+040	660
51+240	51+360	120	50+200	50+440	240
51+780	51+800	20	50+640	50+880	240
51+860	52+220	360	51+140	51+380	240
52+380	52+420	40	51+860	52+280	420
52+520	52+680	160	52+520	52+760	240
52+960	53+220	260	53+000	53+280	280
53+740	53+780	40	53+700	53+800	100

Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
53+880	53+900	20	54+000	54+260	260
54+040	54+100	60	54+500	54+625	125
54+160	54+200	40	55+640	55+820	180
54+480	54+540	60	56+120	56+260	140
54+560	54+625	65	56+300	56+500	200
55+360	55+420	60	56+740	56+820	80
55+660	55+720	60	57+480	57+520	40
56+100	56+260	160	57+600	57+640	40
56+320	56+520	200	57+740	57+880	140
57+180	57+256	76	58+860	58+920	60
57+440	57+540	100	59+040	59+220	180
57+600	57+660	60	59+500	59+620	120
57+720	57+860	140	59+680	59+740	60
57+940	58+000	60	59+800	59+940	140
58+300	58+400	100	60+180	60+280	100
59+340	59+700	360	60+960	61+000	40
59+780	60+000	220	61+400	61+660	260
60+880	61+020	140	61+680	62+240	560
61+420	61+620	200	62+860	62+920	60
61+680	62+180	500	63+040	63+060	20
62+360	62+460	100	63+360	63+400	40
62+580	62+680	100	63+460	63+600	140
62+900	63+060	160	63+700	63+920	220
63+200	63+220	20	64+180	64+220	40
63+380	63+420	40	64+240	64+320	80
63+460	63+560	100	64+340	64+500	160
63+680	63+900	220	64+640	65+060	420
64+240	64+320	80	65+220	65+260	40
64+340	64+520	180	65+300	65+340	40
64+700	64+740	40	65+360	65+420	60
64+780	65+100	320	65+480	65+500	20
66+380	66+760	380	65+620	65+680	60
67+040	67+280	240	65+700	65+840	140
67+420	67+500	80	65+960	65+980	20
67+560	67+680	120	66+380	66+760	380
67+760	68+020	260	66+840	66+860	20
68+060	68+140	80	66+900	66+940	40
68+220	68+440	220	67+060	67+280	220
68+480	68+540	60	67+420	67+520	100
68+560	68+580	20	67+580	67+700	120
68+640	68+900	260	67+760	68+020	260
69+340	69+580	240	68+080	68+160	80
69+620	69+700	80	68+300	68+500	200

Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
69+740	69+780	40	68+520	68+540	20
69+820	69+860	40	68+700	68+920	220
70+145	70+200	55	69+340	69+400	60
70+300	70+380	80	69+480	69+600	120
70+440	70+560	120	69+640	69+880	240
71+000	71+180	180	69+920	70+000	80
71+220	71+380	160	70+180	70+280	100
71+420	71+520	100	70+340	70+420	80
71+540	71+640	100	70+480	70+540	60
71+700	71+740	40	70+980	71+300	320
71+880	71+920	40	71+440	71+500	60
72+900	72+940	40	71+900	71+920	20
73+580	73+620	40	74+080	74+280	200
74+040	74+400	360	74+300	74+340	40
74+440	74+640	200	74+360	74+400	40
74+660	74+820	160	74+460	74+640	180
74+880	75+000	120	74+740	74+980	240
75+060	75+300	240	75+060	75+180	120
75+360	75+440	80	75+240	75+400	160
75+580	75+700	120	75+580	75+700	120
75+720	75+760	40	75+720	75+760	40
75+780	75+880	100	75+780	75+905	125
75+980	76+040	60	75+960	76+040	80
76+080	76+100	20	76+080	76+100	20
76+200	76+400	200	76+220	76+320	100
76+440	76+540	100	76+500	76+540	40
76+700	77+060	360	76+700	77+100	400
77+300	77+340	40	77+300	77+340	40
77+760	77+820	60	77+360	77+400	40
77+860	78+160	300	77+760	78+140	380
			78+180	78+200	20
			78+340	78+360	20
			78+400	78+420	20
		13351			13999

Breast wall (For Interchanges)

Left Side			Right Side		
Design Chainage (From)	Design Chainage (To)	Length (m)	Design Chainage (From)	Design Chainage (To)	Length (m)
Interchange at km 54+760		1877	Interchange at km 54+760		1877
Interchange at km 65+010		1501	Interchange at km 65+010		1501
Interchange at km 77+705		2300	Interchange at km 77+705		2300
		5678			5678

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6.9 Muck Disposal

6.9.15 Provision of muck disposal

As per clause “13.13” of section 13 (Special Requirement for Hill Road) of IRC:SP-84:2019 specified in Schedule-D.

