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 completed by the Contractor in conformity with the Specifications and Standards specified in Annex-I of Schedule-D.

Annex – I

(Schedule-B)

Description of Four-Laning and strengthening

1. Widening of the Existing Highway

(i) 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/rolling] terrain to the extent land is available.

(ii) **Width of Carriageway**

(a) The Paved carriageway shall be 18 (Eighteen) meter wide excluding the median as per IRC: SP: 84-2014.

Provided that in the following built-up areas the 7.5 m service road shall be provided with the main carriageway as per IRC:SP:84-2014.

Sl.No.	Built-up stretch (Township)	Location (km to km)	Remarks
1	Puranigudam area	280.645 to 286.400	As per Fig. 2.6 of the manual

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

(iii) **Design chainage corresponding to existing chainage:**

Kilometre stones are existing in entire length of the project highway. It is called the "Existing Chainage". During topography survey with Total Station, observations are made to these Km stones and after finalization of alignment by improving the existing geometry the chain age has been referred to "Design Chainage". The relationship between the "Existing Chainage" and the "Design Chainage" as per field surveys of the location of existing Km stones using the total station for the "Project Highway" is given below.

Existing chainage (m)	Design Chainage (m)	Name of place
282900.000	282800.000	Kacharigaon
283892.548	284200.000	Near Dr. BKB Collage
284884.172	285000.000	Near Chapanala road
285933.607	285900.000	Volanath Boruah Adarsha

		School
286900.000	286900.000	Mikirhat L.P.School
287929.278	288020.000	Teliagaon L.P. School

(iv) Median shall be as per section 2.5 of Manual.

2. Geometric Design and General Features

(i) General

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

(ii) Design speed

The ruling design speed shall be 100 km per hr for plain/rolling terrain]. The minimum design speed of 80 Km per hour shall be adopted only where site conditions are restrictive as indicated in the schedule.

Sl. No.	Restrictive Stretch	Location (km)	Minimum Design Speed
1	Puranigudam	284.890	80 km/hr
2	Puranigudam	285.193	80 km/hr

(iii) 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:

Sl. No.	Stretch (from km to km)	Length in m	Type of deficiency	Remarks
1	284.760 to 285.200	440	Deficient ROW due to important	Minimum Design speed

(iv) Right of Way

The proposed ROW is 45 m as under:

Sl.No	**Design Chainage in km**	**Proposed ROW (in metre)**
1	278.600 to 288.600 of NH-37	45.00

(v) Type of shoulders

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

Sl.No	Design Chainage (km)		Reference to cross section of manual	Remarks
	From	To		
1	280.645	286.400	Fig. 2.6 of the manual	Puranigudam Area

(b) In open country, [paved shoulders of 1.5 m width shall be provided and balance 1.0 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 requirements specified in the relevant Manual.

(vi) Lateral and vertical clearances at underpasses

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

(b) Lateral clearance: The width of the opening at the underpasses shall be as follows:

Sl. No	Location (Chainage) (from km to km)	Span/ opening (m)	Remarks
NIL			

(vii) Lateral and vertical clearances at overpasses

(a) Lateral and vertical clearances at overpasses shall be as per the provision of relevant Manual.

(b) Lateral clearance: The width of the opening at the overpasses shall be as follows:

Sl. No	Location (Chainage) (from km to km)	Span/ opening (m)	Remarks
NIL			

(viii) Service roads / Slip roads

Service roads shall be constructed at the locations and for the lengths indicated below:

Sl.No.	Design chainage	Length in m	Side

	From (km)	To (km)		
1	280.645	288.600	14215	S/R to be provided one side / both sides as per availability of land
Total			**14215**	

(ix) Grade separated structures

(b) Grade separated structures shall be provided as per provision of the relevant Manual. The requisite particulars are given below:

Sl. No.	Location of structure	length (m)	Number and length of spans (m)	Approach gradient	Remarks, if any
NIL					

(c) 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:

Sl. No.	Location	Type of structure Length (m)	Cross road at			Remarks, if any
			Existing Level	Raised Level	Lowered Level	
As per drawing enclosed at Annexure-III of schedule A						

(x) Cattle and pedestrian underpass /overpass

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

Sl. No.	Location	Type of crossing
NIL		

(xi) Typical cross-sections of the Project Highway

Different types of Cross sections for different segments of four lane stretch shall be developed as provided in "Manual of Specifications and Standard for four laning of Highways through Public Private Partnership (IRC: SP: 84-2014) referred in Schedule – D.

Shift of Proposed centerline with respect to existing road centre. Widening is involved at both sides.

