Engineering Procurement and Construction(EPC)

Agreement

For

Widening/Improvement to 4 (Four)Lane with Paved Shoulder from Ch. 00.000km to Ch.21.350km (Design Ch.00.000km to Ch.21.200 Km.) Package-1 of Paikan-Tura National Highway Road(NH 217) in the state of Assam on EPCmode.

NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (NHIDCL)

3rd Floor, PTI Building, 4 Parliament Street, New Delhi-110001

August, 2021

Schedules

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1 The Site

(i) Site of the Four-Lane Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

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

(iii) An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2 (i) of this Agreement.

(iv) The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be upgraded. The proposed profile of the Project Highways shall be followed by the contractor **with minimum FRL as indicated in the alignment plan**. The Contractor, however, shall improve/upgrade the Road Profile as indicated in Annex-III based on site/design requirement.

(v) The status of the environment clearances obtained or awaited is given in Annex-IV.

Annex – I

(Schedule-A)

Site

Note: All the chainages/ location referred to in Annex-I to Schedule-A shall be existing chainages.

1. Site

The Site of the Four-Lane Project Highway comprises the section of National Highway-217 (Old NH-51) **Road,** "Package-1" **Paikan Junction to Assam Meghalaya State boarder,from** Km 0+000 to Km 21+350 (From Design Ch .Km 00.000 to Km 21.200, Design Length = 21.200 Km) in the State of Assam. The land, carriageway and structures comprising the Site are described below.

2. Land

The Site of the Project Highway comprises the land (sum total of land already in possession and land to be possessed) as described below:

Sl. No.	Existing Chainage as per survey		Design Chainage		ROW		Total Width of ROW (m)	Remarks
	From	To	From	To	LHS (m)	RHS (m)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	0+000	0+700	0.000	0.700	15.0	15.0	30	
2	0+700	2+775	0.700	2.700	22.5	22.5	45	
3	2+775	3+025	2.700	3.000	15.0	15.0	30	
4	3+025	3+675	3.000	3.650	22.5	22.5	45	
5	3+675	4+225	3.650	4.200	15.0	15.0	30	
6	4+225	5+925	4.200	5.900	22.5	22.5	45	
7	5+925	6+625	5.900	6.600	15.0	15.0	30	
8	6+625	9+050	6.600	9.000	22.5	22.5	45	
9	9+050	9+400	9.000	9.300	22.5	22.5	45	Minor Realignment
10	9+400	12+475	9.300	12.325	22.5	22.5	45	
11	12+475	13+050	12.325	12.875	15.0	15.0	30	
12	13+050	18+600	12.875	18.450	22.5	22.5	45	
13	18+600	19+475	18.450	19.325	15.0	15.0	30	
14	19+475	20+250	19.325	20.075	22.5	22.5	45	
15	20+250	20+750	20.075	20.600	15.0	15.0	30	
16	20+750	21+350	20.600	21.200	22.5	22.5	45	

3. *Carriageway*

The present carriageway of the Project Highway consists two Lane/two lane with paved shoulder with bituminous pavement and earthen shoulder configuration from Ex. Ch. 00+000 km to Ex. Ch. 21+851 km. The type of the existing pavement of the section is flexible.

Sr. No.	**Existing Chainage (km)**		**Carriageway**	**Remarks**
	From	To		
(1)	(2)	(3)	(4)	(5)
1	0+000	21+350	2-lane/ 2-lane with Paved shoulder	

Note: The Project Highway alignment has modified at existing Ch. From Km 9+050 to Km. 400.

4. *Major Bridges*

The Site includes the following Existing Major Bridges:

Sr. No.	**Existing Chainage (km)**	**Type of Structure**			**No. of Spans with span length (m)**	**Width (m)**
		Foundation	**Sub-Structure**	**Super-structure**		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			NIL			

5. *Road over-bridges (ROB)/ Road under-bridges (RUB)*

The Site includes the following ROB (road over railway line)/RUB (road under railway line):

S. No.	Existing Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Superstructure			
(1)	(2)	(3)		(4)	(5)	(6)
-NIL-						

6. *Grade separators*

The Site includes the following grade separators:

S. No.	Existing Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)
		Foundation	Superstructure		
(1)	(2)	(3)	(4)	(5)	(6)
NIL					

7. *Minor bridges*

The Site includes the following minor bridges:

Sr. No.	Existing Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)	Remarks
		Foundation	Sub-Structure	Supper-structure			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	1+300	Open	Wall Type	Slab	2X8.6	11.1	
2	8+920	Open	Wall Type	Slab	1X10.0	11.95	
3	10+325	Open	Wall Type	Slab	1X10.0	12	
4	10+955	Open	Wall Type	Slab	2X6.70	12.2	
5	12+125	Open	Wall Type	Slab	2X6.80	12.5	
6	16+000	Open	Wall Type	Slab	2X8.78	12	
7	18+450	Open	Wall Type	Slab	6X4.7	11	

Note
* The Project Highway Alignment is being modified at these Minor Bridge locations

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	**Location (km)**	**Remarks**
(1)	(2)	(3)
		NIL

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

S. No.	Existing Chainage (km)	Type of Structure	No. of Spans with span length (m)	Width (m)
(1)	(2)	(3)	(4)	(5)
NIL				

10. Culverts

The Site has the following culverts:

Sr. No.	Existing Chainage (km)	Type of structure	Span arrangement No of Span x Clear Span (m)	Width of culvert (m)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
1	0+120	Pipe	1x0.8	13	
2	0+670	SLAB	1x1.5	12	
3	1+605	SLAB	1x1.0	11	
4	1+845	SLAB	1x1.55	11.15	
5	2+435	Pipe	6x0.8	20	
6	3+175	Pipe	1x0.8	10	
7	3+710	Pipe	1x1.0	17.5	
8	4+240	SLAB	1x1.45	12.2	
9	4+415	SLAB	1x0.95	12.1	
10	4+660	Pipe	1x1.0	17.55	
11	5+155	Pipe	1x1.0	17.55	
12	5+605	SLAB	1x5.0	12	
13	5+840	Pipe	1x1.0	18	
14	6+220	Pipe	1x0.9	17.5	
15	6+375	Pipe	1x0.9	17.6	
16	6+635	SLAB	1x0.8	12.15	
17	6+715	Pipe	1x1.0	17.6	
18	7+190	SLAB	1x1.6	12.1	
19	7+400	SLAB	1x6.0	12.1	
20	7+640	Pipe	1x1.0	17.55	
21	7+815	SLAB	1x1.5	12.1	
22	8+065	Pipe	1x1.0	17.8	
23	8+255	Pipe	1x0.9	17.8	
24	8+360	SLAB	1X5.65	12	
25	8+540	SLAB	1x1.5	12.25	
26	8+825	SLAB	1x6.0	12.1	
27	9+565	SLAB	1x1.5	12	
28	11+250	SLAB	1x1.8	12	
29	11+450	SLAB	1x1.5	12.1	
30	11+725	SLAB	1x0.8	12.2	
31	16+53	Pipe	1x1.0	18	
32	16+685	SLAB	1x1.0	12	
33	17+750	Pipe	1x0.9	12	
34	18+700	Pipe	1x1.0	12	
35	18+750	SLAB	1x1.0	12	
36	19+605	Pipe	1x1.0	17.75	
37	19+935	Pipe	1x1.0	17	
38	19+990	SLAB	1X6.0	12	
39	20+110	Pipe	1x1.0	17.65	
40	20+915	Pipe	1x0.9	28	

11. *Bus bays*

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

Sl. No.	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
(1)	(2)	(3)	(4)	(5)
NIL				

12. *Truck Lay byes*

The details of truck lay byes are as follows:

SL. No.	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
(1)	(2)	(3)	(4)	(5)
		-NIL-		

13. *Road side drains*

The details of the roadside drains are as follows:

Left Hand Side (LHS)					**Right Hand Side (RHS)**				
S .No.	Location (Km)		Type	Remarks (if any)	S.No.	Location (Km)		Type	Remarks (if any)
	From	To				From	To		
(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)

14. *Major junctions*

The details of major junctions are as follows:

S. No.	Location		At grade	Separated	Category of Cross Road			
	From km	to km			NH	SH	MDR	Others
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	0+000		At grade (T)		NH			

(NH: National Highway, SH: State Highway, MDR: Major District Road)

15. *Minor junctions*

The details of the minor junctions are as follows:

S. No.	Location		Type	
	From km	To km	T -junction	Cross road

S. No.	Location		Type	
	From km	To km	T -junction	Cross road
(1)	(2)	(3)	(4)	(5)
1	0+280		Y	VR
2	0+320		T	VR
3	0+505		T	VR
4	0+600		T	VR
5	1+225		T	VR
6	1+455		X	VR
7	1+925		T	VR
8	2+715		T	VR
9	2+930		Y	VR
10	3+350		T	VR
11	3+400		X	VR
12	3+705		T	VR
13	3+965		X	VR
14	4+875		T	VR
15	5+205		T	VR
16	5+980		T	VR
17	6+080		T	VR
18	6+650		T	VR
19	6+855		T	VR
20	8+450		X	VR
21	8+720		X	VR
22	9+430		T	VR
23	11+400		Y	VR
24	11+620		T	VR
25	11+620		X	VR
26	12+675		T	VR
27	12+920		Y	VR
28	14+575		T	VR
29	14+700		T	VR
30	15.000		X	VR
31	15+050		T	VR
32	15+650		T	VR
33	15+650		X	VR
34	17+055		Y	VR
35	18+400		T	VR
36	18+700		T	VR
37	19+080		X	VR
38	20+680		Y	VR
39	20+760		T	VR
40	21+110		X	VR

16. Bypasses

The details of the existing road sections proposed to be bypassed are as follows:

S. No.	Name of bypass (town)	Existing Chainage (km) From km to km	Length (in Km)

NIL

17. *Other structures*

S. No.	Type of Structure	Existing Chainage (km) From km to km	Length (in Km)
-NIL-			

18. Retaining *Walls/ Breast Walls*

The details of the existing Retaining Wells/ Breast Walls are as follows.

Left Hand Side (LHS)					Right Hand Side (RHS)				
S.No.	Location (Km)		Type	Remarks (if any)	S. No.	Location (Km)		Type	Remarks (if any)
	From	To				From	To		
(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
1	17+675	18+175	RRM						

RRM =Random Rubble Masonry

Sheet-I (Annexure-1 to Schedule-A)

(i) Electricalutilities

The site includes following electrical utilities: -

(a) Extra High-Tension Lines (EHT Lines)*

Sr. No.	Chainage (Km)		Length(in Km)				Crossings			
	From	To	400KV	220KV	110KV	66KV	400KV	220KV	132KV	66KV

(b) High Tension/Low Tension Lines (HT/LTLines)

Sr. No.	Chainage		Length(in Km)		Crossing (m)		Transformers	
	From	To	11 KV (HT)	LT	11 KV (HT)	LT	Number	Capacity
1	0.040	0.175	0.135					16 KVA
2	0.400	0.575	0.175					25 KVA
3	0.575	0.600			25.00			63 KVA
4	0.600	1.770	1.170					
5	0.850	0.950			100.00			
6	1.450	0.000			45.00			
7	1.825	0.000			45.00			
8	1.975	2.750	0.775					
9	2.725	2.775	0.050					
10	2.775	2.975	0.200					
11	3.325	0.000			45.00			
12	3.325	4.000	0.675					
13	4.000	0.000			45.00			
14	4.425	5.725	1.300					
15	6.050	0.000			45.00			
16	6.520	0.000			45.00			
17	6.600	6.850	0.250					
18	7.510	0.000			45.00			
19	7.850	8.800	0.950					
20	9.175	9.200	0.025		25.00			
21	9.275	9.725	0.450					
22	9.975	10.050	0.075					
23	11.475	11.850	0.375					
24	12.700	12.750	0.050		50.00			
25	12.750	12.825	0.075		75.00			
26	12.825	0.000						
27	12.825	13.600	0.775					
28	13.600	13.725	0.125		125.00			
29	13.800	0.000			45.00			
30	14.815	0.000			45.00			
31	15.300	16.075	0.775					

Sr. No.	Chainage		Length(in Km)		Crossing (m)		Transformers	
	From	To	11 KV (HT)	LT	11 KV (HT)	LT	Number	Capacity
32	16.075	16.275	0.200		200.00			
33	16.275	16.425	0.150		45.00			
34	17.300	0.000			45.00			
35	18.225	0.000			45.00			
36	18.375	0.000			0.00			
37	18.875	18.900	0.025		25.00			
38	18.900	20.075	1.175					
39	20.075	21.025	0.950					
1	0.175	0.200		0.03		50.00		
2	0.225	0.285		0.06				
3	0.300	0.000				45.00		
4	0.325	0.350				50.00		
5	0.350	0.565		0.22				
6	1.625	1.725		0.10				
7	2.770	0.000				45.00		
8	2.770	3.280		0.51				
9	3.370	3.400		0.03				
10	3.925	4.000		0.08				
11	5.300	0.000				45.00		
12	5.300	5.325		0.03				
13	5.325	5.650						
14	5.650	0.000				45.00		
15	5.725	0.000				45.00		
16	5.725	5.775		0.05				
17	5.950	0.000				50.00		
18	6.175	6.450		0.28				
19	6.375	0.000				45.00		
20	6.550	0.000				45.00		
21	6.625	0.000				45.00		
22	6.550	6.850		0.30				
23	7.960	0.000						
24	8.360	8.375		0.02		25.00		
25	8.640	0.000				40.00		
26	8.925	0.000				40.00		
27	9.225	9.300		0.08				
28	9.650	10.025		0.38				
29	11.450	0.000				40.00		
30	12.500	12.850		0.35				
31	12.725	12.775		0.05		80.00		
32	12.725	12.800		0.08				
33	14.325	0.000				50.00		
34	14.525	0.000				50.00		

Sr. No.	Chainage		Length(in Km)		Crossing (m)		Transformers	
	From	To	11 KV (HT)	LT	11 KV (HT)	LT	Number	Capacity
35	14.400	14.525		0.13				
36	14.810	0.000				30.00		
37	14.860	0.000				30.00		
38	14.860	0.000						
39	15.050	15.075		0.02		50.00		
40	15.075	15.475		0.40				
41	15.200	0.000				30.00		
42	15.280	0.000				30.00		
43	15.475	0.000				30.00		
44	15.575	0.000						
45	15.925	16.125		0.20				
46	16.125	0.000				30.00		
47	16.525	0.000				30.00		
48	16.815	17.500		0.68				
49	16.800	0.000						
50	17.200	0.000						
51	17.900	18.200		0.30				
52	18.050	18.175		0.13				
53	18.080	0.000				30.00		
54	18.170	0.000				30.00		
55	18.525	0.000						
56	18.900	18.950		0.05		100.00		
57	19.100	0.000						
58	19.300	0.000						
59	19.450	19.550		0.10				
60	19.550	19.640		0.09				
61	19.640	0.000				20.00		
62	21.350	21.400		0.05				
63	21.400	21.450		0.05			1	

Chainage	**Road Side**	**High tension (11KV)**
0.090	LHS	HT with transformer 25 KV
4.700	RHS	HT with transformer
	RHS	HT With Transformer (16 KV)
6.500	LHS	HT with transformer 16 KV
7.850	RHS	HT with Transformer 25 KV
	RHS	HT with transformer 63 KV
	RHS	HT with transformer
10.025	LHS	HT with transformer
	RHS	HT with transformer
15.280	LHS	HT with transformer 25 KV
15.475	LHS	HT with transformer 25 KV
17.300	LHS	HT with transformer 16 KV

Chainage	Road Side	High tension (11KV)
18.200	LHS	HT with transformer 25 KV
20.275	RHS	HT with transformer 16 KV
20.550	RHS	HT with transformer 16 KV

(ii) Public Health utilities (Water/Sewage Pipe Lines)* The site includes the following Public Health utilities:-

Sr. No	Chainage		Length(in Km)				Crossings			
	From	To	Water Supply line		Sewage line		Water Supply line		Sewage line	
			With Pumping	With Gravity flow	With Pumping	With Gravity flow	With Pumping	With Gravity flow	With Pumping	With Gravity flow
1	0+000	0+125		0.125, GI pipe of 75 mm Dia						
	0+125							LHS to RHS, GI pipe of 75 mm Dia		
2	2+725	3+700		0.975, GI pipe of 90 mm Dia						
4	3+700							LHS to RHS, GI pipe of 90 mm Dia		
5	4+125							LHS , GI pipe of 110 mm Dia		
6	11+975	12+500		RHS 0.525, GI pipe of 25 mm Dia						
7	11+925	12+825		RHS 0.900, GI pipe of 25 mm Dia						

(iii) Tree Cutting "Total approximately 4000 Tree shall be cut be contractor and transport to designated Place indicate by Forest Department, Assam.

