Schedules

SCHEDULE – A

(See Clause 10.1)

SITE OF THE PROJECT

1 Background

Ministry of Road Transport & Highways vide OM No. NH14012/27/2014-P&M dated 21.12.2017 issued Guidelines and SOP for implementation of Bharatmala Pariyojana wherein development of 35 nos. Multimodal Logistics Parks have been proposed with the objective to improve the efficiency of the existing corridors (GQ and NS-EW) by removing the congestion points through access control, uniform corridor tolling, bypasses, ring roads etc. Guwahati was one among the 35 proposed locations for developing a Multimodal Logistic Park which was subsequently shifted to Jogighopa.

Further in a meeting chaired by Secretary MoRT&H it was decided that to enhance the multimodality of the site the development of Inland Water Terminal (IWT) on River Brahmaputra at Jogighopa will also be integrated in this project.

Govt. of Assam has allocated 200 acres of land belonging to Ashok Paper Mill (APM) for developing the MMLP at Jogighopa and Inland Waterways Authority of India (IWAI) also agreed to allocate 40 acres for land for development of IWT

2 The Site

2.1 Jogighopa is a small town located on the banks of the Brahmaputra River in the Bongaigaon district in the state of Assam. Bongaigaon, the District Headquarter is approximately 45 km to the North of the Jogighopa and distance from Guwahati is around 150 Km. Map 1.1 shows the location and regional connectivity of Jogighopa.

By road Jogighopa can be accessed through NH 17 (Sevoke (West Bengal) to Guwahati (Assam)) and via rail it is connected through Kolkata – Bongaigaon and Kolkata – Guwahati line. Bongaigaon – Guwahati stretch of NH 17 is a part of the proposed Northeast Economic Corridor. Jogighopa is also located on the NW-2

stretch from Dhubri to Sadiya on River Brahmaputra. It is directly connected to important ports like Haldia and Kolkata on the eastern coast via Indo-Bangladesh Protocol route.

The proposed site for MMLP is approximately 3.0 Km away from the Jogighopa Railway station. The MMLP Site is to the North of NH-17 whereas the IWT site is to the south of NH-17 along river Brahmaputra. Presently the MMLP site within APM can be accessed through the existing Saibari-Jogighopa Road. There is an existing railway siding from Jogighopa Railway station to Ashok paper mill (APM), but it is in a defunct state from last three decades. The Map 1.1 shows the location of site.

2.2 The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.

2.3 The status of the environment clearances obtained or awaited is given in Annex-III.

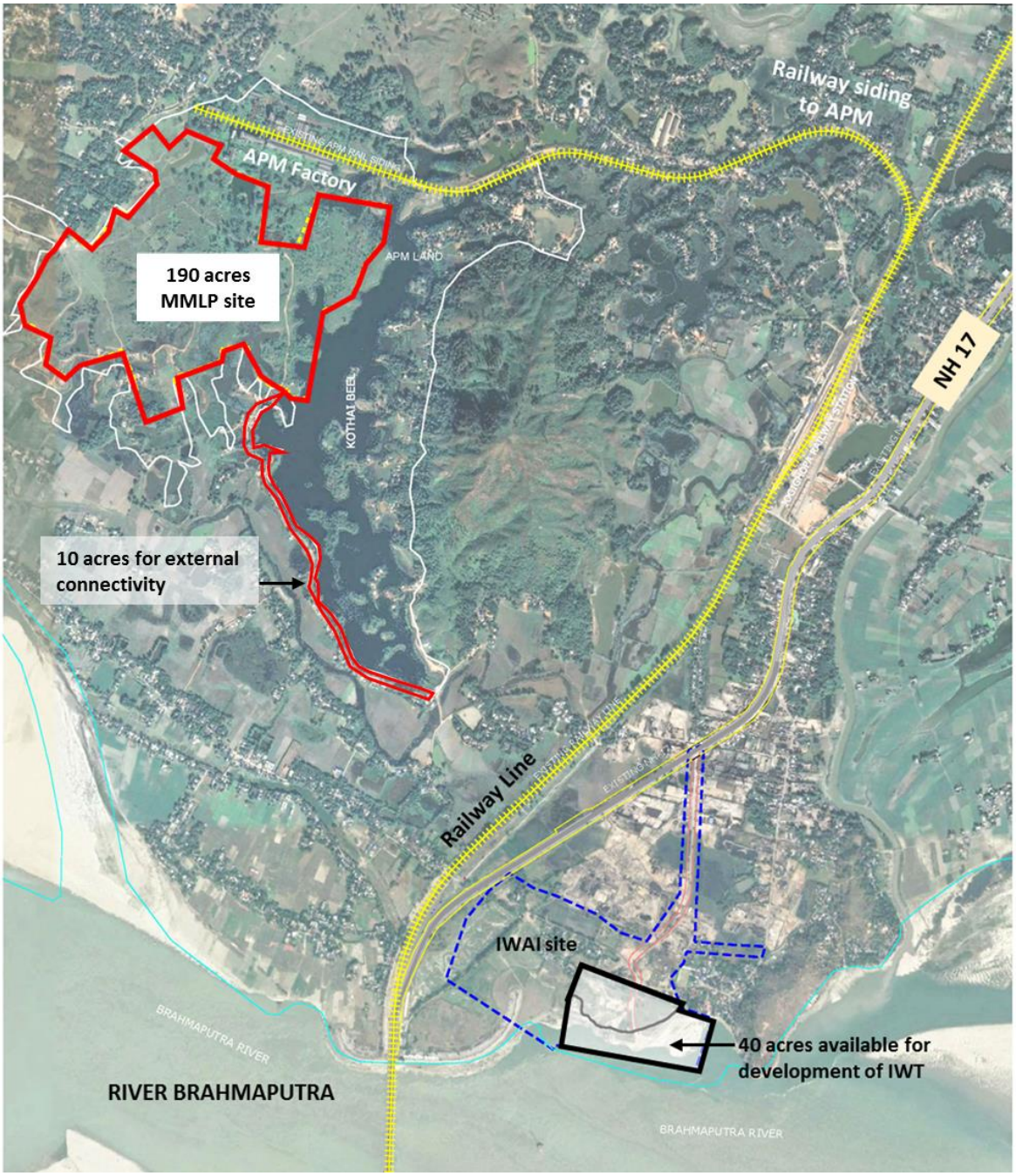
3 About the Project

The development of Multi Modal Logistics Park at Jogighopa comprises of three Key components

1. 190 acres of Multi Modal Logistics park at Ashok Paper Mill site
2. External Road and Rail connectivity to the logistics park and Inland water terminal
3. 40 acres of Inland water terminal (IWT)

The project will be developed in two phases. **Phase-I** will be 102 acres of Logistics park along with the external road and rail connectivity between Logistic park and IWT. Remaining 88 acres of logistic park and 40 acres of IWT will be developed in **Phase-II**.

Map 1.1: location and regional connectivity of Jogighopa



Map 1.2: Location of Site

Annex I

(Schedule-A)

Site

[Note: Through suitable drawings and description in words, the land, buildings, structures and road works comprising the Site shall be specified briefly but precisely in this Annex-I.]

1. Site

The project highway aims at developing a new standard 4-lane road with paved shoulder along with widening the existing 2-lane/single lane road to a standard 4-lane carriageway with paved shoulder.

The project has two road parts. The 1st part starts from Port connectivity road and runs almost in west direction to reach MMLP with connectivity to NH-17 with a length of 2.886 km. The 2nd part (Port Connectivity Road) starts from NH-17 and runs almost in south direction to reach Port with a length of 1.155 km.

Thus the construction package for the project includes developing a new standard 4-lane road with paved shoulder and widening the existing 2-lane/single lane road to a standard 4-lane carriageway with paved shoulder.

The Index Map of the Project Highway is appended at the end of this Schedule–A.

2. Land

The project passes mostly through land area of Assam Paper Mill, IWAI, Railway and NH. A part of the connectivity passes through private land.

As per available revenue maps, average total existing ROW is of the order of 10.0m to 12.0m along port connectivity road for length of about 1.155 km.

3. Carriageway

Roadway Width

Variable cross-sectional parameters were found for the project road as mentioned below

Stretch	Existing Carriageway		Existing Shoulder		Remarks
	Type	Average Width (m)	Type	Average Width (m)	
MMLP Connecting Road (0+000 to 1+400)					This stretch is green field alignment
MMLP Connecting Road (1+400 to 2+835)	Earthen	3.0	Earthen	1.5	
Port Connecting Road (0+000 to 1+155)	Bituminous	5.5	Earthen	1.5 to 2.0	

4. Major Bridges

The Site includes the following Major Bridges:

Sl No.	Road Segment	Name of Stream	Existing Chainage (km)	Type of Structures			Span Arrangement (Nos.xLength in m)	Overall Width (m)	Remarks
				Foundation	Sub-Structure	Super Structure			
NIL									

5. Road Over Bridges (ROB) / Road Under Bridges (RUB)

The Site includes the following ROB/RUB:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structure		No. of Spans with Span Length (m)	Width (m)
			Foundation	Super Structure		
NIL						

6. Railway Level Crossings

The Site has following Level Crossings:

Sl No.	Existing Chainage (km)	Description	Railway Section	Remarks
NIL				

7. Grade Separators

The Site includes the following grade separators:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structure		No. of Spans with Span Length (m)	Width (m)
			Foundation	Super Structure		
NIL						

8. Minor Bridges

The Site includes the following minor Bridges:

Sl No.	Road Segment	Name of Stream	Existing Chainage (km)	Type of Structures			Span Arrangement (Nos.xLength in m)	Overall Width (m)	Remarks
				Foundation	Sub-Structure	Super Structure			
NIL									

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structure	No. of Spans with Span Length (m)	Width (m)
NIL					

10. Culverts

The Site includes the following culverts:

Sl. No.	Road Segment	Existing Chainage (km)	Type	Span Arrangement		Length (m)	Width(m)
				(No.)	(Length, m)		
MMLP Connectivity Road							
NIL							
Port Connectivity Road							
1	Port Road	0+300	RCC Box Culvert	1	3.2	3.2	9.2

11. Causeway:

The Site includes the following causeway:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structures	Span Arrangement		Length (m)	Width(m)
				(No.)	(Length, m)		
NIL							

12. Total Number of Structures

Structure Type	Numbers		
	Part-1 (MMLP Connectivity Road)	Part-2 (Port Connectivity Road)	Total
Major Bridge	0	0	**0**
Minor Bridge	0	0	**0**
Slab Culvert	0	1	**1**
HP Culvert	0	0	**0**
Chocked	0	0	**0**
Vented Causeway	0	0	**0**
Causeway without Vent	0	0	**0**
Total	**0**	**1**	**1**

13. Bus Bays

The details of bus bays on the Site are as follows:

Sl. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
NIL					

14. Truck Lay Bye

The details of truck lay byes on the Site are as follows:

Sl. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
NIL					

15. Roadside Drains

The details of the road side drains on the Site are as follows:

Sl. No.	Road Segment	Existing Location		Type	
		From (km)	To (km)	Masonry/CC (Pucca)	Earthen (Kutcha)
NIL					

16. Major Intersections

The details of major intersections are as follows:

Sl No.	Road Segment	Name	Existing Chainage (km)	Type	Side
MMLP Connectivity Road					
NIL					
Port Connectivity Road					
1	Port Connectivity Road	Jogighopa	0+000	3-Legged	Both

17. Minor Intersections

The details of major junctions are as follows:

Sl No.	Name	Existing Chainage (km)	Type	Side
MMLP Connectivity Road				
NIL				

Sl No.	Name	Existing Chainage (km)	Type	Side
Port Connectivity Road				
1	Village	0+870	3-Arm	RHS
2	Village	0+940	3-Arm	LHS

18. Bypasses

The details of existing bypasses are as follows:

Sl. No.	Name of Bypass (Town)	Road Segment	Existing Chainage		Length (km)	Carriageway	
			From (km)	To (km)		Width m)	Type
NIL							

19. Other Structures

The details of other structures are as follows:

Sl. No.	Type	Existing Chainage (km)	Length (m)	Width
NIL				

20. Permanent Bridge, Bypass or Tunnel Costing Rs. 50 Crore or More

-NIL-

Annex-II

(Schedule-A)

Dates for Providing Right of Way

Design Chainage (km)		Length (m)	Proposed ROW (m)	Date of Providing ROW*
From	**To**			
(i) Full Right of Way (ROW) Width				
MMLP Connectivity Road				
0+000	0+500	500	45	September, 2020
0+560	0+800	240	45	
0+800	1+380	580	45	
Port Connectivity Road				
NIL				
(ii) Partial Right of Way (ROW) Width				
MMLP Connectivity Road				
0+500	0+560	60	45	
1+380	2+886	1506	45	
Port Connectivity Road				
0+000	1+155	1155	30	
(iii) Balance Right of Way (ROW) Width				
MMLP Connectivity Road				
0+500	0+560	60	45	
1+380	2+886	1506	45	
Port Connectivity Road				
0+000	1+155	1155	30	

* The dates specified herein shall in no case be beyond 150 (one hundred and fifty) days after the Appointed Date.

Annex-III

(Schedule-A)

Environmental Clearances

The Environment Impact Assessment (EIA) Notification 2006, Ministry of Environment, Forest & Climate Change, Government of India, came into effect from 14th September 2006. The EIA Notification, 2006 specifies the requirement of prior clearance from MOEF&CC for certain development projects specified under the schedule of the Notification.

The External Trunk Connectivity does not attract the conditions of obtaining environmental clearance as per EIA Notification 2006 and its amendments thereafter.

The Internal Infrastructure works is falling under category B of 8(b). Form 1 and Form 1A submitted for required Environmental Clearance.

SHEDULE - B

(See Clause 2.1)

DEVELOPMENT OF THE PROJECT

1 Introduction

1.1 About the Project

The development of Multi Modal Logistics Park at Jogighopa comprises of three Key components

1. 190 acres of Multi Modal Logistics park at Ashok Paper Mill site
2. External Road and Rail connectivity to the logistics park and Inland water terminal
3. 40 acres of Inland water terminal (IWT)

The project will be developed in two phases. **Phase-I** will be 102 acres of Logistics park along with the external road and rail connectivity between Logistic park and IWT. Remaining 88 acres of logistic park and 40 acres of IWT will be developed in **Phase-II**.

Under this scope, **Package-1 of Phase-I** will be developed.

1.2 Phase-1 of Multi Model Logistic Park

As per the Draft Policy for developing a MMLP there will be five broad zones:

1) Commodity storage zone – dedicated zones for different types of commodity and bonded storage yard along with vehicle loading ramps, cross docking facilities.
2) Intermodal zone – rail siding area for intermodal freight transfer; terminals for inland waterways, wherever applicable.
3) Value added services zone- Package, Re-packaging, Processing, Reprocessing.
4) Ancillary services zone – dedicated area for other value-added services such as customs clearance, vehicle service area, office spaces, restaurant, Retail & wholesale, Hotels and entertainment etc.
5) Vehicle parking zone – dedicated area for vehicle parking.

A tentative Master Plan for the 190 acres of the Logistic Park that caters to the above five zones and other supporting utilities for smooth function of the activities. Refer **Map 2.1** for Master Plan

ACTIVITIES	AREA (ACRES)	PHASE -I
Core Logistics Area	**118.84**	**55.08**
Warehousing & Cold storage	*86.58*	28.78
Value added services	*3.27*	
Rail siding	*14.14*	13.63
Container Yard	*9.89*	9.89
Exim /Bonded/ Quarantine/testing facility	*4.96*	2.78
Ancillary Logistic	**4.79**	**4.79**
Admin	*1.4*	1.4

ACTIVITIES	AREA (ACRES)	PHASE -I
Lodging/ Boarding/ Vehicle maintenance/ Dhabas	*1.2*	1.2
Office for transporters / vehicle sales	*1.52*	1.52
Petrol Pump	*0.67*	0.67
Commercial / Service apartments	**6.08**	**1.97**
MMLP Internal Roads	**23.38**	**17.94**
Truck Parking	**10.99**	**6.92**
Utilities	**6.08**	**4.46**
Green and Landscaped areas	**19.84**	**10.9**
TOTAL	**190**	**102**

1.3 External Road and Rail Connectivity

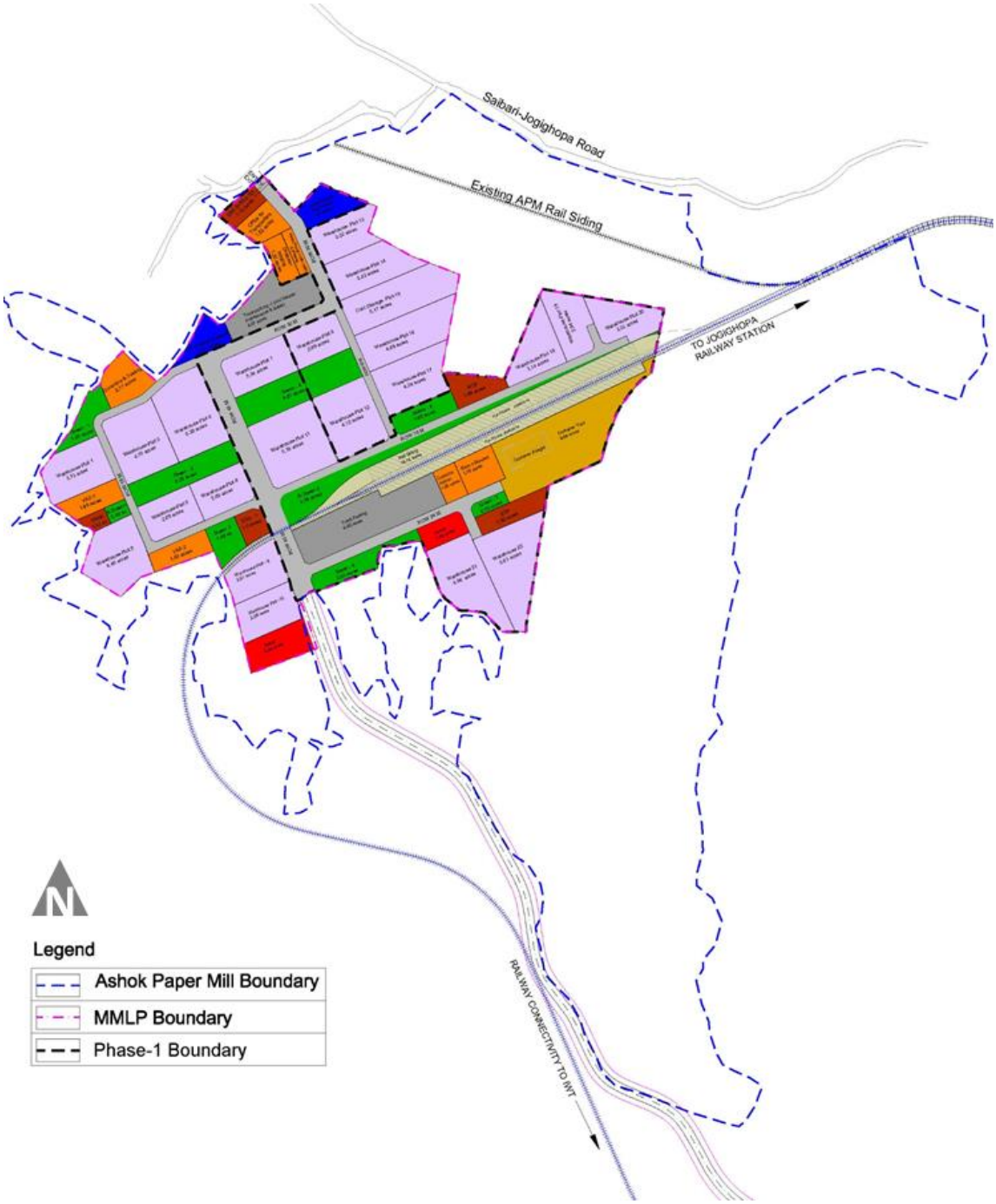
The proposed MMLP site at APM land doesn't have a direct access from NH 17. Moreover, the IWT site will also require connectivity to MMLP for seamless movement of goods. Considering the fact that connectivity plays a critical role in successful functioning of a logistics park and for the purpose of integrating the two sites (APM & IWT) it is proposed to have a direct road and rail connectivity between APM site and IWT site as well as with NH 17. The external road and rail alignment is shown is **Map 2.2**.

The external Road connectivity will have the following components.

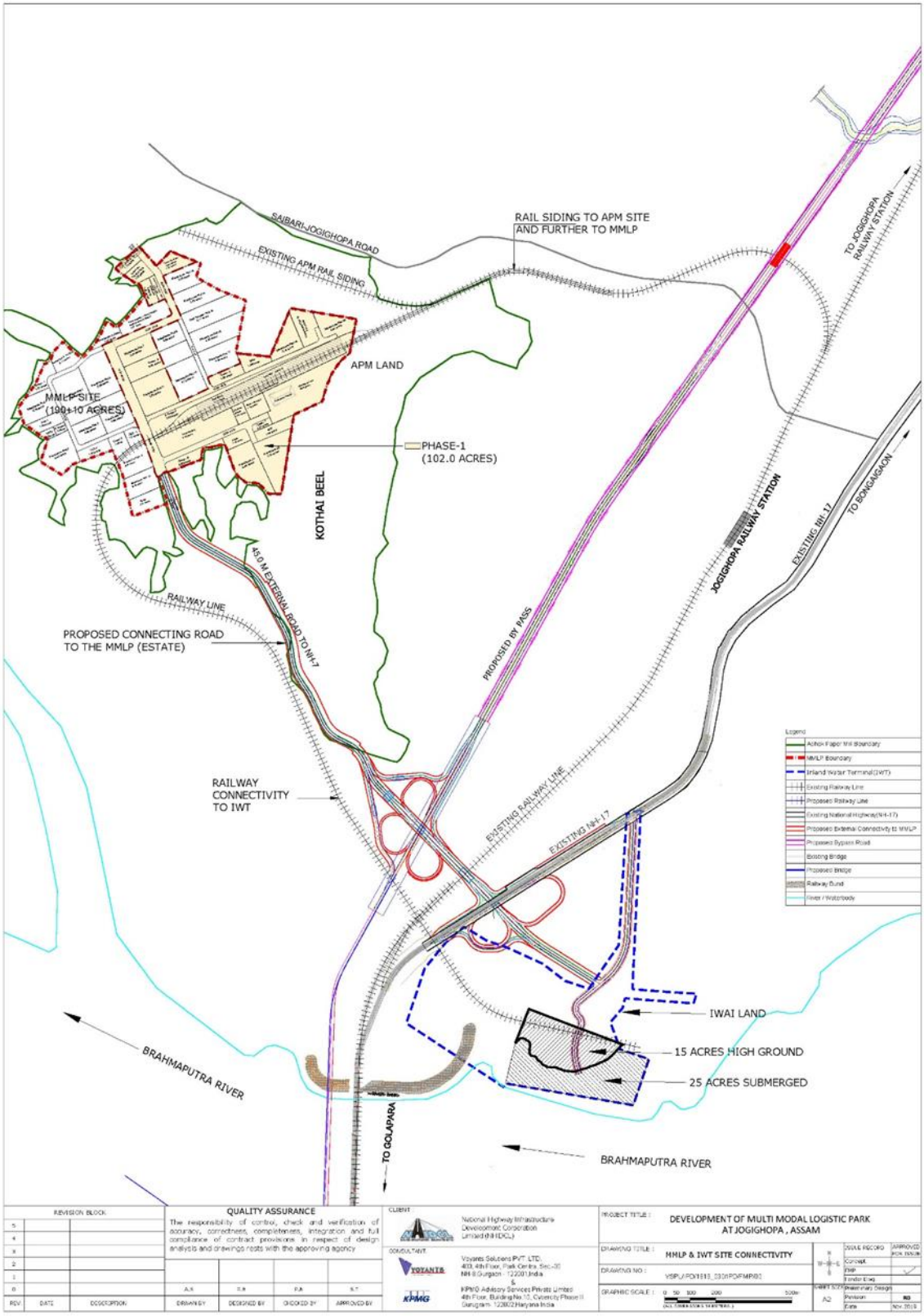
- ✓ 2.1 Km (MMLP to NH 17)
- ✓ 1.0 Km (NH 17 to IWT)
- ✓ Length of clover leaf at NH-17
- ✓ 1 RUB (proposed road crossing railway line)

The external Rail connectivity will have the following components. Total rail length 6.78 Km (Jogighopa railway station to IWT)

- ✓ 2.6 Km (revival of existing siding)
- ✓ 1.07 Km (within MMLP)
- ✓ 3.11 Km (MMLP to IWT)



Map 2.1: Master Plan for 190 acres of Logistic Park



Map 2.2: External Road and Rail Alignment

1.4 Project Packaging

In order to initiate the development work at site, NHIDCL has decided to invite tenders for Phase-I development only. The Phase-I has been divided into three packages.