Approximate quantity of **5453409.28** cum of muck/debris is anticipated to be generated from roadway cutting and excavation works. The Concessionaire/Contractor shall identify suitable muck disposal locations in consultation with the local village authorities, District Administration and Forest Department, as applicable.

All statutory approvals, permissions, and No-Objection Certificates (NOCs) required for muck disposal shall be obtained by the Concessionaire/Contractor at his own cost, in addition to the clearances stipulated under Schedule-E of the Contract.

No muck disposal shall be permitted within Reserved Forest areas. Disposal of approximately **5453409.28** cum of muck/debris shall be carried out only at designated approved locations by providing suitable retaining structures of adequate height and properly design for stability, complete in all respects, as per MoRTH Specifications and directions of the Engineer, including all leads, lifts, labour, materials, equipment, and incidentals.

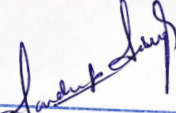

 Team Leader

Table 6.22: Muck Disposal locations

Sr. No.	Muck Disposal Location (Chainage in m.)	Length (m)	Width(m)	Height (m)	Capacity/Volume (cum)
Nil					

Note- Muck disposal location selected adjacent to road at intermittent and appropriate location for filling/dumping the muck. Environmental impact assessment report will be submitted separately.

6.9.15 Proposed Toll Plaza

Tolling system shall be provided in entire length of the project and the same is integrated with the adjoining packages. The toll plazas shall be provided as per NHAI circular No.17.5.82 dated 24/05/2021. Minimum Lane requirement in the opening year are as follows.

Toll locations have been provisioned at all access locations. Each direction for entry to project corridor is provided with entry booms for necessary registering travel start point of vehicles. Each direction for exit from project corridor is provisioned with toll booths.

Toll plaza shall be provided at the following locations:

Table 6.23: Proposed Toll Plaza/Toll Booth locations

S. No.	Existing Chainage (km)	Design Chainage (km)	Direction	Minimum number of Toll Lanes		Remarks
				Entry	Exit	
1	-	0+350	Ramp-01 – Shillong to Silchar		2	Interchange-1
2	-	0+200	Ramp-02- Shillong to Silchar	2		
3	-	0+405	Ramp-03- Silchar to Shillong		2	
4	-	0+325	Ramp-04- Silchar to Shillong	2		
5	-	0+540	Ramp-01 – Shillong to Silchar		2	Interchange-2
6	-	0+660	Ramp-02- Shillong to Silchar	2		
7	-	0+320	Ramp-03- Silchar to Shillong		2	
8	-	0+300	Ramp-04- Silchar to Shillong	2		
9	-	0+240	Ramp-01 – Shillong to Silchar	2		Interchange-3
10	-	0+560	Ramp-02- Shillong to Silchar		2	
11	-	0+260	Ramp-03- Silchar to Shillong	2		
12	-	0+340	Ramp-04- Silchar to Shillong		2	

Plan showing the directional details at each location is provided in Plan & Profile (separately submitted). Number of toll lanes have been projected with standard capacity of 900 vehicles per hour per lane for ETC type tolling.

CHAPTER-7 ENVIRONMENTAL ASSESSMENT

7.1 ENVIRONMENTAL IMPACT ASSESSMENT

The environmental impacts associated with the proposed up-gradation are construction related impacts associated with road widening projects. These are proposed to be addressed through good engineering practices and adoption of environmental management measures proposed in the Environmental Management Plan (EMP) for the corridor. **The EMP budget for this project road** include the management measures and provision for environmental monitoring.

Table 7.1: EMP Details

S. No.	Component	Item	Unit	Quantity
1	Legislation, Permits and Agreements	Consent to Establish and Consent to Operate for plants and machinery of the contractor		
2	Flora	Clearing of Road side plantation	Km	32.955
		Compensatory Afforestation (minimum 10 trees planted for every tree cut)	No.	68160
3	Environmental issues at construction sites	Sanitation Arrangement at Camp	Lump sum	
		Dust Suppression Measures	Km	
		Labour camps, health and other service	Lump sum	
		Solid Waste Management	Lump sum	
		Environmental Management Training and Awareness Programme	Lump sum	
		Installation of oil separator at car washing area	No	2
4	Rain Water Harvesting	Rain water Harvesting Structures	No.	0
5	Environmental Monitoring	(a) Ambient Air Quality monitoring of PM ₁₀ , PM _{2.5} , CO, SO ₂ & NO ₂ (Quarterly in two locations for two years)	No.	16
		(b) Ambient Noise level monitoring (Quarterly in two locations for two years)	No.	16
		(c) Water Quality monitoring of surface water (Quarterly in one location for two years)	No.	8
		(d) Soil Quality monitoring of Agricultural lands (Quarterly in one location for two years)	No.	8
		(e) Monitoring of drinking water/ground water once in month (Quarterly in one location for two years)	No.	8

