

**Schedule B**  
*(See Clause 2.1)*

**Development of the Project Highway**

**1 Development of the Project Highway**

Development of the Project Highway shall include design and construction of the Project Highway as described in this Schedule-B and in Schedule-C.

**2 Rehabilitation and augmentation**

Rehabilitation and augmentation shall include Four-Laning and strengthening of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

**3 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.

## Annex – I

(Schedule-B)

### Description of Four laning

#### 1. Widening of the Existing Highway

1.1 The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex III of Schedule-A. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for plain terrain to the extent land is available.

#### 1.2 Width of carriageway

1.2.1 Four-Laning shall be undertaken. The width of roadway shall depend upon the width of the carriageway, shoulders and the median in accordance with the typical cross sections drawings in the Manual i.e. **IRC:SP:84-2014**.

Provided that in built-up areas, the width of the carriageway shall be as specified in the following table:

Sr. No.	Built-up stretch (Township)	Location (km to km)	Width (m)	Typical cross section (Ref. to Manual)
1	New Khowang	564.560 to 565.380	19.0	Fig 2.6
2	Borbaruah, Lepatekata	580.300 to 581.100	19.0	Fig 2.6

1.2.2 Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.1 above.

## 2. GEOMETRIC DESIGN AND GENERAL FEATURES

### 2.1 General

Geometric design and general features of the Project Highway shall be in accordance with Section-2 of the Manual.

### 2.2 Design Speed

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

### 2.3 Improvement of the existing Road Geometrics

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

#### **Realignment:**

Sl. No.	Existing Chainage (km)		Length (km)	Widening side/Scheme
	From	To		
1	562.525	563.172	0.600	Realignment
2	563.172	563.567	0.400	Left side Widening
3	563.567	564.571	1.000	Right side Widening
<b>4</b>	<b>564.571</b>	<b>565.376</b>	<b>0.800</b>	<b>4-Lane Approach with RE Walls &amp; Service Road</b>
5	565.376	568.623	3.300	Right side Widening
6	568.623	571.116	2.500	Left side Widening
7	571.116	571.537	0.400	Realignment
8	571.537	573.493	1.900	Left side Widening
9	573.493	573.788	0.300	Realignment
10	573.788	574.285	0.500	Left side Widening
11	574.285	575.188	0.900	Right side Widening
12	575.188	575.492	0.300	Realignment
13	575.492	575.797	0.300	Right side Widening
14	575.797	575.949	0.150	Bypass/Realignment
15	575.949	576.556	0.600	Right side Widening
16	576.556	576.909	0.350	Realignment
17	576.909	577.257	0.350	Left side Widening
18	577.257	577.901	0.650	Realignment
19	577.901	579.900	2.000	Right side Widening
20	579.900	580.300	0.400	Left side Widening
<b>21</b>	<b>580.300</b>	<b>581.103</b>	<b>0.800</b>	<b>2-lane Flyover Approach with RE Walls &amp; Service Road</b>
22	581.103	581.700	0.578	Left side Widening

## 2.4 Right of Way

Details of the Right of Way are given in Annex II of Schedule-A.

## 2.5 Type of Shoulders

- (a) In built-up sections, footpaths/ fully paved shoulders shall be provided in the following stretches:

Sr. No	Existing Stretch		Fully paved shoulders/ footpaths	Reference to cross section in Manual	Remarks
	From (km)	To (km)			
1	564.560	565.380	Yes	Figure 2.6	New Khowang
2	580.300	581.100	Yes	Figure 2.6	Borbaruah, Lapetketa

- (b) In open country, paved shoulders of 1.5 m width shall be provided and balance 2.0 m width shall be covered with 150 mm thick compacted layer of granular material.
- (c) Design and specifications of paved shoulders and granular material shall conform to the requirement specified in paragraphs 5.10 & 5.11 of the Manual

## 2.6 Lateral and Vertical Clearances at Underpasses

- 2.6.1 Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per the paragraph 2.10 of the Manual.