1) **Package I**: For all road works i.e. external and internal and development of utilities of main line on **EPC mode**. The following works are to be developed under **Package I**.
    a. External truck connectivity with MMLP
        i. MMLP Connecting Road as green field alignment from 0+000 chainage to 1+400 chainage.
        ii. Improving and upgradation of MMLP Connecting Road from chainage 1+400 to 2+835 chainage as per design specifications and standards outlined in **Schedule–D.**
        iii. Improving and upgradation of Port Connecting Road from chainage 0+000 to 1+155 chainage as per design specifications and standards outlined in **Schedule–D.**
    b. Internal Infrastructure Development as below
        i. Rigid Pavement as internal roadwork including culverts, etc.
        ii. Storm water drainage system along the road
        iii. Intake works at Brahmaputra river
        iv. Rising Main from Intake to WTP inside MMLP site
        v. Potable, Fire and recycled water supply network along the road
        vi. Sewerage system including plot connectivity along the road
        vii. Power supply network along the road
        viii. Street lighting along the road
        ix. Data & telecommunication along the road
        x. Landscaping work along the road
2) **Package II**: For MMLP facility on **EPC mode** for following:
    a. Outer boundary wall for 190 acres land including gates
    b. Plinth level boundary wall along with filling of plots upto plinth level ready for construction of warehouses etc.
    c. Administrative building, custom office, electric sub station
    d. Water and sewage treatment plant
    e. Plot connection from main service line of Potable, Fire and recycled water supply network
    f. Landscaping works at green area
    g. Rain Water Harvesting System
    h. Solid Waste Management
3) **Package III**: Construction of embankment for main track and siding of railway line upto top of the embankment ready for laying of ballast, sleepers and track on

Item Rate Contract.

4) Under this scope, **Package-1 of Phase-I** will be developed.

2 Development of the Project

Development of External Trunk Connectivity in accordance with IRC SP: 84-2014 shall primarily include design and construction of the Project as described in this Schedule-B and in Schedule-C.

3 Development of Infrastructure Works at Multi Model Logistics Park at Jogighopa

3.1 Development of Infrastructure Works at Multi Model Logistics Park at Jogighopa shall be completed by the Contractor in conformity with the Specifications and Standards set forth in Annex-I of Schedule-D.

4 Specifications and Standards

The Project Highway shall be designed and constructed in conformity with the Specifications and Standards specified in Annex-I of Schedule-D IRC SP: 84-2014.

5 Partition of Schedule B

Schedule B has been divided into Two parts.
Schedule B Part 1 for External Trunk Connectivity from NH-17 to MMLP and Schedule B Part 2 is for Internal Utility

6 Appointed Date and Start of Work

Acquiring some portion of land is under process at external truck connectivity and EC is under process for Internal development. In this regard, Contractor will start the survey, investigation work, preparation of design, working drawing from the date of agreement signed and provision of payment is mentioned at Schedule H and can be claimed even before the appointed date.
The appointed date shall be declared as per Article 8 of DCA during or after September 2020 with completion period of 18 Months.

Section B-1: External Trunk Connectivity

Annex I

(Schedule-B)

Description of Project

[Note: Description of the Project shall be given by the Authority in detail together with explanatory drawings (where necessary) to explain the Authority's requirements precisely in order to avoid subsequent changes in the Scope of the Project. The particulars that must be specified in this Schedule-B are listed below as per the requirements of the Manual of Specifications & Standards for Four Laning of Highways through PPP (IRC:SP:84-2014), referred to as the Manual. If any standards, specifications or details are not given in the Manual, the minimum design/construction requirements shall be specified in this Schedule. In addition to these particulars, all other essential project specific details, as required, should be provided in order to define the Scope of the Project clearly and precisely.]

1 Construction of New Highway, Improving and upgradation of Existing Road

1.1 Notwithstanding the alignment plans enclosed with this document the Contractor shall himself carryout and be responsible for engineering surveys, investigation and detailed engineering designs and prepare the working drawings for all the components relevant for the construction of new Highway as well as improvement, upgradation of the existing Project Highway to fulfill the scope of the project as envisaged hereinunder. These shall comply with design specifications and standards given in **Schedule–D**. The designs for different project facilities shall follow the locations and indicative designs given in **Schedule–C** and shall comply with design specifications and standards outlined in **Schedule–D**. All the designs and drawings shall be reviewed by the Independent Consultant prior to execution.

1.2 Width of Carriageway

1.2.1 The paved carriageway width shall be 3.5 excluding kerb shyness on either side of raised median, paved shoulder and earthen shoulder.

The paved carriageway shall be as specified in the following table:

Sl. No.	Attributes	Width (m)
i.	Carriageway Width	For Six lane: 3 x 3.5m (on either side) For Four lane: 2 x 3.5m (on either side) For Two lane: 2 x 3.5m
ii.	Paved Shoulder	2.5m in Rural area 2.5m in Built up area 2.5m in Grade Separator Approach 2.5m in Bridge Approach
iii.	Earthen Shoulder	1.5m in Rural area 1.5m in Bridge Approach
iv.	Raised Median (Including kerb shyness of 0.5 m on either side)	5.0 m in Rural area 2.5 m in Built up area
v.	Median side paved strip (Shy distance)	0.50M on each side

2. Geometric Design and Project Facilities

Project facilities shall be constructed in conformity with Annex-I of Schedule-C.

2.1 General

Geometric design and general features of the Project Highway shall be in accordance with Manual of Specifications & Standards for Four Laning of Highways through PPP' (IRC:SP:84-2014).

2.2 Design Speed

The design speed shall be the minimum design speed of 80 km per hr for plain/rolling terrain.

2.3 Improvement of the existing road geometrics

[Refer to paragraph 2.1 (v) of the manual and provide details]

In the following sections where improvement of the existing road geometrics to the prescribed standard is not possible, the existing road geometrics shall be improved to the extent possible within the given ROW and proper road signs and safety measures shall be provided.

2.4 Right of Way

The details of the Proposed ROW are given in **Appendix B-VII.**

3. Intersections and Grade Separators

3.1 At-grade Intersections

The cross roads shall be re-graded and strengthened to have a crust same as of main carriageway for a length shown in the Ministry's Type Designs and Schedule-D for intersections along with provision of adequate cross drainage structures on the cross roads. The details of at-grade intersections (both major and minor) with its locations are specified in **Appendix B-VIII**.

3.2 Grade Separated Intersections

The grade separated intersections shall be as provided in **Appendix B-IX**.

4. Road Embankment and Cut Section

i. Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/cuttings shall conform to the Specifications and Standards given in section-4 of the Manual and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

ii. Raising of the existing road [Refer to the provision of relevant Manual and specify sections to be raised].

5. Pavement Design

Pavement design shall be carried out in accordance with the provision of relevant Manual.

5.1 Type of Pavement

Flexible pavement shall be adopted for External Trunk Connectivity.

5.2 Design Requirement

5.2.1 Design Period and strategy

Pavement design life is the period for which the initial design of pavement crust layers shall be designed. Design life should not be referred as terminal stage of crust beyond which crust becomes unusable. A design life of 20 years for flexible pavement has been considered for the design purposes.

5.2.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for entire Project Highway for design traffic of not less than 20 million standards axles (MSA).

6. Road Side Drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per the provision of relevant Manual.

6.1 Lined Rectangular Uncovered Drains

The Contractor shall provide lined rectangular uncovered drains at the locations as given in **Appendix B-XIX**.

6.2 Rectangular RCC Covered Drains

The Contractor shall provide rectangular RCC covered drains at the locations as given in **Appendix B-XX**. The minimum length of rectangular RCC covered drains to be provided is 29.8km. Contractor shall provide rectangular RCC covered drains at other locations as per design and in accordance with the Manual indicated in the Schedule D.

7. Design of Structures

7.1 General

i. All bridges, culverts and structures shall be designed and constructed in accordance with the provision of relevant Manual and shall conform to the cross- sectional features and other details specified therein.

ii. All bridges shall be high-level bridges.

[Refer to the provision of relevant Manual and state if there is any exception]

iii. Cross–section of the new culverts and bridges at deck level for the project highway shall conform to the typical cross- sections given in the provision of manual.

7.2 Construction of Major Bridges

The Major bridges shall be constructed as per details provided in **Appendix B-XIII**.

7.3 Construction of Minor Bridges

The Minor bridges shall be constructed as per details provided in **Appendix B-XIV**.

7.4 Construction of Viaduct

The Viaduct shall be constructed as per details provided in **Appendix B-XV**.

7.5 Construction New ROBs

Details of ROB/RUBs to be provided are given at **Appendix B-XVII**. Following points shall be taken care of:

i. Proposed span arrangements of the ROB are tentative and subject to change as per availability of railway boundaries/requirement of the railways.

ii. ROB shall be designed, constructed and maintained as per the requirements of Railway authorities. The construction plans shall be prepared in consultation with the concerned railway authority.

iii. The ROB shall be constructed and maintained by the concessionaire under supervision of the Railways.

iv. All expenditure related to construction, maintenance and supervision of ROB (except P&E charges) shall be borne by the Concessionaire.

7.6 Vehicular Underpasses

Locations and details of Vehicular underpasses to be provided along the project highway are given in **Appendix B-X**.

7.7 Overpass

Locations and details of Overpasses to be provided along the project highway are given in **Appendix B-XII**.

7.8 Culverts

i. Overall width of all culverts shall be equal to the roadway width of the approaches.

ii. Culverts shall be constructed, reconstructed or retained & widened as per **Appendix B-XVI**.

8. Traffic Control Devices and Road Safety Works

i. Traffic control devices and road safety works shall be provided in accordance with the provision of relevant manual.

ii. Specification of the reflective sheeting [Refer to the provision of relevant manual].

iii. To ensure long term road safety of the project highway, engineering measures prescribed in Schedule-D shall be adopted.

9. Roadside Furniture

i. Roadside furniture shall be provided in accordance with the provisions of IRC, SP-84: 2014.

ii. Overhead traffic signs: [Location may change in consultation with the Authority's Engineer].

10. Compulsory Afforestation

[Refer to the provision of relevant Manual and specify the number of trees which are required to be planted by the Contractor as compensatory afforestation.].

11. Hazardous Locations

The safety barriers shall also be provided at the following hazardous locations.

Sl. No.	Location stretch from (km) to (km)	LHS/ RHS
This shall be Provided at High Embankment (more than 3.0m) and at sharp curve locations.		

11.1 RCC Retaining Walls

The Contractor shall provide RCC Retaining Walls at the locations as given in **Appendix B-XXI**.

12. Other Features of Four Laning

[Refer to the provision of relevant e Manual and provide details where relevant and required.] Change of Scope

The length of Structures and bridges specified here in above shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule-B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article13.

12.1 Cross Section Type along the Project Corridor

Different type of cross sections for different segments of Four Lane stretch shall be developed as provided in 'Manual of Specifications & Standards for Four Laning of Highways through PPP' (IRC:SP:84-2014) referred in Schedule D. Different cross-sections shall be as indicated in **Appendix B-II**.

12.2 Alignment Plan and Longitudinal Section

An alignment plan and profile of the project highway are given at **Appendix B-III**.

12.3 Bypass/Realignment

These are indicated in **Appendix B-IV**.

12.4 Built-Up Areas

Locations of built-up areas are provided in **Appendix B-V**.

12.5 Service Road

The details of service roads to be provided are given at **Appendix B-VI**.

12.6 Pedestrian/Cattle/Elephant Underpass

Locations and details of Pedestrian/Cattle/Elephant underpasses to be provided along the project highway are given in **Appendix B-XI**.

12.7 Median

Details of type and width of median are given at **Appendix B-XVIII**.

12.8 Utilities

Provision for accommodating utilities shall be made both for overhead as well as

underground wherever required. Minimum utility crossing duct locations shall be as given below:

1. Built-up locations : At 500m interval
2. Rural locations and rest of the highway : At 2.0km interval

12.9 Utility Services to be Carried over the Structures

As per site requirement and approved by the Authority's Engineer.

12.10 Measures for Protecting Structures against Corrosion

TMT-EQR 500/IS: 1786 Fe500 D bars shall be used for all RCC works.

12.11 Rainwater Harvesting

No rain water harvesting structure is required for the proposed project as the project influence zone is not at all water crisis area.

13. Change of Scope

The length of Structures, bridges and slope protection works whatsoever in terms of retaining wall, breast wall and reinforced earth wall or under special requirement of hill slope specified herein above shall be treated as an approximate assessment. The actual lengths and height as required on the basis of detailed investigations, shall be determined by the Contractor in accordance with the specification and standards. Any variations in the lengths and specifications given in the Schedule-B shall not constitute a Change of Scope.

Appendix B-I

Summary of Widening Scheme

Summary of widening scheme is mentioned below:

Sl No.	Design Chainage (km)		Length (m)	TCS Types	Widening Scheme
	From	To			
Part 1: MMLP Connectivity Road					
1	0+000	0+400	400	TYPE-2	4-Lane Rural
2	0+400	0+680	280	TYPE-3	6-Lane Rural
3	0+680	0+740	60	-	RUB
4	0+740	1+100	360	TYPE-3	6-Lane Rural
5	1+100	1+147	47	TYPE-2	4-Lane Rural
6	1+147	1+177	30	-	Minor Bridge
7	1+177	2+835	1658	TYPE-2	4-Lane Rural
Sub Total			**2835**		
Part 2: Port Connectivity Road					
1	0+000	1+155	1155	TCS-1	4-Lane Built-up
Sub Total			**1155**		
Part 3: Existing NH					
1	0+000	0+100	100	TYPE-2	4-Lane Rural
2	0+100	0+645	545	TYPE-5	6-Lane Rural with RE Wall (Slip road on RHS)
3	0+645	0+675	30	-	VUP
4	0+675	0+900	225	TYPE-5	6-Lane Rural with RE Wall (Slip road on RHS)
5	0+900	0+970	70	-	Merging 2-Lane Rural
Sub Total			**970**		
Part 4: Ramp 1A					
1	0+000	0+70	70	-	Merging (Only pavement layer to be considered)
2	0+70	0+350	280	TYPE-9	2-Lane with RE Wall
3	0+350	0+442	92	TYPE-10	2 Lane Rural
4	0+442	0+512	70	-	Merging
Sub Total			**512**		
Part 5: Ramp 1B					
1	0+000	0+70	70	-	Merging
2	0+70	0+300	300	TYPE-10	2 Lane Rural
3	0+300	0+520	220	TYPE-9	2-Lane with RE Wall
4	0+520	0+590	70	-	Merging (Only pavement layer to be considered)
Sub Total			**590**		
Part 6: Slip Road 1A					
1	0	70	70	-	Merging (already considered in Ex NH)
2	70	295	225	-	2-Lane Road (Considered in TCS of Existing NH)
3	295	327	32	TYPE-10	2-Lane Road
4	327	397	70	-	Merging
Sub Total			**397**		

Sl No.	Design Chainage (km)		Length (m)	TCS Types	Widening Scheme
	From	To			
Part 7: Slip Road 1B					
1	0	70	70	-	Merging
2	70	615	545	-	2-Lane Road (Considered in TCS of Existing NH)
3	615	674	59	TYPE-10	2-Lane Road
4	674	744	70	-	Merging
Sub Total			**744**		
Part 8: Slip Road 1C					
1	0	70	70	-	Merging
2	70	455	385	TYPE-10	2-Lane Rural
3	455	525	70	-	Merging (already considered in Ex. NH)
Sub Total			**525**		

Appendix B-II

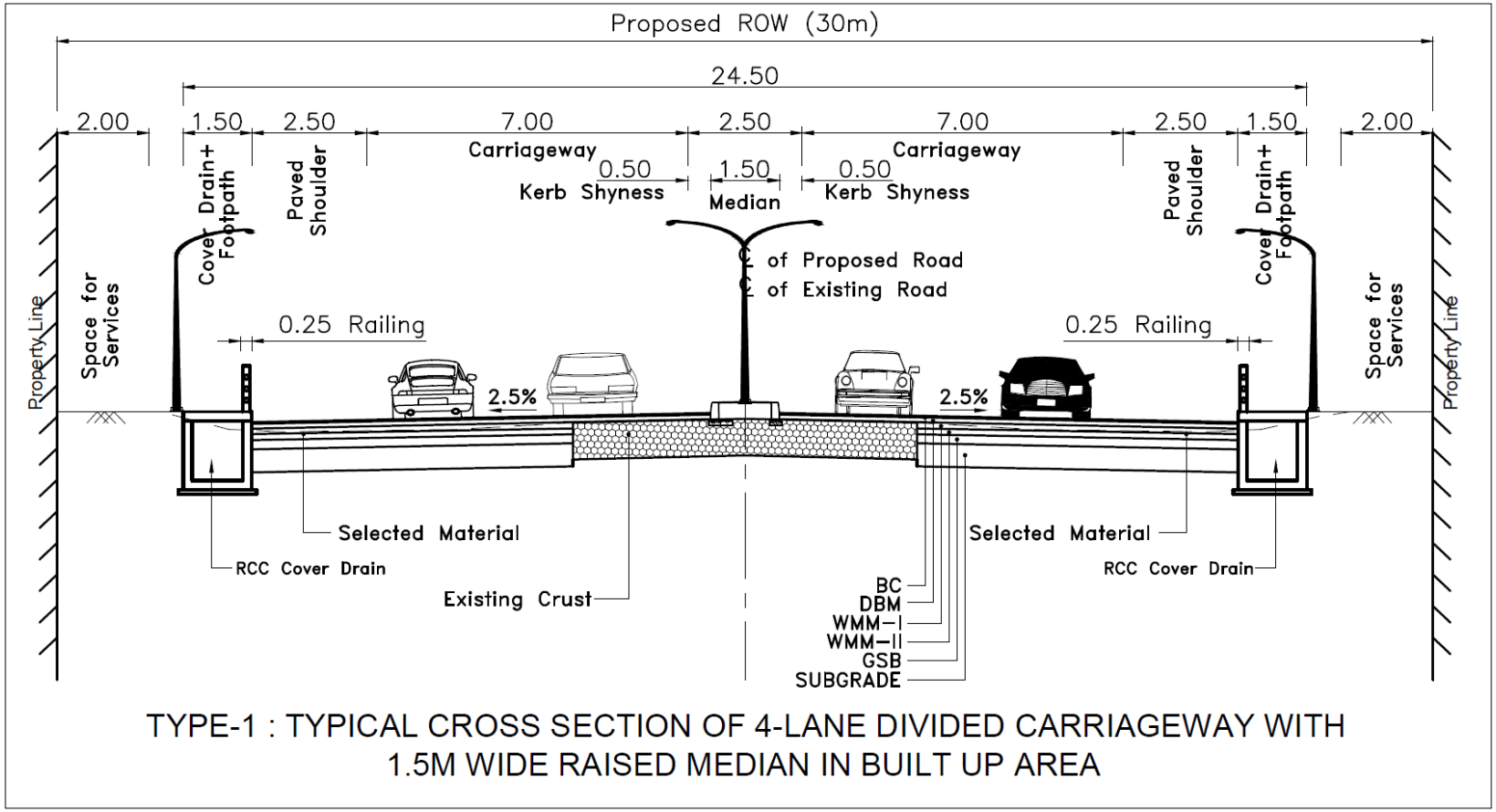
Typical Cross Sections

Cross-section for the improved facility should be adequate to cater to the traffic expected over the design period and offer safe and convenient traffic operation at speeds consistent with the terrain conditions and functional classification of this road.

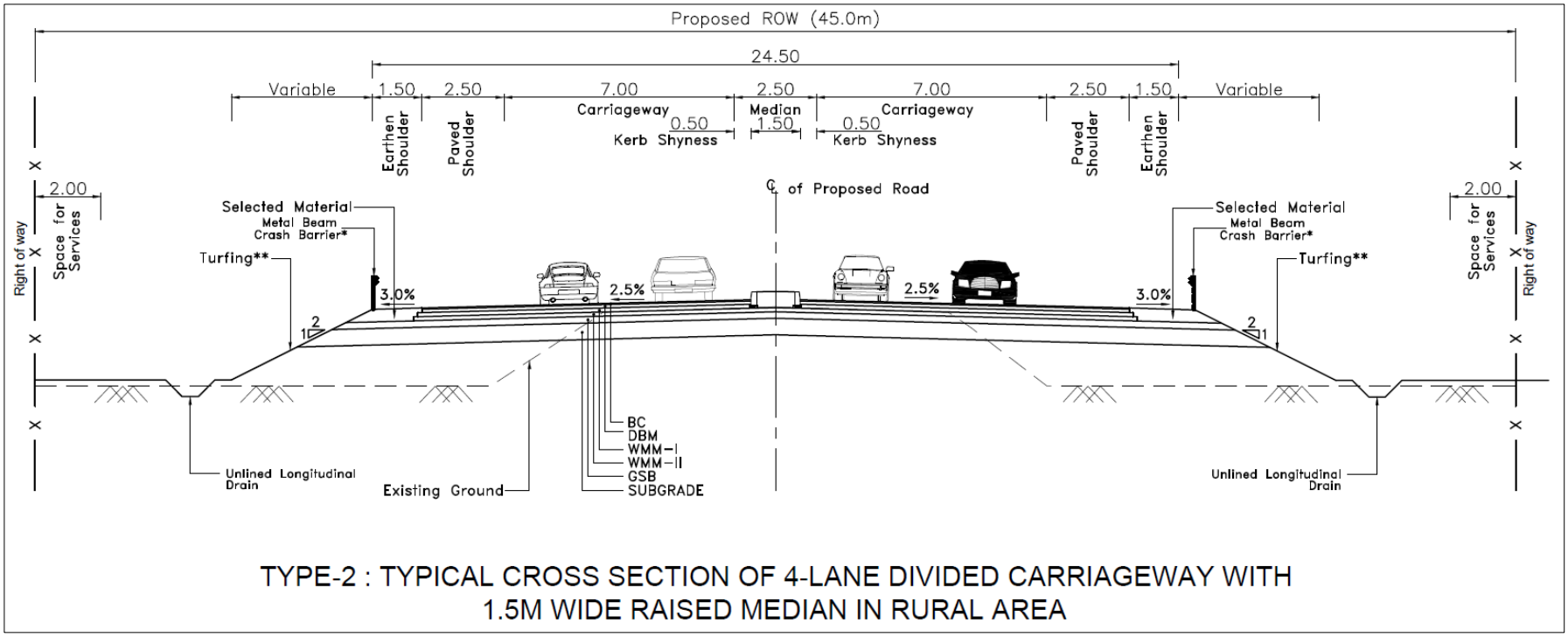
The cross-sectional elements (lane/shoulder width etc.) are as per standards specified in geometric design manual. Eleven nos. typical cross sections have been envisaged for the subject project at this stage as mentioned below. These have been prepared on the basis of site reconnaissance and design guidelines.

