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 Six lane flyover with at grade improvement 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 Project highway

Description of the Project Highway 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 for Four Laning of Highways (IRC: SP:84-2019), 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. 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) In rural areas, at grade four-Laning with paved shoulders shall be undertaken. The paved carriageway shall be 7(seven) m (excluding paved shoulder and kerb shyness) wide on either side in accordance with the typical cross section's drawings in the Manual.

Provided that in the built-up areas: the width of the carriageway (either side) shall be as specified in the following table:

Sl. No.	Built-up stretch (Township)	Location (km to km)	Width(m)	Typical cross section
1	Dergaon Town (At-grade)	429+300 to 432+400	9.25 (including paved shoulder& kerb shyness)	TCS-1
2	Negheriting Village (At-grade)	433+500 to 434+100	9.25 (including paved shoulder & kerb shyness)	TCS-1
3	Balijan Village (At-grade)	435+800 to 436+400	9.25 (including paved shoulder & kerb shyness)	TCS-1

(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.

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 design speed shall be the minimum design speed of 80 km per hour for [Plain/Rolling terrain].

(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:

(iv) Right of Way

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

(v) Type of shoulders

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

Sl. NO	Stretch		Fully paved shoulders/ footpaths	Width (m)		Reference to cross section
	From (km)	To (km)		Paved shoulder	Footpath	
1	429+300	432+400	Paved Shoulder & Footpath	2	3.75	TCS-1
2	433+500	434+100	Paved Shoulder & Footpath	2	3.75	TCS-1
2	435+800	436+400	Paved Shoulder & Footpath	2	3.75	TCS-1

(b) In open country area, 2.5 m width paved shoulder on either side and 1.5m width Earthen shoulder has been proposed in TCS-2, 3A, 3B

(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 junctions & median opening underneath six lane flyover and provision of guardrails/crash barriers shall be as per the provision of the Manual.

(b) Lateral clearance: The width of the opening at junctions & median opening underneath six lane flyover shall be as follows:

Sl. No	Chainage (km)	Type	Lateral clearance (m)	Minimum vertical clearance (m)
Nil				

(vii) Lateral and vertical clearances at overpasses

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

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

Sl No.	Location of Service Road (km)		Right Hand Side (RHS) / Left Hand Side (LHS) / Both Sides	Length (km) of Service Road
	From	To		
1	429+300	432+400	Both	3.1
2	433+500	434+100	Both	0.6
3	435+800	436+400	Both	0.6

(ix) Grade separated structures

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

Sl no.	Start Chainage (km)	End Chainage (km)	Span Arrangement (m)	Structure width	Type of Superstructure	Length (m)
Nil						

(b) 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			Remarks, if any
			Existing Level	Raised Level	Lowered Level	
Nil						

(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

Typical cross section details are given below:

Design Chainage		Length (m)	TCS Type	Description
From	To			
426+800	427+798	998	TCS-3A	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Left Side Widening)
427+798	427+814	16	STR	MNB
427+814	428+100	286	TCS-3A	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Left Side Widening)
428+100	428+993	893	TCS-3B	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Right Side Widening)
428+993	429+007	14	STR	MNB
429+007	429+300	293	TCS-3B	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Right Side Widening)

Design Chainage		Length (m)	TCS Type	Description
From	To			
429+300	432+400	3100	TCS-1	Typical Cross Section of 4-Lane Divided Carriageway with 0.5m Wide Median Crash Barrier and with 7.5m Service Road (including Kerb Shyness) on Both Sides in Built-Up Area
432+400	433+500	1100	TCS-3A	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Left Side Widening)
433+500	434+100	600	TCS-1	Typical Cross Section of 4-Lane Divided Carriageway with 0.5m Wide Median Crash Barrier and with 7.5m Service Road (including Kerb Shyness) on Both Sides in Built-Up Area
434+100	434+850	750	TCS-3A	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Left Side Widening)
434+850	435+308	458	TCS-3B	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Right Side Widening)
435+308	435+322	14	STR	MNB
435+322	435+800	478	TCS-3B	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Right Side Widening)
435+800	436+400	600	TCS-1	Typical Cross Section of 4-Lane Divided Carriageway with 0.5m Wide Median Crash Barrier and with 7.5m Service Road (including Kerb Shyness) on Both Sides in Built-Up Area
436+400	436+700	300	TCS-3B	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Right Side Widening)
436+700	437+050	350	TCS-3A	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Left Side Widening)
437+050	437+400	350	TCS-3B	Typical Cross Section of 4-Lane Divided Carriageway with 4.0m Wide Raised Median in Rural Area (Eccentric Right Side Widening)
Total =		**10600**		