Note The NHIDCL has identified the existing Utilities are coming in proposed Highway Project and need to be shifted along with concern utilities agonies with Joint Visits. Based on these site visits concern utilities agencies have identified the quantum of shifting and construction scope. The details ofnew utilities need to be construction are given in schedule-B.

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

The dates on which the Authority shall provide Right of Way of Construction Zone to the Contractor on different stretches of the Site are stated below:

Sl. No.	**From km to km**	**Length (km)**	**Width (m)**	**Date of providing Right of Way***
(1)	**(2)**	**(3)**	**(4)**	**(5)**
(I) Full Right of way (full width)				
(a) Stretch	From Design km. 0.000 to Km. 21.200	21.200	As per Clause 1.2 of Schedule-A, Anne-I ROW Details	On appointed date
(ii) Part Right of Way (part width)				
(a) Stretch				
(iii) Balance Right of Way (width)				
(a) Stretch				

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

Existing & Design Chainage

Sr. No.	**Particular**	**Existing Alignment**	**Design Alignment**
	Narimbanglo to Jantinga Junction "Package AS-22"		
1	Start Chainage (km)	00+000	00.000
2	End Chainage (km)	21+350	21.200
	Length (km)	21.350	21.200

Annex - III

(Schedule-A)

Alignment Plans

The existing alignment of the Project Highway shall be modified in the following sections as per the alignment plan indicated below:

(i) The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.

(ii) Traffic Signage plan of the Project Highway showing numbers & locations of traffic signs is enclosed. The contractor shall, however, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per the relevant specifications/IRC Codes/Manual.

Annex – IV

(Schedule-A)

Environment Clearances

The following environment clearances have been obtained:

1. ***Environment Clearance***

   Environmental Clearance (EC) is not required for the Project Highway under Schedule 7(f) as per S.O. 2559 (E), MoEF Notification of 22nd August 2013 (as amendment of 14th September 2006) i.e., Expansion of National Highways greater than 100 km involving additional right of way or land acquisition greater than 40m on the existing alignments and 60m on re-alignment or bypasses.

2. ***Wild Life clearances:***

   Not Applicable.

The following environment clearances are awaited:

3. ***Forest Diversion:***

   The Status of Diversion of Forest Land.

   - Uploaded in Forest Portal on 01.06.21
   - Uploading of Revised proposal is in progress.

   The project stretch passes through various Reserve Forest and Proposed Reserved Forest. Details are given below.

Sl. No.	Design Chainage		ROW		Remarks
	From	To	LHS (m)	RHS (m)	
(1)	(2)	(3)	(4)	(5)	(6)
1	0.507	1.247	LHS		Paikan Reserve Forest
2	0.675	1.225		RHS	Paikan 220 KVA reserve
3	3.017	3.328		RHS	Bormohara Proposed Reserve Forest
4	3.500	4.761		RHS	
5	5.157	5.327		RHS	Salpara Proposed Reserve Forest
6	7.756	8.06	LHS		Zangrazans Reserve Forest
7	10.977	11.280		RHS	Kachumari PT-1 Proposed Reserve Forest
8	11.556	11.802		RHS	
7	17.894	18.155	LHS		Changkhal Proposed Reserve Forest

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

Note: 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: 84-2014 & 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.

Note: All the chainages/ location referred to in Annex-I to Schedule-B shall be Design chainages.

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 Mountainous and Steep terrain to the extent land is available.

(ii) **Width of Carriageway**

(a) Four-Laning divided Carriageway shall be undertaken. The paved carriageway shall be 2 x 9.5 (Nine Point Five) m wide in accordance with the typical cross sections drawings in the Manual and Paragraph 2 (xii) of Typical Cross Section.

Provided that in the built-up areas [refer to paragraphs 2.1 (ii) (a) of the Manual and provide necessary details]: the width of the carriageway shall be as specified in the following table:

Sr. No.	**Built-up stretch (Township)**	**Location Design Chainage (km to km)**		**Width (m)**	**Typical cross section (Ref. to Manual)**
(1)	(2)	(3)	(4)	(5)	**(5)**
1	PAIKAN	0.000	0.700	2X7.5 m CW + 2X2.5m	TCS-1
2	BARMOHRA PART-2	2.700	3.000		TCS-1

Sr. No.	Built-up stretch (Township)	Location Design Chainage (km to km)		Width (m)	Typical cross section (Ref. to Manual)
(1)	(2)	(3)	(4)	(5)	**(5)**
3	BARMOHRA PART-1	3.650	4.200	PS+2X1.75 m+2.5 m median	TCS-1
4	AMJONGA PART -1	5.900	6.600		TCS-1
5	NAYAGAON	12.325	12.875		TCS-1
6	KUKURKATA	18.450	19.325		TCS-1
7	DAWRAKONA	20.075	20.600		TCS-1

Note:

1) The Design chainages given in above table are indicative and stretches may increase or decrease depending upon profile designed by contractor, however, this shall not be treated as change of scope.

(b) Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.(a) above.

(c) Where ~~Toll Plaza~~, Bus Bays & Truck Lay Byes are constructed as per Schedule C a transition shall be provided as per the Manual.

(d) The entire cross-sectional elements shall be accommodated in the available/proposed ROW. If required, suitable retaining structures shall be provided to accommodate the highway cross section within the available/ proposed ROW and the same 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.

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 80 km/hr for Plain/ Rolling terrain as per Manual. At following locations, speed shall be below 80 km/hr. This Deviation has also been specified in Schedule-D

S.No.	Stretch (km)		Radius (m)	Design Speed (Kmph)	Delta angle	Type of deficiency
	From	To				
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	4.115	4.258	200.000m	65	40.9648 (d)	Speed & Radius
2	7.100	7.269	200.000m	50	48.4000 (d)	Speed & Radius
3	9.068	9.276	200.000m	35	59.7597 (d)	Speed & Radius
4	9.566	9.700	200.000m	35	38.5747 (d)	Speed & Radius
5	9.876	10.137	200.000m	35	74.7792 (d)	Speed & Radius
6	12.227	12.437	200.000m	65	60.2614 (d)	Speed & Radius
7	13.530	13.630	200.000m	65	28.6456 (d)	Speed & Radius
8	16.428	16.468	500.000m	70	4.5399 (d)	Speed
9	19.196	19.290	200.000m	50	26.9593 (d)	Speed & Radius
10	19.426	19.469	200.000m	50	12.2408 (d)	Speed & Radius
11	19.557	19.610	200.000m	50	14.9166 (d)	Speed & Radius
12	20.049	20.209	200.000m	35	45.7089 (d)	Speed & Radius
13	20.255	20.440	200.000m	35	53.2485 (d)	Speed & Radius

(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. This Deviation has also been specified in Schedule-D.

S.No.	Stretch (km)		Radius (m)	Design Speed (Kmph)	Type of deficiency
	From	To			
(1)	(2)	(3)	(4)	(5)	(7)
1	4.115	4.258	200.000m	65	Speed & Radius
2	7.100	7.269	200.000m	50	Speed & Radius
3	9.068	9.276	200.000m	35	Speed & Radius
4	9.566	9.700	200.000m	35	Speed & Radius
5	9.876	10.137	200.000m	35	Speed & Radius
6	12.227	12.437	200.000m	65	Speed & Radius
7	13.530	13.630	200.000m	65	Speed & Radius
8	16.428	16.468	500.000m	70	Speed
9	19.196	19.290	200.000m	50	Speed & Radius
10	19.426	19.469	200.000m	50	Speed & Radius
11	19.557	19.610	200.000m	50	Speed & Radius
12	20.049	20.209	200.000m	35	Speed & Radius
13	20.255	20.440	200.00m	35	Speed & Radius

(a) Extra Widening on Curves

(i) On horizontal curve roadway width shall be increased to provide for extra widening of curve.

(ii) The width of carriageway at existing/retained/reconstructed/additional new Minor Bridges, shall be same as specified in TCS and Section-7 of Schedule-B and no extra widening shall be required.

(iii) The width of carriageway at reconstructed/additional new Culverts shall attract provision (i) above.

(b) The following bypasses shall be provided :

S. No.	Stretch Design Chainage (from km tom)	Length (Km)	Remarks
(1)	(2)	(3)	(4)
	NIL-		

Total length of Bypasses = NIL km.

(c) The following realignment shall be provided :

The following Stretches shall be realigned.

Sl. No.	Stretch Design Chainage (from km tom)	Length (Km)	Remarks
(1)	(2)	(3)	(4)
1	From Km 9.000 to Km. 9.300	0.300	Minor Realignment
	Total length of realignment =	km.0.300	

(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 the following stretches:

S. No.	Stretch Design Chainage (from km tom)		Fully paved shoulders/	Reference to cross
(1)	(2)	(3)	(4)	**(5)**
1	0.000	0.700	2x2.5 m Fully Paved Shoulders and 2x1.75 Footpath cum Drain	TCS-1
2	2.700	3.000	2x2.5 m Fully Paved Shoulders and 2x1.75 Footpath cum Drain	TCS-1

S. No.	Stretch Design Chainage (from km tom)		Fully paved shoulders/	Reference to cross
(1)	(2)	(3)	(4)	**(5)**
3	3.650	4.200	2x2.5 m Fully Paved Shoulders and 2x1.75 Footpath cum Drain	TCS-1
4	5.900	6.600	2x2.5 m Fully Paved Shoulders and 2x1.75 Footpath cum Drain	TCS-1
5	12.325	12.875	2x2.5 m Fully Paved Shoulders and 2x1.75 Footpath cum Drain	TCS-1
6	18.450	19.325	2x2.5 m Fully Paved Shoulders and 2x1.75 Footpath cum Drain	TCS-1
7	20.075	20.600	2x2.5 m Fully Paved Shoulders and 2x1.75 Footpath cum Drain	TCS-1

b. In open country, Paved Shoulder of 2.5 m width shall be provided and balance 1.5 m width shall be Earthen Shoulders. This provision is in deviation from Manual and the Deviation has also been specified in Schedule-D.

c. Design and specifications of earthen shoulders, paved shoulders and granular material shall conform to the requirements specified in the relevant Manual.

(vi) Median

The details of Width and Type of Median is as follow

S. No.	Design Chainage (from km to km) of the stretch	Width & Type of Median	Reference to cross section
(1)	**(2)**	**(3)**	**(4)**
1	From Km 00.000 to Km 21.200, except at locations of Minor Bridges	Minimum 2.5 m Raised Median including Kerb Shyness of 0.50 m on each Side with Metal Beam Crash Barriers	TCS 1, TCS-2, TCS-3, TXS-4 TCS-5, TXS-6, TCS-7 & TCS-7 (Type-1)

Notes

1) The Concrete Crash barriers shall be provided at location of Minor Bridges, on Median Side. The minimum height of Concrete Crash Barrier s shall be 1.1 m.

2) The median shall have suitably designed drainage system so that water does not stagnate in the median. All median drains shall be of Cement Concrete.
3) In super elevated sections, the drains should be designed so as to take the discharge from one side of carriageway to other side also.

(vii) Lateral and vertical clearances at underpasses

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

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

Sl. No.	Location (Design Chainage Km)	Span/ opening (m)	Remarks
(1)	**(2)**	**(3)**	**(4)**
NOT APPLICABLE			

(viii) 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**
(1)	**(2)**	**(3)**	**(4)**
NOT APPLICABLE			

(ix) Service/ Slip roads

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

Sl. No.	**Location of service road (from km to km)**	**Right hand side (RHS)/Left hand side (LHS)/ or Both sides**	**Length (km) of service road**
(1)	**(2)**	**(3)**	**(4)**
NIL			

Note:

1) Above length of the service/ slip/ connecting roads is indicative and minimum as specified. The actual length of the service/ slip/ connecting roads shall be determined

by the Contractor in accordance with the relevant manual (IRC: SP:84-2019) requirements with approval from the Authority's Engineer. Any increase in the length specified in this Clause of 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.

(x) 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.	Location of Structure	Length (m)	Number and length of spans (m)	Approach gradient	Remarks, if any
(1)	(2)	(3)	(4)	(5)	(6)
			NIL		

Note:

1) Proposed levels at structure locations as shown in plan & profile specified in Annex III of schedule A are only for guidance and any upward change in the levels shall not constitute any change of scope.
2) Vertical Clearance of ROB shall be provided as per the Railway Authorities requirements

(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 Level*			Remarks, if any
			Existing Level	Raised Level	Lowered Level	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
NOT APPLICABLE						

(xi) Cattle and pedestrian underpass /overpass

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

Sl. No.	Location (Design Chainage km)	Type of crossing
(1)	(2)	(3)
NIL		

(xii) Typical cross-sections of the Project Highway

Typical Cross Sections of relevant Manual, modified and additional TCS as per Project requirements are provided below. Deviation of Typical Cross Sections contained in the Manual have also been mentioned in Schedule-D.

TCS Code and indicative details are as follow.

Sr. No.	Particular of TCS	TCS Codes
1	Four-lane Divided Highway without Service Road with raised Median in Built-up Area	TCS-1
2	Four-lane Divided Highway with raised Median widening & Reconstruction of existing 2-lane carriageway and construction of 2-lane New Carriageway /Construction of 4-lane road at realignment section upto 3.0 m Embankment heights	TCS-2
3	TYPICAL CROSS SECTION -3 Four-lane Divided Highway with raised Median widening & Reconstruction of existing 2-lane carriageway and construction of 2-lane New Carriageway /Construction of 4-lane road at realignment section more than 3.0 m Embankment heights	TCS-3
4	TYPICAL CROSS SECTION -4 Four-lane Divided Highway with raised Median widening & Reconstruction of existing 2-lane carriageway and construction of 2-lane New Carriageway /Construction of 4-lane road at realignment section more than 3.0 m Embankment heights on one side upto 3.0 m Embankment Height on Other side	TCS-4
5	TYPICAL CROSS SECTION -5 Four-lane Divided Highway with raised Median widening & Reconstruction of existing 2-lane carriageway and construction of 2-lane New Carriageway /Construction of 4-lane road at realignment section water logged areas	TCS-5
6	TYPICAL CROSS SECTION -6 Four-lane Divided Highway with raised Median in Cutting widening & Reconstruction of existing 2-lane carriageway and construction of 2-lane New Carriageway /Construction of 4-lane road at realignment section	TCS-6
7	TYPICAL CROSS SECTION -7 Four-lane Divided Highway with raised Median in One side Hill and other Embankment with River protection widening & Reconstruction of existing 2-lane carriageway and construction of 2-lane New Carriageway /Construction of 4-lane road at realignment section	TCS-7
8	TYPICAL CROSS SECTION -7 (Type-1) Four-lane Divided Highway with raised Median in One side Hill and other filling Embankment	TCS-7 (Type-1)
9	4-lane New Bridge	TCS-6
10	Existing 2-Lane Bridge retained with 2-lane bridge	TCS-9

Chainage wise Locations of TCS are as follows

Chainagewise TCS details				
Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code
	From	To		
(1)	(2)	(3)	(4)	(5)
1	0.000	0.700	0.700	TCS-1
2	0.700	1.275	0.575	TCS-2
3	1.275	1.29	0.015	TCS-5
4	1.290	1.31	0.020	RCC Girder MNB
5	1.310	1.325	0.015	TCS-5
6	1.325	1.750	0.425	TCS-2
7	1.750	1.800	0.050	TCS-4
8	1.800	1.900	0.100	TCS-3
9	1.900	2.025	0.125	TCS-2
10	2.025	2.075	0.050	TCS-5
11	2.075	2.100	0.025	TCS-4
12	2.100	2.390	0.290	TCS-2
13	2.390	2.41	0.020	TCS-5
14	2.410	2.420	0.010	Slab MNB
15	2.420	2.700	0.280	TCS-5
16	2.700	3.000	0.300	TCS-1
17	3.000	3.650	0.650	TCS-2
18	3.650	4.200	0.550	TCS-1
19	4.200	4.275	0.075	TCS-3
20	4.275	4.350	0.075	TCS-2
21	4.350	4.425	0.075	TCS-4
22	4.425	4.600	0.175	TCS-2
23	4.600	4.725	0.125	TCS-3
24	4.725	4.825	0.100	TCS-2
25	4.825	5.000	0.175	TCS-4
26	5.000	5.075	0.075	TCS-2
27	5.075	5.175	0.100	TCS-4
28	5.175	5.275	0.100	TCS-6
29	5.275	5.475	0.200	TCS-7(Type-1)
30	5.475	5.650	0.175	TCS-3
31	5.650	5.775	0.125	TCS-2
32	5.775	5.875	0.100	TCS-4
33	5.875	5.900	0.025	TCS-2
34	5.900	6.600	0.700	TCS-1
35	6.600	6.825	0.225	TCS-4