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2.6.2 Lateral clearance: The size of the opening at the underpasses shall be as follows:

Sr. No.	Location (Existing Chainage in km)	Span/ opening (m)	Minimum length of RE Wall	Remarks
1	564.940	12 x 5.5	2 x 827.5	VUP

## 2.7 Lateral and vertical clearance at overpasses

2.7.1 Lateral and vertical clearances at over passes shall be as per paragraph 2.11 of the Manual.

2.7.2 Lateral clearance: The size of the opening at the overpasses shall be as follows:

S. No.	Location (chainage) From km to km	Number and length of spans	Remarks
Nil			

## 2.8 Service roads

Service roads, as per clause 2.12.2 of the manual, shall be constructed at the locations and for the lengths indicated below:

Sr. No.	Location of Service Road*		Side	Width of Carriageway (m)	Length of service road (km)
	From (km)	To (km)			
1	564.560	565.380	LHS & RHS	7.5	0.800
2	580.300	581.100	LHS & RHS	7.5	0.800

\*Existing chainage

## 2.9 Grade separated structures

2.9.1 Grade separated structures shall be provided as per paragraph 2.13 of the Manual. The requisite particulars are given below

Sr. No.	Location of Structure	Existing Chainage	Length (m)	Number and length of spans	Approach gradient	Remarks
1	Bogibeel	580.780	30	1 x 30	1:50	2-lane new structure with min. RE wall length is 815 m

2.9.2 In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows:

Sr. No.	Location Existing Chainage	Type of structure/ Length (m)	Cross Road at			Remarks
			Existing level	Raised Level	Lowered Level	
1	580.780	Flyover/ 30	Existing level	-	-	RE wall length is as per Clause 2.9.1

## 2.10 Cattle and Pedestrian under pass / over pass

Cattle and pedestrian underpass/Overpass shall be constructed as follows:

Sr. No.	Location	Type of crossing
NIL		

## 2.11 Typical cross-sections of the Project Highway

Four laning of NH-37 from End of Moran Bypass (km 562.525) to Bogibeel Junction near Lapetketa (km 581.700) in the state of Assam under SARDP-NE, Phase 'A' on EPC mode -Balance Work

Different type of cross sections for different segments of Four Lane stretch shall be developed as provided in 'Manual of Specifications & Standard for Four Laning of Highways through Public Private Partnership' (IRC:SP:84-2014) referred in Schedule D.

### 3.0 Intersections and grade separators

All intersections and grade separators shall be as per Section 3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

Properly designed intersections shall be provided at the locations and of types and features given in the tables below:

#### (a) At-grade intersections

##### i) Major Junction

Sr. No.	Location Existing Chainage	Category of Road	Type of Intersection	Other features
1	580+789	NH	3-legged	Bogibeel Junction (at grade on RHS of carriageway)

##### ii) Minor Junctions

Sr. No.	Location (Existing Chainage)	Category of Road	Type of Intersection with project road Side (Left/Right)	Other features Carriageway Width in m	
				Left	Right
1	563.360	Non- NH	Right	-	3.50
2	563.685		Left	4.00	-
3	565.089		Right	-	4.00
4	567.603		Both side	5.00	5.00
5	568.204		Both side	3.50	3.50
6	569.058		Right	-	4.50
7	569.259		Left	4.50	-
8	570.057		Both side	3.50	3.50
9	570.486		Left	4.00	-
10	571.642		Left	4.00	-
11	581.092		Left	3.50	-
12	581.253		Left	3.75	-

#### (b) Grade separated intersection with/without ramps

S. No.	Location	Salient features	Minimum length of viaduct to be provided	Read to be carried over / under the structures
NIL				

### 4. Road embankment and cut section

#### 4.1 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment / cuttings shall conform to the standards and specifications 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.