TYPE –1	: Typical cross section of 4-lane divided carriageway with 1.50m wide raised median in built-up stretches
TYPE –2	: Typical cross section of 4-lane divided carriageway with 1.50m wide raised median in rural stretches
TYPE –3	: Typical cross section of 6-lane divided carriageway with 1.50m wide raised median in rural stretches
TYPE –4	: Typical cross section of 4-lane divided carriageway at Grade Separator approaches with Slip Road and and RE wall on both sides
TYPE –5	: Typical cross section of 4-lane divided carriageway at Grade Separator approaches with RE wall and Slip Road on RHS
TYPE –6	: Typical cross section of 4-lane divided carriageway at Grade Separator approaches with RE wall and Slip Road on LHS
TYPE –7	: Typical cross section of 4-lane divided carriageway at Grade Separator approaches with RE wall
TYPE –8	: Typical cross section of 2-lane carriageway at Grade Separator approaches with RE wall
TYPE –9	: Typical cross section of 2-lane carriageway at Ramps with RE wall

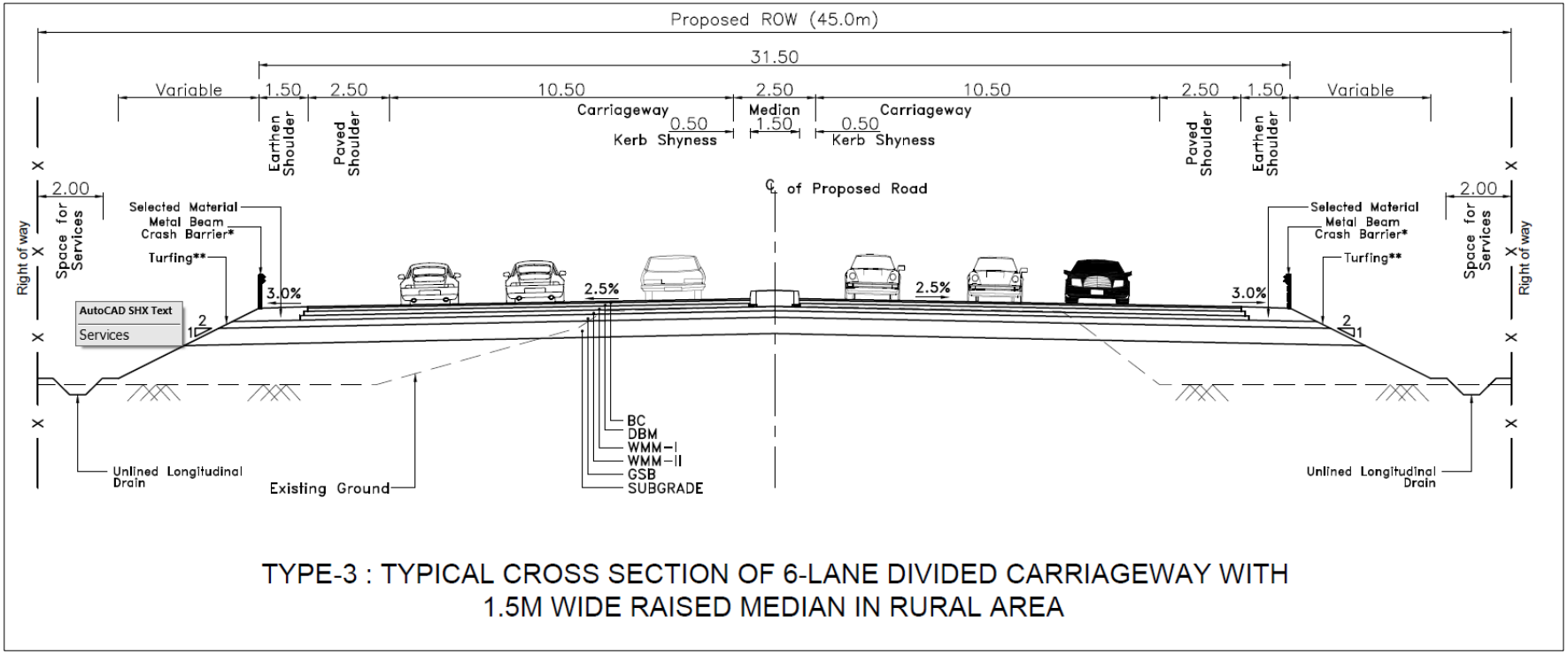
Typical Cross Section for Road



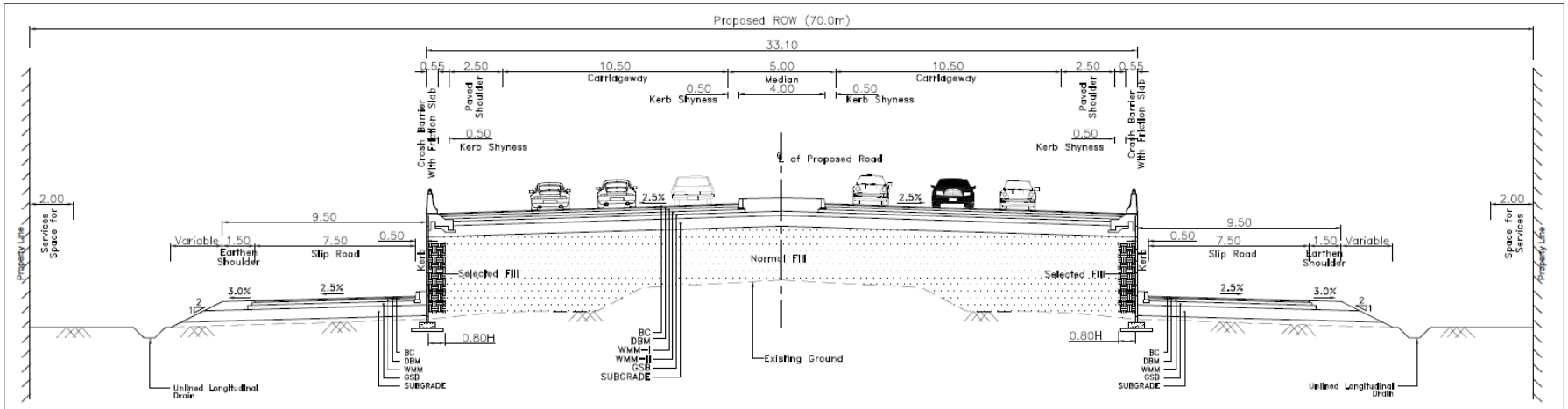
TYPE-1 : TYPICAL CROSS SECTION OF 4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN BUILT UP AREA



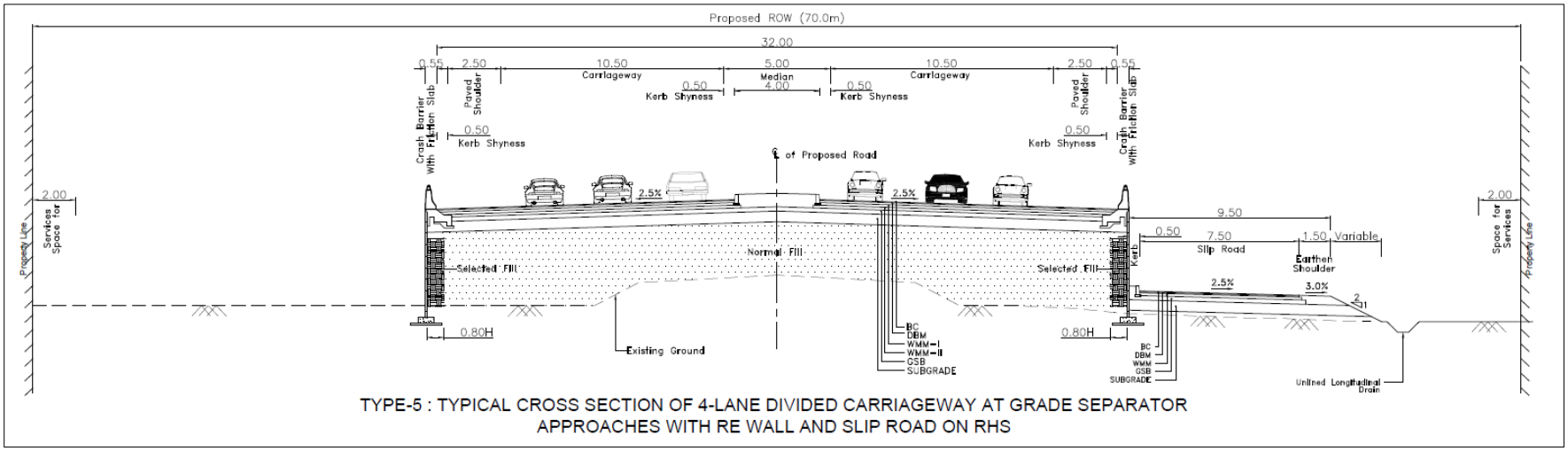
TYPE-2 : TYPICAL CROSS SECTION OF 4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA



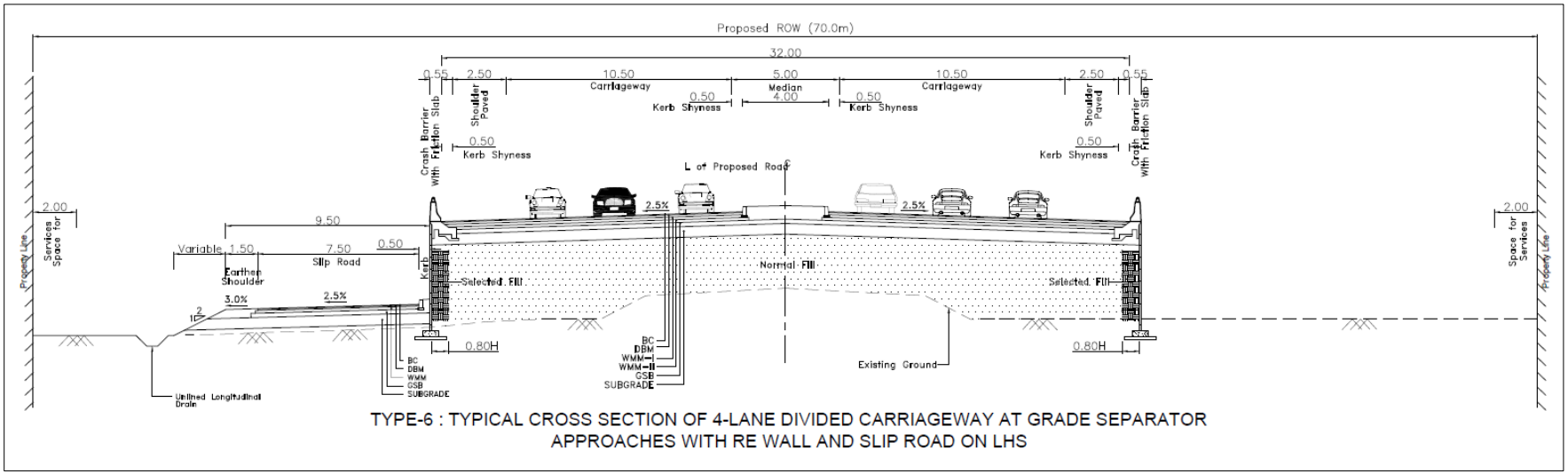
TYPE-3 : TYPICAL CROSS SECTION OF 6-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA



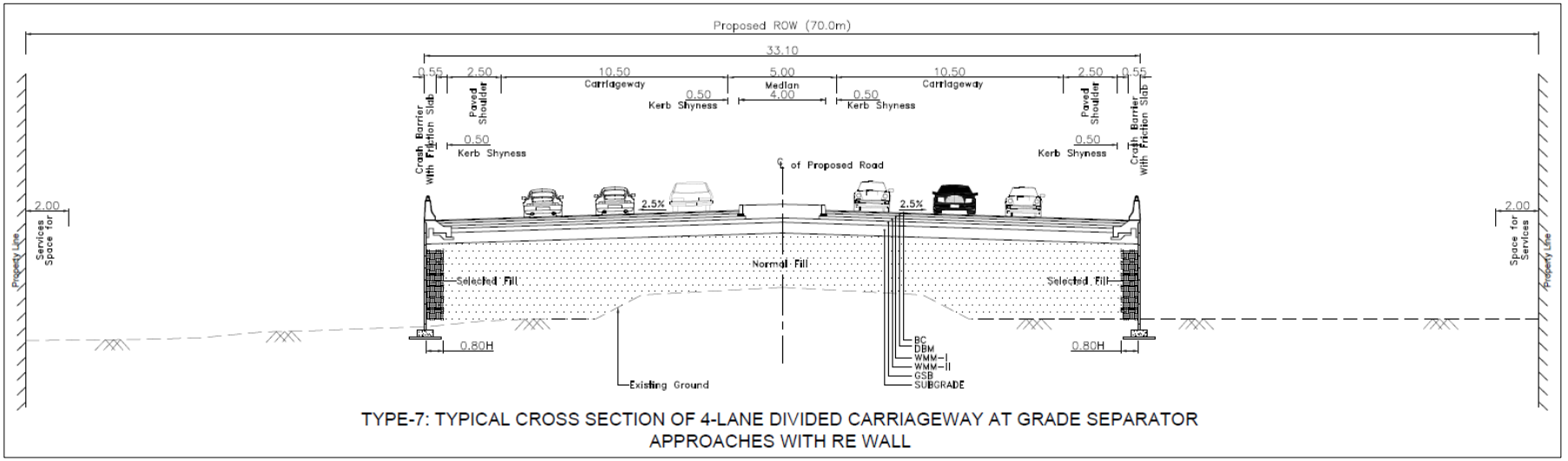
TYPE-4 : TYPICAL CROSS SECTION OF 4-LANE DIVIDED CARRIAGEWAY AT GRADE SEPARATOR APPROACHES WITH SLIP ROAD AND RE WALL ON BOTH SIDES



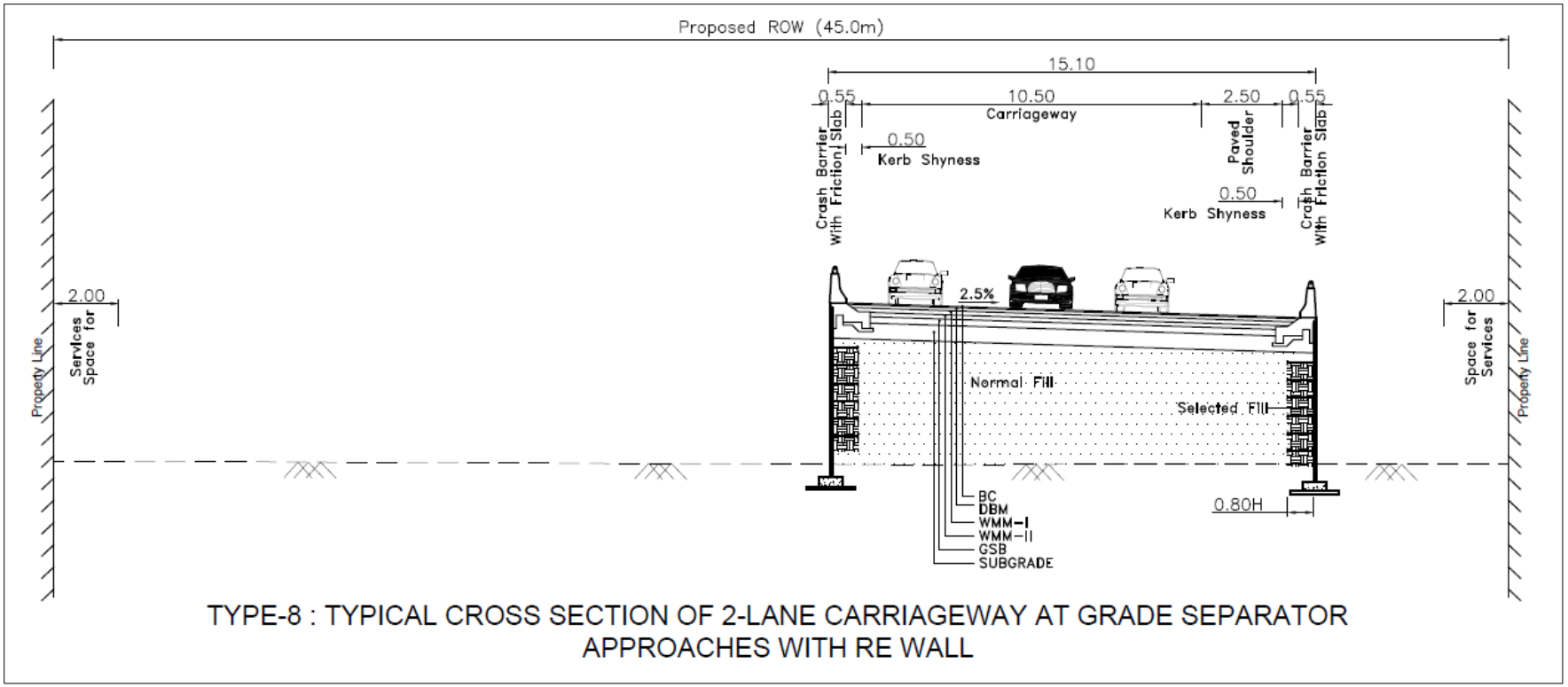
TYPE-5 : TYPICAL CROSS SECTION OF 4-LANE DIVIDED CARRIAGEWAY AT GRADE SEPARATOR APPROACHES WITH RE WALL AND SLIP ROAD ON RHS



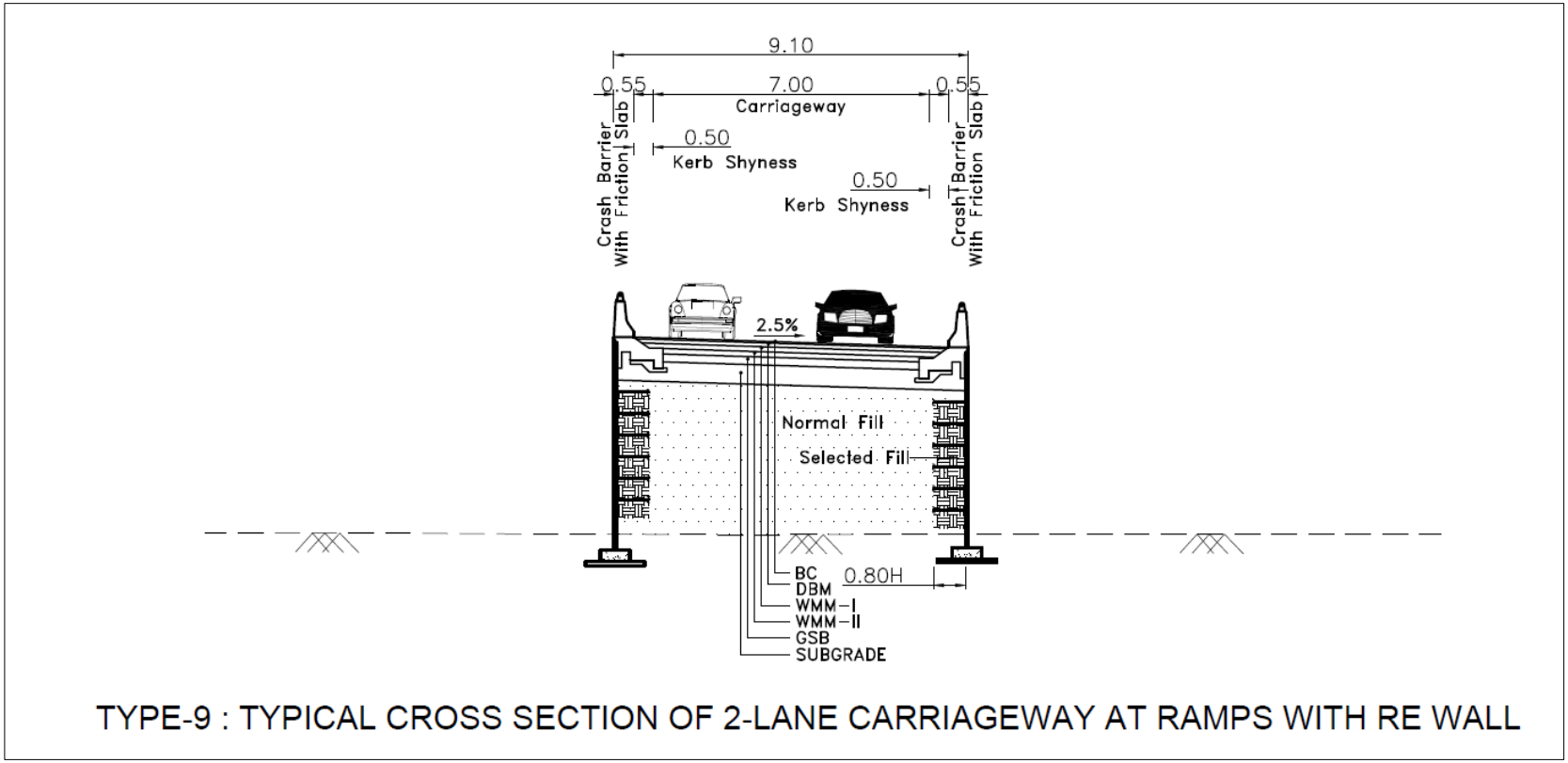
TYPE-6 : TYPICAL CROSS SECTION OF 4-LANE DIVIDED CARRIAGEWAY AT GRADE SEPARATOR APPROACHES WITH RE WALL AND SLIP ROAD ON LHS



TYPE-7: TYPICAL CROSS SECTION OF 4-LANE DIVIDED CARRIAGEWAY AT GRADE SEPARATOR APPROACHES WITH RE WALL



TYPE-8 : TYPICAL CROSS SECTION OF 2-LANE CARRIAGEWAY AT GRADE SEPARATOR APPROACHES WITH RE WALL



TYPE-9 : TYPICAL CROSS SECTION OF 2-LANE CARRIAGEWAY AT RAMPS WITH RE WALL

Cross Section Schedule

Sl. No.	Description	Length (m)	TCS Type
A	**MMLP Connectivity Road**		
1	4-Lane Divided Carriageway With 1.5m Wide Raised Median in Rural Area	2105	TCS-2
2	6-Lane Divided Carriageway With 1.5m Wide Raised Median in Rural Area	640	TCS-3
3	Structure (MNB/RUB)	90	-
B	**Port Connectivity Road**		
4	4-Lane Divided Carriageway With 1.5m Wide Raised Median in Built Up Area	1155	TCS-1
C	**Existing NH -17**		
5	4-Lane Divided Carriageway With 1.5m Wide Raised Median in Rural Area	100	TCS-2
6	6-Lane Divided Carriageway at Grade Separator Approaches with RE Wall and Slip Road On RHS	770	TCS-5
7	Merging 2-Lane Rural	70	-
8	Structure (MNB/RUB)	30	-
D	**Ramp/slip road**		
9	2-Lane Carriageway at Ramps with RE Wall	500	TCS-9
10	2-Lane Carriageway at Slip Road	798	TCS-10
11	Merging	700	-
12	2-Lane Road (Considered in TCS of Existing NH)	770	-

Appendix B-III

Alignment Plan and longitudinal section (Plan & Profile) are enclosed marked as Appendix B-III.