Chainagewise TCS details				
Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code
	From	To		
(1)	(2)	(3)	(4)	(5)
36	6.825	6.925	0.100	TCS-7(Type-1)
37	6.925	6.975	0.050	TCS-4
38	6.975	7.025	0.050	TCS-7(Type-1)
39	7.025	7.075	0.050	TCS-6
40	7.075	7.225	0.150	TCS-7(Type-1)
41	7.225	7.250	0.025	TCS-4
42	7.250	7.370	0.120	TCS-3
43	7.370	7.380	0.010	Slab MNB
44	7.380	7.525	0.145	TCS-3
45	7.525	7.600	0.075	TCS-4
46	7.600	7.700	0.100	TCS-2
47	7.700	7.800	0.100	TCS-4
48	7.800	7.950	0.150	TCS-7(Type-1)
49	7.950	8.450	0.500	TCS-2
50	8.450	8.500	0.050	TCS-5
51	8.500	8.700	0.200	TCS-2
52	8.700	8.750	0.050	TCS-5
53	8.750	8.76	0.010	TCS-2
54	8.760	8.770	0.010	Slab MNB
55	8.770	8.854	0.084	TCS-2
56	8.854	8.866	0.012	Slab MNB
57	8.866	9.100	0.234	TCS-2
58	9.100	9.150	0.050	TCS-4
59	9.150	9.200	0.050	TCS-2
60	9.200	9.250	0.050	TCS-4
61	9.250	9.400	0.150	TCS-2
62	9.400	9.450	0.050	TCS-3
63	9.450	9.575	0.125	TCS-2
64	9.575	9.650	0.075	TCS-4
65	9.650	10.075	0.425	TCS-2
66	10.075	10.168	0.093	TCS-5
67	10.168	10.183	0.015	RCC Girder MNB
68	10.183	10.300	0.117	TCS-5
69	10.300	10.600	0.300	TCS-2
70	10.600	10.79	0.190	TCS-4
71	10.790	10.810	0.020	Slab MNB

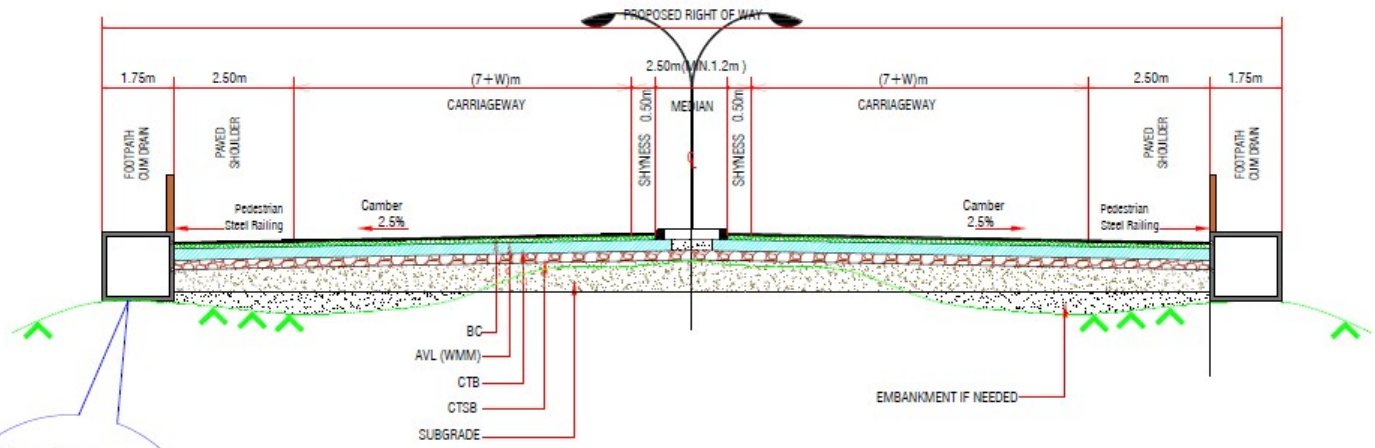
Chainagewise TCS details				
Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code
	From	To		
(1)	(2)	(3)	(4)	(5)
72	10.810	10.950	0.140	TCS-4
73	10.950	11.075	0.125	TCS-2
74	11.075	11.125	0.050	TCS-5
75	11.125	11.225	0.100	TCS-2
76	11.225	11.325	0.100	TCS-4
77	11.325	11.550	0.225	TCS-2
78	11.550	11.600	0.050	TCS-3
79	11.600	11.850	0.250	TCS-2
80	11.850	11.956	0.106	TCS-4
81	11.956	11.970	0.014	Slab MNB
82	11.970	12.325	0.355	TCS-4
83	12.325	12.875	0.550	TCS-1
84	12.875	13.625	0.750	TCS-4
85	13.625	14.650	1.025	TCS-2
86	14.650	15.800	1.150	TCS-2
87	15.800	15.828	0.028	TCS-4
88	15.828	15.846	0.018	Slab MNB
89	15.846	16.125	0.279	TCS-4
90	16.125	16.275	0.150	TCS-4
91	16.275	16.650	0.375	TCS-4
92	16.650	17.025	0.375	TCS-2
93	17.025	17.100	0.075	TCS-4
94	17.100	17.275	0.175	TCS-2
95	17.275	17.325	0.050	TCS-4
96	17.325	17.450	0.125	TCS-2
97	17.450	18.025	0.575	TCS-7
98	18.025	18.100	0.075	TCS-4
99	18.100	18.150	0.050	TCS-7(Type-1)
100	18.150	18.225	0.075	TCS-4
101	18.225	18.25	0.025	TCS-3
102	18.250	18.280	0.030	BOX MNB
103	18.280	18.450	0.170	TCS-3
104	18.450	19.325	0.875	TCS-1
105	19.325	19.400	0.075	TCS-2
106	19.400	19.450	0.050	TCS-2
107	19.450	19.525	0.075	TCS-2

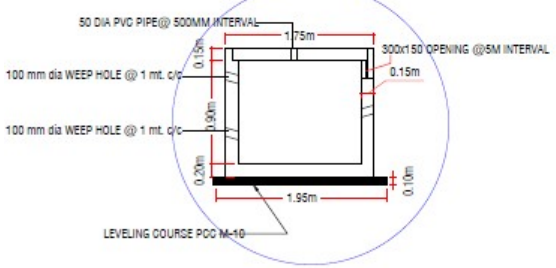
Chainagewise TCS details				
Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code
	From	To		
(1)	(2)	(3)	(4)	(5)
108	19.525	19.600	0.075	TCS-7(Type-1)
109	19.600	19.700	0.100	TCS-6
110	19.700	19.750	0.050	TCS-7(Type-1)
111	19.750	19.795	0.045	TCS-4
112	19.795	19.805	0.010	BOX MNB
113	19.805	20.075	0.270	TCS-4
114	20.075	20.600	0.525	TCS-1
115	20.600	20.675	0.075	TCS-4
116	20.675	20.800	0.125	TCS-4
117	20.800	20.850	0.050	TCS-4
118	20.850	20.875	0.025	TCS-7(Type-1)
119	20.875	20.975	0.100	TCS-6
120	20.975	21.200	0.225	TCS-4
	Total Length		21.200	

Note:

1) The cross-section and Design chainages as given in above table are indicative and stretches may increase or decrease in length depending upon profile designed by contractor, however, this shall not be treated as change of scope.
2) All the cross-sectional elements are to be accommodated within the proposed ROW. If required, suitable retaining structures along with drainage system shall be provided as per site condition and this will not constitute any change of scope.
3) The Contractor shall match the start and end points of Project Highway with Nearby Packages. Increase in length due to this shall not be treated as change of scope.

Typical Cross Sections Package-1

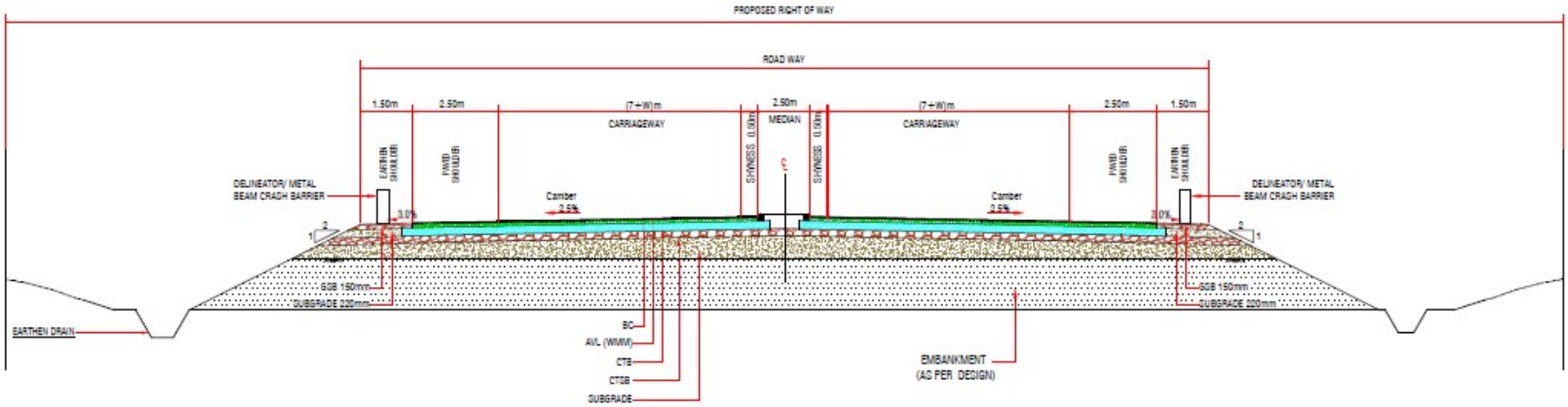




TYPICAL CROSS SECTION -1

4-LANE DIVIDED HIGHWAY WITHOUT SERVICE ROAD AND WITH RAISED MEDIAN

(BUILT UP SECTION PLAIN/ROLLING TERRAIN)



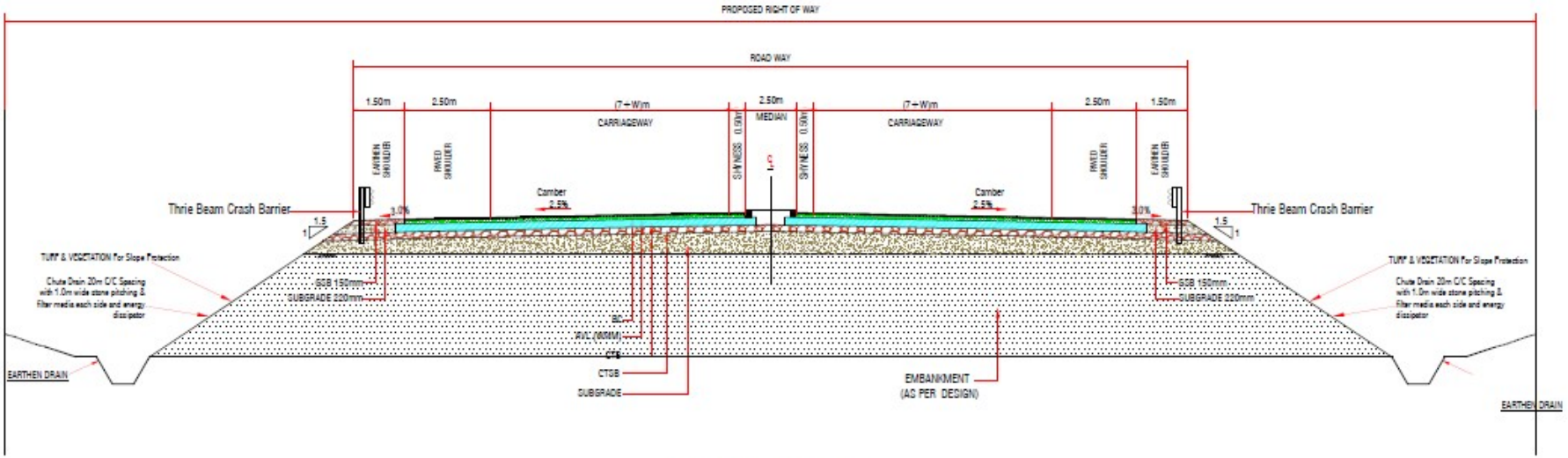
TYPICAL CROSS SECTION -2

(OPEN COUNTRY PLAIN/ROLLING TERRAIN)

4-LANE DIVIDED HIGHWAY WITH RAISED MEDIAN

WIDENING & RECONSTRUCTION OF 2-LANE EXISTING CARRIAGEWAY AND CONSTRUCTION OF 2-LANE NEW CARRIAGEWAY / CONSTRUCTION OF 4-LANE ROAD AT RE-ALIGNMENT SECTION

UPTO 3.0m EMBANKMENT HEIGHT BOTH SIDE



TYPICAL CROSS SECTION -3

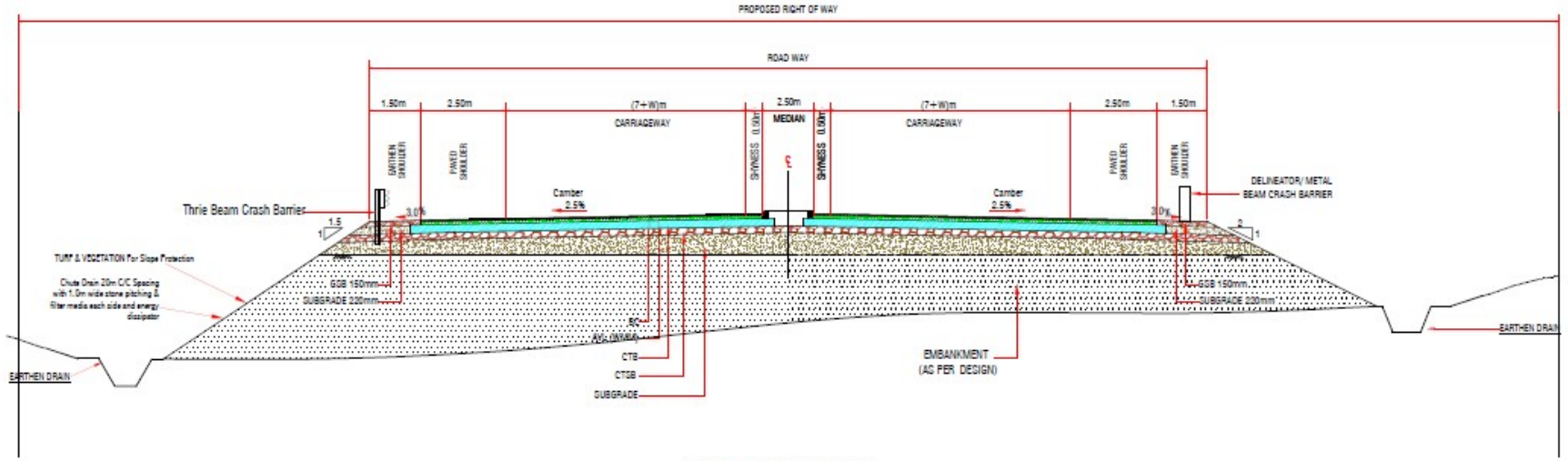
(OPEN COUNTRY PLAIN/ROLLING TERRAIN)

4-LANE DIVIDED HIGHWAY WITH RAISED MEDIAN

WIDENING & RECONSTRUCTION OF 2-LANE EXISTING CARRIAGEWAY AND CONSTRUCTION OF 2-LANE NEW CARRIAGEWAY /

CONSTRUCTION OF 4-LANE ROAD AT RE-ALIGNMENT SECTION

MORE THAN 3.0m EMBANKMENT HEIGHT BOTH SIDE



TYPICAL CROSS SECTION -4

(OPEN COUNTRY PLAIN/ROLLING TERRAIN)