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- 4.2** Raising of existing road. The existing road shall be raised in the following section as per section 4 of the manual:

Existing chainage in km		Length in m	Remarks
From	To		
564.571	565.376	800	VUP

## **5. Pavement design**

- 5.1** Pavement design shall be carried out in accordance with Section 5 of the Manual.

### **5.2 Type of pavement**

Any type of pavement shall be constructed (Refer section 5.2.1 of Manual).

### **5.3 Design requirements**

#### **5.3.1 Design Period and Strategy**

New pavement and for widening and strengthening of the existing pavement shall be designed as per relevant paragraphs of Section 5 of the Manual, for a minimum design period of 15 years. Stage construction shall not be permitted.

#### **5.3.2 Design Traffic**

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the contractor shall design the pavement for design traffic for not less than 60 million standard axles (msa).

## **5.4 Reconstruction of stretches**

The following stretches of the existing road shall be reconstructed. These shall be designed as new pavement.

Existing chainage in km		Length (km)	Remarks
From	To		
562.525	563.172	0.600	
571.116	571.537	0.400	
573.493	573.788	0.300	
575.188	575.492	0.300	
575.797	575.949	0.150	
576.556	576.909	0.350	
577.257	577.901	0.650	

## **6. Roadside drainage**

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per section 6 of the Manual. Covered Drains and lined drain shall be provided in the following stretches.

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Existing Chainage in km		Length (m)	Side
From	To		
564.571	564.602	0.03	RHS
564.980	565.040	0.11	RHS
565.079	565.376	0.31	RHS
580.360	580.370	0.01	RHS
580.700	580.750	0.05	RHS
581.000	581.021	0.02	RHS
581.083	581.134	0.05	RHS
564.571	564.622	0.05	LHS
564.878	565.061	0.14	LHS
565.129	565.144	0.015	LHS
565.337	565.376	0.04	LHS
580.400	580.550	0.2	LHS
580.640	580.775	0.125	LHS
<b>Total Length</b>		<b>1.15</b>	

## 7. Design of structures

### 7.1 General

7.1.1 All bridges, culverts and structures shall be designed and constructed in accordance with Section 7 of the Manual and shall conform to the cross-sectional features and other details specified therein.

7.1.2 Width of the carriageway of new bridges and structures shall be as follows:

All new structures shall have minimum carriageway as per Manual Fig. 7. 2A

7.1.3 The following structures shall be provided with footpaths

Sr. No.	Bridge at km	Utility service to be carried	Remarks
All New Bridges in built-up area shall have provisions for footpath			

7.1.4 All bridges shall be high-level bridges

7.1.5 Utility services to be carried over the structures

The following structures shall be designed to carry utility services specified in the table below:

S. No.	Bridge at km	Utility service to be carried	Remarks
All New Bridges shall have provisions for utility services to be carried over			

7.1.6 Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections given in section 7 of the Manual.

### 7.2 Culverts

Four laning of NH-37 from End of Moran Bypass (km 562.525) to Bogibeel Junction near Lapetketa (km 581.700) in the state of Assam under SARDP-NE, Phase 'A' on EPC mode -Balance Work

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

**7.2.2** Reconstruction of existing culverts:

The existing culverts at the following locations shall be re-constructed as new culverts:

S. No.	Design Chainage	Proposed Type of Structure	Recommendation	Proposed Span (m)	Over all Width in m
Nil					

**7.2.3 Widening of existing culverts**

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in section 7 of the Manual. Repairs /strengthening and widening of existing structures where required shall be carried out.

The following works listed below is the scope of work to be executed. The Bidder shall verify the usability as per project specifications/ requirement and any reworks/ modifications shall price the bid accordingly.