1	Environmental Monitoring	(a) Ambient Air Quality monitoring of PM ₁₀ , PM _{2.5} , CO, SO ₂ & NO ₂ (Once in quarter for one year in one location)	No.	4
		(b) Ambient Noise level monitoring (Once in quarter for one year in one location)	No.	4
		(c) Water Quality monitoring of surface water (Once in quarter for one year in one location)	No.	4
		(d) Monitoring of ground water (Once in quarter for one year in one location)	No.	4
		(e) Soil Quality monitoring (Once in quarter for one year in one location)	No.	4

7.2 LAND ACQUISITION AND RESETTLEMENT IMPACTS

Being a greenfield alignment, there is no land width available. For proposed Project highway width as per TCS will be required. PROW section can be referred to for details.

A resettlement budget including compensation for the affected land & structures, assets within the affected properties and rehabilitation and resettlement assistance has been included in the estimate. Any unforeseen impacts on resettlement during implementation will be taken up in accordance with the Resettlement Policy Framework (RPF) of the Project.

Table 7.2: Summary of Land Acquisition

Total Land	241.06 Ha.
Status	Total Land required 241.06 Ha. 3A Status- Published in the Gazette 3D Status - Under Progress

It is evident that the above-mentioned land is desired for the development of the project highway, the number of affected structures & land loosening impact on the owners are some of the key points to be taken care in Environmental & Social Impact assessment. Impact of the tree felling across the project alignment has been suitably assessed and remunerated back to Mother Nature by mandatory afforestation measures. These measures are discussed in detail in Environment Management Plan for the project Road development.

CHAPTER-8 COST ESTIMATE

8.1 General

Cost estimation is an important component of the study as it provides insights for proper planning of project execution. Detailed Cost estimates are prepared based on the detailed engineering designs and detailed drawings.

8.2 Quantification

The construction items covered in cost estimates include are as follows:

1. Site clearance & Dismantling
2. Earthwork
3. Sub-Base, Base Courses (Granular)
4. Bituminous Courses / Concrete Pavements
5. Cross Drainage Structures
 - 5.1 Culverts
 - 5.2 Minor Bridge
6. Drainage & Protection Works
7. Traffic Signs, Road Markings & Appurtenances
8. Miscellaneous

The items of work have been given only in summarized form without detailed description of work and materials. All individual items however have referenced to the relevant Sections/Clauses of Specifications. The Specification Clauses cover input details, method of construction, mode of measurement etc.

8.3 Centages

As per MoRT&H circular on HAM mode, the Cost estimates incorporate other provisions besides the Civil works and comprises of following parts as under:

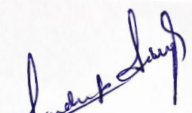
- i. IC/pre-operative expenses @1% of C
- ii. Financing Cost (1% of debt amount)
- iii. Interest during Construction
- iv. GST - @18% of Estimated Project Cost
- v. Labour Cess (1% of Estimated Project Cost with GST)
- vi. Contingencies @ 1% (on Cost Put to Tender)
- vii. Agency Charges @3% (on Cost Put to Tender)
- viii. Supervision Charges @ 3% (on Cost Put to Tender)
- ix. Escalation @5% for 1 Year (on Cost Put to Tender i/c utility shifting)
- x. O&M Cost for 15 years as per Ministry OM dated 23.05.2022

8.3 Rate Analysis and Cost Estimate

Rates have been considered **based on the rate calculation using MoRTH Standard Data Book (using basic rates of items as per Meghalaya PWD SOR 2019-20 & for the items not found in Meghalaya SOR, Assam PWD SOR 2020-21 has been used), Market Rates, direct rates from SDB wherever applicable and latest NHAI policy circulars/guidelines related to Road Safety and allied works.**

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Table 8.1: Cost Abstracts: As per RFP


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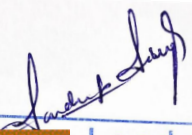
	DEVELOPMENT, MAINTENANCE, MANAGEMENT AND OPERATION OF GREENFIELD HIGH-SPEED CORRIDOR FROM MAWLYNGKHUNG (NEAR SHILLONG) IN MEGHALAYA TO PANCHGRAM (NEAR SILCHAR) IN ASSAM BY 4-LANING WITH PAVED SHOULDERS ON HYBRID ANNUITY BASIS. (PACKAGE-2: FROM KM 45+645 TO KM 78+600, DESIGN LENGTH – 32.955 KM)	MAIN REPORT (DPR)
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8.3.1 Lead calculation summary for preparation of Rate Analysis and Cost Estimate

Leads are necessary to be accommodated for arriving at appropriate rates against each item. Necessary leads and final cost with respect to basis input items are presented below: -

Table 8.2: Lead of Materials

As per Meghalaya SOR


 Team Leader