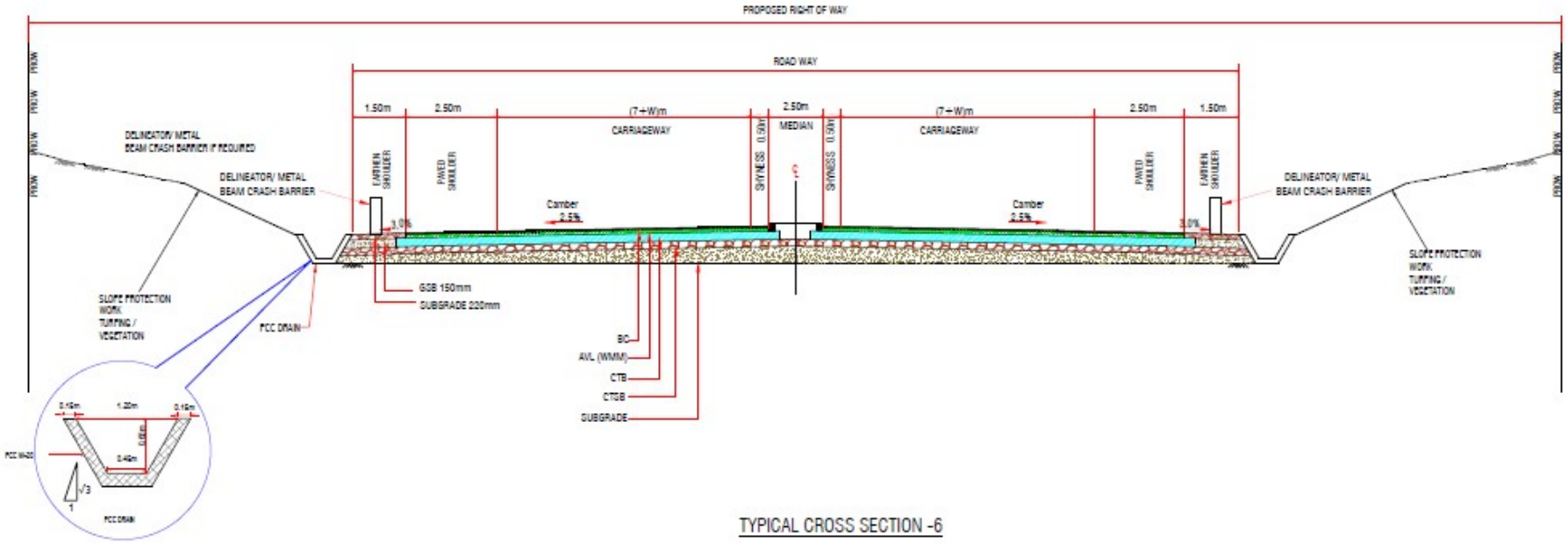
4-LANE DIVIDED HIGHWAY WITH RAISED MEDIAN

WIDENING & RECONSTRUCTION OF 2-LANE EXISTING CARRIAGEWAY AND CONSTRUCTION OF 2-LANE NEW CARRIAGEWAY /

CONSTRUCTION OF 4-LANE ROAD AT RE-ALIGNMENT SECTION

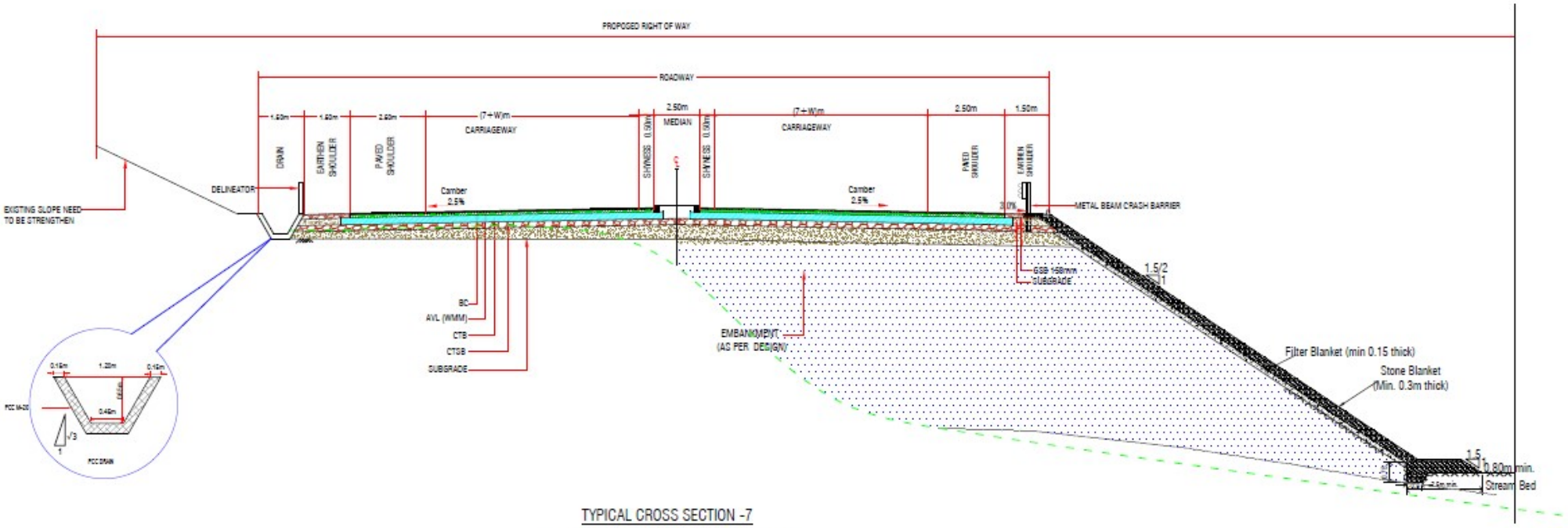
MORE THAN 3.0m EMBANKMENT HEIGHT ON ONE SIDE

UPTO 3.0m EMBANKMENT HEIGHT ON OTHER SIDE



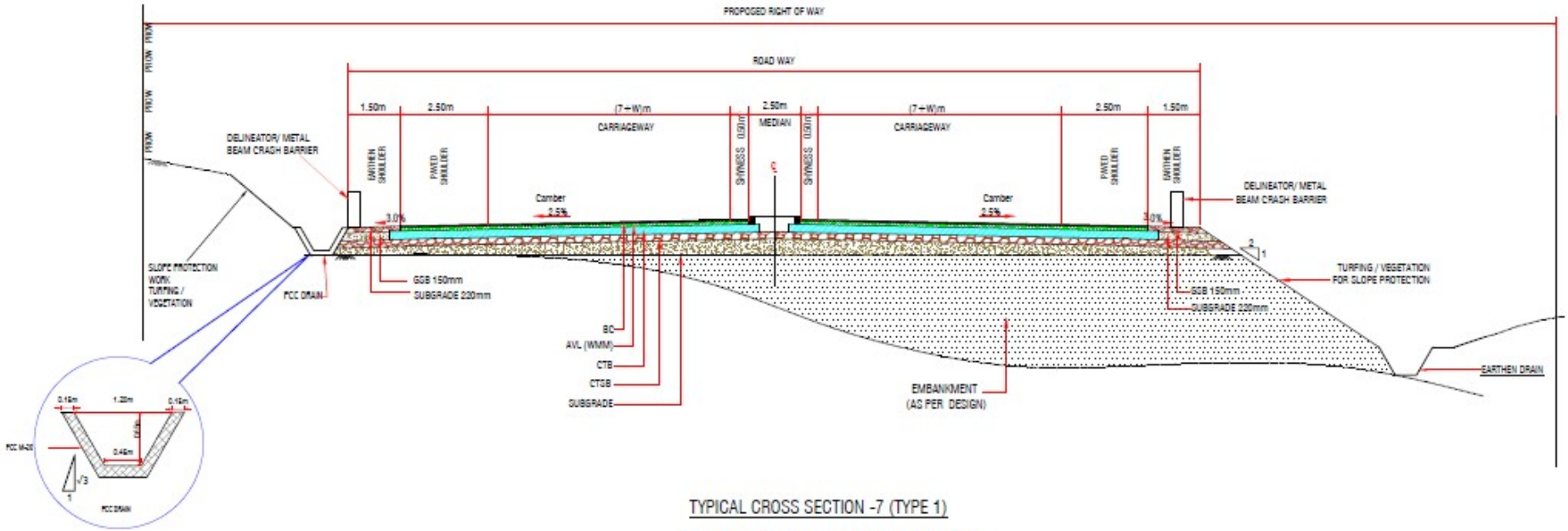
TYPICAL CROSS SECTION -6

(OPEN COUNTRY PLAIN/ROLLING TERRAIN)
4-LANE DIVIDED HIGHWAY WITH RAISED MEDIAN
WIDENING & RECONSTRUCTION OF 2-LANE EXISTING CARRIAGEWAY AND CONSTRUCTION OF 2-LANE NEW CARRIAGEWAY / CONSTRUCTION OF 4-LANE ROAD AT RE-ALIGNMENT SECTION IN CUTTING



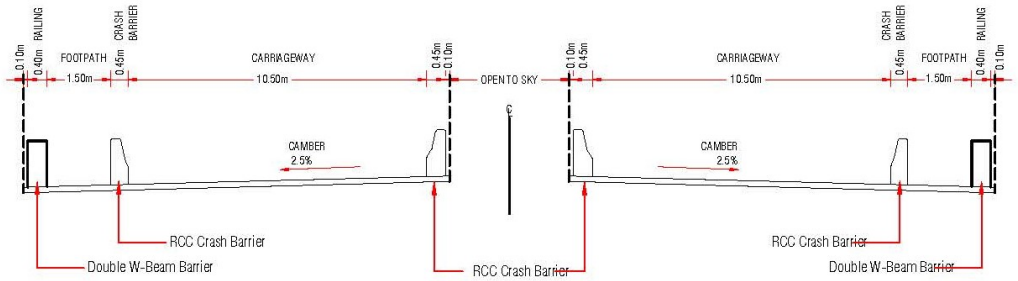
TYPICAL CROSS SECTION -7

(OPEN COUNTRY PLAIN/ROLLING TERRAIN)
4-LANE DIVIDED HIGHWAY WITH RAISED MEDIAN
ONE SIDE HILL AND OTHER SIDE RIVER



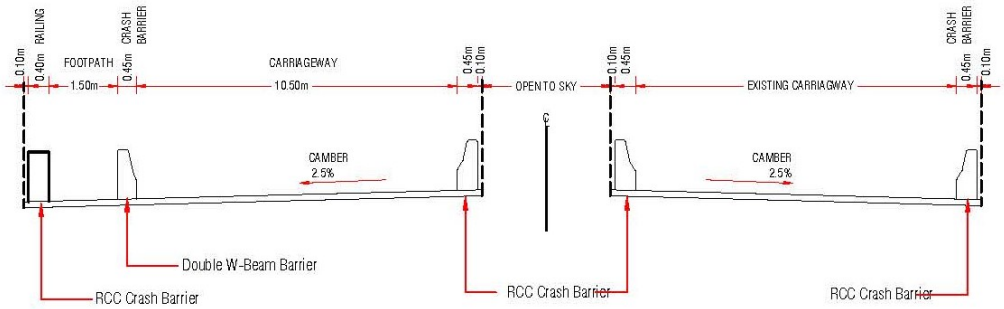
TYPICAL CROSS SECTION -7 (TYPE 1)

(OPEN COUNTRY PLAIN/ROLLING TERRAIN)
4-LANE DIVIDED HIGHWAY WITH RAISED MEDIAN
WIDENING & RECONSTRUCTION OF 2-LANE EXISTING CARRIAGEWAY AND CONSTRUCTION OF 2-LANE NEW CARRIAGEWAY / CONSTRUCTION OF 4-LANE ROAD AT RE-ALIGNMENT SECTION IN CUTTING AND FILLING



TYPICAL CROSS SECTION TYPE-8 (NEW BRIDGE)

CROSS-SECTION OF BRIDE AT DECK LEVEL -WITH FOOTPATH 4-LANE DIVIDED HIGHWAY



TYPICAL CROSS SECTION TYPE-9

CROSS SECTION OF BRIDGE AT DECK LEVEL-WITHOUT FOOTPATH

4-LANE DIVIDED HIGHWAY (ONE SIDE NEW BRIDGE AND OTHER SIDES EXISTING FOR 2-LANE BRIDGE)

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 of the types and features given in the tables below:

(i) At-grade intersections

Sl. No.	Location of intersection(Design Chainage)	Type of intersection	Other features
(1)	(2)	(3)	(4)
Major Intersections			
1	0.000	T	
Minor Intersections			
1	0.170	T	Crossroad
2	0.285	Y	Crossroad
3	0.310	T	
4	0.510	T	
5	0.605	T	Paikan
6	1.225	T	
7	1.455	X	Crossroad
8	1.925	T	Kharmohara
9	2.725	T	Crossroad
10	2.925	Y	
11	3.340	T	Barmohara
12	3.380	X	Crossroad
13	3.695	T	
14	3.950	X	
15	4.850	T	
16	5.175	T	Bar Vita
17	5.950	T	
18	6.050	T	Crossroad
19	6.620	T	Crossroad
20	6.825	T	
21	8.375	X	Crossroad
22	8.645	X	Crossroad
23	149.330	T	
24	11.250	Y	Crossroad
25	11.380	T	
26	11.460	X	Crossroad
27	12.505	T	Crossroad
28	12.750	Y	
29	14.400	T	

Sl. No.	Location of intersection(Design Chainage)	Type of intersection	Other features
(1)	(2)	(3)	(4)
30	14.530	T	
31	14.820	X	
32	14.875	T	Crossroad
33	15.415	T	
34	15.475	X	Crossroad
35	16.875	Y	
36	18.215	T	Crossroad
37	18.500	T	Nibari
38	18.890	X	
39	20.480	Y	Crossroad
40	20.560	T	
41	20.910	X	Crossroad

(ii) Grade separated intersection with/without ramps

Sl. No.	Location	Salient features	Minimum length of viaduct to be provided	Road to be carried over/under the structures
(1)	(2)	(3)	(4)	(5)
NOT APPLICABLE				

Note:

1) Junctions to be improved shall be as per section-3 of relevant Manual as specified in Schedule-D and MOST type design for intersection on National Highways, 1992.
2) It is clarified that if any other junction is identified during development/Construction of the project highway in addition to those mentioned above, shall also be improved with proper drainage facilities as per standards. They are deemed to be covered within the scope of work. The Number, location & type of junction shown in above table are minimum and it may increase as per actual site condition and increase in number will not attract change of Scope.
3) The contractor shall take up 'Detailed Engineering study' to ascertain further details of all intersections and treatment of the intersections and all shall be designed in accordance with the latest guidelines mentioned in section-3 of relevant Manual as specified in Schedule-D. The same shall not constitute a Change of Scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.
4) Junction improvement under grade separators/ interchanges shall be carried out as per section-3 of relevant Manual as specified in Schedule-D and typical layout drawing attached, with proper entry/exit to cross roads and slip/service roads.
5) Traffic calming measures on Major & Minor Junction and cross Roads: The cross-road junctions as mentioned above shall be provided with Rumble strips by thermoplastic paint at the approach of junctions as per IRC: 99-2018 Guidelines for Traffic Calming Measures in Urban and Rural Areas (First Revision).
6) For cross road drainage facility, Box culverts of sufficient size on cross roads shall be constructed as per Manual.

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 cross sectional details specified in Schedule B. This shall be in addition to (ii) below.

(ii) Deficiencies in plan and profile of the existing road shall be corrected subject to the condition that finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.

(iii) Raising of the existing road

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]**
The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.			

(iv) Project Specific Provisions

(a) The Contractor may adopt suitable slope (angle) for the embankment as per the availability of fill material/design requirements. The slopes shall be checked for safety against failure. The slopes shall be protected with turfing/geo synthetics /geo green blanket/geo cells/stone pitching or any other method as specified in schedule D. These measures are incidental and shall be deemed part of the Scope of work. Any increase in the cost on this account shall not be treated as Change in Scope of Work.

(b) Wherever required, toe wall/retaining wall/other protection works along with drainage system shall be provided. All the features shown in the TCS are to be accommodated in the ROW given.

(c) The Project Highway is located in high Rainfall Area and the Project Highway area is generally experiencing water erosion. As per clause 4.2.3.3 of relevant Manual (IRC:SP:84-2019 ,) "The side slopes and the earthen shoulders shall be protected against erosion by providing a suitable vegetative cover, kerb channel, chute, stone/cement concrete block pitching or any other suitable protection measures depending on the height of the embankment and susceptibility of soil to erosion.

5. Pavement Design

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

(ii) Type of pavement

The Flexible pavement shall be provided for the entire length of Four-lane Project Highway for Main carriageway, Bus bays and Truck Lay-Bye.