Appendix B-IV

Details of Bypass/Realignment

Details of bypass/realignments are as follows:

Sl No.	Design Chainage (km)		Length (m)	TCS Types	Description
	From	To			
Part 1: MMLP Connectivity Road					
1	0+000	2+886	2886	-	Green Field alignment
Part 2: Port Connectivity Road					
NIL					
Total			**2880**		

Appendix B-V

Details of Built-Up Areas

Details of built-up areas are as follows:

Sl No.	Design Chainage (km)		Length (m)	Town/Village Name
	From	To		
Part 1: MMLP Connectivity Road				
NIL				
Part 2: Port Connectivity Road				
1	0+000	1+155	1155	Jogighopa Port Area
Total			**1155**	

Appendix B-VI

Details of Service Roads

Service Roads along mainline shall be constructed at the following locations:

Existing Chainage (km)		Existing Length (m)	Design Chainage (km)		Design Length (m)	Side	Width (m)
From	To		From	To			
NIL							

Appendix B-VII

Details of Proposed Right of Way (ROW)

The proposed ROW shall be as follows:

Sl No.	Design Chainage (km)		Length (m)	PROW w.r.t PCL (m)
	From	To		
Part 1: MMLP Connectivity Road				
1	0+000	2+835	2835	45
Part 2: Port Connectivity Road				
1	0+000	1+155	1155	30

Appendix B-VIII

Details of At-Grade Intersections

At-grade intersections shall be provided with the intersecting roads at the following locations:

(A) Major Intersections

Sl No.	Design Chainage (km)	Road Segment	Type of Intersection	Type	Side	Improvement Proposals	Remarks
Part 1: MMLP Connectivity Road							
1	0+000	MMLP Connectivity Road	Major	3-legged	Both	At Grade	Junc. With Port Connectivity Road
Part 2: Port Connectivity Road							
2	0+000	Port Connectivity Road	Major	3-legged	Both	At Grade	Junction with NH-17

(B) Minor Intersections

Sl No.	Design Chainage (km)	Road Section	Type of Intersection	Type	Side	Improvement Proposals	Remarks
Part 1: MMLP Connectivity Road							
NIL							
Part 2: Port Connectivity Road							
1	0+870	PCR	Minor	3-legged	RHS	At Grade	Village Road
2	0+940	PCR	Minor	3-legged	LHS	At Grade	Village Road

Notes: (1) PCR : Port Connectivity Road

(2) Above intersections to be developed as per IRC/MoRTH drawings & design standards

Appendix B-IX

Details of New Grade Separated Intersections (Interchanges)

Sl No.	Location	Existing Chainage	Design Chainage	Name of Intersecting Roads	Proposed Structural Configuration	Proposed Structure Type	Proposed Span Arrangement	Total Width of Structure
Part 1: MMLP Connectivity Road								
1	Junction with NH-17	-	0+530	NH-17	-	-	-	21.5
Part 2: Port Connectivity Road								
NIL								

Appendix B-X

Details of Proposed New Vehicular Underpasses

The following new vehicular underpasses shall be constructed:

Sl. No.	Structure	Chainage (Km.)	Road Name	Span Arrangement (m)	Width of Structure	Type of Super Structure
Phase 1						
1	VUP	0+660 of NH 17 & 0+550 of MMLP Connecting Road	NH 17 & MMLP Connecting Road	2 x 12.0	2x15.10 + 3.0m Median	PSC-I GIRDER
2	RUB	0+715 of MMLP Connecting Road	MMLP Connecting Road	2x15.0	25.0	Composite (RDSO Standard)

Appendix B-XI

Details of Proposed New Pedestrian/Cattle/Elephant Underpasses

The following new pedestrian/cattle/elephant underpasses shall be constructed:

Sl No.	Type of Underpasses	Design Chainage (km)	Span Arrangement (Nos. x Length in m)	Total Length (m)	Clear Height (m)	Overall Width (m)	Structure Type
NIL							

Appendix B-XII

Details of Proposed Overpasses

The following new overpasses shall be constructed:

Sl No.	Design Chainage (km)	Span Arrangement (Nos.xLength in m)	Total Length (m)	Clear Height (m)	Overall Width (m)	Structure Type
NIL						

Appendix B-XIII

Major Bridges

(A) New Construction of Major Bridges

The following new major bridges shall be constructed:

Sl No.	Road Segment	Name of Stream	Existing Chainage (km)	Design Chainage (km)	Span Arrangement (Nos.x L in m)	Total Length (m)	Overall Width (m)	Structure Type	Remarks
New Construction									
NIL									

(B) Retained with Repair and Strengthening of Existing Major Bridges

The following major bridges shall be repaired and strengthened

Sl No.	Existing Chainage (km)	Design Chainage (km)	Carriageway Width (m)	Span (m) No. of Span x Effective Soan Length	Type of Structure	Overall Width (m)
NIL						

(C) Reconstruction of Existing Major Bridges

The following major bridges shall be re-constructed [refer Clause 7.3 (iv) (a) of Schedule-D]:

Sl No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Proposed Span Arrangement (No. x Length)	Total Width of Structure (m)
NIL					

Appendix B-XIV

Minor Bridges

(A) New Construction of Minor Bridges

The following new minor bridges shall be constructed:

Sl. No.	Structure	Chainage (Km.)	Road Name	Span Arrangement (m)	Width of Structure	Type of Super Structure
Phase-1						
1	MNB	1+162	MMLP CONNECTIVITY	1x30.0	2x17.0	PSC-I GIRDER

(B) Retained with Repair and Strengthening of Existing Minor Bridges

The following minor bridges shall be repaired and strengthened:

Sl No.	Road Segment	Name of Stream	Existing Chainage (km)	Design Chainage (km)	Span Arrangement (Nos.xLength in m)	Total Length (m)	Overall Width (m)	Str. Type	Remarks
NIL									

(C) Reconstruction of Existing Minor Bridges

The following major bridges shall be re-constructed:

Sl No.	Road Segment	Name of Stream	Existing Chainage (km)	Design Chainage (km)	Span Arrangement (Nos.xLength in m)	Total Length (m)	Overall Width (m)	Str. Type	Remarks
NIL									

Appendix B-XV

Details of Proposed Viaduct

There is no viaduct structure has been proposed.

Appendix B-XVI

Culverts

(A) Widening of Culverts

The following culverts shall be widened:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structures	Overall Condition	Improvement Proposal	Span Arrange-ment (m)	Proposed Width of Structure (m)
NIL							

(B) Reconstruction of Culverts

The following culverts shall be reconstructed:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Overall Condition	Improvement Proposal	Type of Strs	Span Arrangement (m)	Proposed Width of Structure (m)
Part 1: MMLP Connectivity Road							
NIL							
Part 2: Port Connectivity Road							
1	0+298	0+298	Poor	Reconstruction	Box Culvert	1x2.50	21.50

(C) Construction of New Culverts

The following new culverts shall be constructed:

Sl. No.	Design Chainage (km)	Road Name	Span Arrangement (m)	Type of Culvert	Proposed Width of Structure (m)	Proposed Width of Structure (m)
1	0+050	MMLP Connectivity Road	1x2.50	RCC Box	New construction	24.50
2	0+140	Slip Road 1C	1x2.50	RCC Box	New construction	10.00
3	0+465 / 0+442 / 0+065	MMLP Connectivity Road / Ramp 1A / Ramp 1B	1x2.50	RCC Box	New construction	49.30
4	0+630 / 0+326 / 0+674	MMLP Connectivity Road / Slip Road 1A / Slip Road 1B	1x2.50	RCC Box	New construction	46.30
5	0+820	MMLP Connectivity Road	1x2.50	RCC Box	New construction	36.80
6	1+040	MMLP Connectivity Road	1x2.50	RCC Box	New construction	38.80
7	1+547	MMLP Connectivity Road	1x2.50	RCC Box	New construction	35.80
8	1+950	MMLP Connectivity Road	1x2.50	RCC Box	New construction	32.70
9	2+190	MMLP Connectivity Road	1x2.50	RCC Box	New construction	30.50
10	2+360	MMLP Connectivity Road	1x2.50	RCC Box	New construction	34.00
11	2+570	MMLP Connectivity Road	1x2.50	RCC Box	New construction	32.10
12	0+265 / 0+246	Ramp 1A / Slip Road 1C	1x2.50	RCC Box	New construction	24.00
13	0+230	Ramp 1B	1x2.50	RCC Box	New construction	10.00
14	0+145 / 0+826	Slip Road 1A / NH-17	1x2.50	RCC Box	New construction	41.50
15	0+284 / 0+255	Slip Road 1B / NH-17	1x2.50	RCC Box	New construction	41.50
16	0+560	Port Connectivity	1x2.50	RCC Box	New construction	21.50
17	0+965	Port Connectivity	1x2.50	RCC Box	New construction	21.50

Appendix B-XVII

Construction of New ROBs

The following new ROBs shall be constructed:

Sl No.	Existing Chainage (km)	Design Chainage (km)	Span Arrangement (Nos.xLength in m)	Total Length (m)	Overall Width (m)	Structure Type	Remarks
NIL							

Appendix B-XVIII

Details of Median

Medians shall be provided at following locations:

Design Chainage (km)		Length (m)	Median Width (m)	Median Type (m)	TCS Types	Remarks
From	To					
Part 1: MMLP Connectivity Road						
0+000	2+105	2105	2.5	Raised	2	
0+000	0+640	640	2.5	Raised	3	
Part 2: Port Connectivity Road						
0+000	1+155	1155	1.5	Raised	1	

Appendix B-XIX

Details of Lined Rectangular Uncovered Drains

Medians shall be provided at following locations:

Design Chainage (km)		Side	Nos.	Total Length (m)	TCS Type	Remarks
From	To					
NIL						

Details of Un-Lined Trapezoidal Drains

Trapezoidal Un-lined Drains shall be provided at following locations:

Design Chainage (km)		Side	Nos.	Total Length (m)	TCS Type	Remarks
From	To					
0+000	3+543	Both	2	7086	TCS – 2, 3, 4, 10	4-lane C/W
0+000	0+770	Single	1	770	TCS – 5, 6	4-lane C/W with Grade Separator

Appendix B-XX

Details of RCC Covered Drains

RCC covered drains shall be provided at following locations:

Design Chainage (km)		Side	Nos.	Total Length (m)	TCS Type	Remarks
From	To					
Part 1: MMLP Connectivity Road						
NIL						
Part 2: Port Connectivity Road						
0+000	1+155	Both	2	2310	TCS-1	4-lane C/W in Built-Up Area
Sub Total				**2310**		
Grand Total				**2310**		

Appendix B-XXI

Details of RCC Retaining Walls

RCC retaining wall shall be provided at following locations:

Sl no	Chainage		Length	Side	Remarks
	From	To			
Part 1: MMLP Connectivity Road					
NIL					
Part 2: Port Connectivity Road					
NIL					

Appendix B-XXII

Details of RCC Toe Walls

RCC toe wall shall be provided at following locations:

Sl No.	Design Chainage (km)		Length (m)	Side	Nos.	Remarks
	From	To				
NIL						

Appendix B-XXIII

Details of Reinforced Earth (RE) Walls

RRE wall shall be provided at following locations:

Sl No.	Facility	Design Chainage (km)		Length (m)	Shape	Location	Side	Nos.	Cross Sectional Parameters			Remarks
		From	To						Max. Ht. (m)	Min. Ht. (m)	Area (sqm)	
Part 1: MMLP Connectivity Road												
1		0+060	0+290	230		Approach	Both	2	8	3.5	-	-
2		1+230	1+380	180		Approach	Both	2	8	3.5	-	-
Additionally, total 760m RE wall is proposed in both sides for 4 nos. of ramps												
Part 2: Port Connectivity Road												
NIL												

Section B-2: Internal Infrastructure Development inside MMLP Site

Annex I

(Schedule-B)

Description of Project

[Note: Description of the Project shall be given by the Authority in detail together with explanatory drawings (where necessary) to explain the Authority's requirements precisely in order to avoid subsequent changes in the Scope of the Project. The particulars that must be specified in this Schedule-B are listed below as per the requirements of the Manual of Specifications and Standards, referred to as the Manual. If any standards, specifications or details are not given in the Manual, the minimum design/construction requirements shall be specified in this Schedule. In addition to these particulars, all other essential project specific details, as required, should be provided in order to define the Scope of the Project clearly and precisely.]

1 Internal Road network

1.1 The road network is the most important infrastructure development in any industrial area, as movement of all raw material to and finished goods from the plot is dependent on the road network. The alignment and design development of an industrial road network is a measure of and catalyst to an efficient construction and operations of an industrial area. Appropriate combination of various links both technically and economically generate industrial traffic infrastructure and promote the objectives of accessibility and connectivity. Road network planning includes the fixing of right of way, geometric design of roads, design of typical cross- sections to ensure adequacy of carriageway widths and utility corridors, selection and design of pavement type, design of intersections, interchanges, location & provision of appropriate facilities. Design of road sections has been done according to design standards stipulated in IRC codes and improvements identified at the various stages of the project.

1.2 The proposed site is located in Ashok Paper Mill (APM). Saibari-Jogighopa Road of 27 mt runs along the northern edge and acts as the access road to the site. Saibari-Jogighopa Road connects the site with NH-17 on the east. The site can also be accessed from 20 mt wide village road that runs along the north western edge of the site.

A 45 mt road is proposed towards south to connect the site to NH-17. This 45 M wide road will provide direct access to the site from the National Highway. It is assumed that this road will act as a major connecting road between the NH-17 and the APM site as well as between APM site and IWT site

1.3 The roads have been proposed keeping in mind the site topography and physical conditions. The existing village road and the adjoining network of roads have been considered while designing the internal road network of the site.

The network is designed in a way that it favours smooth freight flow within the MMLP. IRC codes have been followed while designing the junctions and road widths. The roads have been laid keeping in mind the existing contour, and the slope has been kept at maximum 1:50, for ease of truck movement

1.4 Notwithstanding the basic alignment plans enclosed with this document the Contractor shall himself carryout and be responsible for engineering surveys, investigation and detailed engineering designs and prepare the working drawings for all the components relevant for the improvement and upgradation of the Project Highway to fulfill the scope of the project as envisaged hereinunder. These shall comply with design specifications and standards given in **Schedule–D**. The designs for different project facilities shall follow the locations and indicative designs given in **Schedule–C** and shall comply with design specifications and standards outlined in **Schedule–D**. All the designs and drawings shall be reviewed by the Independent Consultant prior to execution.

Summary of Road is indicated in **Appendix B-I.**

1.5 Width of Carriageway

1.5.1 The paved carriageway width shall be 3.5 excluding kerb shyness on either side of raised median, paved shoulder and earthen shoulder.

The paved carriageway shall be as specified in the following table:

Sl. No.	Attributes	Width (m)
1	Carriageway Width	For 45M ROW: 3 x 3.5m (on either side) For 30M ROW: 2 x 3.5m (on either side)
2	Cycle Lane	2.50m on each side of both 45.0 & 30.0M ROW
3	Footpath	2.5m in 45M ROW 1.5m in 30M ROW
4	Raised Median (Including kerb shyness of 0.5 m on either side)	in 45M ROW - 4.0 m in 30M ROW - 4.0 m at Center & 0.50 m at the edge of carriageway and ROW edge
5	Median side paved strip (Shy distance)	0.50M on each side

2. Project Facilities

Project facilities shall be constructed in conformity with Annex-I of Schedule-C.

3. Specifications and Standards

The Project Highway shall be constructed in conformity with the Specifications and Standards specified in Annex-I of Schedule – D.

4. Pavement Design

Pavement design shall be carried out in accordance with the provision of relevant Manual.

4.1 Pavement Composition

Rigid pavement is proposed for all the roads in the project, the pavement composition for main Carriageway, Cycle track, Footpath is stated in Tables below:

Pavement Composition for Main Carriageway

Pavement Layers	Thickness
PQC	300 mm
DLC	150 mm

GSB	150 mm
SUBGRADE	500 mm

Pavement Composition for Cycle Track

Pavement Layers	Thickness
Paver Block	60 mm
Sand Bedding	50 mm
GSB	200 mm

Pavement Composition for Footpath

Pavement Layers	Thickness
Paver Block	60 mm
Sand Bedding	50 mm
GSB	200 mm

4.2 Design Requirement

4.2.1 Design Period and strategy

Pavement design life is the period for which the initial design of pavement crust layers shall be designed. Design life should not be referred as terminal stage of crust beyond which crust becomes unusable. A design life of 20 years for rigid pavement has been considered for the design purposes.

4.2.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for entire Project for design traffic as per below table.

Year	2052
TW	3372
Car	1776
Taxi	1013
Mini Bus	23
Bus	29
Mini	788
Max	1313
LCV	438
2-Axle	488
3-Axle	465
Multi Axle	277

Year	2052
Total Passenger Vehicles (in Numbers)	6213
Total Goods Vehicles (in Numbers)	3768
Total Vehicles (in Numbers)	9981
Total Passenger Vehicles (in PCUs)	5414
Total Goods Vehicles (in PCUs)	5917
Total Vehicles (in PCUs)	11331
Total Peak Hour Traffic (in Numbers)	2699
Total Peak Hour Traffic (in PCU)	2636

- In year 2022 Peak Hour Traffic at MMLP (internal & external link road) = 444 PCUs. As per IRC-106:1990 Two Lane Divided Carriage Way recommended.
- In year 2027 Peak Hour Traffic at MMLP (internal & external link road) = 800 PCUs. As per IRC-106:1990 Two Lane Carriage Way recommended.
- In year 2033 Peak Hour Traffic at MMLP (internal & external link road) = 1637 PCUs. As per IRC-106:1990 Four Lane Carriage Way recommended.
- In year 2038 Peak Hour Traffic at MMLP (internal & external link road) = 1919 PCUs. As per IRC-106:1990 Four Lane Carriage Way recommended.
- In year 2052 Peak Hour Traffic at MMLP (internal & external link road) = 2636 PCUs. As per IRC-106:1990 Four Lane Divided Carriage Way recommended.

5. Other Features of Internal Roads

5.1 Cross Section Type

Different type of cross sections for different segments of stretch shall be developed as provided in Schedule D. Different cross-sections shall be as indicated in **Appendix B-II**.

5.2 Alignment Plan and Longitudinal Section

An alignment plan and profile of the project highway are given at **Appendix B-III**.

5.3 Bypass/Realignment

These are indicated in **Appendix B-IV**.

5.4 Built-Up Areas

Locations of built-up areas are provided in **Appendix B-V**.

5.5 Service Road

The details of service roads to be provided are given at **Appendix B-VI**.

5.6 Proposed Right of Way

The details of the Proposed ROW are given in **Appendix B-VII**.

5.7 At-grade Intersections

The cross roads shall be re-graded and strengthened to have a crust same as of main carriageway for a length shown in the Ministry's Type Designs and Schedule-D for intersections along with provision of adequate cross drainage structures on the cross roads. The details of at-grade intersections (both major and minor) with its locations are specified in **Appendix B-VIII**.

5.8 Grade Separated Intersections

The grade separated intersections shall be as provided in **Appendix B-IX**.

5.9 Vehicular Underpasses

Locations and details of Vehicular underpasses to be provided along the project highway are given in **Appendix B-X**.

5.10 Pedestrian/Cattle/Elephant Underpass

Locations and details of Pedestrian/Cattle/Elephant underpasses to be provided along the project highway are given in **Appendix B-XI**.

5.11 Overpass

Locations and details of Overpasses to be provided along the project highway are given in **Appendix B-XII**.

5.12 Construction of Major Bridges

The Major bridges shall be constructed as per details provided in **Appendix B-XIII**.

5.13 Construction of Minor Bridges

The Minor bridges shall be constructed as per details provided in **Appendix B-XIV**.

5.14 Construction of Viaduct

The Viaduct shall be constructed as per details provided in **Appendix B-XV**.

5.15 Culverts

Culverts shall be constructed, reconstructed or retained & widened as per **Appendix B-XVI**.

5.16 Construction New ROBs

Details of ROB/RUBs to be provided are given at **Appendix B-XVII**. Following points shall be taken care of:

(I) Proposed span arrangements of the ROB are tentative and subject to change as

per availability of railway boundaries/requirement of the railways.

(II) ROB shall be designed, constructed and maintained as per the requirements of Railway authorities. The construction plans shall be prepared in consultation with the concerned railway authority.

(III) The ROB shall be constructed and maintained by the concessionaire under supervision of the Railways.

(IV) All expenditure related to construction, maintenance and supervision of ROB (except P&E charges) shall be borne by the Concessionaire.

5.17 Median

Details of type and width of median are given at **Appendix B-XVIII**.

5.18 Lined Rectangular Uncovered Drains

The Contractor shall provide lined rectangular uncovered drains at the locations as given in **Appendix B-XIX**.

5.19 Rectangular RCC Covered Drains

The Contractor shall provide rectangular RCC covered drains at the locations as given in **Appendix B-XX**. The minimum length of rectangular RCC covered drains to be provided is 1.40km. Contractor shall provide rectangular RCC covered drains at other locations as per design and in accordance with the Manual indicated in the Schedule D.

5.20 Utilities

Provision for accommodating utilities shall be made both for overhead as well as underground wherever required. Minimum utility crossing duct locations shall be as given below:

3. Built-up locations : At 500m interval
4. Rural locations and rest of the highway : At 2.0km interval

5.21 Utility Services to be Carried over the Structures

As per site requirement and approved by the Independent Engineer.

5.22 Type of Pavement for New Construction

Flexible pavement shall be provided for the Project Highway as per Schedule D.

5.23 Measures for Protecting Structures against Corrosion

TMT-EQR 500/IS: 1786 Fe500 D bars shall be used for all RCC works.

5.24 Rainwater Harvesting

No rain water harvesting structure is required for the proposed project as the project influence zone is not at all water crisis area.

5.25 Road Safety Measures

To ensure long term road safety of the project highway, engineering measures prescribed in Schedule-D shall be adopted.