#### List of Slab/Box/Arch Culverts

Sl. No.	Existing Chainage	Proposed Type of Span (m)	Proposed Span (m)	Total Width in m	Remarks
1	563.969	BOX	1x2x1.5	4-lane	Culverts have been constructed by previous Contractor, any rectification if needed and protection work has to be executed
2	564.341	BOX	1x2x1.5	4-lane	
3	564.680	BOX	1x2.5x2	4-lane	
4	564.723	BOX	1x2.5x2	4-lane	
5	565.161	BOX	1x2x2	4-lane	
6	567.816	BOX	1x1.5x3.0	4-lane	
7	566.012	BOX	2x2.5x2.6	4-lane	
8	566.599	BOX	1x1.5x3.0	4-lane	
9	567.026	BOX	1x1.5x1	4-lane	Culverts have been constructed by previous Contractor, any rectification if needed and protection work has to be executed
10	567.650	BOX	1x1.5x3.0	4-lane	RHS Culverts and protection work of LHS Culverts and any rectification work if needed for LHS Culverts.
11	567.880	BOX	1x1x2.5	4-lane	
12	568.182	BOX	1x1.5x3.0	4-lane	Culverts have been constructed by previous Contractor, any rectification if needed and protection work has to be executed
13	568.803	BOX	1x1x1	4-lane	
14	569.313	BOX	1x1x2.5	4-lane	
15	569.465	BOX	1x5x3	4-lane	Culverts have been constructed by previous Contractor, any rectification if needed and protection work has to be executed
16	574.111	BOX	1x3.5x3	4-lane	
17	574.469	BOX	1x2x2	4-lane	
18	577.956	BOX	1x4x3	4-lane	
19	579.397	BOX	1x1.5x1.5	4-lane	
20	580.500	BOX	1x5x3	4-lane	



7.2.4 Additional new culverts shall be constructed as per particulars given in the table below:

The following works listed below is the scope of work to be executed. The Bidder shall verify the usability as per project specifications/ requirement and any reworks/ modifications shall price the bid accordingly.

Sr. No.	Existing Chainage (km)	Proposed Type of Culvert	Span Arrangement No. x Length/ No. x Dia (m)	Total Width in m	Remarks
1	563.288	Pipe	1x1.2 m dia	4-lane	Partially constructed by previous Contractor
2	563.654	Pipe	1x1.2 m dia	4-lane	Partially constructed by previous Contractor
3	565.950	Box	1x2.5x2	4-lane	
4	565.551	Box	1x2.5x2	4-lane	Partially constructed by previous Contractor

7.2.5 Repairs/ replacements of railing/parapets, flooring and protection works of the existing culverts shall be undertaken as follows:

As per site condition,

Repairs/Replacement of railings/parapets and any other defects noticed at the time of construction shall be undertaken by the contractor for all the retained culverts along with repair/construction of flooring and protection works.

7.2.6 Floor protection works shall be as specified in the relevant IRC Codes and Specifications.

### 7.3 Bridges

#### 7.3.1 Existing bridges to be re-constructed/widened /Repairs

i) The existing bridges at the following locations shall be reconstructed as new structures:

a) Major Bridges: NIL

b) Minor Bridges: NIL

ii) The following narrow bridges shall be widened/Repairs and Strengthened:

a) **Major Bridges:** NIL

b) **Minor Bridges:** NIL

#### 7.3.2 Additional new bridges

New bridges at the following locations on the Project Highway shall be constructed

a) **Major Bridge:**

Sr.	Name of Bridge	Existing	Type of	Proposed span arrangement No.	Proposed structural
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No.	Bridge	No.	Chainage	crossing	x L	configuration
1	Buri Dihing	573/1	573.31	River	2 x 35.458 + 2x 40.97 + 2 x 35.458	New 2-lane Bridge
2	Sessa	576/1	577.094	River	2 x 38.48	New 2-lane Bridge

### b) Minor Bridge:

Sr. No.	Name of Bridge	Bridge No.	Existing Chainage	Proposed span arrangement No. x L	Proposed structural configuration
1	Dulia Demow	567/2	567.68	1 x 29.248	New 2-lane Bridge

Note: The span arrangement is indicative. Contractor shall design the bridge as per site requirement.