(iii) Design requirements

(a) Design Period and strategy

Flexible 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 for **minimum 20 million standard axles (20 MSA)**.

(c) Granular-Sub Base Material

The natural sand material shall not be permitted for Granular Sub-Base construction. Only crushed gravel and crushed stone or combination thereof depending upon the grading requirement shall be used.

(iv) Reconstruction of stretches

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

Sr. No.	Stretch Design Chainage From km to km		Remarks
	From	**To**	
(1)	(2)	(3)	(4)
1	0.000	21.200	

Note: Contractor shall provide 65 mm Wearing coat comprising 40 mm BC & 25 mm Mastic Asphalt on all Structures and culverts which are designed without overburden.

(v) Strengthening of existing road stretches

The following stretches of the existing road shall be Strengthened by Contractor as per Clause 5.9 of relevant Manual as specified in Schedule-D (IRC: SP: 84, 2019) as per the DesignTraffic as specified (20 MSA).

Sr. No.	Stretch Design Chainage From km to km		Remarks
	From	**To**	
(1)	(2)	(3)	(4)
		-NIL-	

6. Roadside Drainage

The design and construction of surface and sub-surface drains for highway drainage and drainage for structures shall be carried out in accordance with the requirement of this Section-6 of relevant Manual as specified In Schedule-D.

(i) Surface Drainage

RCC footpath cum Drain and Open side trapezoidal PCC lined cross section drain shall be provided as per TCS for the project Highway in order to intercept surface water from the carriageway, shoulders and slopes. The drains outfall into the natural water courses i.e. either in culverts or bridges,

Sr. No.	Stretch Design Chainage From km to km		Type of Drain	Remarks
	From	To		
(1)	(2)	(3)	(4)	(5)
1	0.000	0.700	RCC Footpath Cum Drain Both Sides	TCS-1
2	2.700	3.000	RCC Footpath Cum Drain Both Sides	TCS-1
3	3.650	4.200	RCC Footpath Cum Drain Both Sides	TCS-1
4	5.900	6.600	RCC Footpath Cum Drain Both Sides	TCS-1
5	12.325	12.875	RCC Footpath Cum Drain Both Sides	TCS-1
6	18.450	19.325	RCC Footpath Cum Drain Both Sides	TCS-1
7	20.075	20.600	RCC Footpath Cum Drain Both Sides	TCS-1
8	5.175	5.275	PCC Open Trapezoidal Drain Both Sides	TCS-6
9	7.025	7.075	PCC Open Trapezoidal Drain Both Sides	TCS-6
10	19.600	19.700	PCC Open Trapezoidal Drain Both Sides	TCS-6
11	20.875	20.975	PCC Open Trapezoidal Drain Both Sides	TCS-6
12	5.275	5.475	PCC Open Trapezoidal Drain One side	TCS-7 (Type-1)
13	6.825	6.925	PCC Open Trapezoidal Drain One side	TCS-7 (Type-1)
14	6.975	7.025	PCC Open Trapezoidal Drain One side	TCS-7 (Type-1)
15	7.075	7.225	PCC Open Trapezoidal Drain One side	TCS-7 (Type-1)
16	7.800	7.950	PCC Open Trapezoidal Drain One side	TCS-7 (Type-1)
17	17.450	18.025	PCC Open Trapezoidal Drain One side	TCS-7
18	18.100	18.150	PCC Open Trapezoidal Drain One side	TCS-7(Type-1)
19	19.525	19.600	PCC Open Trapezoidal Drain One side	TCS-7(Type-1)
20	19.700	19.750	PCC Open Trapezoidal Drain One side	TCS-7(Type-1)
21	20.850	20.875	PCC Open Trapezoidal Drain One side	TCS-7(Type-1)

Note

1) The Length of the lined drains mentioned above are indicative and minimum. The actual length of the lined drains shall be determined by the Contractor keeping in view the drainage locations and in accordance with the Manual requirements with approval from the Authority/ Authority's Engineer. Any increase in the length of drain as specified in above location shall not constitute a Change of Scope.

2) Invert levels of the longitudinal drains shall be decided as per adjoining draining area and properties. All drains should be connected to nearest natural nallah/Drainage Source.

(ii) Subsurface drainage system

a) Drainage within road body and subgrade: The drainage within road body and subgrade shall be design as per IRC SP 42, Section 5 Subsurface drainage.
b) Drainage in boundary between cuts and fills: It shall be compulsory to install the subsurface drainage equipment in the boundary between cuts and fills as shown in Figure along the entire Project wherever needed.
c) Drainage within embankment: Within high embankment, horizontal drainage layer and subsurface drainage that can discharge spring or seepage water out of the embankment shall be installed to ensure embankment stability. This horizontal drainage layer is similar to drainage layer that has been suggested by both MORTH Specifications and IRC: 37.

(iii) Drainage Plan

The Contractor shall prepare the Detailed Drainage Plan including Surface Drainage and Sub-Surface Drainage Plan. The size of various type of surface Drains and subsurface shall be decided as per the site requirements and relevant codes

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 Deign Chainage at km**	**Width of carriageway and cross-sectional features***
(1)	(2)	(3)
	Minor Bridge	
1	1.300	TCS 8: 2x13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median
2	8.860	TCS 8: 2x13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median
3	10.175	TCS 8: 2x13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median
4	10.800	TCS 8: 2x13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median

Sl. No.	Bridge Deign Chainage at km	Width of carriageway and cross-sectional features*
(1)	(2)	(3)
5	18.265	TCS 8: 2x13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median
6	2.415	TCS 8: 2x13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median
7	7.375	TCS 8: 2x13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median
8	8.765	TCS 8: 2x13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median
9	11.963	TCS 9: 13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median+ Existing 2lane Bridge
10	15.837	TCS 9: 13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median+ Existing 2lane Bridge.
11	19.800	TCS 8: 2x13.5 m (7.0 m CW +2.5 m Paved Shoulders +2x 0. 5m Shyness +1 x 0.55m CC Barriers +0.45 CC Barrier+.1.5 m Footpath +0.5 M Steel Railing) + Median

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

Sl. No.	Location at km	Remarks
(1)	(2)	(3)
	Minor Bridge	
1	1.300	2x1.5 m wide Footpath
2	8.860	2x1.5 m wide Footpath
3	10.175	2x1.5 m wide Footpath
4	10.800	2x1.5 m wide Footpath
5	18.265	2x1.5 m wide Footpath
6	2.415	2x1.5 m wide Footpath
7	7.375	2x1.5 m wide Footpath
8	8.765	2x1.5 m wide Footpath
9	11.963	1x1.5 m wide Footpath
10	15.837	1x1.5 m wide Footpath
11	19.800	2x1.5 m wide 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
All Minor Bridges, shall carry 200 mm Over Hang PVC Pipes on both sides the structure utilities			

(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 provision of relevant Manual.

(g) IRC Class Special Vehicle loading (385 T) shall be taken into account in the structural design of Elevated Viaduct, Major Bridges /Minor bridges/Flyover/VUP/ROB.

(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 box culverts:

Sl. No.	Design Chainage (Km)	No. of Spans x Clear Span (m)/Opening (mxm)	Remarks If any*
(1)	(2)	(3)	(4)
1	0.125	1x2.0	
2	0.675	1x2.0	
3	1.610	1x3.0	
4	1.840	1x5.0	
5	3.160	1x2.0	
6	3.700	1x2.0	
7	4.220	1x5.0	
8	4.390	1x5.0	
9	4.640	1x5.0	
10	5.125	1x3.0	
11	5.560	1x5.0	
12	5.805	1x5.0	
13	6.180	1x3.0	
14	6.330	1x5.0	
15	6.595	1x3.0	
16	6.680	1x5.0	
17	7.145	1x2.0	
18	7.585	1x5.0	
19	7.765	1x5.0	
20	8.000	1x2.0	
21	8.190	1x2.0	
22	8.300	1x5.0	
23	8.475	1x5.0	
24	9.445	1x5.0	
25	11.100	1x5.0	
26	11.275	1x5.0	
27	11.575	1x5.0	
28	16.350	1x5.0	

Sl. No.	Design Chainage (Km)	No. of Spans x Clear Span (m)/Opening (mxm)	Remarks If any*
(1)	(2)	(3)	(4)
29	16.500	1x5.0	
30	17.540	1x3.0	
31	18.515	1x2.0	
32	18.565	1x2.0	
33	19.420	1x3.0	
34	19.750	1x2.0	
35	19.925	1x3.0	
36	20.700	1x5.0	

* Road level shall be minimum as per Proposed FRL provided in Alignment Plan at Annexure-III Schedule-A.

Note:

1) All the Culverts shall be Box type only.
2) The proposed locations are minimum in number. Any change in number/length/span/height shall not be treated as change in scope of work.
3) The culvert location planned as Table above shall be adjusted accordingly to the exact location of cross-water stream or existing culvert located based on the topographic survey performed by the Contractor for the final drawings of the Detailed Design. The Contractor shall construct culvert in Skew Angle if required as per the site conditions. This shall be deemed to be included in the Scope of Work.
4) The Contractor shall carry out appropriate Ground improvement works as per the State of art reports IRC-HRB: SR-13, SR-14 to increase the Safe Bearing Capacity of in-situ soil and reduce the settlement during the construction & post construction period.
5) The Contractor shall provide Granular Material below the foundation of Box Structure in case of presence of Clayey soils as per clause 23.3 of IRC: SP: 13, 2004.
6) The Contractor shall provide necessary Protection Works on upstream & downstream site of box structure as per Article 23 of IRC: SP: 13, 2018 and Figure 8.5 Culvert with Catch pit, chute, Guide wall and Apron of IRC: SP:48, 1998, as per the site requirement.
7) On the Culvert location at the end of roadway edges, Only Concrete Crash Barriers shall be provided of minimum 1.1 m height.
8) The Contractor shall provide necessary Barrel length of Box as per the extra widening, embankment Height and site requirement. This shall not constitute Change of Scope.

(c) **Widening of existing culverts**:

All existing culverts which are not to be reconstructed shall be widened up 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. This shall not constitute Change of Scope.

S/No.	**Culvert location (km)**	No. of Spans x Clear Span (m)	**Remarks, if any*any ***
(1)	(2)	(3)	(4)
		-NIL-	

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

Sl. No.	Culvert location (KM)	No. of Spans x Clear Span (m)	Remarks, if any*
(1)	(2)	(3)	(4)
1	6.965	1x3.0	
2	9.125	1x5.0	
3	9.625	1x5.0	
4	10.275	1x3.0	
5	12.125	1x2.0	
6	12.800	1x3.0	
7	13.595	1x5.0	
8	13.925	1x5.0	
9	14.100	1x2.0	
10	14.600	1x2.0	
11	15.000	1x2.0	
12	15.275	1x5.0	
13	15.500	1x2.0	
14	16.600	1x3.0	
15	17.075	1x3.0	
16	17.350	1x3.0	
17	19.190	1x5.0	
18	19.275	1x5.0	

* Road level shall be minimum as per Proposed FRL provided in Alignment Plan at Annexure-III Schedule-A.

Note:

1) All the Culvert shall be Box type only.
2) The proposed locations are minimum in number. Any change in number/length/span/height shall not be treated as change in scope of work.
3) The culvert location planned as Table above shall be adjusted accordingly to the exact location of cross-water stream or existing culvert located based on the topographic survey performed by the Contractor for the final drawings of the Detailed Design. The Contractor shall construct culvert in Skew Angle if required as per the site conditions. This shall be deemed to be included in the Scope of Work.
4) The Contractor shall carry out appropriate Ground improvement works as per the State of art reports IRC-HRB: SR-13, SR-14 to increase the Safe Bearing Capacity of in-situ soil and reduce the settlement during the construction & post construction period.
5) The Contractor shall provide Granular Material below the foundation of Box Structure in case of presence of clayey soils as per clause 23.3 of IRC: SP: 13, 2004.
6) The Contractor shall provide necessary Protection Works on upstream & downstream site of box structure as per Article 23 of IRC: SP: 13, 2018 and Figure 8.5 Culvert with Catch pit, chute, Guide wall and Apron of IRC: SP:48, 1998, as per the site requirement.

7) On the Culvert location at the end of roadway edges, Concrete Crash Barriers shall be provided. The minimum Height of Concrete Crash Barrier shall 1.2 m.

8) The Contractor shall provide necessary Barrel length of Box as per the extra widening, embankment Height and site requirement. This shall not constitute any Change of Scope.

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

Sl. No.	**Culvert location***	**Type,**	No. of Spans x Clear Span(m) **of existing culvert**	**Repairs to be carried out specify***
(1)	(2)	(3)	(4)	(5)
			-NIL-	

The existing and retained culverts shall be inspected by Contractor to check and assess the requirement of repairs and /or Strengthening or reconstruction as case may be. If so, required, the repair and/or strengthening or reconstruction work shall be carried out as per the assessment. The type of repairs are specified in note no. 2. This shall not constitute Change of Scope of work

Notes

1) All the existing culverts need to be cleaned properly

2) Any one or more than one type of repair shall be carried out on culverts depending on requirements

   a. Repair/replacement of damaged railings and parapets,

   b. Replacement of wearing coat and approach slab (old concrete/bituminous wearing coat shall be replaced by bituminous wearing coat),

   c. Structural repairs to substructure/superstructure,

   d. Repair to flooring and protection works.

   e. Construction of Catch Pits on Hill sides.

   f. Replacement of Drainage Spouts.

(f) Floor protection works shall be carried out as specified in the relevant IRC Codes and 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,	Remarks
(1)	(2)	(3)	(4)	(5)
1	1.300	2X8.6 m	Waterway need to be increased Spans= 1X20.0m	TCS-8, RECONSTRUCTION enclosed GAD
2	8.860	1X10.0	Waterway need to be increased Spans= =1X12.0 m	TCS-8, RECONSTRUCTION enclosed GAD
3	10.175	1X10.0	Waterway need to be increased Spans= 1X15.0 m	TCS-8, RECONSTRUCTION enclosed GAD
4	10.8	2X6.70	Waterway need to be increased Spans=2X10.0 m	TCS-8, RECONSTRUCTION enclosed GAD
5	18.265	6X4.7	Waterway need to be increased Spans=3X10.0 m	TCS-8, RECONSTRUCTION enclosed GAD

*Attach GAD

(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 @
(1)	(2)	(3)	(4)	(5)

@ ~~Attach cross-section~~

(b) Additional new bridges

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
(1)	(2)	(3)	(4)
	Minor Bridge		

1	2.415	10 m	TCS-8, Minimum span length will be 10 m
2	7.375	10 m	TCS-8, Minimum span length will be 10 m
3	8.765	10 m	TCS-8, Minimum span length will be 10 m
4	11.963	2X6.80 m =13.60 m	TCS-9 , 2-lane New Bridge, width 13.5 m
5	15.837	2X8.78m	TCS-9 , 2-lane New Bridge, width 13.5 m
6	19.800	10 m	TCS-8, Minimum span length will be 10 m

Notes:

1) The bridge approaches, Abutments and Pier locations shall be protected as per IRC 89 2019 River Training & control works on bridges.

2) The Contractor shall use modern launching method.

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

Sl. No.	Location at km	Remarks
(1)	(2)	(3)
NIL		

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

Sl. No.	Location at km	Remarks
(1)	(2)	(3)
NIL		

(e) Drainage system for bridge decks

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

(f) Structures in marine environment

Following is the list of structures to be constructed.

Sr. No.	Design Chainage (Km)	No. of Spans with Span Length (m)	Structure
(1)	(2)	(3)	(4)
NIL			

Notes

1) Looking at the salty and corrosive nature of the river, The Contractor shall design & Construct the Structures as per IRC: SP: 80-2008,"Guidelines for Corrosion Prevention, Monitoring and Remedial Measures for Concrete Bridge Structures "

(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 Structure (m)**	**Remarks**
(1)	**(2)**	**(3)**	**(4)**
		-NIL-	

Notes:

1) The proposed span arrangements/ Type of Structure of ROB are tentative and subject to change as per the availability of railway boundaries / requirement of the railways. Increase in ROB structure length/ Change in Span /Type of Structure shall not constitute Change of Scope Work.
2) 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 authorities.
3) The ROB's shall be constructed and maintained by the Contractor under supervision of Railways.
4) All the expenditure related to construction, maintenance and supervision of ROB and (except P&E charges) shall be borne by the concessionaire.
5) Instrumentation in Railway Super Structure:

   The Contractor shall do instrumentation in the Railway super structure across Railway bridge portion to ensure and carry out regular monitoring of the health of bridge to meet its serviceability and functionality requirement during the period,

   (I) Phase —I: Installation of sensors and response monitoring during Construction and pre-stressing.
   (II) Phase-II: Study of performance parameters:

   - Monitoring during Peak Summer
   - Monitoring during Peak winter

(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 Structure (m)	Remarks
(1)	(2)	(3)	(4)
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 (x) and 3 of this Annex-I.