6. Potable Water Supply System

The proposed water supply system will have following components

- Intake well Proposed in Brahmaputra River near to the project area.
- From intake well raw water will be pumped to Raw water sump by using V.T Pumps capable of pumping to raw water sump.
- Pumping main of DI K-9 has proposed from Intake well to Raw water Sump.
- Storage of raw water sump at the WTP with 2Hrs retention Time.
- Raw water will be pumped from Raw water sump to WTP by using Submersible pumps.
- Pumping main of DI K-9 is proposed from raw water Sump to WTP.
- Decentralized distribution system should be designed to ensure equalization of supply water throughout the area.
- Dedicated fire water supply system should be proposed through suitable Dia DI k-9 pipe from Clear Water Sump.
- The proposed pipe materials are DI & HDPE pipe for the distribution system.

6.1 Intake

The Brahmaputra is one of the major rivers of India, which flow through China, India and Bangladesh. In India it flows southwest through the Assam valley. Our project site MMLP Jogighopa situated 4.4km from the bank of Brahmaputra river in Assam. Raw water of 1.78 MLD is needed to cater the demand of MMLP and it is collecting from Brahmaputra river by proposing intake well of suitable dia to accommodate pump, electrical panels, etc. at bank of Brahmaputra river nearer to project site. Raw water will be pumped from Intake to Raw water Sump by DI K-9 pipe of length 4.4 km.

6.2 Rising Main

(a) Minimum pipe size

Minimum pipe size of 110 mm is considered for design of distribution mains.

(b) Velocity

For pumping mains, minimum velocity of 0.6 m/s and maximum velocity of 2.0 m/s is considered.

6.3 Distribution System

(a) Residual Pressure

Generally, distribution system is designed for minimum residual pressure at ferrule point. The minimum residual pressures at

ferrule point as per CPHEEO.

(b) Minimum pipe size
As per CPHEEO Manual on water supply, minimum pipe size of 100 mm is recommended.

(c) Velocity
Velocity with a maximum limit of 1.5 m/s is considered for design of gravity mains.

(d) Pipe Material
The selection of pipe material depends on various technical factors such as internal pressures, coefficient of roughness, hydraulic and operating conditions, maximum permissible diameter, internal and external corrosion problem, laying and jointing, type of soil, special conditions etc.,

7. Recycled Water System

Water Balance is achieved considering that Re-cycled water demand comprising cooling water demand, horticulture demand and Washing/ Cleaning will be met from the re-cycled water generated from Sewerage Treatment Plant (STP). In the chapters ahead, the waste water generation from various sources has been identified and estimated. Based on the treated water available from the STP the recycling water deficit has been calculated and furnished below.

From above calculations 0.03 MLD of water is deficit for Non-Potable water demand. The same quantity (0.03 MLD) of water is given from potable water supply system which is deficit.

Availability of re-cycled water is estimated based on the assumption that, about 20 to 45% of the wastewater generated from the industries.

The recycled water supply distribution system is designed as per the manual of Central Public Health and Environmental Engineering Organisation (CPHEEO).

The source of water for non-potable demand is from the STP. Recycled water of 0.43 MLD generated from STP. Recycled water of 0.43 MLD will be pumped to plots by using HDPE PN 10 pipes through pumps.

8. Sewerage Network

Wastewater network is designed to avoid number of pumping/ lift stations and at the same time to avoid deep sewers.

8.1 Waste Water Generation

The quantity of wastewater generation from the Jogighopa area is calculated based on the water demand and has been estimated to about 0.48 MLD. The sewage generations are taken as 80% of the per capita water consumption of potable water. No waste water is expected from the horticulture and cooling water demands.

8.2 Design Approach

The collection system should be designed based on CPHEEO manual and using SewerGEMS software.

8.3 Gravity Sewers

For design purposes, sewage flow in pipes is presumed to be steady and uniform. The sewer lines are aligned with positive slopes as much as possible and follow the gravity flow. As a design practice, the Manning's equation is used to design sewers, which are assumed to be open channel flows.

8.4 Minimum Diameter of Pipe

In order to ensure that the sewer possesses adequate capacity for peak flow, a minimum sewer size of 150 mm has been recommended.

8.5 Minimum Cover

The difference between the ground level and the crown of the sewer can be termed as cover. The minimum cover of 1m considered in the entire network.

8.6 Velocity of Flow

To maintain self-cleaning velocities in the sewers, it is usual practice to maintain a minimum velocity of 0.6 m/sec at initial peak flow and 0.8 m/sec at design peak flow as recommended in clause 3.15.1 of the CPHEEO Manual. Usually, upstream reaches of the system generates less peak flow due to which velocity in the sewer may be less than 0.6 m/sec. In such cases, minimum velocity of 0.3 m/sec is maintained during peak flow to dislodge the solids deposited during average flow. In sewers, where 0.3 m/sec velocity cannot be maintained, periodic flushing of sewers is proposed. The pipe diameter and slope shall be selected to attain the required velocities to minimize solids settling problems.

8.7 Erosion and Maximum Velocity

To avoid scouring and erosion of sewer pipes caused by sand and other grit material, the maximum velocity in gravity sewers is recommended not to exceed 3.0 m/sec, as per clause 3.15.3 of the CPHEEO Manual.

8.8 Ground Water Infiltration

The CPHEEO Manual on sewerage and sewage treatment specifies rates for ground water infiltration for sewers (clause 3.2.7).

8.9 Manholes

Manholes are to be provided to facilitate cleaning and inspection of sewers. Table 3-3 gives the type and size of various manholes to be employed for different diameter of sewers and for different depths. The selection of types of manhole shall also be based on the economic and construction factors.

8.10 House Connections and Sewer Connection Chambers

The basic criteria for design & installation of the service sewers are summarized below:

- The minimum diameter of the service sewer shall be 110 /160 mm
- The service sewer shall be laid up to the property line/Building, at slope not less than 1percent, i.e.. 1 in 100.

9. Fire Water

The fire water supply to be designed based on CPHEEO manual and using Water GEMS software.

a) Design process based on the CPHEEO Manual using the formula $100\sqrt{P}$ where P

= Population in thousands.

b) Fire flow requirements shall be in accordance as per the Fire Protection.

c) Fire demand requirement is considered about 0.34 MLD. Fire hydrants provided in required locations.

d) Minimum residual pressure of 1.5 bar (kgf/cm2) is considered.

e) Dedicated fire water supply system is proposed through 150 mm Dia DI k-9 pipe from Clear Water Sump. From Sump it should convey the water to the plots.

10. Power Supply Network

While designing Electrical system, it is every designer's job to build a reliable, efficient, effective and secure system. To cater the power demand of area, 132/33 kV Main Receiving Substation (MRSS) is required. The evacuation of power from the 132/33 KV MRSS to the plots will be done by 33/11kV ZSS and subsequent 33kV, 11kV, LV underground distribution network to provide the power supply to plots.

As the power distribution of the project, once completed shall be handed over to electricity board or any other agency for operation and maintenance, the whole network shall be designed as per the electricity board or any other approval agency guidelines. The detailed design documents/drawings will have to be approved from approval agency before execution to avoid any problem at time of commissioning & handing over etc.

10.1 Zonal substation

The total power demand of the MMLP has been divided to Zonal Substation (ZSS) of 33/11kV level.

The plots have been also identified for proposed construction of Zonal Substation (ZSS). The identification of ZSS plots are considered on its central location has made easy to balance the load density of the development. The ZSS comprise of two number 33kV incomer through underground cable from the MRSS. The proposed system inside ZSS, consists 33kV C&R panel with LI-LO facility and 11kV Distribution Panel with suitable capacitor bank. Power Transformers with NGR Transformer with Differential Relay, will be located outside the control building room on foundation. U.G MV Cable is proposed to cater power to individual industrial through Ring Main Units. The Ring Main Units interconnected with each other to build system redundancy. The Power Transformer rating of the ZSS for phase 1 & Phase 2 is 4# 5MVA Oil Type Transformers.

10.2 HV and LV Cable

The MV cable will be laid underground at a minimum level of 900mm below ground level in tier formation according to the voltage level. The cables will be run through the RCC Masonry Cable Trenches. The typical cross section of RCC Masonry cable trenches will be as follows:

LV cable will be buried at a minimum depth of 750mm below ground and will connect the distribution transformer as per the L.T Load requirement. LV cables shall be installed a minimum of 300 mm apart from other 11kV cables.

10.3 Renewable Energy

Provision of Rooftop Photovoltaic system shall be proposed as per the availability of

space upon the roof of buildings and open spaces; to meet partial power demand of the development area. Solar Panel & inverter cum rectifier unit will be placed along with the LT panel.

Provision of Rooftop Photovoltaic system should be mandatory for plot holder.

Solar energy generated shall be directly consumed, battery storage not to apply

Solar Rooftop System provides following benefits:

- Utilization of available vacant roof space
- Lower transmission and distribution losses
- Improvement in the tail-end grid voltages and reduction of system congestion
- Loss mitigation by utilization of distribution network as a source of storage through net metering
- Long term energy and ecological security by reduction in carbon emission
- Better Management of daytime peak loads by DISCOM/ utility
- Minimal technical losses as power consumption and generation are co-located.

10.4 Street Lighting System

Proposed roads will generally cater to-

- Movement of goods/machinery/finished product through heavy vehicles.
- Movement of persons through light vehicles including cyclist/pedestrian. Other roads around shopping area and residential area/ parking area shall be considered for aesthetic and pleasing lighting systems.

Basic requirement of road, green area and periphery lighting proposed be as follows:

- Adequate level of illuminations for heavy vehicles/light vehicles/cyclist
- Uniform illumination level over carriage way with minimum glare
- Safety of movement
- Minimum disturbance during fog/dust conditions
- Use of high efficiency lighting fixtures with high lumen output and low power consumption
- Beautification and pleasing view

10.4.1 Power supply to Conventional Road lighting pole be fed through underground 1.1 kV XLPE insulated, armoured, aluminium conductor cables. Distribution of power be through 440V, 3phase, 4 wire system.

10.4.2 Cables for street lighting system shall be sized based on protection device rating, the capacity of cable, permissible voltage drop and in general, according to IEC. All cable shall be armoured, aluminium conductor cable and to be installed direct buried. Voltage drop is an important consideration in long runs associated with street/road lighting. Cable shall be sized in a way to maintain a minimum voltage drop between feeder pillars to the last pole on the circuit. Power supply for road lighting be made available from the proposed Distribution Transformer located at three nos. of Zonal Sub-Stations in the entire project area depending upon the site conditions.

10.4.3 In Solar Road lighting pole is a crystalline silicon solar battery power supply, (valve

control type sealed and maintenance-free battery, gel battery) to store electrical energy, super bright LED as light source, lamps and lanterns and controlled by the intelligent charging and discharging controller, is used to instead of the traditional public power lighting lamps. There is no need to lay cables, no communication power, no electricity bills; DC power supply and control; It has the advantages of good stability, long life, high luminous efficiency, simple installation and maintenance, high safety performance, energy-saving and environmental protection, economical and practical. It can be widely used in urban main, secondary road, residential area, factory, tourist attraction, parking lot and other places. Product parts lighting rod structure: GI lamp pole and bracket, surface spray treatment, the panel connection adopts special anti-theft stainless steel screws.

10.4.4 Solar street lamp principle of work: During the day under the control of the intelligent controller of solar energy street lamp, solar panels after the illuminate of sunshine, absorb the solar energy light into electrical energy, solar battery components to the battery charge during the day, night batteries to provide electricity to power a LED light source, lighting functions. The dc controller ensures that the battery pack is not damaged by over-charging or over-discharge, and also has the functions of light control, time control, temperature compensation and lightning protection and anti-polarity protection.

10.4.5 In order to have an energy efficient system, LED luminaries of various ratings are proposed for the street lighting. LED, are significantly energy efficient; offer good quality of light and have a longer life than others of around 40000 – 90000 hrs depending upon the quality of LED, design and operating environment. The lux level has been considered as per IS1944.

10.5 Telecommunication System

The implementation of Telecommunication system is very important for any development and its usage has become a necessity these days. As such telecommunication network is proposed to be provided in a manner so as to have connectivity by different service providers.

10.6 Data Communication System

A high-speed communication facility through earth station is available for Information Technology units/companies. Earth station functions as international gateway and provides worldwide reliable high-speed data communication (HSDC) services at internationally competitive rates. In India, the facility of internet as well as international private leased line is available from earth station owned by software technology park of India or VSNL and some other prominent players in this field. The telecommunication and broadband connectivity network Overhead Conductors can be provided within the project site by either project authority or provision can be made in service corridor by project authority for laying of Overhead Conductors by any of the prominent service providers e.g. Airtel, BSNL, and Reliance etc. Provision in service corridors should be sufficient to accommodate 3-4 service providers to ensure competition and hence better service. Further, while reserving space in service corridors, provision for laying the conduits & chambers in front of all the plots is to be kept in mind.

1378257/2020/Technical

Appendix B-I

Summary of Widening Scheme

Summary of widening scheme is mentioned below:

Sl No.	Design Chainage (km)		Length (m)	TCS Types	Widening Scheme
	From	To			
NIL					

Appendix B-II

Typical Cross Sections

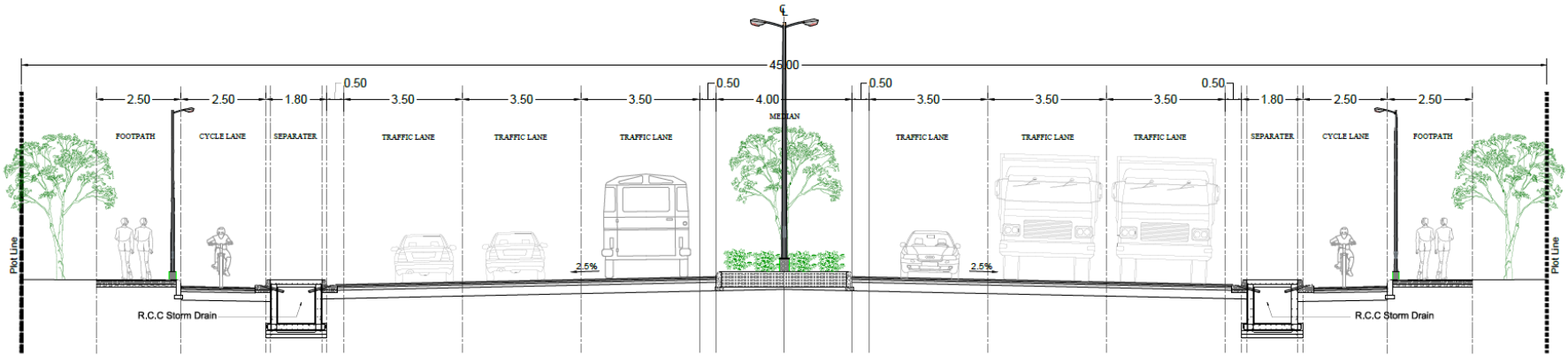
Cross-section for the improved facility should be adequate to cater to the traffic expected over the design period and offer safe and convenient traffic operation at speeds consistent with the terrain conditions and functional classification of this road network.

The cross-sectional elements (lane/shoulder width etc.) are as per standards specified in geometric design manual. Two nos. typical cross sections have been envisaged for the subject project at this stage as mentioned below. These have been prepared on the basis of site reconnaissance and design guidelines.

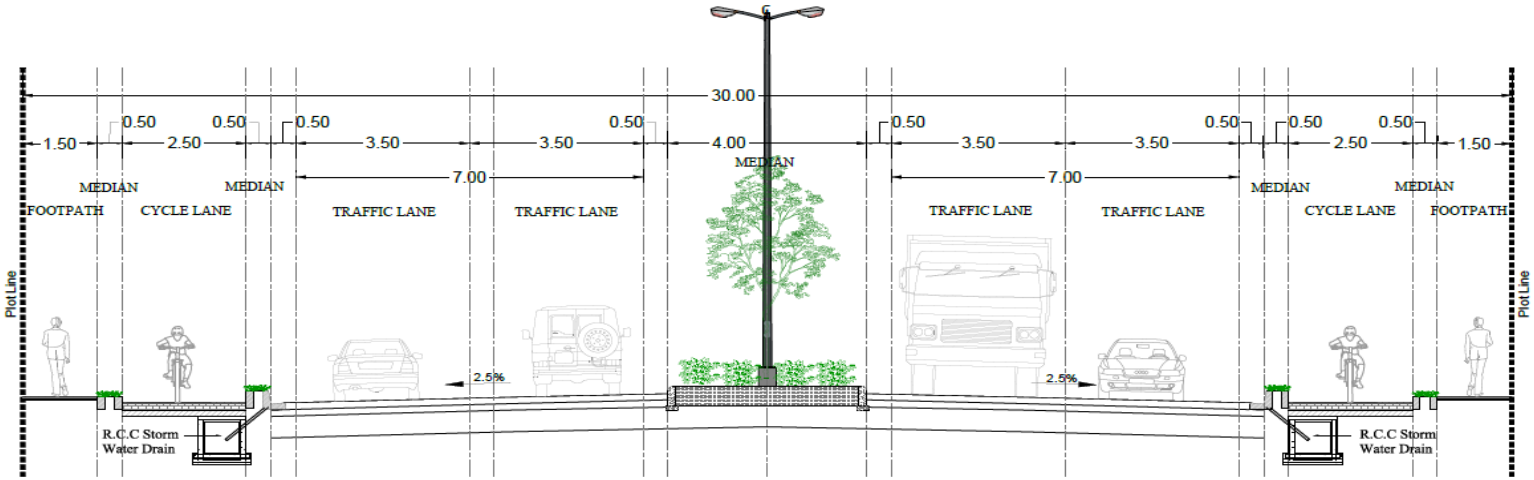
TYPE –1 : Typical cross section of 6-lane divided carriageway with 4.00m wide raised median

TYPE –2 : Typical cross section of 4-lane divided carriageway with 4.00m wide raised median at Centre and 0.50m wide raised median at the edge of carriageway & ROW edge at both ends.

Typical Cross Section for Road



TYPE A:- TYPICAL CROSS SECTION OF 6-LANE DIVIDED CARRIAGEWAY
(45.0m Wide)



TYPE B:- TYPICAL CROSS SECTION OF 6-LANE DIVIDED CARRIAGEWAY
(30.0m Wide)

Cross Section Schedule

Sl No.	Road Name	Design Chainage (km)		Length (m)	TCS Types	Widening Scheme
		From	To			
1	RA-01	0+000	0+576	576	TCS-1	NIL
2	RB-01	0+000	0+315	315	TCS-2	NIL
3	RB-02	0+000	0+325	325	TCS-2	NIL
Sub Total				**1216**		

Appendix B-III

Alignment Plan and longitudinal section (Plan & Profile) are enclosed marked as Appendix B-III.

Appendix B-IV

Details of Bypass/Realignment

There is no bypass/realignments is proposed:

Appendix B-V

Details of Built-Up Areas

Details of built-up areas are as follows:

Sl No.	Design Chainage (km)		Length (m)	Town/Village Name
	From	To		
MMLP Jogighopa Site				

Appendix B-VI

Details of Service Roads

Service Roads along mainline shall be constructed at the following locations:

Existing Chainage (km)		Existing Length (m)	Design Chainage (km)		Design Length (m)	Side	Width (m)
From	To		From	To			
NIL							

Appendix B-VII

Details of Proposed Right of Way (ROW)

The proposed ROW shall be as follows:

Sl No.	Design Chainage (km)		Length (m)	PROW w.r.t PCL (m)
	From	To		
1	0+000	0+576	576	45.0M (RA-01)
2	0+000	0+315	315	30.0M (RB-01)
3	0+000	0+325	325	30.0M (RB-02)

Appendix B-VIII

Details of At-Grade Intersections

At-grade intersections shall be provided with the intersecting roads at the following locations:

(A) Major Intersections

Sl No.	Design Chainage (km)	Road Segment	Type of Intersection	Type	Side	Improvement Proposals	Remarks
NIL							

(B) Minor Intersections

Sl No.	Design Chainage (km)	Road Section	Type of Intersection	Type	Side	Improvement Proposals	Remarks
NIL							

Notes: (1) PCR : Port Connectivity Road

(2) Above intersections to be developed as per IRC/MoRTH drawings & design standards

Appendix B-IX

Details of New Grade Separated Intersections (Interchanges)

Sl No.	Location	Existing Chainage	Design Chainage	Name of Intersecting Roads	Proposed Structural Configuration	Proposed Structure Type	Proposed Span Arrangement	Total Width of Structure
1	NIL							

Appendix B-X

Details of Proposed New Vehicular Underpasses

The following new vehicular underpasses shall be constructed:

Sl. No.	Structure	Chainage (Km.)	Road Name	Span Arrangement (m)	Width of Structure	Type of Super Structure
NIL						

Appendix B-XI

Details of Proposed New Pedestrian/ Cattle/ Elephant Underpasses

The following new pedestrian/cattle/elephant underpasses shall be constructed:

Sl No.	Type of Underpasses	Design Chainage (km)	Span Arrangement (Nos. x Length in m)	Total Length (m)	Clear Height (m)	Overall Width (m)	Structure Type
NIL							

Appendix B-XII

Details of Proposed Overpasses

The following new overpasses shall be constructed:

Sl No.	Design Chainage (km)	Span Arrangement (Nos.xLength in m)	Total Length (m)	Clear Height (m)	Overall Width (m)	Structure Type
NIL						

Appendix B-XIII

Major Bridges

(A) New Construction of Major Bridges

The following new major bridges shall be constructed:

Sl No.	Road Segment	Name of Stream	Existing Chainage (km)	Design Chainage (km)	Span Arrangement (Nos.x L in m)	Total Length (m)	Overall Width (m)	Structure Type	Remarks
NIL									

Appendix B-XIV

Minor Bridges

(A) New Construction of Minor Bridges

The following new minor bridges shall be constructed:

Sl. No.	Structure	Chainage (Km.)	Road Name	Span Arrangement (m)	Width of Structure	Type of Super Structure
1	MNB	NIL				

Appendix B-XV

Details of Proposed Viaduct

There is no viaduct structure has been proposed.

Appendix B-XVI

Culverts

(C) Construction of New Culverts

The following new culverts shall be constructed:

Sl. No.	Design Chainage (km)	Road Name	Span Arrangement (m)	Type of Culvert	Proposed Width of Structure (m)	Proposed Width of Structure (m)
				Box		
				Box		
				Box		

Appendix B-XVII

Construction of New ROBs

The following new ROBs shall be constructed:

Sl No.	Existing Chainage (km)	Design Chainage (km)	Span Arrangement (Nos.xLength in m)	Total Length (m)	Overall Width (m)	Structure Type	Remarks
NIL							

Appendix B-XVIII

Details of Median

Medians shall be provided at following locations:

Design Chainage (km)		Length (m)	Median Width (m)	Median Type (m)	TCS Types	Remarks
From	To					
0+000	0+582	582	4.0	Raised	TCS=-1	
0+000	0+321	321	4.0 m at Center & 0.50 m at the edge of carriageway and ROW edge (both edge)	Raised	TCS-2	
0+000	0+325	325	4.0 m at Center & 0.50 m at the edge of carriageway and ROW edge (both edge)	Raised	TCS-2	

Appendix B-XIX

Details of Lined Rectangular Uncovered Drains

Medians shall be provided at following locations:

Design Chainage (km)		Side	Nos.	Total Length (m)	TCS Type	Remarks
From	To					
NIL						

Appendix B-XX

Details of RCC Covered Drains

RCC covered drains shall be provided at following locations:

Design Chainage (km)		Side	Nos.	Total Length (m)	TCS Type	Road Name	Internal Drain Section
From	To						
0+000	0+232	LHS	1	232	TCS-1	RA-01	1.05x1.05M
0+000	0+244	RHS	1	244	TCS-1	RA-01	1.50x1.65M
0+232	0+419	LHS	1	187	TCS-1	RA-01	0.90x0.90M
0+419	0+565	LHS	1	187	TCS-1	RA-01	0.45x0.45M
0+244	0+565	RHS	1	321	TCS-1	RA-01	0.90x0.90M
0+018	0+276	LHS	1	276	TCS-2	RB-01	0.90x0.90M
0+018	0+260	RHS	1	260	TCS-2	RB-01	0.60x0.60M
0+000	0+135	LHS	1	135	TCS-2	RB-02	0.90x0.90M
0+135	0+335	LHS	1	200	TCS-2	RB-02	0.60x0.60M
0+000	0+053	RHS	1	53	TCS-2	RB-02	0.90x1.05M
0+053	0+124	RHS	1	71	TCS-2	RB-02	0.90x0.90M
0+124	0+330	RHS	1	206	TCS-2	RB-02	0.60x0.60M
Grand Total				**2372**			

Appendix B-XXI

Details of Potable and Fire Water Supply

Potable Water Supply Network is enclosed marked as Appendix B-XXI.