Refer to Typical cross section drawing in Annexure III of schedule A

3. Intersections and Grade Separators

All intersections and grade separators shall be as per the provision of relevant 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 inter sections

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

Design Chainage (km)	Type of Intersection	Type	Side	Improvement Proposals
427+150	Minor	4 legged	Both	At Grade
427+780	Minor	4 legged	Both	At Grade
428+110	Minor	3 legged	Left	At Grade
428+350	Minor	3 legged	Left	At Grade
428+450	Minor	3 legged	Right	At Grade
429+480	Major	4 legged	Both	At Grade
430+370	Major	4 legged	Both	At Grade
431+140	Major	4 legged	Both	At Grade
431+340	Minor	3 legged	Right	At Grade
431+680	Minor	3 legged	Left	At Grade
433+040	Minor	3 legged	Right	At Grade
433+630	Minor	4 legged	Both	At Grade
433+730	Minor	4 legged	Both	At Grade
434+050	Minor	3 legged	Right	At Grade
434+840	Minor	3 legged	Right	At Grade
435+585	Minor	3 legged	Right	At Grade
437+330	Minor	3 legged	Right	At Grade

(ii) Grade separated intersection with/without ramps

Sl no.	Start Chainage(km)	End Chainage(km)	Span Arrangement (m)	Structure width	Type of Superstructure	Length (m)
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 as per Section 4 of the Manual
The existing road shall be raised in the following sections:

Sl. No.	Section (from km to km)	Length	Extent of raising [Top of finished road level]
NIL			

5. Pavement Design

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

(ii) Type of pavement

Flexible pavement shall be proposed at the entire project road.

(iii) Design requirements

Design of new pavement has been carried out based on IRC 37 "Guidelines for the design of Flexible Pavements"

(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 20 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 a design traffic as

mentioned below:

- 4-Lane Carriageway designed for 67 MSA
- Service road designed for 20msa

(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	Remarks
1	426+800 to 437+400	-

6. Roadside Drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per section 6 of the manual and as per cross section schedule provided as Annexure -I to this schedule.
RCC covered drain should be provided in following locations.

Sl no.	Design chainage (km)		Length (km)	Side(LHS/RHS/Both Side)
	From	To		
1	429+300	432+400	3+100	Both
2	433+500	434+100	0+600	Both
3	435+800	436+400	0+600	Both

7. Design of Structures

(i) General

(a) All Grade separator, Bridges, culverts and structures shall be designed and constructed in accordance with the section 7 of the 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.	Design Chainage (km)	Remarks
1	427+806	
2	429+000	
3	435+315	

(d) All bridges shall be high-level bridges: NIL

(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 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.	Design chainage (km)	Type of Existing Culvert	Ex. No. of span x Span length (m)	Width of Existing Culvert (m)	Proposed Type of Culvert	Proposed Cell Arrangement	Proposed Carriageway (m)	Proposed Overall Width (m)
1	431+498	Slab Culvert	1x5.5	10	RCC Box	1 x 5.5 x 2.0	37.5	37.5
2	432+449	Slab Culvert	1x1.5	11.1	RCC Box	1 x 2.0 x 1.5	26	27
3	433+015	HP Culvert	1x0.8ϕ	15	RCC Box	1 x 2.0 x 2.0	26	27
4	433+493	Slab Culvert	1x1.2	13	RCC Box	1 x 2.0 x 1.5	26	27
5	433+685	Slab Culvert	1x1.2	12	RCC Box	1 x 2.0 x 1.5	37.5	37.5
6	434+030	Slab Culvert	1x1.1	12	RCC Box	1 x 2.0 x 1.5	37.5	37.5

Sl. No.	Design chainage (km)	Type of Existing Culvert	Ex. No. of span x Span length (m)	Width of Existing Culvert (m)	Proposed Type of Culvert	Proposed Cell Arrangement	Proposed Carriageway (m)	Proposed Overall Width (m)
7	434+167	Slab Culvert	1x1.5	11	RCC Box	1 x 2.0 x 1.5	26	27
8	434+457	Slab Culvert	1x1.1	11	RCC Box	1 x 2.0 x 1.5	26	27
9	434+684	Slab Culvert	1x5.2	11	RCC Box	1 x 5.5 x 2.0	26	27
10	434+892	Slab Culvert	1x1.1	10	RCC Box	1 x 2.0 x 1.5	26	27
11	435+003	Slab Culvert	1x1.1	11	RCC Box	1 x 2.0 x 2.0	26	27
12	435+533	Chocked	Chocked	-	RCC Box	1 x 2.0 x 2.0	26	27
13	435+960	Slab Culvert	1x1.2	13.5	RCC Box	1 x 5.5 x 5.0	37.5	37.5
14	436+377	Slab Culvert	1x5.5	11	RCC Box	1 x 5.5 x 2.0	37.5	37.5
15	436+682	HP Culvert	1x1.0	16	RCC Box	1 x 2.0 x 1.5	26	27