SL No.	Location of Structure	Length (m)	Number and length of spans (m)	Remarks, if any
(1)	(2)	(3)	(4)	(5)
12		NIL		

(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
(1)	(2)	(3)
1	11.963	➢ Repair/replacement of damaged railings and parapets, provision of crash barriers, ➢ Replacement of wearing coat and approach slab (old concrete/bituminous wearing coat shall be replaced by bituminous wearing coat), ➢ Structuralrepairs to substructure/superstructure, ➢ Repair to flooring and protection works. ➢ Replacement of Drainage Spouts

2	15.837	➢ Replacement of damaged railings and parapets, provision of crash barriers, ➢ Replacement of wearing coat and approach slab (old concrete/bituminous wearing coat shall be replaced by bituminous wearing coat), ➢ Replacement of expansion joints, ➢ Replacement of bearings, ➢ Structural repairs to substructure/superstructure, ➢ Repair to flooring and protection works. ➢ Replacement of Drainage Spouts

Note:

The Existing retained Bridges and /or Structures shall be inspected by Contractor, checked and assessed for the requirement of repairs and /or Strengthening or reconstruction. If so, required, the repair and/or strengthening or reconstruction work shall be carried out as per the assessment. This shall not constitute any Change of Scope of work.

(b) ROB / RUB

SL. No.	**Location of ROB/RUB (km)**	**Nature and extent of repairs /strengthening to be carried out**
(1)		**(3)**
NIL		

(c) Overpasses/Underpasses and other structures

Sl. No.	**Location of Structure (km)**	**Nature and extent of repairs /strengthening to be carried out**
(1)	**(2)**	**(3)**
NIL		

(vii) List of Major Bridges and Structures

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

S/. No.	**Location (Design Chainage km)**
(1)	(2)
	Minor Bridge
1	1.300

2	8.860
3	10.175
4	10.800
5	18.265
6	19.800
7	2.415
8	7.375
9	8.765
10	11.963
11	15.837

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 Section-9 of relevant Manual as specified in Schedule-D. The Minimum number / Quantities of Traffic Control Devices and Road Safety Works are specified in Schedule-C.

(ii) Specifications of the reflective sheeting & Marking

All road signs shall be with Prismatic Grade sheeting corresponding to Class C sheeting described in IRC:67 and any of the sheeting types VIII, IX or XI as per ASTM D 4956-09 fixed over Aluminum or Aluminum composite material (as per 9.2.3 of Manuals). Road markings shall be of hot applied thermoplastic Material with glass reflectorizing beads and design specifications shall be as per IRC 35.

9. Roadside Furniture

Roadside furniture like km/Hectometer Stones, Railings, Traffic Impact Attenuators, and Delineator shall be provided in accordance with the provision of section -9 of relevant Manual. The Minimum Numbers / Quantities of Roadside furniture are specified in Schedule-C.

10. Compulsory Afforestation

The number of trees which are required to be planted by the Agency as compensatory afforestation should be as per Forest Conservation Act, decided by Forest Department

11. Hazardous Locations

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

Sl. No.	**Design Chainage (Km)**		**LH/RHS/Both**
	From	**To**	
1	Thrie Beam Type Steel Barriers shall be provided on Road side as per the TCS indicated along the entire length of Project Highway		
2	Guard Rail shall be provided on Hills side as per TCS indicated along the entire length of Project Highway		

Sl. No.	Design Chainage (Km)		LH/RHS/Both
	From	To	
3	The Concrete Crash barriers shall be provided at location of Minor Bridges, on median and road sides		

Note:

1) The Railing with Concrete Crash Barrier shall be provided as per relevant TCS on All Minor bridges

12. *Special Requirement for Hill Roads*

Sl. N.	Design Chainage (Km)		LH/RHS/Both
	From	To	
	As per relevant Manual as specified in Schedule-D		

13. *Protection Works*

The Consultant has specified Minimum Slope protection works. These hereinabove shall be treated as an approximate assessment. The actual quantities and additional type of slope protection works and safety requirements 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/quantities specified in Schedule-B shall not constitute a Change of Scope.

a) Vegetation & Turfing

Sr. No.	Chainage (Km)		Design Length (Km	TCS Code	Remarks
	From	To			
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1	1.750	1.800	0.050	TCS-4	One side
2	1.800	1.900	0.100	TCS-3	Both Sides
3	2.075	2.100	0.025	TCS-4	One side
4	4.200	4.275	0.075	TCS-3	Both Sides
5	4.350	4.425	0.075	TCS-4	One side
6	4.600	4.725	0.125	TCS-3	Both Sides
7	4.825	5.000	0.175	TCS-4	One side
8	5.075	5.175	0.100	TCS-4	One side
9	5.175	5.275	0.100	TCS-6	One Side
10	5.275	5.475	0.200	TCS-7(Type-1)	One Side
11	5.475	5.650	0.175	TCS-3	Both Sides
12	5.775	5.875	0.100	TCS-4	One side
13	6.600	6.825	0.225	TCS-4	One side
14	6.825	6.925	0.100	TCS-7(Type-1)	One Side
15	6.925	6.975	0.050	TCS-4	One side
16	6.975	7.025	0.050	TCS-7(Type-1)	One Side
17	7.025	7.075	0.050	TCS-6	One Side
18	7.075	7.225	0.150	TCS-7(Type-1)	One Side
19	7.225	7.250	0.025	TCS-4	One side

Sr. No.	Chainage (Km)		Design Length (Km	TCS Code	Remarks
	From	To			
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
20	7.250	7.370	0.120	TCS-3	Both Sides
21	7.380	7.525	0.145	TCS-3	Both Sides
22	7.525	7.600	0.075	TCS-4	One side
23	7.700	7.800	0.100	TCS-4	One side
24	7.800	7.950	0.150	TCS-7(Type-1)	One Side
25	9.100	9.150	0.050	TCS-4	One side
26	9.200	9.250	0.050	TCS-4	One side
27	9.400	9.450	0.050	TCS-3	Both Sides
28	9.575	9.650	0.075	TCS-4	One side
29	10.600	10.790	0.190	TCS-4	One side
30	10.810	10.950	0.140	TCS-4	One side
31	11.225	11.325	0.100	TCS-4	One side
32	11.550	11.600	0.050	TCS-3	Both Sides
33	11.850	11.956	0.106	TCS-4	One side
34	11.970	12.325	0.355	TCS-4	One side
35	12.875	13.625	0.750	TCS-4	One side
36	15.800	15.828	0.028	TCS-4	One side
37	15.846	16.125	0.279	TCS-4	One side
38	16.125	16.275	0.150	TCS-4	One side
39	16.275	16.650	0.375	TCS-4	One side
40	17.025	17.100	0.075	TCS-4	One side
41	17.275	17.325	0.050	TCS-4	One side
42	17.450	18.025	0.575	TCS-7	One Side
43	18.025	18.100	0.075	TCS-4	One side
44	18.100	18.150	0.050	TCS-7(Type-1)	One Side
45	18.150	18.225	0.075	TCS-4	One side
46	18.225	18.250	0.025	TCS-3	Both Sides
47	18.280	18.450	0.170	TCS-3	Both Sides
48	19.525	19.600	0.075	TCS-7(Type-1)	One Side
49	19.600	19.700	0.100	TCS-6	One Side
50	19.700	19.750	0.050	TCS-7(Type-1)	One Side
51	19.750	19.795	0.045	TCS-4	One side
52	19.805	20.075	0.270	TCS-4	One side
53	20.600	20.675	0.075	TCS-4	One side
54	20.675	20.800	0.125	TCS-4	One side
55	20.800	20.850	0.050	TCS-4	One side
56	20.850	20.875	0.025	TCS-7(Type-1)	One Side
57	20.875	20.975	0.100	TCS-6	One Side
58	20.975	21.200	0.225	TCS-4	One side

Sr. No.	Chainage (Km)		Design Length (Km	TCS Code	Remarks
	From	To			
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Total Length in Km. =		7.523		

b) Toe Wall

Sr. No.	Chainage (Km)		Design Length (Km	TCS Code	Remarks
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
1	1.750	1.800	0.050	TCS-4	One side
2	1.800	1.900	0.100	TCS-3	Both Sides
3	2.075	2.100	0.025	TCS-4	One side
4	4.200	4.275	0.075	TCS-3	Both Sides
5	4.350	4.425	0.075	TCS-4	One side
6	4.600	4.725	0.125	TCS-3	Both Sides
7	4.825	5.000	0.175	TCS-4	One side
8	5.075	5.175	0.100	TCS-4	One side
9	5.475	5.650	0.175	TCS-3	Both Sides
10	5.775	5.875	0.100	TCS-4	One side
11	6.600	6.825	0.225	TCS-4	One side
12	6.925	6.975	0.050	TCS-4	One side
13	7.225	7.250	0.025	TCS-4	One side
14	7.250	7.370	0.120	TCS-3	Both Sides
15	7.380	7.525	0.145	TCS-3	Both Sides
16	7.525	7.600	0.075	TCS-4	One side
17	7.700	7.800	0.100	TCS-4	One side
18	9.100	9.150	0.050	TCS-4	One side
19	9.200	9.250	0.050	TCS-4	One side
20	9.400	9.450	0.050	TCS-3	Both Sides
21	9.575	9.650	0.075	TCS-4	One side
22	10.600	10.790	0.190	TCS-4	One side
23	10.810	10.950	0.140	TCS-4	One side
24	11.225	11.325	0.100	TCS-4	One side
25	11.550	11.600	0.050	TCS-3	Both Sides
26	11.850	11.956	0.106	TCS-4	One side
27	11.970	12.325	0.355	TCS-4	One side
28	12.875	13.625	0.750	TCS-4	One side
29	15.800	15.828	0.028	TCS-4	One side
30	15.846	16.125	0.279	TCS-4	One side
31	16.125	16.275	0.150	TCS-4	One side
32	16.275	16.650	0.375	TCS-4	One side

Sr. No.	Chainage (Km)		Design Length (Km	TCS Code	Remarks
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
33	17.025	17.100	0.075	TCS-4	One side
34	17.275	17.325	0.050	TCS-4	One side
35	18.025	18.100	0.075	TCS-4	One side
36	18.150	18.225	0.075	TCS-4	One side
37	18.225	18.250	0.025	TCS-3	Both Sides
38	18.280	18.450	0.170	TCS-3	Both Sides
39	19.750	19.795	0.045	TCS-4	One side
40	19.805	20.075	0.270	TCS-4	One side
41	20.600	20.675	0.075	TCS-4	One side
42	20.675	20.800	0.125	TCS-4	One side
43	20.800	20.850	0.050	TCS-4	One side
44	20.975	21.200	0.225	TCS-4	One side
	Total Length in Km. =		5.748		

d) Stone Pitching

Sr. No.	Chainage (Km)		Design Length (Km	TCS Code	Remarks
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
1	1.275	1.290	0.015	TCS-5	Both Sides
2	1.310	1.325	0.015	TCS-5	Both Sides
3	2.025	2.075	0.050	TCS-5	Both Sides
4	2.390	2.410	0.020	TCS-5	Both Sides
5	2.420	2.700	0.280	TCS-5	Both Sides
6	5.275	5.475	0.200	TCS-7(Type-1)	One side
7	6.825	6.925	0.100	TCS-7(Type-1)	One side
8	6.975	7.025	0.050	TCS-7(Type-1)	One side
9	7.075	7.225	0.150	TCS-7(Type-1)	One side
10	7.800	7.950	0.150	TCS-7(Type-1)	One side
11	8.450	8.500	0.050	TCS-5	Both Sides
12	8.700	8.750	0.050	TCS-5	Both Sides
13	10.075	10.168	0.093	TCS-5	Both Sides
14	10.183	10.300	0.117	TCS-5	Both Sides
15	11.075	11.125	0.050	TCS-5	Both Sides
16	17.450	18.025	0.575	TCS-7	Both Sides
17	18.100	18.150	0.050	TCS-7(Type-1)	One side
18	19.525	19.600	0.075	TCS-7(Type-1)	One side
19	19.700	19.750	0.050	TCS-7(Type-1)	One side
20	20.850	20.875	0.025	TCS-7(Type-1)	One side

Sr. No.	Chainage (Km)		Design Length (Km	TCS Code	Remarks
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
	Total Length in Km. =		2.165		

14. *Change of Scope*

The length of Structures and bridges specified hereinabove shall be treated as an approximate assessment. The actual lengths, number and type 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, Number and quantities specified in this Schedule- B shall not constitute a Change of Scope, save and except any variations in the length, Number and Quantities arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

15. *Rainwater Harvesting*

As per Ministry of Environment and Forests Notification, New Delhi dated 14.01.1997 (as amended on 13.01.1998, 05.01.1999 & 6.11.2000), the construction of Rain water, harvesting structure is mandatory in and around Water Crisis area, notified by the Central Ground Water Board.

16. *Utilization of Fly ash*

Fly ash utilisation is mandated by notifications under Environment Protection Act, 1986. Ministry of Environment & Forest, Govt. of India have brought out Fly Ash Notifications S.O. 763(E) dated 14 Sept 1999, its amendment notification on S.O 979(E) dated 27 Aug 2003 and notification S.O 2804(E) dated 3 Nov 2009 and 25-01-2016.Clause 5 of the said Notification stipulates use of fly ash in road making which reads as under:

"No agency, person or organization shall within a radius of Three kilometers of a thermal power plant undertake construction or approve design for construction of roads of flyover embankments with top soil, the guidelines or specifications issued by the Indian Road Congress (IRC) as contained in IRC specification No.SP:58 of 2001 as amended from time to time regarding use of fly ash shall be followed and any deviation from this direction can only be agreed to on technical reasons if the same is approved by Chief Engineer (Design) or Engineer in Chief of the concerned agency or organization or on production of a certificate of "fly ash not available" from the thermal power plant(s) (TPPs) located within three hundred kilometers of the site of construction and this certificate shall be provided by the TPP within two working days from the date of receipt of a request for fly ash, if fly ash is not available "

17. Utility ducts

Utility ducts in form of NP-4 Hume Pipe diameter 600 mm shall be provided across the Project Highway at one full length crossing in 500 meters and along with inspection chamber and RCC cover at both ends of the duct as directed for crossing all types of utilities anywhere as per IRC: SP:84-2019 (Clause 2.16) requirements. Location for such utility crossing shall be finalized in consultation with Authority Engineer which may not be exact but around at every 500 meters.

(Schedule B-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.	As per the existing and Proposed Utilities shifting plan given in Schedule-B	**(LHS/RHS)**
A2	Electrical cables	meters		
A3	Transformers	Nos.		**(LHS/RHS)**
B	Water/Sewage pipeline			
B1	Sewage	meters	Nil	
B2	Water supply	meters	As per the existing and Proposed Utilities shifting plan given in Schedule-B	**(LHS/RHS)**
C	Felling of Tress	Nos.	4000	**(LHS/RHS)**

Annexure-I to Schedule-B 1

Utility Shifting.

Shifting of obstructing existing **utilities** indicated in Schedule A to an appropriate location in accordance with the standards and specifications of concerned Utility OwningDepartment ispartof the scopeof workof the Contractor~~/Concessionaire*~~.Thebiddersmayvisitthesiteandassessthequantum of shifting of utilities for the projects before submission of their bid. Copy of utility relocation plan is enclosed. The specifications of concerned Utility Owning Department shall be applicable andfollowed.

Notes:

(a) The type/ spacing/ size/ specifications of poles/ towers/ lines/ cables to be used in shifting work shall be as per the guidelines of utility owning department (Power Grid Corporation of India and or Assam Power Distribution Company Limited (APDCL)) and it is to be agreed solely between the Contractor ~~*I* Concessionaire*~~ and the utility owning department. No change of scope shall be admissible and no cost shall be paid for using different type/ spacing/ size/ specifications in shifted work incomparisontothoseintheexistingworkorformakinganyoverheadcrossingsto underground as per requirement of utility owning department and/or construction of project highway. The Contractor~~/Concessionaire*~~ shall carry out joint inspection with utility owning department and get the estimates from the utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor~~/Concessionaire*~~ to utility owning department whenever asked by the Contractor~~/Concessionaire*.~~ The decision/ approval of utility owning department shall be binding on theContractor~~/Concessionaire*.~~

(b) The supervision charges at the rates/ charges applicable of the utility owning department shall be paid directly by the Authority to the Utility Owning department as and when Contractor/~~Concessionaire*~~ furnishes demand of Utility Owning Department along with a copy of estimated cost given by thelater.