Appendix B-XXII

Details of Recycled Water Supply

Recycled Water Supply Network is enclosed marked as Appendix B-XXII.

Appendix B-XXIII

Details of Sewerage Network

Sewerage Network is enclosed marked as Appendix B-XXIII.

Appendix B-XXIV

Details of Power, Street Lighting and Data & Telecommunication

Power, Street Lighting and Data & Telecommunication alignment plan is enclosed marked as Appendix B-XXIV.

SCHEDULE – C

(See Clause 2.1)

PROJECT FACILITIES

2 Project Facilities

The Concessionaire shall construct the Project Facilities in accordance with the provisions of this Agreement with an aim to cater to the envisaged demand till the end of the concession period. Such Project Facilities shall include:

(a) Toll Plaza(s);
(b) Roadside Furniture;
(c) Street Lighting;
(d) Pedestrian Facilities;
(e) Landscaping and Tree Plantation;
(f) Potable, Recycled, Fire Water Services
(g) Sewerage System
(h) Power Supply Networks
(i) Rest Areas;
(j) Truck Lay-bys;
(k) Bus Bays and Bus Shelters;
(l) Cattle Crossings;
(m) Wayside Amenities;
(n) Traffic Aid Posts;
(o) Medical Aid Posts;
(p) Vehicle Rescue Posts;
(q) Operation and Maintenance Centre and
(r) HTMS

3 Project Facilities for Development of External Trunk Connectivity and Infrastructure Works at Multi Model Logistics Park at Jogighopa

Project Facilities forming part of Development of External Trunk Connectivity and Infrastructure Works at Multi Model Logistics Park at Jogighopa to be completed on or before the Project Completion Date have been described in Annex-I of this Schedule-C.

Annex I

(Schedule-C)

1 Project Facilities for Development of External Trunk Connectivity and Infrastructure Works at Multi Model Logistics Park at Jogighopa

Each of the Project Facilities is briefly described below:

(a) Toll Plaza

NIL

(b) Roadside Furniture

Road side furniture shall be provided in accordance with the Manual of Specifications and Standards as referred in schedule-D.

(i) Traffic Signs

Traffic signs include roadside signs, overhead signs, curb mounted signs etc. provided for the entire Project Highway as per Manual.

(ii) Pavement Markings

Pavement markings shall cover road marking provided for the entire Project Highway as per Manual.

(iii) LED Traffic Blinkers

LED Traffic Blinker signal provided for entire project as per Manual.

(iv) Delineators

Delineators for the entire Project Highway at the locations as suggested in IRC Manual.

(v) Boundary stones

For the entire Project Highway as suggested in relevant IRC Manual.

(vi) Hectometer / Kilometer stones

For the entire Project Highway as suggested in relevant IRC Manual.

(c) Street Lighting

Highway illumination shall be provided at various locations of the project highway as per provisions of Schedule-D.

(d) Pedestrian Facilities

Pedestrian facilities shall be provided in accordance with the Manual of Specifications and Standards as referred in Schedule-D.

(e) Landscaping and Tree Plantation

Landscaping of the highway shall be done on, but not limited to, the following:

(i) The aim of landscaping will be conservation of existing natural or manmade features e.g. ponds, historical buildings and scenic vistas along the highway.

(ii) Landscaping will address the issue of drainage to ensure minimum disturbance to the natural drainage and at the same time ensure protection of natural surfaces from erosion.

(iii) Proper landscaping will be provided for highway Alignment, to fit-in with surroundings for pleasing appearance, reducing adverse environmental effects such as air pollution, noise pollution and visual intrusion.

(iv) Landscaping will include stabilization of embankment by pitching and/or turfing/ plantation. The treatment of embankment slopes along the highway will be as per recommendations of IRC:56–1974, depending upon soil type involved.

(v) Trees, their spacing and arrangement in different situations will be as per IRC:21–1979 and IRC:SP:66–1976.

(vi) Pitching of slopes of high embankment (Ht.>3m) with chute drains at 30m interval shall be provided for controlling of erosion due to weathering action for stability of slopes. The treatment of embankment slopes along the highway will be as per recommendations of IRC:56–1974, depending upon soil type involved.

Tree plantation shall be provided in accordance with the Manual of Specifications and Standards as referred in Schedule-D.

(f) Potable, Recycled, Fire Water Services

Potable, Recycled, Fire Water Services facilities shall be provided in accordance with the Manual of Specifications and Standards as referred in Schedule-D.

(g) Sewerage System

Sewerage System facilities shall be provided in accordance with the Manual of Specifications and Standards as referred in Schedule-D.

(h) Power Supply Network

Power Supply Network facilities shall be provided in accordance with the Manual

of Specifications and Standards as referred in Schedule-D.

(i) Rest Areas

Nil.

(j) Truck Laybys

Nil.

(k) Bus Bays

The Contractor shall provide Bus Bays along the project highway and the locations are given below. The design of Bus Bays should be aesthetically pleased with surrounding.

The locations of these bus bays shall be finalized by the Contractor in consultation with the Authority's Engineer.

Sl. No.	Design Chainage (Km)	Side	Remarks
1	0+500	LHS	RA-01 (45m Wide ROW)
2	0+500	RHS	RA-01 (45m Wide ROW)

(l) Cattle Crossings

Nil

(m) Wayside Amenities

NIL

(n) Traffic Aid Posts

Traffic Aid Post shall be provided as specified in IRC:SP:73-2015.

(o) Medical Aid Posts

NIL

(p) Vehicle Rescue Posts

NIL

(q) Operation and Maintenance Centre

Operation & Maintenance Center shall be provided at some suitable location in consultation with Authority's Engineer.

(r) HTMS

NIL

SCHEDULE – D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1 Six and Four Laning of Project

The Concessionaire shall comply with the Specifications and Standards set forth in Annex-I of this Schedule-D for Construction of External Trunk Connectivity.

2 Internal Road of Project

The Concessionaire shall comply with the Specifications and Standards set forth in Annex-II of this Schedule-D for construction of the Internal Road.

3 Water (Potable & Recycled) Supply System of Project

The Concessionaire shall comply with the Specifications and Standards set forth in Annex-III of this Schedule-D for construction of the Potable and Recycled Water Supply System.

4 Sewerage System of Project

The Concessionaire shall comply with the Specifications and Standards set forth in Annex-IV of this Schedule-D for construction of the Sewerage System.

5 Power Supply System of Project

The Concessionaire shall comply with the Specifications and Standards set forth in Annex-V of this Schedule-D for construction of the Power Supply System.

6 Landscaping and Tree Plantation

The Concessionaire shall comply with the Specifications and Standards set forth in Annex-VI of this Schedule-D for Landscaping and Tree Plantation.

Annex I

(Schedule-D)

SPECIFICATIONS AND STANDARDS FOR SIX AND FOUR LANE PROJECT HIGHWAY

1 Manual of Specifications and Standards to Apply

Subject to the provisions of Paragraph 2 of this Annex-I, Two-Laning of the Project Highway shall conform to the **MANUAL OF SPECIFICATIONS AND STANDARDS FOR FOUR LANING of HGHWAYS WITH PAVED SHOULDERS** (IRC Publication No. IRC:SP:84-2014) published by IRC.

2 Deviations from the Manual

Notwithstanding anything to the contrary contained in the aforesaid Manual, the following Specifications and Standards shall apply to the Two-Lane Project Highway, and for purposes of this Agreement, the aforesaid Manual shall be deemed to be amended to the extent set forth below:

Sl No.	Clause Referred in Manual	Item	Provisions as per Manual	Modified Provisions
NIL				

Annex II

(Schedule-D)

SPECIFICATIONS AND STANDARDS FOR INTERNAL ROAD

1 Manual of Specifications and Standards to Apply

Subject to the provisions of Internal Road shall conform to the **MANUAL OF SPECIFICATIONS AND STANDARDS FOR RIGID PAVEMENT** (IRC Publication No. IRC SP 62 2004) published by IRC.

2 Deviations from the Manual

Notwithstanding anything to the contrary contained in the aforesaid Manual, the following Specifications and Standards shall apply to the Internal Road, and for purposes of this Agreement, the aforesaid Manual shall be deemed to be amended to the extent set forth below:

Sl No.	Clause Referred in Manual	Item	Provisions as per Manual	Modified Provisions
NIL				

Annex III

(Schedule-D)

SPECIFICATIONS AND STANDARDS FOR POTABLE & RECYCLED WATER SUPPLY SYSTEM

1 Manual of Specifications and Standards to Apply

Subject to the provisions of Potable and Recycled Water Supply System shall conform to the **Central Public Health and Environmental Engineering Organization (CPHEEO) Manual, latest**.

2 Deviations from the Manual

Notwithstanding anything to the contrary contained in the aforesaid Manual, the following Specifications and Standards shall apply to the Potable and Recycled Water Supply System, and for purposes of this Agreement, the aforesaid Manual shall be deemed to be amended to the extent set forth below:

Sl No.	Clause Referred in Manual	Item	Provisions as per Manual	Modified Provisions
NIL				

Annex IV

(Schedule-D)

SPECIFICATIONS AND STANDARDS FOR SEWERAGE SYSTEM

1 Manual of Specifications and Standards to Apply

Subject to the provisions of Sewerage System shall conform to the **Central Public Health and Environmental Engineering Organization (CPHEEO) Manual, latest**.

2 Deviations from the Manual

Notwithstanding anything to the contrary contained in the aforesaid Manual, the following Specifications and Standards shall apply to the Sewerage System, and for purposes of this Agreement, the aforesaid Manual shall be deemed to be amended to the extent set forth below:

Sl No.	Clause Referred in Manual	Item	Provisions as per Manual	Modified Provisions
NIL				

Annex V

(Schedule-D)

SPECIFICATIONS AND STANDARDS FOR POWER SUPPLY SYSTEM

Annex VI

(Schedule-D)

SPECIFICATIONS AND STANDARDS FOR LANDSCAPING AND TREE PLANTATION

1 Specifications and Standards to Apply

The Hierarchy of the roads defines its characteristic of landscape. Plantation on different streets must be done keeping this in mind.

a. Main Axial Road- 45 m ROW

A combination of thick & thin canopy trees have been proposed on the plot edge and along the footpath. The trees Arjuna trees which are good for waterlogged areas and grow well in humid climate have been proposed keeping in mind the high water table and high humidity level of Jogighopa. Also shade providing trees like Queensland Umbrella tree have also been provided along the plot lines. Tall and ever green Ashoka tree have been provided along the footpath.

The most ideal shrub for plantation on road, Bougainvillea has been suggested along with Madagascar Dragon and Oleander. Bahia grass has been suggested for ground cover. Concrete curb of height 150mm is provided from road level of the median. Paver blocks with solar reflexivity index between 38 and 52 are proposed for pedestrian pathways/ cycle tracks. Permeable range for paver blocks should be between 16% and 25%. Pole light has been provided in planting edge of about 6m above the ground level.

For the Central Median of the road having a width of 4 m, trees like Rubber tree and Flame of the Forest (ornamental tree) have been proposed. Shrubs like Duranta Erecta & Bougainvillea have been suggested. Bahia grass has been suggested for ground cover.

Pole lights of about 6m height above the ground level at 15 m c/c (single sided) for the footpath and 9m height above the ground level at 15 m c/c (double sided) for the central median has been suggested to create a good ambience.

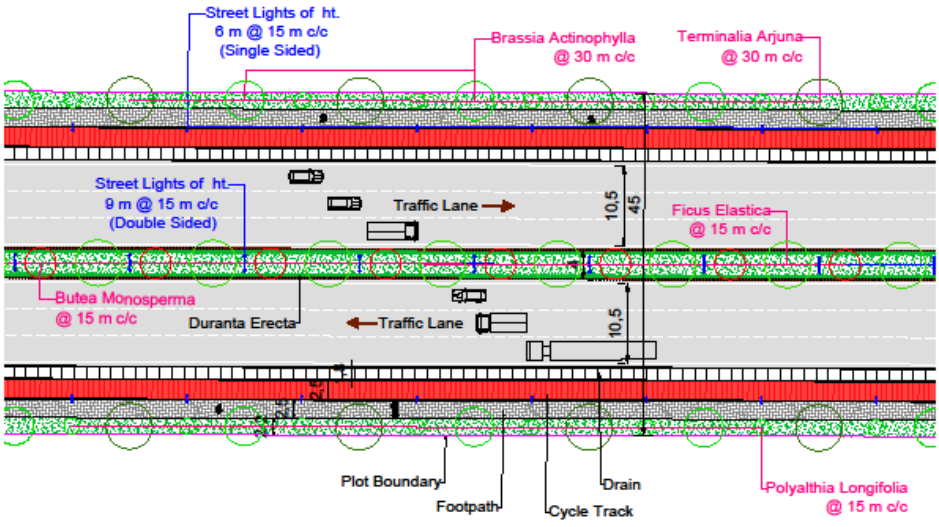


Figure 1: 45.0 m Road Plantation Drawing

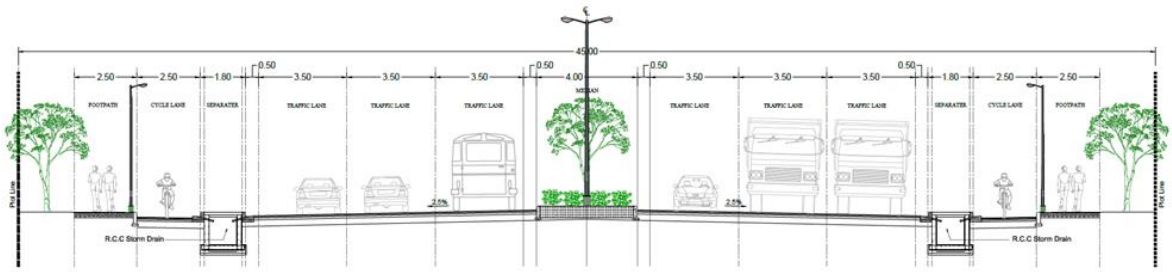


Figure 2: 45.0 m Road Section

b. Main Axial Road- 45 m ROW

Rows of Orange Champa and Kampong trees has been suggested for the central median of the road. Medium height shrubs like Bougainvillea and Duranta Erecta has been suggested for the central median. Bahia grass has been suggested for ground cover. Pole lights of 9m height above the ground level at 15 m c/c (double sided) for the central median has been suggested.

For the green edge of 0.5 m along the both sides of the cycle track, Low height shrubs like Pisonia Alba and Canna Lily has been suggested for the beautification purposes.

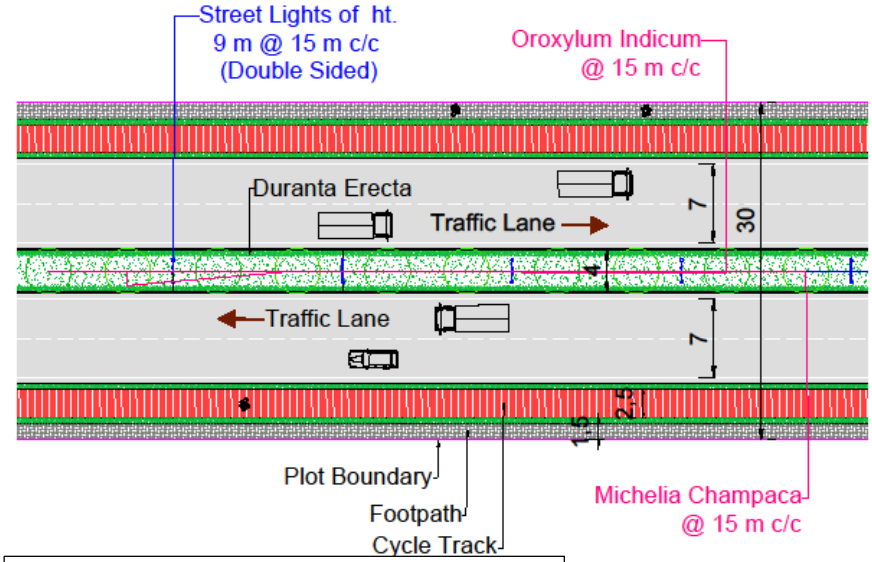


Figure 3: 30.0 m Road Plantation Drawing

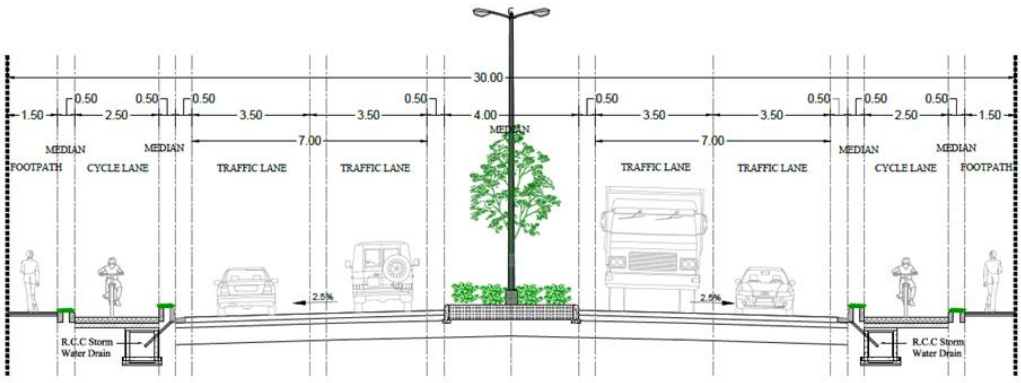


Figure 4: 30.0 m Road Section

SCHEDULE - E

(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

1.1 The Contractor shall, at all times maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

1.2 The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfillment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.

1.3 All Materials, works and construction operations shall conform to the MORTH Specifications for Road and Bridge Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted.

2 Repair/rectification of Defects and deficiencies

The obligations of the Contractor in respect of Maintenance Requirements shall include repair and rectification of the Defects and deficiencies specified in Annex - I of this Schedule-E within the time limit set forth therein.

3 Other Defects and deficiencies

In respect of any Defect or deficiency not specified in Annex - I of this Schedule-E, the Authority's Engineer may, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards, and any deviation or deterioration beyond the permissible limit shall be repaired or rectified by the Contractor within the time limit specified by the Authority's Engineer.

4 Extension of time limit

Notwithstanding anything to the contrary specified in this Schedule-E, if the nature and extent of any Defect or deficiency justifies more time for its repair

or rectification than the time specified herein, the Contractor shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the Authority's Engineer and conveyed to the Contractor and the Authority with reasons thereof.

5 Emergency repairs/restoration

Notwithstanding anything to the contrary contained in this Schedule-E, if any Defect, deficiency or deterioration in the Project Highway poses a hazard to safety or risk of damage to property, the Contractor shall promptly take all reasonable measures for eliminating or minimizing such danger.

6 Daily inspection by the Contractor

The Contractor shall, through its engineer, undertake a daily visual inspection of the Project Highway and maintain a record thereof in a register to be kept in such form and manner as the Authority's Engineer may specify. Such record shall be kept in safe custody of the Contractor and shall be open to inspection by the Authority and the Authority's Engineer at any time during office hours.

7. Pre-monsoon inspection / Post-monsoon inspection

The Contractor shall carry out a detailed pre-monsoon inspection of all bridges, culverts and drainage system before [1st June] every year in accordance with the guidelines contained in IRC: SP35. Report of this inspection together with details of proposed maintenance works as required on the basis of this inspection shall be sent to the Authority's Engineer before the [10th June] every year. The Contractor shall complete the required repairs before the onset of the monsoon and send to the Authority's Engineer a compliance report. Post monsoon inspection shall be done by the [30th September] and the inspection report together with details of any damages observed and proposed action to remedy the same shall be sent to the Authority's Engineer.

8. Repairs on account of natural calamities

All damages occurring to the Project Highway on account of a Force Majeure Event or default or neglect of the Authority shall be undertaken by the Authority at its own cost. The Authority may instruct the Contractor to undertake the repairs at the rates agreed between the Parties.

Annex - I

(Schedule-E)

Repair/rectification of Defects and deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit set forth in the table below.

Nature of Defect or deficiency		**Time limit for repair/rectification**
ROADS		
(a)	**Carriageway and paved shoulders**	
(i)	Breach or blockade	Temporary restoration of traffic within 24 hours; permanent restoration within 15 (fifteen) days
(ii)	Roughness value exceeding 2,200 mm in a stretch of 1 km (as measured by a calibrated bump integrator)	120 (one hundred and twenty) days
(iii)	Pot holes	24 hours
(iv)	Any cracks in road surface	15 (fifteen) days
(v)	Any depressions, rutting exceeding 10 mm in road surface	30 (thirty) days
(vi)	Bleeding/skidding	7 (seven) days
(vii)	Any other defect/distress on the road	15 (fifteen) days
(viii)	Damage to pavement edges	15 (fifteen) days
(ix)	Removal of debris, dead animals	6 hours
(b)	**Granular earth shoulders, side slopes, drains and culverts**	
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi-urban areas	24 hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Road side furniture including road sign and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	48 hours
(ii)	Painting of km stone, railing,	As and when

Nature of Defect or deficiency		Time limit for repair/rectification
	parapets, crash barriers	required/Once every year
(iii)	Damaged/missing road signs requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road lighting**	
(i)	Any major failure of the system	24 hours
(ii)	Faults and minor failures	8 hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum head-room of 5 m above carriageway or obstruction in visibility of road signs	24 hours
(ii)	Removal of fallen trees from carriageway	4 hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f)	**Rest area**	
(i)	Cleaning of toilets	Every 4 hours
(ii)	Defects in electrical, water and sanitary installations	24 hours
(g)	**[Toll Plaza]**	
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a)	**Superstructure**	
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	 within 48 hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year

Nature of Defect or deficiency		Time limit for repair/rectification
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(iii)	Snow requiring clearance	24 (twenty four) hours
Utility Services		
(a)	**Potable & Recycled Water Supply System**	
	Pumping Main, Gravity mains including valves, valve chambers etc.	As specified in CPHEEO Manual and/or Specification
(b)	**Sewerage System**	
	Sewerage Pipelines including Manholes, Inspection Chambers, House Service Connections	As specified in CPHEEO Manual and/or Specification
(c)	**Power Supply System**	
	Power Supply System including Street Lighting, Data & Telecommunication	As per APDCL Specification

[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

SCHEDULE - F

(See Clause 3.1.7(a))

APPLICABLE PERMITS

1 Applicable Permits

1.1 The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:

(a) Permission of the State Government for extraction of boulders from quarry;

(b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;

(c) License for use of explosives;

(d) Permission of the State Government for drawing water from river/reservoir;

(e) License from inspector of factories or other competent Authority for setting up batching plant;

(f) Clearance of Pollution Control Board for setting up batching plant;

(g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;

(h) Permission of Village Panchayats and State Government for borrow earth; and

(i) Any other permits or clearances required under Applicable Laws.