(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 section 7 of the 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.	Design chainage (km)	Type of Culvert	Cell Arrangement a x b	Carriageway (m)	Overall Width (m)
1	426+900	RCC Box	1 x 2.0 x 1.5	26	27
2	427+100	RCC Box	1 x 2.0 x 1.5	26	27
3	427+300	RCC Box	1 x 2.0 x 1.5	26	27
4	427+600	RCC Box	1 x 2.0 x 1.5	26	27
5	427+950	RCC Box	1 x 2.0 x 1.5	26	27
6	428+150	RCC Box	1 x 2.0 x 1.5	26	27
7	428+600	RCC Box	1 x 2.0 x 1.5	26	27
8	428+800	RCC Box	1 x 2.0 x 1.5	26	27
9	429+280	RCC Box	1 x 2.0 x 1.5	26	27
10	429+520	RCC Box	1 x 2.0 x 1.5	26	27
11	429+860	RCC Box	1 x 2.0 x 1.5	37.5	37.5
12	432+652	RCC Box	1 x 2.0 x 1.5	26	27
13	432+852	RCC Box	1 x 2.0 x 1.5	26	27
14	433+252	RCC Box	1 x 2.0 x 1.5	26	27
15	435+203	RCC Box	1 x 2.0 x 1.5	26	27
16	436+900	RCC Box	1 x 2.0 x 1.5	26	27
17	437+100	RCC Box	1 x 2.0 x 1.5	26	27
18	437+300	RCC Box	1 x 2.0 x 1.5	26	27

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

Sl. No.	Location at km	Type of repair required
NIL		

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

(iii) Bridges: NIL

(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.	Name of Stream	Design Chainage (km)	Span Arrangement (Nos. x Length in m)	Total Length (m)	Overall Width (m)	Structure Type	Remarks
1	Local stream	427+806	2 x 8.0	16	Widening + New 2 lane (16.0m)	RCC Box	New 2 lane
2	Local stream	429+000	2 x 7.0	14	Widening + New 2 lane (14.0m)	RCC Box	New 2 lane
3	Local stream	435+315	2 x 7.0	14	Widening + New 2 lane (14.0m)	RCC Box	New 2 lane

(b) Additional new bridges: NIL

New bridges at the following locations on the Project Highway shall be constructed. GADs for the new bridges are attached in the drawings folder.

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 section 7 of the Manual

(f) Structures in marine environment

NIL

(iv) Rail-road bridges: NIL

(a) Design, construction and detailing of ROB/RUB shall be as specified in the provision of 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.	Location of Level crossing (Chainage	Number and length of
NIL		

(v) Grade separated structures

Design of grade separator shall be as per section 7 of the manual. Locations and type of the grade separated structures specified in paragraphs 2 (ix).

(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 section 9 of the Manual.

(ii) Specifications of the reflective sheeting should be of high intensity grade with encapsulated lens or with micro prismatic retro reflective element in accordance with ASTM Standard D 4956 – 04

9. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provision of section 9 of the Manual.

(ii) Overhead traffic signs: location and size

S. No.	Location/ Design Chainage (In Km)
1	Start of Project road
2	End of Project Road

Note: The exact location of Signs and size shall be finalized as per provisions in Manual and as per site conditions.

10. Compulsory Afforestation

Compulsory afforestation should be as per section 11 of the manual

11. Hazardous Locations

NIL.

12. Special Requirement for Hill Roads

NIL

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, 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.

(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.	265	LHS/RHS
A2	Electrical cables	meters	13000	LHS/RHS
A3	Transformers	Nos.	6	LHS/RHS
A4	Electric Box	Nos.	3	LHS/RHS
B	***Water/Sewage pipeline***			
B1	Water Pipe Line	meters	5187	LHS/RHS
B2	Hand Pump	Nos.	3	LHS/RHS
C	***Felling of Tress***	***Nos.***	***1420***	***LHS/RHS***