Design Chainage		Length	Shift
From	To	m	
278+600	278+740	140	Concentric
278+740	278+910	170	Concentric
278+910	280+500	1590	RHS
280+500	280+540	40	Concentric
280+540	281+200	660	RHS
281+200	281+390	190	Concentric
281+390	281+580	190	LHS
281+580	281+730	150	Concentric
281+730	282+730	1000	RHS
282+730	282+980	250	Concentric
282+980	283+130	150	RHS
283+130	283+250	120	Concentric
283+250	283+310	60	LHS
283+310	283+400	90	Concentric
283+400	283+490	90	RHS
283+500	284+160	660	Concentric
284+160	284+250	90	RHS
284+250	284+410	160	Concentric
284+410	284+800	390	RHS
284+800	285+050	250	Concentric
285+050	285+150	100	RHS
285+150	285+250	100	Concentric
285+250	285+900	650	RHS
285+900	287+510	1610	Concentric
287+510	287+800	290	LHS
287+800	287+830	30	Concentric
287+830	288+520	690	RHS
288+520	288+600	210	Concentric

(xii) Status of balance work (Highway):

Subgrade Top Balance Quantity			
From	To	Side	Length(m)
278+600	278+750	LHS	150
279+300	279+310	LHS	10
280+540	280+620	LHS	80
281+580	282+090	LHS	510
282+900	283+030	LHS	130
283+650	284+200	LHS	550
285+520	285+620	LHS	100
278+600	278+800	RHS	200
280+540	280+620	RHS	80
280+800	281+160	RHS	360

281+800	281+850	RHS	50
283+650	284+200	RHS	550
285+520	285+620	RHS	100
TOTAL (2 lane)			**2870**
TOTAL (4 lane)			**1.435 km**

Sl. No.	**WMM TOP Balance Quantity**				
	Chainage		**Length**	**SIDE**	**Scope**
	From	**To**			
1	278+600	286+410	7810	LHS	New
2	286+410	286+510	100	LHS	Rectification
3	286+510	286+550	40	LHS	New
4	286+550	286+720	170	LHS	Rectification
5	286+720	286+750	30	LHS	New
6	286+750	286+950	200	LHS	Rectification
7	287+280	288+600	1320	LHS	New
8	278+600	278+830	230	RHS	New
9	279+150	286+350	7200	RHS	New
10	286+350	286+530	180	RHS	Rectification
11	286+530	286+950	420	RHS	Rectification
12	287+125	287+160	35	RHS	New
13	287+250	288+600	1350	RHS	New
Total (2 Lane)			**19085 m**		
Total (4 Lane)			**9.542 km**		

Balance Quantity of DBM-1st Layer			
From	**To**	**Length in m**	**Side**
278+600	286+970	8370	LHS
287+240	288+600	1360	LHS
278+600	286+970	8370	RHS
287+245	288+600	1355	RHS
Total (2 Lane)		**19455**	
Total (4 Lane)		**9.728 km**	

Balance Quantity of DBM-2nd Layer			
From	To	Length **in m**	Side
278+600	288+600	10000	LHS
278+600	288+600	10000	RHS
Total (2 Lane)		**20000**	
Total (4 Lane)		**10.000 km**	

Balance Quantity of BC			
From	To	Length **in m**	Side
278+600	288+600	10000	LHS
278+600	288+600	10000	RHS
Total (2 Lane)		**20000**	
Total (4 Lane)		**10.000 km**	

Clearing & Grabbing work to be re-executed			
From	**To**	**Length in m**	**Side**
278+600	286+410	7810	LHS
286+510	286+550	40	LHS
286+720	286+750	30	LHS
287+280	288+600	1320	LHS
278+600	278+830	230	RHS
279+150	286+350	7200	RHS
287+250	288+600	1350	RHS
Total (2 Lane)		**17980**	
Total (4 Lane)		**8.990 km**	

Main Carriage Way			
Chainage		**Side**	**Length**
from	**To**		
278+600	288+600	B/S	10000 m
Service Road			
Start	**End**	**Length(m)**	**Side**
283+910	284+500	590	LHS
286+000	288+600	2600	LHS
283+500	284+500	1000	RHS
286+000	288+600	2600	RHS
Total (2 Lane)		**6790**	
Total (4 Lane)		**3.395 km**	

Covered Side Drain			
From	**To**	**Side**	**Length in m**
280+645	283+000	LHS	2355
283+910	287+000	LHS	3090
288+110	288+600	LHS	490
278+840	279+805	RHS	965
280+645	283+400	RHS	2755
283+500	287+360	RHS	3860

287+900	288+600	RHS	700
Total (2 Lane)			**14215**
Total (4 Lane)			**7.107 km**

Bus Bay with Bus Shelter		
Chainage	**Side**	**Total Nos.**
279+860	LHS	2
279+534	RHS	

3. Intersections and Grade Separators

All intersections and grade separators shall be as per the provision of 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 the types and features given in the tables below:

(i) At-grade intersections

(a) Major Intersections (Type – II)

Sl.No.	Location (km)	Type	Category of Cross Road (NH/SH/MDR/Other)	Remarks
1	279.750	T	Other (Barhampur Road)	Right Side
2	285.000	T	Other (Puranigudam Garmur Road)	Right Side

(b) Minor Intersection (Type – I)

Sl no.	Location intersection	Type of intersection	Other features	Remarks
1	278+810	T	RIGHT	MINOR
2	279+005	T	RIGHT	MINOR
3	280+130	T	RIGHT	MINOR
4	280+600	T	RIGHT	MINOR
5	281+600	X	BOTH	MINOR
6	283310	Y	RIGHT	MINOR
7	283+690	T	LEFT	MINOR

8	284+205	T	LEFT	MINOR
9	284+385	T	RIGHT	MINOR
10	284+864	X	BOTH	MINOR
11	285+665	T	LEFT	MINOR
12	285+785	X	BOTH	MINOR
13	286+245	T	RIGHT	MINOR
14	287+155	T	RIGHT	MINOR
15	287+420	T	RIGHT	MINOR
16	287+560	X	BOTH	MINOR
17	287+975	Y	LEFT	MINOR
18	288+360	T	LEFT	MINOR
19	288+590	T	LEFT	MINOR

(ii) Grade separated intersection with/without ramps

Sl. No.	**Location**	**Salient features**	**Minimum length of viaduct to be**	**Road to be carried over/under the**
NIL				

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 paragraph 4.2.1, 4.2.2 and 4.2.3 of the Manual and specify sections to be raised] as per the alignment plan & profile given in the Annexure – III of Schedule – A.

5. Pavement Design

(i) Pavement design shall be carried out in accordance with the section 5 of the Manual.

(ii) **Type of pavement**

Flexible pavement shall be adopted.

(iii) **Design requirements**

(a) Design Period and strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 15 years. Stage construction shall not be permitted.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic not less than **70 million** standard axles.

(iv) **Reconstruction of stretches**

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

Sl. No.	Stretch From km to km	Remark
NIL		

6. Roadside Drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per Section 6 of the Manual.
Location of covered side drain:

Sl. No.	Design chainage		Length in m
	From (km)	To (km)	
1	280.645	288.600	2 X 7.107 = 14215
Total			**14215**

7. Design of Structures

(i) **General**

(a) 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.

(b) Width of the carriageway of new bridges and structures shall be as follows:

Sl. No.	Bridge at km	Width of carriageway and cross-sectional features*
NIL		

(c) The following structures shall be provided with footpaths:

Sl. No.	Location at km	Remark
All new bridges in built-up-area shall have provisions for footpath		

(d) All bridges shall be high-level bridges.

(e) The following structures shall be designed to carry utility services specified in table below:

Sl. No.	Bridge at km	Utility service to be carried	Remarks
NIL			

(f) 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 Section 7 of the Manual.

(ii) Culverts

(a) Overall width of all culverts shall be equal to the roadway width of the approaches.

(b) Reconstruction of existing culverts:

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

Sl.No.	New Location as per Design	Type of Culvert	Proposed Size (mtr.)	Remarks	Comments
1	283+795	(2X2) Box	1 x 2.0 x 2.0	Reconstruction	
2	284+418	(2X2) Box	1 x 2.0 x 2.0	Reconstruction	RHS Downstream
3	285+244	(2X2) Box	1 x 2.0 x 2.0	Reconstruction	

(c) **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 the provision of relevant Manual. Repairs and strengthening of existing structures where required shall be carried out.

Sl. No.	Culvert location	Type, span, height and width of existing culvert (m)	Repairs to be carried out [specify]
NIL			

(d) Additional new culverts shall be constructed as per particulars given in the table below:

Sl.No.	New Location as per Drawing	Type of Culvert	Proposed Size (mm)	Remarks	Comments
1	279+900	Hume Pipe	1 X 1200	New Reconstruction	
2	280+617	Hume Pipe	1 X 1200	New Reconstruction	
3	282+670	Hume Pipe	1 X 1200	New Reconstruction	
4	284+275	Hume Pipe	1 X 1200	New Reconstruction	
5	285+811	Hume Pipe	1 X 1200	New Reconstruction	
6	287+479	Hume Pipe	1 X 1200	New Reconstruction	

7.2.4. (A). Status of Hume Pipe Culvert executed and Balance Quantity:

Sl. No	Chainage	Type of Culvert	Proposed size	Width of culvert (mtr.) (Scope)	Execution Status (Work Executed)	Side	Balance	Remarks
1	279+900	Hume Pipe	1 x 1200 mm	33.00	30.50	BS	2.5 m. Head wall-1no, protection work	