1.2 Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.

SCHEDULE - G

(See Clauses 7.1 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

Performance Security

The ……

……..

……..

……

WHEREAS:

(A) _____ [name and address of contractor] (hereinafter called the "**Contractor**") and [name and address of the authority], (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "**Agreement**") for the Development of External Trunk Connectivity and Internal Infrastructure Works at Multi Model Logistics Park at Jogighopa in the state of Assam on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) The Agreement requires the Contractor to furnish a Performance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the {Construction Period/ Defects Liability Period and Maintenance Period} (as defined in the Agreement) in a sum of Rs….. cr. (Rupees ……..….. crore) (the "**Guarantee Amount**").

(C) We, …….. through our branch at ……. (the "**Bank**") have agreed to furnish this bank guarantee (*hereinafter called the* **"Guarantee**") by way of Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees

and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of Chief Engineer in Guwahati, Assam, that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the

Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on ****[1]. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

Signed and sealed this ……. day of ……., 20…… at ……..

[1] Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement)

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)
(Name)
(Designation)

(Code Number)
(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

Annex – II
(Schedule - G)
(See Clause 7.5.3)

Form for Guarantee for Withdrawal of Retention Money

……..
…….
……..
……

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "Agreement") with the [name and address of the authority], (hereinafter called the "**Authority**") for the Development of External Trunk Connectivity and Internal Infrastructure Works at Multi Model Logistics Park at Jogighopa in the state of Assam on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement.

(B) In accordance with Clause 7.5.3 of the Agreement, the Contractor may withdraw the retention money (hereinafter called the "**Retention Money**") after furnishing to the Authority a bank guarantee for an amount equal to the proposed withdrawal.

(C) We, …….. through our branch at ……. (the "**Bank**") have agreed to furnish this bank guarantee (hereinafter called the "**Guarantee**") for the amount of Rs. --------- cr. (Rs.----------crore) (the "**Guarantee Amount**").

NOW, THEREFORE, the Bank hereby unconditionally and irrevocably guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of Chief Engineer in Guwahati, Assam, that the Contractor has committed default in the due and faithful performance of all or any of its obligations for under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final, and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Retention Money and any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Retention Money.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this

Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect 90 (ninety) days after the date of the Completion Certificate specified in Clause 12.4 of the Agreement.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

Signed and sealed this ……. day of ……., 2020…… at ……..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)
(Name)
(Designation)
(Code Number)
(Address)
NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

Annex – III
(Schedule - G)
(See Clause 19.2)

Form for Guarantee for Advance Payment

……..
……..
……..
……..

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the Development of External Trunk Connectivity and Internal Infrastructure Works at Multi Model Logistics Park at Jogighopa in the state of Assam on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest free advance payment (herein after called "**Advance Payment**") equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in three installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second/third} installment of the Advance Payment is Rs. ------ cr. (Rupees ------ crore) and the amount of this Guarantee is Rs. ------- cr. (Rupees ------ crore) (the **"Guarantee Amount")**[1]**.**

(C) We, …….. through our branch at ……. (the "**Bank"**) have agreed to furnish this bank guarantee (hereinafter called the **"Guarantee"**) for the Guarantee Amount.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid installment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay

to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

1. A letter from the Authority, under the hand of an officer not below the rank of Chief Engineer in Guwahati, Assam, that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the installment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

2. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

3. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

4. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

5. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.

6. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

7. The Guarantee shall cease to be in force and effect on ****.[2] Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.

8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

10. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

Signed and sealed this ……. day of ……., 2020…… at ……..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

[1] Insert a date being 90 (ninety) days after the end of one year from the date of payment of the Advance payment to the Contractor (in accordance with Clause 19.2 of the Agreement).

[2] The Guarantee Amount should be equivalent to 110% of the value of the applicable installment.

SCHEDULE – H

Section – 1: External Trunk Connectivity

(See Clauses10.1.4 and 19.3)

Contract Price Weightages
(for 64% of Total Weightage)

1.1 The Contract Price for this Agreement is Rs…….

1.2 Proportions of the Contract Price for different stages of Development of External Trunk Connectivity for Multi Model Logistic Park Project at Jogighopa at Assam shall be as specified below:

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE
1	2	3	4
Road works including culverts, Minor Bridges/ underpasses/ over passes, Major bridge (length > 60m) works and RoB / RUB/ Elevated sections / Flyovers, viaducts, drainage, Street Lighting, Roadside Landscaping	**0.30%**	On Approval of all type of structural, hydraulic Designs, Working Drawings	100.00%
Road works including culverts (but excluding service roads)	**54.30%**	**A-Widening and Strengthening of existing road**	
		(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock, removal of unserviceable soil etc	0.00%
		(2) Sub Base courses	0.00%
		(3) Non Bituminous Base Course	0.00%
		(4) Bituminous Base Course	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE
1	2	3	4
		(5) Wearing coat	0.00%
		(6) Widening and repair of culverts	0.00%
		B 1- New six/ four lane alignment / bypass (Flexible pavement)	
		(1) Earthwork up to top of the sub-grade	20.44%
		(2) Sub Base Course	18.67%
		(3) Non Bituminous Base Course	13.90%
		(4) Bituminous Base Course	18.80%
		(5) Wearing coat	8.84%
		B 2- Reconstruction / New lane alignment / bypass (Rigid pavement)	
		(1) Earthwork and sub-grade preparation	0.00%
		(2) Sub Base and Base Course	0.00%
		(3) Pavement Courses (DLC and PQC)	0.00%
		C 1- Reconstruction / New Service road/ Slip Road (Flexible pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Non Bituminous Base Course	0.00%
		(4) Bituminous Base Course	0.00%
		(5) Wearing coat	0.00%
		C 2- Reconstruction / New Service road (Rigid pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) course	0.00%
		D - Reconstruction and New culverts on existing road, Realignments, bypasses:	
		Culverts (Length <6m)	
		a - Pipe Culverts	0.00%
		b - Box Culverts	19.36%
		A 1- Widening and repairs of Minor Bridges (length >6m and <60m)	
		Minor Bridges	0.00%
		A 2- New Minor Bridges (length	

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE
1	2	3	4
Minor Bridges / underpasses / over passes	**36.22%**	**>6m and <60m)**	
		(1) Foundation + Sub-structure: on completion of foundation work including foundation for wing and return wall, abutments, piers upto the abutment/pier cap.	20.00%
		(2) Superstructure: on completion of super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road sign & markings, tests on completion etc. complete in all respect.	15.00%
		(3) Approaches: on completion of approaches including Retaining walls, stone pitching, protection works complete in all respect, test on completion in all respects and fit for use.	10.00%
		(4) Guide bunds and river training works: on completion of guide bunds and repair training works complete in all respects.	5.00%
		B 1 - Widening and repair of underpasses / overpasses	
		Underpasses / Overpasses	0.00%
		B 2 - New Underpasses / Overpasses	
		(1) Foundation + Sub-structure: on completion of foundation work including foundation for wing and return wall, abutments, piers upto the abutment/pier cap.	26.20%
		(2) Superstructure: on completion of super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road sign & markings, tests on completion etc. complete in all respect.	13.80%
		(3) Approaches: On completion of approaches including Retaining walls/ Reinforced earth walls, stone pitching, protection works complete in all respect and fit for use.	10.00%
Major bridge (length > 60m) works and RoB / RUB / Elevated sections /	**3.75%**	**A 1 - Widening and repair of major bridges**	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints	0.00%
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Guide bunds, River Training works etc.	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE
1	2	3	4
Flyovers including viaducts, if any		(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		A 2 - New Major bridges	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints	0.00%
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%
		(6) Wing walls/return walls upto top	0.00%
		(7) Guide bunds, River Training works etc.	0.00%
		(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		B 1 - Widening and repair of	
		a) RoB	
		b) RuB	
		1) Foundation	0.00%
		2) Sub Structure	0.00%
		3) Super Structure (Including bearings)	0.00%
		4) Wearing coat (a) in case of **RoB -** wearing coat including expansion joints complete in all respect as specified and (b) in case of **RuB -** rigid pavement under RuB including drainage facility complete in all respect as specified	0.00%
		5) miscellaneous items like hand rails, crash barrier, road markings etc.	0.00%
		6) wing walls / return walls	0.00%
		7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		B 2 - New RoB / RuB	
		a) RoB	
		b) RuB	
		1) Foundation	27.00%
		2) Sub Structure	27.00%
		3) Super Structure (Including bearings)	27.00%
		4) Wearing coat (a) in case of **RoB -** wearing coat including expansion joints complete in all respect as specified and (b) in case of **RuB -** rigid pavement under	9.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE
1	2	3	4
		RuB including drainage facility complete in all respect as specified	
		5) miscellaneous items like hand rails, crash barrier, road markings etc	1.00%
		6) wing walls / return walls	5.00%
		7) Approaches (including Retaining walls, stone pitching and protection works)	4.00%
		C 1 - Widening and repair of Elevated sections / Fly overs / Grade Separators	
		1) Foundation	0.00%
		2) Sub Structure	0.00%
		3) Super Structure (Including bearings)	0.00%
		4) Wearing coat including expansion joints	0.00%
		5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%
		6) wing walls / return walls	0.00%
		7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		C 2 - New Elevated sections / Fly overs / Grade Separators	
		1) Foundation	0.00%
		2) Sub Structure	0.00%
		3) Super Structure (Including bearings)	0.00%
		4) Wearing coat including expansion joints	0.00%
		5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%
		6) wing walls / return walls	0.00%
		7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
Other Works	**5.43%**	**(i) Toll Plaza**	0.00%
		(ii) Road side drains	
		Lined Drain	12.04%
		Unlined Drain	0.78%
		(iii) Road Signs, markings, km stones, safety devices, Road furniture, etc.	12.80%
		(iv) Project facilities	
		(a) Bus Bays	0.00%
		(b) Truck lay byes	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE
1	2	3	4
		© Rest Areas	0.00%
		(d) Others	
		a) Clearing n Grubbing & Dismantling works	0.43%
		b) improvement of Junctions	0.00%
		c) Sand Filling in embankment in Pond Locations	0.00%
		d) Turfing and hydroseeding	0.00%
		e) Traffic Aid Post	0.00%
		f) Lighting in Built-up areas	4.10%
		(v) Road side Plantation	0.50%
		(vi) Repair of Protection works other than approaches to the bridges, elevated sections / flyovers / grade separators and RoBs/ RuBs	
		(a) Crash Barrier	0.00%
		(b) Parapet wall	0.00%
		© Retaining wall	69.35%
		(d) Breast Wall	0.00%
		(e) Gabion	0.00%
		f) River Training works /Pitching on Slopes	0.00%
		(vii) Safety and traffic management during construction	

**The above list is illustrative and may require modification as per the scope of the work*

NA: Not Applicable

1.3 Procedure of estimating the value of work done

1.3.1 Road Works

Procedure for estimating the value of road work done shall be as per Table 1.3.1

Table 1.3.1

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
A-Widening and Strengthening of existing road		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 100 (one hundred) metre of the total length.
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock, removal of unserviceable soil etc	0.00%	

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(2) Sub Base courses	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing coat	0.00%	
(6) Widening and repair of culverts	0.00%	Cost of completed culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least one culvert.
B 1- New six/ four lane alignment / bypass (Flexible pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 100 (one hundred) metre length, whichever is less
(1) Earthwork up to top of the sub-grade	20.44%	
(2) Sub Base Course	18.67%	
(3) Non Bituminous Base Course	13.90%	
(4) Bituminous Base Course	18.80%	
(5) Wearing coat	8.94%	
B 2- Reconstruction / New lane alignment / bypass (Rigid pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 100 (one hundred) metre length, whichever is less
(1) Earthwork and sub-grade preparation	0.00%	
(2) Sub Base and Base Course	0.00%	
(3) Pavement Courses (DLC and PQC)	0.00%	
C 1- Reconstruction / New Service road/ Slip Road (Flexible pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 100 (one hundred) metre length, whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub Base Course	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing coat	0.00%	
C 2- Reconstruction / New Service road (Rigid pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 100 (one hundred) metre length, whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub Base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) course	0.00%	
D - Reconstruction and New culverts on existing road, Realignments, bypasses:		Cost of each culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least one culvert.
Culverts (Length <6m)		
a - Pipe Culverts	0.00%	
b - Box Culverts	19.36%	

@ For example, if the total length of bituminous work to be done is 100 km, the cost per km

of bituminous work shall be determined as follows:

Cost per km = P x weightage for road work x weightage for bituminous work x (1/L)

Where,

P = Contract Price

L = Total Length in Km

Similarly, the rates per km for other stages shall be worked out accordingly.

Note: The length affected due to law and order problems or litigation during execution due to which the Contractor is unable to execute the work, may be deducted from the total project length for payment purposes. The total length calculated here is only for payment purposes and will not affect and referred in other clauses of the Contract Agreement.

1.3.2 Minor Bridges/ underpasses/ over passes

Procedure for estimating the value of Minor Bridges/ underpasses/ over passes work done shall be as per Table 1.3.2

Table 1.3.2

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
A 1- Widening and repairs of Minor Bridges (length >6m and <60m)		
Minor Bridges	0.00%	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on completion of widening and repair works of a minor bridge.
A 2- New Minor Bridges (length >6m and <60m)		
(1) Foundation + Sub-structure: on completion of foundation work including foundation for wing and return wall, abutments, piers upto the abutment/pier cap.	20.00%	(1) Foundation + Sub Structure: Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment against Foundation + Sub Structure shall be made on pro rata basis on completion of a stage i.e. not less than 10% of the scope of Foundation + Sub Structure of each bridge subject to completion of at least one foundations along with sub structure upto abutment/pier cap level of each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Superstructure: on completion of super- structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road sign & markings, tests on completion etc. complete in all respect.	15.00%	**(2) Super structure:** Payment shall be made on pro rata basis on completion of a stage i.e.. completion of super structure of at least one span in all respect as specified in the column of " Stage of Payment" in this Sub-clause.

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(3) Approaches: on completion of approaches including Retaining walls, stone pitching, protection works complete in all respect, test on completion in all respects and fit for use.	10.00%	**(3) Approaches:** Payment shall be made on pro rata basis on completion of a stage i.e.. completion of approaches in all respect as specified in the column of "Stage of Payment" in this Sub-clause.
(4) Guide bunds and river training works: on completion of guide bunds and repair training works complete in all respects.	5.00%	**(4) Guide bunds and river training works:** Payment shall be made on pro rata basis on completion of a stage i.e.. completion of guide bunds and river training works in all respect as specified.
B 1 - Widening and repair of underpasses / overpasses		
Underpasses / Overpasses	0.00%	Cost of each underpass / overpass shall be determined on pro rata basis with respect to the total linear length of the underpass / overpass. Payment shall be made on completion of widening and repair works of a underpass / overpass.
B 2 - New Underpasses / Overpasses		
(1) Foundation + Sub-structure: on completion of foundation work including foundation for wing and return wall, abutments, piers upto the abutment/pier cap.	26.20%	**(1) Foundation + Sub Structure:** Cost of each underpass / overpass shall be determined on pro rata basis with respect to the total linear length of the underpass / overpass. Payment against Foundation + Sub Structure shall be made on pro rata basis on completion of a stage i.e. not less than 10% of the scope of Foundation + Sub Structure of each underpass / overpass subject to completion of at least one foundations along with sub structure upto abutment/pier cap level of each underpass / overpass. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Superstructure: on completion of super- structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road sign & markings, tests on completion etc. complete in all respect.	13.80%	**(2) Super structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure of at least one span in all respect as specified in the column of " Stage of Payment" in this Sub-clause.
(3) Approaches: On completion of approaches including Retaining walls/ Reinforced earth walls, stone pitching, protection works complete in all respect and fit for use.	10.00%	**(3) Approaches:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "Stage of Payment" in this Sub-clause

1.3.3 Major Bridge works, ROB/RUB and Structures.

Procedure for estimating the value of Major Bridge works, ROB/RUB and Structures shall be as stated in table 1.3.3:

Table 1.3.3

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
A 1 - Widening and repair of major bridges		
(1) Foundation	0.00%	**(i) Foundation:** Cost of each Major Bridge shall be determined on prorata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of foundation of the major Bridge subject to completion of at least one foundations of the major bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also were specified.
(2) Sub-structure	0.00%	**(ii) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of sub-structure of the major bridge subject to completion of at least one sub structures of abutment / pier cap level of the major bridge.
(3) Super-structure (including bearings)	0.00%	**(iii) Super-structure:** Payment shall be made on pro rata basis on completion of a stage i.e.. completion of super structure including bearings of at least one span in all respects as specified
(4) Wearing Coat including expansion joints	0.00%	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%	**(v) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/ return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	0.00%	**(vii) Guide Bonds, River Training works:** Payments shall be made on completion of all guide bunds/river

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
		training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	(viii) **Approaches**: Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
A 2 - New Major bridges		
(1) Foundation	0.00%	**(i) Foundation:** Cost of each Major Bridge shall be determined on prorata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of foundation of the major Bridge subject to completion of at least one foundations of the major bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also were specified.
(2) Sub-structure	0.00%	**(ii) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e.. not less than 10% of the scope of sub-structure of the major bridge subject to completion of at least two sub structures of abutment / pier cap level of the major bridge..
(3) Super-structure (including bearings)	0.00%	**(iii) Super-structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of at least one span in all respects as specified.
(4) Wearing Coat including expansion joints	0.00%	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%	**(v) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls upto top	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	0.00%	**(vii) Guide Bonds, River Training works:** Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	(viii) **Approaches**: Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B 1 - Widening and repair of		
a) RoB		
b) RuB		
1) Foundation	0.00%	**(i) Foundation**: Cost of each RoB / RuB shall be determined on pro rata basis with respect to the total linear length (m) of the RoB / RuB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of foundation of the RoB / RuB subject to completion of at least one foundations of the RuB/ROB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
2) Sub Structure	0.00%	**(ii) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of sub-structure of the RoB / RuB subject to completion of at least one sub structure of abutments / pier cap level of the RuB/ROB.
3) Super Structure (Including bearings)	0.00%	**(iii) Super-structure:** Payment shall be made on pro rata basis on completion of a stage i.e.. completion of super structure including bearings of at least one span in all respects as specified.
4) Wearing coat (a) in case of **RoB** - wearing coat including expansion joints complete in all respect as specified and (b) in case of **RuB** - rigid pavement under RuB including drainage facility complete in all respect as specified	0.00%	(iv) **Wearing Coat**: Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
5) miscellaneous items like hand rails, crash barrier, road markings etc.	0.00%	(v) **Miscellaneous**: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
6) wing walls / return walls	0.00%	(vi) **Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	(vii) **Approaches**: Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B 2 - New RoB / RuB		
a) RoB		
b) RuB		
1) Foundation	27.00%	**(i) Foundation**: Cost of each RoB / RuB shall be determined on pro rata basis with respect to the total linear length (m) of the RoB / RuB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of foundation of the RoB / RuB subject to completion of at least one foundations of the RuB/ROB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified
2) Sub Structure	27.00%	**(ii) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of sub-structure of the RoB / RuB subject to completion of at least one sub structure of abutments / pier cap level of the RuB/ROB.
3) Super Structure (Including bearings)	27.00%	**(iii) Super-structure:** Payment shall be made on pro rata basis on completion of a stage i.e.. completion of super structure including bearings of at least one span in all respects as specified
4) Wearing coat (a) in case of **RoB** - wearing coat including expansion joints complete in all respect as specified and (b) in case of **RuB** - rigid pavement under RuB including drainage facility complete in all respect as specified	9.00%	(iv) **Wearing Coat**: Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
5) miscellaneous items like hand rails, crash barrier, road markings etc	1.00%	(v) **Miscellaneous**: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
6) wing walls / return walls	5.00%	(vi) **Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
		in all respects as specified.
7) Approaches (including Retaining walls, stone pitching and protection works)	4.00%	(vii) **Approaches**: Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C 1 - Widening and repair of Elevated sections / Fly overs / Grade Separators		
1) Foundation	0.00%	**(i) Foundation**: Cost of each RoB / RuB shall be determined on pro rata basis with respect to the total linear length (m) of the RoB / RuB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of foundation of the RoB / RuB subject to completion of at least one foundations of the RuB/ROB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified
2) Sub Structure	0.00%	**(ii) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of sub-structure of the RoB / RuB subject to completion of at least one sub structure of abutments / pier cap level of the RuB/ROB.
3) Super Structure (Including bearings)	0.00%	**(iii) Super-structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of at least one span in all respects as specified
4) Wearing coat including expansion joints	0.00%	(iv) **Wearing Coat**: Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%	(v) **Miscellaneous**: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
6) wing walls / return walls	0.00%	(vi) **Wing walls/return walls:** Payments shall be made on completion

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
		of all wing walls/return walls complete in all respects as specified.
7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	(vii) **Approaches**: Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C 2 - New Elevated sections / Fly overs / Grade Separators		
1) Foundation	0.00%	**(i) Foundation**: Cost of each RoB / RuB shall be determined on pro rata basis with respect to the total linear length (m) of the RoB / RuB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of foundation of the RoB / RuB subject to completion of at least one foundations of the RuB/ROB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified
2) Sub Structure	0.00%	**(ii) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 10% of the scope of sub-structure of the RoB / RuB subject to completion of at least one sub structure of abutments / pier cap level of the RuB/ROB.
3) Super Structure (Including bearings)	0.00%	**(iii) Super-structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of at least one span in all respects as specified
4) Wearing coat including expansion joints	0.00%	(iv) **Wearing Coat**: Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%	(v) **Miscellaneous**: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
6) wing walls / return walls	0.00%	(vi) **Wing walls/return walls:** Payments shall be made on completion

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
		of all wing walls/return walls complete in all respects as specified.
7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	(vii) **Approaches**: Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.

Note: (1) In case of innovate Major Bridge projects like cable suspension/ cable stayed/ Extra Dozed and exceptionally long span bridges, the schedule may be modified as per site requirements before bidding with due approval of Competent Authority.

(2) The Schedule for exclusive tunnel projects may be prepared as per site requirements before bidding with due approval of Competent Authority.

1.3.4 Other works

Procedure for estimating the value of other works done shall be as stated in table 1.3.4.