(c) The dismantled material/scrap of existing Utility to be shifted/ dismantled shall belong to the Contractor~~/ Concessionaire*~~ who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor ~~/Concessionaire*~~ is required to deposit the dismantled material to utility owning department as per the norm and practice and in that case the amount of credit for dismantled material may be availed by the Contractor~~/Concessionaire*~~ as per estimate agreed betweenthem.

(d) The utilities shall be handed over after shifting work is completed to Utility Owning Department to their entire satisfaction. The maintenance liability shall rest with the Utility Owning Department after handing over process is complete as far as utility shifting works areconcerned.

Note -II **Copy of utility shifting plans enclosed as Annexure-11 to Schedule B1.**

Schedule – C
(See Clause 2.1)
Project Facilities

1. Project Facilities

The Contractor shall construct the Project Facilities in accordance with the provisions of this Agreement. Such Project Facilities shall include:

i. Toll plaza[s];

ii. Traffic Control Devices and Road Safety Works;

(a) Road Signs

(b) Road Marking

(c) Road Delineator

(d) Reflective Pavement Markers (Road Studs)

(e) Roadside & Median Side Safety Barriers

iii. Pedestrian facilities;

iv. Land Scoping & Tree Plantation

v. Project Facilities

(a) Road Boundary Stone

(b) Kilometre & 200 m Stone

(c) Street Lighting

(d) Truck lay-byes;

(e) bus-bays and bus shelters;

(f) Rest Area

(g) Highway Petro Units

(h) Emergency Medical Services Cranes;

(i) Crane Services

(j) Communication System

(k) Advance Traffic Management System (A.T.M.S).;

(l) Telecom system;

(m) Operation and Maintenance Centre;

vi. Traffic Diversion during Construction

vii. Others

(a) Rain water Harvesting Structures

(b) Utilities Ducts

(c) Boundary Fencing

2. *Description of Project Facilities*

i. Toll Plaza(s)

Toll Plaza(s) shall be designed and constructed as per Section-10 of relevant the IRC Manual as specified in Schedule-D and it has been provided at following location:

Sl. No.	Project Facility	Location	Design Requirements	Other essential details
(1)	**(2)**	**(3)**	**(4)**	**(5)**
	Toll Plaza	Not Provided		

ii. Traffic Control Devices and Road Safety Works

The Traffic Control Devices and Road Safety Works shall be provided as per the Section-9 of relevant IRC Manual (IRC SP 84 2019) as specified in Schedule-D. The Contractor shall provide following Traffic Control Devices and Road Safety Works.

(a) Road Signs

The Road Signs shall be designed and provided for the Project Highway as per the Specifications and Standard indicated in Schedule-D. All Traffic Signs for Road Users would be provided as per Manual.

- **Full width Overhead signs: 14 Nos**

Sr. No.	Chainage (Km)	Location	Size
(1)	**(2)**	**(3)**	**(4)**
1	0.000	Start of Package	Full Formation Width
2	21.200	End of Package	Full Formation Width

- **Cantilever Overhead Signs:**

20 numbers	

- **Project Information Sign Board**

S/ No.	Chainage (Km)	Location	Size
(1)	**(2)**	**(3)**	**(4)**
1	0.000	At the Start of Project Road	1.8 m x 1.2 m
2	21.200	At the end of Project Road	1.8 m x 1.2 m

- **Mandatory, Cautionary, informatory and Facility Sign Boards**

Sl No	Traffic Signage, Road Marking and other appurtenances	unit	Quantity
(1)	**(2)**	**(3)**	**(4)**

Sl No	Traffic Signage, Road Marking and other appurtenances	unit	Quantity
(1)	(2)	(3)	(4)
	Main Road		
1	**Right Hand Side Curve**	**Nos.**	Minimum Number of sign boards as per Traffic Singing Plan given in Annexure-III of Schedule-A
2	Left Hand Side Curve	Nos.	
3	School	Nos.	
4	Side road left	Nos.	
5	Side road right	Nos.	
6	Cross Road	Nos.	
7	Petrol pump/ Filling facility	Nos.	
8	Bus Stop	Nos.	
9	Direction Sign	Nos.	
10	Stop Sign	Nos.	
11	Horn prohibited	Nos.	
12	Hazard Marker (one way)	Nos.	
13	Object Marker (one way)	Nos.	
Junction			
1	Right Hand Side Curve	Nos.	Minimum Number of sign boards as per Traffic Singing Plan given in Annexure-III of Schedule-A
2	Left Hand Side Curve	Nos.	
3	Side Road	Nos.	
4	T Intersection	Nos.	
5	Pedestaling Crossing	Nos.	
6	Stop Sign	Nos.	
7	Speed limit	Nos.	
8	U-Turn prohibited	Nos.	
9	Rumble strip	Nos.	
10	Object Marker (one way)	Nos.	
11	Object Marker (Two way)	Nos.	
12	Direction Sign	Nos.	
13	Direction Sign	Nos.	
14	W-Metal Beam Crash Barrier	Nos.	
15	Lane marking, edge marking	Sqm	
16	Delineator	Nos.	

- Chevron marking sign Boards shall be provided on the outer side of Curves as per IRC: 67-2012.
- Above numbers of Road signs are indicative and minimum in number. The actual numbers of Road signs shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority's Engineer. Any increase in the numbers specified in this Clause of Schedule C shall not constitute a Change of Scope.
- Solar Traffic blinker signal (L.E.D) shall be provided at Major intersections.
- Rumble strips of Thermoplastic paint shall be provided at all cross-road junction as per IRC: 99-2018.

(b) Pavement Markings

The Pavement markings shall be provided for the entire Project Highway as per Clause 9.3 of relevant IRC Manual of Specifications and Standards as Specified in Schedule-D.

(c) Road Delineators

The Design & Construction of Road Delineators shall be carried out as per Clause 9.4 Manual of Specifications and Standards as Specified in Schedule-D. The Road Delineators include Roadway Indicators, Hazards Markers and Object Hazards Markers.

Object Markers shall be provided as given in IRC: 79 and IRC: 67. All physical objects above the Finished Road Level (FRL) that are falling within 3 m from the carriageway edge line shall be illuminated with Object Hazard Markers (OHM). The objects shall include foot path or utility poles or parapet or concrete barrier of Major Bridge, Minor Bridge and Culverts.

(d) Reflective Pavement Markers (RRPM)

The Reflective Pavement Markers (RRPM) for the entire Project Highway at the locations shall be as per Clause 9.5 Manual of Specifications and Standards specified in Schedule-D.

- The Reflective Pavement Markers (RRPM) i.e. road studs shall be provided to improve the visibility in night-time and wet-weather conditions as per Manual. These shall be prismatic retro-reflective type, conforming to ASTM D4280.
- White colour road studs shall be used at locations where lane markings are in white colour. Amber colour shall be used where lane markings is in amber colour. Red colour may be used to indicate no entry/edge markings.

(e) Roadside & Median Side Safety Barriers

Contractor shall provide the Roadside & Median side Safety Barriers along the Project Highway in entire length as per TCS and as per Clause 9.7 Manual of Specifications and Standards as specified in Schedule-D.

iii. Pedestrian Facilities

The pedestrian facilities shall be as per the Schedule -B and Schedule-D and include the provision of

- Footpath (Sidewalks): The 1.75 m wide footpath shall be provided as per TCS as given in Clause 2.(xii) of Annexure-1 of Schedule-B
- Pedestrian Guardrail: pedestrian guardrail shall be provided at each bus shelter locations, Truck Lay byes, near School/Hospital and at major junctions. The pedestrian guardrail shall be provided at Foot paths locations
- Pedestrian Crossings: Pedestrian crossing facilities at Junctions shall be provided.

iv. Landscaping and tree plantation

The Contractor shall plant trees and shrubs of required number and type at the appropriate locations as decided by Authority/AE/IE within the Right of Way and in the land earmarked by the Authority for afforestation keeping in view the IRC Guidelines on Landscaping and Tree Plantation. The landscaping and tree plantation shall be done as per IRC- SP: 21 which shall also include provision of the;

- Tree Plantation to the extent of number and species as decided by Environmental / Forest authorities for the entire Project Highway. The Contractor shall provide minimum 500 trees per Km. along the entire Project Highway.
- Median Plantation: at locations where the median width is 2.5m and more.
- Landscaping: A suitable landscape treatment with provision of Fountains and coloured lighting so as to enhance the overall aesthetics shall be provided at toll plazas, grade separators, elevated section, viaducts, traffic islands, bus bays, truck lay byes, rest areas, O&M centre, etc. The landscape treatment shall also be provided for special areas as given in IRC: SP: 21 (Para 8).

- The Contactor shall also do Geo tagging of plants along Project Highways to ensure effective monitoring and to ensure better survival of plantation.

v. Project Facilities

(a) Boundary Stones

Boundary Stones shall be provided @ 50 m space on both sides of the entire Project Highway as per 12.2 relevant Manual of Specifications and Standards as specified in Schedule-D and latest IRC: 25 "Type Designs for Boundary Stones" and as per the latest circular issued by NHAI/MORTH in this regards.

(b) Kilometer Stones & 200 m Stone

The Kilometer and 200 m stones shall be provided as per Clause 12.3 of relevant IRC Manual recommended in Schedule-D for the entire Project Highway.

The Kilometer and 200 m stone shall be provided on BOTH sides of the Project Highway ~~and side shall be decided by Authority~~. The Design and Specifications of Kilometer Stones and 200 m Stones shall be provided as per Latest IRC: 8 and IRC: 26 respectively and latest Circular of MORTH.

(c) Street Lighting

The Lighting shall be provided as per the 12.5 clause of the relevant IRC Manual as specified in Schedule-D.

Street lighting on decorative lamp post with LED /energy efficient lighting system of standard make with minimum 40 Lux capacity shall be provided @ 30m interval. Street lights shall be provided with ~~dual lights on single pole and~~ single lights on single pole. The height of street light pole shall be about 9m above FRL and that of high mast shall be 25m.

The Lighting shall be provided at following locations of the Project Highway.

- **High mast lighting**
  - Provide High mast lighting at toll plazas- NIL
  - Provide High Must Light at Major Junctions: NIL.
- **Street lighting**
  - Built-up sections on the Project Highway both in the median of main carriageway and on the service roads on either side.

Note:

1) Above numbers of street lights are indicative and minimum in number. The actual numbers of street lights shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority/ Authority's Engineer. Any increase in the numbers specified in this Clause of Schedule C shall not constitute a Change of Scope.
2) High mast lighting: High mast lighting shall be provided at ~~Toll Plaza~~ and Major Junctions, using LED / energy efficient lighting system.
3) Solar lights blinkers shall be provided at major junctions etc.
4) The lighting work shall be got done from the qualified specialized agency.

5) The scope includes providing entire lighting systems, trenching, underground / building in cabling, transformers etc and obtaining electric supply / approval from concern Govt. department.

6) The scope includes arrangements of procuring power supply to ensure uninterrupted lighting during night and when visibility is low, including provision of DG sets as stand by arrangements.

7) The scope includes all costs of procurement, installation, running and operation cost of all lighting, including cost of energy consumption etc. in construction period and up to the end of defect liability period.

(d) Truck Lay-Byes

Truck lay byes shall be provided at the following locations for a capacity of 5 bays, in accordance with Clause 12.6 & Figure 12.1 of relevant IRC Manual of Specifications and Standards as referred in Schedule-D.

S.No.	Design Chainage (Km)	Side	Village
(1)	(2)	(3)	(4)
1	19.850	1 Side (LHS)	KUKURKATA
2	21.100	1 Side (RHS)	DAWRAKONA

The location of these truck lay-bys are tentative and shall be finalised by the Contractor in consultation with the Authority/ Authority Engineer.

(e) Bus-bays and Passenger Shelters

The Bus shelters shall be Designed and Constructed as per Clause 12.7 of relevant IRC Manual of Specifications and Standards as referred in Schedule-D.

Locations of Bus Shelters are provided in ***following Table.***

S.No.	Design Chainage (Km)	Side	Location Name
(1)	(2)	(3)	(4)
1	0.650	1 pair (LHS &RHS)	PAIKAN
2	5.800	1 pair (LHS &RHS)	AMJONGA PART -1
3	2.700	1 pair (LHS &RHS)	BARMOHRA PART-2
4	3.650	1 pair (LHS &RHS)	BARMOHRA PART-1
5	12.050	1 pair (LHS &RHS)	NAYAGAON
6	19.650	1 pair (LHS &RHS)	KUKURKATA
7	20.600	1 pair (LHS &RHS)	DAWRAKONA

Note: The location/numbers of bus Shelters are tentative and shall be finalised in consultation with the Authority/ Authority Engineer.

(f) Rest Areas

Rest Area shall be provided as per Section 12 clause 12.9 of relevant IRC: as specified in Schedule-D. The locations are given below:

S.No	Design Chainage	Side	Village
(1)	(2)	(3)	(4)
1		-NIL-	

Note: The locations of these Rest areas are tentative and shall be finalised in consultation with the Authority/ Authority Engineer.

(g) Highway Patrol Units

The Highway Patrol unit shall be provided at proposed ~~toll plazas~~ recommended in Schedule C. Highway Patrol unit (s) shall be provided as per clause 12.10 of relevant IRC Manual as specified Schedule-D.

S.No	Design Chainage	Number
(1)	(2)	(3)
1		1

(h) Emergency Medical Services

The Contractor shall construct Medical Aid Post as per type designs prescribed for Medical Aid buildings by the State Medical Department. The Medical aid post shall be provided at following Locations

S.No	Design Chainage	Number
(1)	(2)	(3)
1		1

The GPS fitted Ambulance shall be provided during the Construction and Operation & Maintenance period as Clause 12.11 of relevant IRC Manual as specified in Schedule-D.

(i) Crane Services

1 (Two) number of GPS fitted Crane unit, of minimum 30 MT capacity, shall be provided during entire Construction and O & M period as per Section 12.12 of relevant IRC the Manual as specified in Schedule-D.

(j) Communication System

The Contractor shall provide suitable communication System as per Section 12.13 of the manual as specified Schedule-D.

(k) Advance Traffic Management System (A.T.M.S)

NOT APPLICABLE

(l) Telecom System

NOT APPLICABLE

(m) Operation and Maintenance Centre

NOT APPLICABLE

vi. **Traffic Diversion during Construction**

The traffic diversion plan during construction shall be prepared by Contractors per IRC: SP: 55 for the entire project highway. Separate traffic diversion plan shall be prepared for structures and CD works. Following suggested layouts presented in IRC: SP: 55 are recommended for various construction scenarios. Suiting the specific site requirements, the application steps described therein shall be followed

- Fig. 9.20 Two-Lane to Four-lane (Eccentric Widening)
- Fig. 9.21 Two-Lane to Four-lane (Shifting of Traffic from One Carriageway to Other)
- Fig. 9.22 Two-lane to four-lane (Concentric Widening)
- Fig. 9.23 Two-Lane to Four-lane (Concentric Widening)
- Fig. 9.24 Two-lane to Four-lane Concentric Widening & Worksite Advances

The Contractor shall provide necessary Men Power for guiding and regulation of Traffic during construction.

vii. Others

(a) Boundary Fencing

1.8 m High Boundary fencing shall be provided on either side of Forest ~~and Wild life~~ Area along the Project Highways per approval of Freest Authorities.

Note: In case of any discrepancy in number or location of any of the Project Facilities mentioned in this Schedule-C, the Authority shall finalize the number/ location of these facilities as per site requirements.

Schedule - D

(See Clause 2.1)

Specifications and Standards

1. Construction

The Contractor shall comply with the Specifications and Standards set forth in Annex- I, Annex-II, Annex-III & Annex IV of Schedule-D for construction of the Project Highway.

2. Design Standards

The Project Highway including Project Facilities shall conform to design requirements set out in the following documents:

- Schedule-D, Annex-I: Manual of Specifications and Standards for Four Laning of Highways (IRC: SP: 84-2019), referred to herein as the Manual.

Annex – I

(Schedule-D)

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Four-Laning of Highways (IRC: SP: 84- 2019), referred to as the Manual, Indian Road Congress (IRC) Codes and MORTH Specifications for Road and Bridge Works. Where the aforesaid Manuals, guidelines, codes, standards and specifications are silent on any aspect, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. *Deviations from the Specifications and Standards*

(i) The terms "Concessionaire", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer" and "Agreement" respectively.