2	280+617	Hume Pipe	1 x 1200 mm	27.60	22.00	BS	5.6 m, Head wall-1no, protection work	
3	282+670	Hume Pipe	1 x 1200 mm	36.50	12.50	RHS	24.0 m, Head wall 1no, protection work	
4	284+275	Hume Pipe	1 x 1200 mm	36.50	15.00	RHS	21.5 m, Head wall 1no, protection work	
5	285+811	Hume Pipe	1 x 1200 mm	36.50	15.00	RHS	Head wall 1 no protection work	
6	287+479	Hume Pipe	1 x 1200 mm	24.50	10.00	RHS	14.50 m + Headwall (2 sides) and Protection work	

(e) Repairs/replacements of railing/parapets, flooring and protection works of the existing culverts shall be undertaken as per site condition.

(f) Floor protection works shall be as specified in the relevant IRC Codes and MoRTH Specifications.

(iii) Bridges

(a) Existing bridges to be re- constructed/widened

(i) The existing bridges at the following locations shall be re-constructed as new Structures.

Sl. No.	Bridge location (km)	Salient details of existing bridge	Adequacy or otherwise of the existing waterway, vertical clearance, etc*	Remarks
NIL				

(ii) The following narrow bridges shall be widened:

Sl. No.	Location (km)	Existing width (m)	Extent of widening (m)	Cross-section at deck level for widening @
NIL				

(b) **Additional new bridges**

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

Sl. No.	Location (km)	Total length (m)	Remarks, if any
NIL			

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

Sl. No.	Location at km	Remarks
NIL		

(d) Repairs / replacements of railing/parapets of the existing bridges shall be undertaken as follows:

Sl. No.	Location at km	Remarks
NIL		

(e) **Drainage system for bridge decks**

An effective drainage system for bridge decks shall be provided as specified in Paragraph 7.2 of the Manual

(f) **Structures in marine environment**

NIL

(iv) **Rail-road bridges**

(a) Design, construction and detailing of ROB/RUB shall be as specified in the provision of relevant Manual.

(b) Road over-bridges

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

Sl. No	**Location of Level crossing (Chainage km)**	**Length of bridge (m)**
NIL		

(c) **Road under-bridges**

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

Sl. No	Location of Level crossing (Chainage km)	Length of bridge (m)
NIL		

(v) Grade separated structures

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2 (ix) and 3 of this Annex-I of Schedule - B.

(vi) Repairs and strengthening of bridges and structures

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

(a) **Bridges**

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

(b) **ROB / RUB**

Sl. No.	Location of ROB/RUB (km)	Nature and extent of repairs /strengthening to be carried out
NIL		

(c) **Overpasses/Underpasses and other structures**

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

(vii) **List of Major Bridges and Structures**

The following is the list of the Major Bridges and Structures:

Sl. No.	Location
NIL	

8. Traffic Control Devices and Road Safety Works

(i) Traffic control devices and road safety works shall be provided in accordance with

the section – 9 of the Manual.

(ii) Specifications of the reflective sheeting shall be provided as per Manual.

9. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provision of Section – 09 of the Manual.

(ii) Overhead traffic signs: location and size

Sl.No.	Design Chainage (km)	Remarks
NIL		

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
NIL		

12. Special Requirement for Hill Roads

13. Change of Scope

The length of structures and bridges specified hereinabove 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 or any deviation thereof.

(Schedule B-1)

1. The shifting of utilities and felling of trees shall be carried out by the Contractor. The cost of the same shall be borne by the Authority. The details of utilities are as follows:

Sr. No	Type of Utility	Unit	Quantity	Location/stretch (LHS/RHS)
A	**Electrical Utilities**			
A1	Electrical Poles	Nos.	496	282+000 to 285+650 =7.30 KM BHS
A2	Electrical cables	meters	LT = 14,600 m & HT = 21,900 m	
A3	Transformers 25 KVA	Nos.	1	
-	Transformers 100 KVA	Nos.	8	
-	Transformers 250 KVA	Nos.	1	
B	Water/Sewage pipeline			
B1	Sewage	meters		
B2	Water supply	meters	4715	282+370 to 283+800 = 1430m RHS, 283+800 to 287+085= 3285m RHS.
-	Street Tap	Nos.	34	Puranigudam PWSS
-	-------	--		
C	Felling of Tress	Nos.	9 Nos.	
1	280+740	No	1	RHS
2	281+170	No	1	RHS
3	282+282	No	1	RHS
4	283+430	No	1	LHS
5	285+590	No	1	LHS
6	285+600	No	1	RHS
7	285+650	No	1	RHS
8	285+680	No	1	RHS
9	288+190	No	1	LHS