7.3.3 The railings of existing bridges shall be replaced by crash barriers at the following locations:

S. No.	Location at km	Remarks
“As per site condition and where ever technically feasible”		

7.3.4 Repairs/replacements of railing/parapets of the existing bridges shall be undertaken as follows:

S. No.	Location at km	Remarks
In all the retained bridges which are proposed for widening, railing/ parapets shall be replaced.		

### 7.3.5 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.20 of the Manual

7.3.6 Structures in marine environment: Nil

## 7.4 Rail-road bridges

7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual.

7.4.2 Road over bridges (road over rail) shall be provided at the following crossings, as per GAD drawings attached:

S. No.	Existing Chainage (km)	Span Arrangement / length of span in m	Remark
Nil			

7.4.3 Road under bridges (road under railway line) shall be provided at the following level crossings, as per GAD drawings attached:

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Sr. No.	Location of level crossing	Number and length of span (No. x L) m	Remarks
1	568.000	2 x 75 (skew)	Existing RUB (under construction)

## 7.5 Grade separated structures

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2.9 & 3 of this Annex-I

## 7.6 Repairs and strengthening of structures

The existing structures to be repaired/ strengthened, and the nature and extent of repairs / strengthening required are given below:

### A – Bridges

#### i) Major Bridges

Sr. No.	Name of Bridge	Existing Chainage (km)	Width (m)	Nature and extent of repairs/ strengthening to be carried out	Widening
1	Buri Dihing River	573.310	8.4	Repairing/ replacement are required for damaged bearings, railings, expansion joints, drainage spout and wearing coat	NA
2	Sessa River	577.094	8.4	Repairing/ replacement are required for damaged bearings, railings, expansion joints, drainage spout and wearing coat	NA

#### ii) Minor Bridge:

Sr. No.	Name of Bridge	Chainage (km)	Width (m)	Nature and extent of repairs/ strengthening to be carried out	Widening
1	Dulia Demow	567.680	8.4	Repairing/ replacement are required for damaged bearings, railings, expansion joints, drainage spout and wearing coat	NA

### B – ROB / RUB

S. No.	Location of structure (km)	Nature and extent of repairs/strengthening to be carried out
1	568.000	RUB

### C – Overpasses/Underpasses and other structures

S. No.	Location of structure (km)	Nature and extent of repairs/strengthening to be carried out
		NIL

## 7.7 List of Major Bridges and Structures

Four laning of NH-37 from End of Moran Bypass (km 562.525) to Bogibeel Junction near Lapetketa (km 581.700) in the state of Assam under SARDP-NE, Phase 'A' on EPC mode -Balance Work

The following is the list of the Major Bridges and structures

Sr. No.	Location/ Design Chainage	Remarks
1	573.310	2-Lane Major Bridge
2	577.094	2-Lane Major Bridge
3	580.780	Flyover
4	564.940	VUP

## 8. Traffic control devices and road safety works

- 8.1 Traffic control devices and road safety works shall be provided in accordance with Section 9 of the Manual.
- 8.2 Specifications of the reflecting sheeting: As per the Clause 9.2 of the Manual of Specification and Standards.

## 9. Roadside furniture

Roadside furniture shall be provided in accordance with the provisions of section 9 of the Manual.

### 9.1 Overhead traffic signs: location and size

3 Nos. of Overhead traffic signs shall be provided excluding toll-Plaza locations.

## 10. Compulsory afforestation

Total of 1440 Nos. of trees affecting the proposed ROW have already been cut by the previous Contractor. Refer to Clause 11 of the Manual. 1:3 times new trees to be planted by the Contractor as compulsory afforestation.

## 11. Hazardous locations

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

S. No.	Location stretch from (km) to (km)	LHS/RHS
This shall be Provided at high embankment and at sharp curve location		

## 12. Special Requirement for hill roads:- Nil

## 13. Change of Scope

The length of Structures and bridges specified herein 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 Article 13.