Table 1.3.4

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(i) Toll Plaza	0.00%	Unit of measurement is each completed Toll Plaza. Payment of each Toll Plaza shall be made on pro rata basis with respect to the total of all Toll Plaza
(ii) Road side drains		Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 (one hundred) metre.
Lined Drain	12.04%	
Unlined Drain	0.78%	
(iii) Road Signs, markings, km stones, safety devices, Road furniture, etc.	12.80%	
(iv) Project facilities		Payment shall be made on pro rata basis for completed facilities
(a) Bus Bays & Bus Shelter	1.00%	
(b) Truck lay byes	0.00%	
(c) Rest Areas	0.00%	
(d) Others		
a) Clearing n Grubbing & Dismantling works	0.43%	
b) improvement of Junctions	0.00%	
c) Sand Filling in embankment in Pond Locations	0.00%	
d) Turfing and hydroseeding	0.00%	
e) Traffic Aid Post	0.00%	
f) Lighting in Built-up areas	4.10%	
(v) Road side Plantation	0.50%	Unit of measurement is linear length.

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(vi) Repair of Protection works other than approaches to the bridges, elevated sections / flyovers / grade separators and RoBs/ RuBs		Payment shall be made on pro-rata basis on completion of a stage in a length of not less than 100 (one hundred) metre.
(a) Crash Barrier	0.00%	
(b) Parapet wall	0.00%	
(c) Retaining wall	68.35%	
(d) Breast Wall	0.00%	
(e) Gabion	0.00%	
f) River Training works /Pitching on Slopes	0.00%	
(vii) Safety and traffic management during construction		Payment shall be made on pro rata basis every six months

Section – 2: Internal Infrastructure Development inside MMLP Site

(See Clauses10.1.4 and 19.3)

Contract Price Weightages
(for 36% of Total Weightage)

2.1 Proportions of the Contract Price for different stages of Development of Internal Infrastructure of the Multi Model Logistic Park Project at Jogighopa at Assam shall be as specified below:

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE
1	2	3	4
Road works including culverts, drainage, Water supply system, Sewerage networks, Intake works with rising main till WTP, Power Supply System, Street Lighting, Roadside Landscaping	**0.20%**	On Approval of all type of structural, hydraulic Designs, Working Drawings	100.00%
Road works including culverts (but excluding service roads)	**66.02%**	**A-Widening and Strengthening of existing road**	
		(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock, removal of unserviceable soil etc	0.00%
		(2) Sub Base courses	0.00%
		(3) Non Bituminous Base Course	0.00%
		(4) Bituminous Base Course	0.00%
		(5) Wearing coat	0.00%
		(6) Widening and repair of culverts	0.00%
		B 1- New six/ four lane alignment / bypass (Flexible pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Non Bituminous Base Course	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE
1	2	3	4
		(4) Bituminous Base Course	0.00%
		(5) Wearing coat	0.00%
		B 2- Reconstruction / New lane alignment / bypass (Rigid pavement)	
		(1) Earthwork and sub-grade preparation	28.01%
		(2) Sub Base and Base Course	24.33%
		(3) Pavement Courses (DLC and PQC)	35.15%
		C 1- Reconstruction / New Service road/ Slip Road (Flexible pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Non Bituminous Base Course	0.00%
		(4) Bituminous Base Course	0.00%
		(5) Wearing coat	0.00%
		C 2- Reconstruction / New Service road (Rigid pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) course	0.00%
		D - Reconstruction and New culverts on existing road, Realignments, bypasses:	
		Culverts (Length <6m)	
		a - Pipe Culverts	0.00%
		b - Box Culverts	12.36%
Other Works	**1.00%**	**(i) Toll Plaza**	0.00%
		(ii) Road side drains	
		Lined Drain	20.45%
		Unlined Drain	0.00%
		(iii) Road Signs, markings, km stones, safety devices, Road furniture, etc.	54.87%
		(iv) Project facilities	
		(a) Bus Bays	7.33%
		(b) Truck lay byes	0.00%
		© Rest Areas	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE
1	2	3	4
		(d) Others	
		a) Clearing n Grubbing & Dismantling works	6.21%
		b) improvement of Junctions	0.00%
		c) Sand Filling in embankment in Pond Locations	0.00%
		d) Turfing and hydroseeding	0.00%
		e) Traffic Aid Post	0.00%
		f) Lighting in Built-up areas	0.00%
		(v) Road side Plantation	11.12%
		(vi) Repair of Protection works other than approaches to the bridges, elevated sections / flyovers / grade separators and RoBs/ RuBs	
		(a) Crash Barrier	0.00%
		(b) Parapet wall	0.00%
		(c) Retaining wall	0.00%
		(d) Breast Wall	0.00%
		(e) Gabion	0.00%
		f) River Training works /Pitching on Slopes	0.00%
		(vii) Safety and traffic management during construction	
Internal Infrastructure Works, i.e.. Potable Water Supply System including Intake Works, Recycled Water Supply System, Sewerage System	**25.01%**	(i) On supply of all materials, like pipes, valves, etc. at site including transportation, loading, unloading, staking all complete.	20%
		(ii) On satisfactory completion of all works	60%
		(iii) On satisfactory testing, disinfected of all the system and handling over to Employer	20%
Internal Power Supply System including Street Lighting, Data & Telecommunication	**7.77%**	(i) On supply of all materials at site including transportation, loading, unloading, etc. all complete	25%
		(ii) On satisfactory completion of all works	65%
		(iii) On satisfactory handling over to Employer	10%

**The above list is illustrative and may require modification as per the scope of the work*

NA: Not Applicable

2.2 Procedure of estimating the value of work done

2.2.1 Road Works

Procedure for estimating the value of road work done shall be as per Table 2.2.1

Table 2.2.1

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
A-Widening and Strengthening of existing road		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 100 (one hundred) metre.
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock, removal of unserviceable soil etc	0.00%	
(2) Sub Base courses	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing coat	0.00%	
(6) Widening and repair of culverts	0.00%	Cost of completed culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least one culvert.
B 1- New six/ four lane alignment / bypass (Flexible pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 100 (one hundred) metre length, whichever is less
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub Base Course	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing coat	0.00%	
B 2- Reconstruction / New lane alignment / bypass (Rigid pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 100 (one hundred) metre length, whichever is less
(1) Earthwork and sub-grade preparation	28.01%	
(2) Sub Base and Base Course	24.33%	
(3) Pavement Courses (DLC and PQC)	35.15%	
C 1- Reconstruction / New Service road/ Slip Road (Flexible pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 100 (one hundred) metre length, whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub Base Course	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing coat	0.00%	
C 2- Reconstruction / New Service road (Rigid pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full
(1) Earthwork up to top of the sub-grade	0.00%	

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(2) Sub Base Course	0.00%	length or 100 (one hundred) metre length, whichever is less.
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) course	0.00%	
D - Reconstruction and New culverts on existing road, Realignments, bypasses:		Cost of each culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least one culvert.
Culverts (Length <6m)		
a - Pipe Culverts	0.00%	
b - Box Culverts	12.01%	

@ For example, if the total length of bituminous work to be done is 100 km, the cost per km of bituminous work shall be determined as follows:

Cost per km = P x weightage for road work x weightage for bituminous work x (1/L)

Where,

P = Contract Price

L = Total Length in Km

Similarly, the rates per km for other stages shall be worked out accordingly.

Note: The length affected due to law and order problems or litigation during execution due to which the Contractor is unable to execute the work, may be deducted from the total project length for payment purposes. The total length calculated here is only for payment purposes and will not affect and referred in other clauses of the Contract Agreement.

2.2.2 Other works

Procedure for estimating the value of other works done shall be as stated in table 2.2.2.

Table 2.2.2

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(i) Toll Plaza	0.00%	Unit of measurement is each completed Toll Plaza. Payment of each Toll Plaza shall be made on pro rata basis with respect to the total of all Toll Plaza
(ii) Road side drains		Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten percent) of the total length
Lined Drain	20.45%	
Unlined Drain	0.00%	
(iii) Road Signs, markings, km stones, safety devices, Road furniture, etc.	54.87%	
(iv) Project facilities		Payment shall be made on pro rata basis for completed facilities
(a) Bus Bays & Bus Shelter	7.33%	
(b) Truck lay byes	0.00%	

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(c) Rest Areas	0.00%	
(d) Others		
a) Clearing n Grubbing & Dismantling works	6.21%	
b) improvement of Junctions	0.00%	
c) Sand Filling in embankment in Pond Locations	0.00%	
d) Turfing and hydroseeding	0.00%	
e) Traffic Aid Post	0.00%	
f) Lighting in Built-up areas	0.00%	
(v) Road side Plantation	11.12%	Unit of measurement is linear length. Payment shall be made on pro-rata basis on completion of a stage in a length of not less than 10% (ten percent) of the total length
(vi) Repair of Protection works other than approaches to the bridges, elevated sections / flyovers / grade separators and RoBs/ RuBs		
(a) Crash Barrier	0.00%	
(b) Parapet wall	0.00%	
(c) Retaining wall	0.00%	
(d) Breast Wall	0.00%	
(e) Gabion	0.00%	
f) River Training works /Pitching on Slopes	0.00%	
(vii) Safety and traffic management during construction		Payment shall be made on pro rata basis every six months

2.2.3 Internal Infrastructure Works, i.e. Potable Water Supply System including Intake Works, Recycled Water Supply System, Sewerage System

Procedure for estimating the value of other works done shall be as stated in table 2.2.3.

Table 2.2.3

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(ii) On supply of all materials, like pipes, valves, etc. at site including transportation, loading, unloading, staking all complete.	20%	Payments shall be made on supply of materials at site after approval of all shop testing, as specified.
(ii) On satisfactory completion of all works	60%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 100 (one hundred) metre length, whichever is less
(iii) On satisfactory testing, disinfected	20%	Payments shall be made on satisfactory

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
of all the system and handling over to Employer		testing, disinfected of all the system and handling over to Employer.

2.2.4 Internal Power Supply System including Street Lighting, Data & Telecommunication System

Procedure for estimating the value of other works done shall be as stated in table 2.2.4.

Table 2.2.4

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(i) On supply of all materials at site including transportation, loading, unloading, etc. all complete	25%	Payments shall be made on supply of materials at site after approval of all shop testing, as specified.
(ii) On satisfactory completion of all works	65%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 100 (one hundred) metre length, whichever is less
(iii) On satisfactory handling over to Employer	10%	Payments shall be made on satisfactory testing, disinfected of all the system and handling over to Employer.

2. Procedure for payment for Maintenance

2.1 The cost for maintenance shall be as stated in Clause 14.1.1.

2.2 Payment for Maintenance shall be made in quarterly installments in accordance with the provisions of Clause 19.7.

SCHEDULE - I

(See Clause 10.2.4)

DRAWINGS

1 Drawings

In compliance of the obligations set forth in Clause 10.2 of this Agreement, the Contractor shall furnish to the Authority's Engineer, free of cost, all Drawings listed in Annex-I of this Schedule-I.

2 Additional Drawings

If the Authority's Engineer determines that for discharging its duties and functions under this Agreement, it requires any drawings other than those listed in Annex-I, it may by notice require the Contractor to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Contractor shall promptly prepare and furnish such drawings to the Authority's Engineer, as if such drawings formed part of Annex-I of this Schedule-I.

Annex - I

(Schedule - I)

List of Drawings

Note: The Authority shall describe in this Annex-I, all the Drawings that the Contractor is required to furnish under Clause 10.2.

i. Alignment plan of Road Network
ii. Typical cross sections
iii. Standard typical drawing for proposed culverts
iv. GAD of bridges and other structures
v. Layout of Major Intersections
vi. GAD of Bus Shelter
vii. Network plan of Potable and Recycled Water Supply System
viii. Detailed Drawings of Chambers with Structural Details
ix. Network plan of Sewerage System
x. Detailed Drawings of Manholes with Structural Details
xi. Layout of Power Supply System, Data & Telecommunication System and
xii. GAD of Street Lighting pole

SCHEDULE - J

(See Clause 10.3.2)

PROJECT COMPLETION SCHEDULE

1 Project Completion Schedule

During Construction period, the Contractor shall comply with the requirements set forth in this Schedule-J for each of the Project Milestones and the **Scheduled Completion Date**. Within 15 (fifteen) days of the date of each Project Milestone, the Contractor shall notify the Authority of such compliance along with necessary particulars thereof.

2 Project Milestone-I

2.1 Project Milestone-I shall occur on the date falling on the 200th (two hundred) day from the Appointed Date (the "**Project Milestone-I**").

2.2 Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

3 Project Milestone-II

3.1 Project Milestone-II shall occur on the date falling on the 300th (three hundred) day from the Appointed Date (the "**Project Milestone-II**").

3.2 Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 30% (thirty per cent) of the Contract Price.

4 Project Milestone-III

4.1 Project Milestone-III shall occur on the date falling on the 400th (four hundred) day from the Appointed Date (the "**Project Milestone- III**").

4.2 Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount

not less than 60% (sixty per cent) of the Contract Price.

5 Scheduled Completion Date

5.1 The Scheduled Completion Date shall occur on the 548th (five hundred and forty eightieth) day from the Appointed Date.

5.2 On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

6 Extension of time

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

SCHEDULE - K

(See Clause 12.1.2)

TESTS ON COMPLETION

1 Schedule for Tests

1.1 The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority's Engineer and the Authority of its intent to subject the Project to Tests, and no later than 10 (ten) days prior to the actual date of Tests, furnish to the Authority's Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Works.

1.2 The Contractor shall notify the Authority's Engineer of its readiness to subject the Project Highway to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Authority's Engineer shall, in consultation with the Contractor, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Authority's Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule-K.

2 Tests

2.1 Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include all relevant tests as per latest MoRT&H guidelines.

2.2 Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometre.

2.3 Tests for bridges: All major and minor bridges shall be subjected to the rebound hammer and ultrasonic pulse velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway Research Board on Nondestructive Testing Techniques, at two spots in every span, to be chosen at random by the Authority's Engineer. Bridges with a span of 15 (fifteen) metres or more shall also be subjected to load testing.

2.4 Other tests: The Authority's Engineer may require the Contractor to carry out

or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards.

2.5 Environmental audit: The Authority's Engineer shall carry out a check to determine conformity of the Project Highway with the environmental requirements set forth in Applicable Laws and Applicable Permits.

2.6 Safety Audit: The Authority's Engineer shall carry out, or cause to be carried out, a safety audit to determine conformity of the Project Highway with the safety requirements and Good Industry Practice.

3 Agency for conducting Tests

All Tests set forth in this Schedule-K shall be conducted by the Authority's Engineer or such other agency or person as it may specify in consultation with the Authority.

4 Completion Certificate

Upon successful completion of Tests, the Authority's Engineer shall issue the Completion Certificate in accordance with the provisions of Article 12.

SCHEDULE - L

(See Clause 12.2 and 12.4)

PROVISIONAL CERTIFICATE

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated ……. (the **"Agreement"**), for the Development of External Trunk Connectivity and Internal Infrastructure Works at Multi Model Logistics Park at Jogighopa in the state of Assam on Engineering, Procurement and Construction (EPC) basis through …… (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been undertaken to determine compliance of the Project Highway with the provisions of the Agreement.

2 Works that are incomplete on account of Time Extension have been specified in the Punch List appended hereto, and the Contractor has agreed and accepted that it shall complete all such works in the time and manner set forth in the Agreement. In addition, certain minor works are incomplete and these are not likely to cause material inconvenience to the Users of the Project Highway or affect their safety. The Contractor has agreed and accepted that as a condition of this Provisional Certificate, it shall complete such minor works within 30 (thirty) days hereof. These minor works have also been specified in the aforesaid Punch List.

3 In view of the foregoing, I am satisfied that the entire Project can be safely and reliably placed in service of the Users thereof, and in terms of the Agreement, the Project Highway is hereby provisionally declared fit for entry into operation on this the …… day of …….. 20…...

ACCEPTED, SIGNED, SEALED	SIGNED, SEALED AND
AND DELIVERED	DELIVERED
For and on behalf of	For and on behalf of
CONTRACTOR by:	AUTHORITY's ENGINEER by:
(Signature)	(Signature)

COMPLETION CERTIFICATE

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated …… (the "**Agreement**"), for the Development of External Trunk Connectivity and Internal Infrastructure Works at Multi Model Logistics Park at Jogighopa in the state of Assam on Engineering, Procurement and Construction (EPC) basis through ……. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the …… day of …… 20…

SIGNED, SEALED AND DELIVERED

For and on behalf of the Authority's

Engineer by:

(Signature)

(Name)

(Designation)

(Address)

SCHEDULE - M

(See Clauses 14.6, 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

1. Payment reduction for non-compliance with the Maintenance Requirements

1.1 Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule-E.

1.2 Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shall continue to be made every month until compliance is done.

1.3 The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph 2.

2. Percentage reductions in lump sum payments

2.1 The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	

S. No.	Item/Defect/Deficiency	Percentage
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/ accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

2.2 The amount to be deducted from monthly lump-sum payment for non-compliance of particular item shall be calculated as under:

R=P/IOO x M x L1/L

Where P = Percentage of particular item/Defect/deficiency for deduction
M = Monthly lump-sum payment in accordance with the Bid
L1 = Non-complying length
L = Total length of the road,
R = Reduction (the amount to be deducted for non-compliance for a particular item/ Defect/ deficiency

The total amount of reduction shall be arrived at by summation of reductions for such items/ Defects/ deficiency or non-compliance.

For any Defect in a part of one kilometer, the non-conforming length shall be taken as one kilometer.

SCHEDULE - N

(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

1.1 The provisions of the Model Request for Proposal for Selection of Technical Consultants, issued by the Ministry of Finance in May 2009, or any substitute thereof shall apply for selection of an experienced firm to discharge the functions and duties of an Authority's Engineer.

1.2 In the event of termination of the Technical Consultants appointed in accordance with the provisions of Paragraph 1.1, the Authority shall appoint another firm of Technical Consultants forthwith and may engage a government-owned entity in accordance with the provisions of Paragraph 3 of this Schedule-N.

2 Terms of Reference

The Terms of Reference for the Authority's Engineer (the "**TOR**") shall substantially conform with Annex 1 to this Schedule N.

3 Appointment of Government entity as Authority's Engineer

Notwithstanding anything to the contrary contained in this Schedule, the Authority may in its discretion appoint a government-owned entity as the Authority's Engineer; provided that such entity shall be a body corporate having as one of its primary functions the provision of consulting, advisory and supervisory services for engineering projects; provided further that a government-owned entity which is owned or controlled by the Authority shall not be eligible for appointment as Authority's Engineer.

Annex – I

(Schedule - N)

TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

1 Scope

1.1 These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the [name and address of the Authority] (the "**Authority**") and ..... (the "**Contractor**") for the Development of External Trunk Connectivity and Internal Infrastructure Works at Multi Model Logistics Park at Jogighopa in the state of Assam on Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

1.2 The TOR shall apply to construction and maintenance of the Multi Modal Logistic Park with External Trunk Connectivity Road Project.

2 Definitions and interpretation

2.1 The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.

2.2 References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this TOR.

2.3 The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Agreement shall apply, *mutatis mutandis*, to this TOR.

3. General

3.1 The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.

3.2 The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:

(a) any Time Extension;

(b) any additional cost to be paid by the Authority to the Contractor;

(c) the Termination Payment; or

(d) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding Rs. 5,000,000 (Rs. fifty lakh).

3.3 The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.

3.4 The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority's prior approval in accordance with the provisions of Clause 18.2.

3.5 The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.

3.6 In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority's Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

4 **Construction Period**

4.1 During the Construction Period, the Authority's Engineer shall review the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1.6. The Authority's Engineer shall complete such review and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

4.2 The Authority's Engineer shall review any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.

4.3 The Authority's Engineer shall review the Quality Assurance Plan submitted

by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty-one) days stating the modifications, if any, required thereto.

4.4 The Authority's Engineer shall complete the review of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.

4.5 The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.

4.6 The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.

4.7 The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.

4.8 The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.

4.9 For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4.9, the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

4.10 The Authority's Engineer shall test check at least 20 (twenty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

4.11 The timing of tests referred to in Paragraph 4.9, and the criteria for acceptance/

rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

4.12 In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.

4.13 The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.

4.14 In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.

4.15 The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.4.

4.16 Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.

4.17 In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

4.18 The Authority's Engineer shall carry out, or cause to be carried out, all the

Tests specified in Schedule-K and issue a Completion Certificate or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5. Maintenance Period

5.1 The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.

5.2 The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.

5.3 The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.

5.4 In respect of any defect or deficiency referred to in Paragraph 3 of Schedule-E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.

5.5 The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause 14.5.

6 Determination of costs and time

6.1 The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.

6.2 The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.

6.3 The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 18.5.

7. Payments

7.1 The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2.4 (d).

7.2 Authority's Engineer shall -

(a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and

(b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause 19.10.

7.3 The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.

7.4 The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

8. Other duties and functions

The Authority's Engineer shall perform all other duties and functions as specified in the Agreement.

9 Miscellaneous

9.1 A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.

9.2 The Authority's Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.

9.3 Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard

copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

9.4 The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.

9.5 The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

SCHEDULE - O

(See Clauses 19.4.1, 19.6.1, and 19.8.1)

FORMS OF PAYMENT STATEMENTS

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with Clause 19.3.1 subsequent to the last claim;

(b) amounts reflecting adjustments in price for the aforesaid claim;

(c) the estimated amount of each Change of Scope Order executed subsequent to the last claim;

(d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2.3 (a);

(e) total of (a), (b), (c) and (d) above;

(f) Deductions:

  (i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;

  (ii) Any amount towards deduction of taxes; and

  (iii) Total of (i) and (ii) above.

(g) Net claim: (e) – (f) (iii);

(h) The amounts received by the Contractor upto the last claim:

  (i) For the Works executed (excluding Change of Scope orders);

  (ii) For Change of Scope Orders, and

  (iii) Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

(a) the monthly payment admissible in accordance with the provisions of

the Agreement;

(b) the deductions for maintenance work not done;

(c) net payment for maintenance due, (a) minus (b);

(d) amounts reflecting adjustments in price under Clause 19.12; and

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

Note: The Contractor shall submit its claims in a form acceptable to the Authority.

SCHEDULE - P

(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

1.1 The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:

(a) insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] per cent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and

(b) insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.

1.2 The insurance under paragraph 1.1 (a) and (b) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

2. Insurance for Contractor's Defects Liability

The Contractor shall effect and maintain insurance cover for the Works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and which arises from a cause occurring prior to the issue of the Completion Certificate. The Contractor shall also maintain other insurances for maximum sums as may be required under the Applicable Laws and in accordance with Good Industry Practice.

3. Insurance against injury to persons and damage to property

3.1 The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit on the number of occurrences.

The insurance cover shall be not less than: Rs. [*****]

3.2 The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this Agreement excluding:

(a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and

(b) damage which is an unavoidable result of the Contractor's obligations to execute the Works.

4. Insurance to be in joint names

The insurance under paragraphs 1 to 3 above shall be in the joint names of the Contractor and the Authority.

SCHEDULE - Q

(See Clause 14.10)

TESTS ON COMPLETION OF MAINTENANCE PERIOD

1. Riding Quality Test

1.1 Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be [2,200 (two thousand and two hundred only)] mm for each kilometer.

2. Visual and Physical Test

2.1 The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include measurement of cracking, rutting, stripping and potholes and shall be as per the requirement of maintenance mentioned in Schedule-E.

SCHEDULE - R

(See Clause 14.10)

TAKING OVER CERTIFICATE

I, ……. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated……(the "**Agreement**"), for **Development of External Trunk Connectivity and Internal Infrastructure Works at Multi Model Logistics Park at Jogighopa in the state of Assam** (the "**Project**") on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

End of the Document