(ii) Notwithstanding anything to the contrary contained in Paragraph 1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below:

Note 1: Deviations from the aforesaid Specifications and Standards are listed below.

<table>
<tr><th>Sl. No.</th><th>Item</th><th>Clause reference of Manual</th><th>Description of Deviation</th></tr>
<tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td></tr>
<tr><td>1</td><td>Design Speed</td><td>Clause 2.2.1 & Table 2.1 of IRC SP-84 2019</td><td>The Ruling Design speed shall be 80 Kmph for Project Highway for Plan /Rolling Terrain.

The ruling design speed shall be below 80 Kmph at Location.
<table>
<tr><th colspan="2">Stretch (km)</th><th rowspan="2">Radius (m)</th><th rowspan="2">Design Speed (Kmph)</th></tr>
<tr><th>From</th><th>To</th></tr>
<tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td></tr>
<tr><td>4.115</td><td>4.258</td><td>200.000m</td><td>65</td></tr>
<tr><td>7.100</td><td>7.269</td><td>200.000m</td><td>50</td></tr>
<tr><td>9.068</td><td>9.276</td><td>200.000m</td><td>35</td></tr>
<tr><td>9.566</td><td>9.700</td><td>200.000m</td><td>35</td></tr>
<tr><td>9.876</td><td>10.137</td><td>200.000m</td><td>35</td></tr>
<tr><td>12.227</td><td>12.437</td><td>200.000m</td><td>65</td></tr>
<tr><td>13.530</td><td>13.630</td><td>200.000m</td><td>65</td></tr>
<tr><td>16.428</td><td>16.468</td><td>500.000m</td><td>70</td></tr>
<tr><td>19.196</td><td>19.290</td><td>200.000m</td><td>50</td></tr>
<tr><td>19.426</td><td>19.469</td><td>200.000m</td><td>50</td></tr>
</table></td></tr>
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<table>
<tr><td>19.557</td><td>19.610</td><td>200.000m</td><td>50</td></tr>
<tr><td>20.049</td><td>20.209</td><td>200.000m</td><td>35</td></tr>
<tr><td>20.255</td><td>20.440</td><td>200.000m</td><td>35</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>Median</td><td>Clause 2.5 & Table 2.2 of IRC SP-84 2019</td><td>The minimum width of raised median shall be 2.5 m including 0.5 m Kerb Shyness Strip as per Annex-I, Schedule B, for Typical Cross-sections.</td></tr>
<tr><td>3</td><td>Radii of Horizontal Curves</td><td>Clause 2.9.4 & Table 2.6 of IRC SP-84 2019</td><td>The desirable minimum radii /Ruling Minimum Radii of horizontal curves for Project Highway shall be 250 m

The locations having curves of radii below desirable minimum 250 m.
<table>
<tr><th colspan="2">Stretch (km)</th><th rowspan="2">Radius (m)</th><th rowspan="2">Design Speed (Kmph)</th></tr>
<tr><th>From</th><th>To</th></tr>
<tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td></tr>
<tr><td>4.115</td><td>4.258</td><td>200.000m</td><td>65</td></tr>
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<tr><td>20.255</td><td>20.440</td><td>200.000m</td><td>35</td></tr>
<tr><td>3.265</td><td>3.398</td><td>230.000m</td><td>80</td></tr>
<tr><td>3.639</td><td>3.698</td><td>230.000m</td><td>80</td></tr>
<tr><td>9.403</td><td>9.455</td><td>230.000m</td><td>80</td></tr>
<tr><td>12.711</td><td>12.8</td><td>230.000m</td><td>80</td></tr>
<tr><td>17.701</td><td>17.744</td><td>230.000m</td><td>80</td></tr>
<tr><td>17.925</td><td>17.944</td><td>230.000m</td><td>80</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>Utility Corridors</td><td>Clause 2.16 of IRC SP-84 2019</td><td>Add Following at the end of the Para Clause 2.16 of IRC SP-84 2019.
Longitudinal Two numbers of 150 mm dia PVC ducts shall be provided in the median.</td></tr>
</table>

Sl. No.	Item	Clause reference of Manual	Description of Deviation
(1)	(2)	(3)	(4)
5	Typical Cross-sections	Clause 2.17 of IRC SP-84 2019	Typical Cross-sections shall be as per Schedule B,
6	Embankment	Sub-Clause 4.2.1 IRC:SP:84-2019	The following shall be added at the End of sub Clause 4.2.1 of IRC: SP: 84-2019. The Minimum Finish Road Level of Road Embankment shall be as per Schedule-B and Alignment Plan is enclosed at Annex.-III Schedule-A.
7	Flexible pavement - design period and strategy	Clause 5.4.1 of IRC:SP:84-2019	Flexible pavement shall be designed for a minimum design period of 20 years, subject to the condition that design traffic shall not be less than 20 Million Standards Axles (MSA) as per Clause 5.2 of Schedule-B, Annex-I
8	Design Load & Stresses	Clause 7.1 of IRC:SP:84-2019	Following additional clause shall be applicable ❖ IRC Special Vehicle 385 T Loading All retaining Structure including retaining walls shall be checked as per IRC:6.
9	Width of the Culverts	Clause 7.3 i) IRC:SP:84-2019	New Culverts ❖ The width of the all culverts in shall be as per the approach road width. ❖ The RCC Crash Barriers shall be provided as per IRC:5, 2017 Fig. 2 Details of Crash Barrier for Bridges without Footpath
10	Width of the New Bridges	Clause 7.3 ii) IRC:SP:84-2019	New Bridges Width of the structures at deck Level for Minor Bridge shall be as per TCS-8 & TCS-9 as provided in Schedule-B, instead of Fig. 7.2A Cross-Section of Bridge at Deck Level- with Footpath 4-Lane Divided Highway
11	Safety Barriers	Clause 7.17 IRC:SP:84-2019	For All Minor Bridge locations "Fig. 1(B) Details of Concrete Crash Barrier & Railing showing Bridge with Footpath" shall be followed
12	Speed reduction measures	Su-Clause 9.3.11 IRC:SP:84-2019	Add Following sub-clause at end of Sub-Clause 9.3.11 of IRC: SP: 84-2019. The Traffic Calming Measures shall be taken at all Minor Junctions and Cross road as per IRC: 99- 2018 , Guidelines for Traffic Calming Measures in Urban and Rural Areas (First Revision) The Traffic Calming Measures signage shall be taken at 6 Elephant crossing asper Assam Forest Department Guidelines.

Sl. No.	Item	Clause reference of Manual	Description of Deviation
(1)	(2)	(3)	(4)
13	Work Zone Traffic Management Plan (WTMP)	Clause 9.8 IRC:SP:84-2019	The Manpower for Traffic Management during construction shall be provided
14	Utilities Shifting		As regards, the work of utility shifting, the relevant specification, relevant rules, regulations and acts of Utility Owning Department/ Agencies of Assam State for electrical works (APDCL) and water supply related works (PHE) shall be applicable

SCHEDULE - E

(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 MaintenanceRequirements

1.1 The Contractor shall, at all times maintain the Project Highway in accordance with the provisionsofthisAgreement,ApplicableLawsandApplicablePermits.

1.2 TheContractorshallrepairorrectifyanyDefectordeficiencysetforthinParagraph2of thisSchedule-Ewithinthetimelimitspecifiedthereinandanyfailureinthisbehalfshall constitute non-fulfillment of the Maintenance obligations by the Contractor. Upon occurrenceofanybreachhereunder,theAuthorityshallbeentitledtoeffectreductionin 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 specificationsforaworkarenotgiven,GoodIndustryPracticeshallbeadopted.

2 Repair/rectification of Defects anddeficiencies

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 anddeficiencies

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 timelimit

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 conformitywithGoodIndustryPractice.Suchadditionaltimeshallbedeterminedbythe Authority's Engineer and conveyed to the Contractor and the Authority with reasons thereof.

5 Emergencyrepairs/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 DailyinspectionbytheContractor

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-monsooninspection

TheContractorshallcarryoutadetailedpre-monsooninspectionofallbridges,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 andproposedactiontoremedythesameshallbesenttotheAuthority'sEngineer.

8. Repairs on account of naturalcalamities

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.

Table -1: Maintenance Criteria for Pavements:

AssetType	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspectionand Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approaches	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm indepth	Daily	Length MeasurementUnit like Scale, Tape, odometeretc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/ reports/03031/)	24-48 hours	MORT&H Specification 3004.2

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					TechnicalSchedules
s of Grade structure, approaches of connecting roads, slip roads, laybyes etc. as applicable)	Cracking	Nil	< 5 % subject to limitof 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations andShoving	Nil	< 0.1% ofarea	Daily	Length Measurement Unit like		2-7 days	IRC:82- 2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRCSP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricte	Daily			7- 15 days	IRC:82-2015

AssetType	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
			d to 30 cm from the edge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015

AssetType	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure,	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTME950(98):2004andASTME1656-94:2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at differentspeedofvehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83-2008

AssetType	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
approaches of connecting roads, slip roads, lay byes etc. as applicable)		**Minimum SN**	**Traffic Speed (Km/h)**		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

AssetType	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Embankment/ Slope	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/crossfall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe	Daily			7-15 days	MORT&H Specification 408.4

AssetType	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
			side slope					
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

Inadditiontotheaboveperformancecriterion,thecontractorshallstrictlymaintaintherigidpavementsasperrequirementsinthefollowingtable Table -2:

Maintenance Criteria for RigidPavements:

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
CRACKING						
1	**Single Discrete Cracks Not intersecting withany joint**	w = width of crack L = length of crack d = depth of crack D = depthofslab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitchif L > lm.
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		Within 7days

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting withone ormorejoints**	w = width of crack L = length of crack d = depth of crack D = depthofslab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal withepoxy. Within 7days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1m. Within 7 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstructaffected. Portion with norms and specifications See Para 5.5 & 9.2 Within 15days
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	NotApplicable,asitmay befulldepth	
3	**Single Longitudinal Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depthofslab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, ifL > l m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair withstapling.
			4	w = 6.0 - 12.0 mm, usually associatedwithspalling	NotApplicable,asitmay be fulldepth	Within 15 days
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion aspernorms and specifications -

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
						See Para 5.6.4 Within 15 days
4	**Multiple Cracks intersecting withone ormorejoints**	**w = width ofcrack**	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30days
			4	w=3.0-6.0mmpanelbrokeninto 2 or3pieces		
			5	w > 6 mm and/or panelbroken		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
				into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal withepoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one cornerbroken		
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP:83-2008) Within 15 days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	ree or four corners broken		Reinstate sub-base, andreconstructthe

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
						slab as per norms and specifications within 30days
6	**Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w = width of crack L = length(m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m^2	Not Applicable, as it may be fulldepth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3 m/m^2		
			3	w > 1.5 mm and L < 3 m/m^2		
			4	w > 3 mm, L < 3 m/m^2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within30days
			5	w > 3 mm, L > 3 m/m^2 and deformation		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
Surface Defects						
7	**Ravelling or Honeycomb type surface**	r = area damaged surface/total surface of slab (%) h = maximumdepth ofdamage	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			1	r < 2 %	Local repair of areas damagedand liable to bedamaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	BondedInlay,2or3slabs ifaffecting.	
			4	r = 25 - 50 %		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
					Within 30 days	
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs ifaffecting. Within 30 days	
8	**Scaling**	r = damaged surface/total surface of slab (%) h = maximumdepth ofdamage	0	Nil, not discernible	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	r <**2 %**	Local repair of areas damagedand liable to bedamaged. Within 7days	
			2	r = 2 - 10 %		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	r = 10 - 20%	Bonded Inlay within 15 days	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 mm	Reconstruct slab within 30 days	
9	**Polished Surface/Glazing**	t = texture depth, sand patchtest	0		No action.	Not Applicable
			1	t > 1 mm		
			2 '	t = 1 - 0.6 mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuou stretchofminimum5km. Within 30days	
10	**Popout (SmallHole), Pothole Refer Para 8.4**	n = number/m^2 d = diameter h =maximumdepth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d=50-100mm;h<50mm;n<1 per 5 m^2	Partial depth repair 65 mm deep.	
			2	d=50-100mm;h>50mm;n<1 per 5 m^2	Within 15 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5m^2	Partial depth repair 110mm i.e.10mmmorethanthe depth of the hole. Within 30days	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5m^2		
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	

Joint Defects						
11	**Joint Seal Defects**	loss or damage L=Lengthas%total jointlength	0	Difficult to discern.	**Short Term** No action.	**Long Term** Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress ofwater	Clean, widen and reseal the joint. Within 7 days	

				and trapping Incompressible material.		
12	**Spalling of Joints**	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in crackedportion.	
			2	w = 10 - 20 mm, L < 25%	Within 7 days	
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w . 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w . 20% of w. Within 30 days	
13	**Faulting (or Stepping)**	f = difference of level	0	not discernible, < 1 mm	No action.	No action.

	in Cracks or Joints		1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamondgrinding	Replace the slab as appropriate. Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	f> 18 mm	Strengthen subgrade and sub-base by groutingand raising sunken slab	
14	**Blowup or Buckling**	h = vertical displacement from normalprofile	0	Nil, not discernible	**Short Term**	**Long Term**
			1	h < 6 mm	No Action	
			2	h = 6 - 12 mm	Install Signs to Warn Traffic	

			3	h = 12 - 25 mm	within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or morepieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Notdiscernible,h<5mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos<20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstatepavementatnormallevel	

			5	h > 100 mm	if L < 20 m. Within 30 days	
16	**Heave**	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	**Short Term**	**Long Term**
					No action.	scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavementatnormalleveliflength < 20 m. Within 30 days	
			5	h > 100 mm		
17	**Bump**	h = vertical	0	h < 4 mm	No action	

		displacement from normalprofile	1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term** No action.	**Long Term**
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder	

			4	f = 50 - 75 mm	within 7 dayss	For any 100 m stretch Reconstruct shoulder, if affecting 25% or moreofstretch. Within 30days
			5	f > 75 mm		
Drainage						
19	**Pumping**	quantity of fines and waterexpelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressedsections andupstream.
			3 to 4	appreciable/ Frequent 10-25%	Lift or jack slab within 30 days.	
		Nos/100 m stretch	5	abundant, crack development>25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	

20	**Ponding**	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do-	

Table -3: Maintenance Criteria for Safety Related Items and Other Furniture Items:

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway		As per IRC SP : 84-2014, a minimum of safe stopping sight distance shall be available throughout.				Manual Measurements with Odometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such astrees, temporaryencroachments. In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures suchas transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP 84-2014
	Availability of Safe Sight Distance	**Design Speed, kmph**	**Desirable Minimum SightDistance (m)**	**Safe Stopping Sight Distance (m)**	Monthly				
		100	360	180					
		80	260	130					
Pavement Marking	Wear	<70% of marking remaining			Bi-Annually	Visual AssessmentasperAnnexure-F of IRC:35-2015	Re - painting	Cat-1 Defect – within 24hours Cat-2 Defect - within2months	IRC:35-2015

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="4">Level of Service (LOS)</th><th>Frequencyof Measurement</th><th>TestingMethod</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="15"></td><td>Day time Visibility</td><td colspan="4">During expected life Service Time
Cement Road - 130mcd/m^2/lux
Bituminous Road - 100mcd/m^2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td rowspan="14">Night Time Visibility</td><td colspan="4"><u>Initial and MinimumPerformancefor Dry Retro reflectivity duringnight time:</u></td><td rowspan="14">Bi-Annually</td><td rowspan="14">As per Annexure-E Of IRC:35-2015</td><td rowspan="14">Re - painting</td><td rowspan="14">Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td rowspan="14">IRC:35-2015</td></tr>
<tr><td>Design Speed</td><td colspan="3" rowspan="2">(RL) Retro Reflectivity (mcd/m^2/lux)</td></tr>
<tr><td></td></tr>
<tr><td rowspan="4"></td><td rowspan="4">Initial (7 days)</td><td rowspan="4">Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<tr><td></td></tr>
<tr><td></td></tr>
<tr><td></td></tr>
<tr><td></td><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td></td><td>65 - 100</td><td>250</td><td>120</td></tr>
<tr><td></td><td>Above 100</td><td>350</td><td>150</td></tr>
<tr><td></td><td colspan="3"><u>Initial and Minimum Performance forNight Visibility under wetcondition(Retro reflectivity):</u></td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)	Frequencyof Measurement	TestingMethod	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Initial 7 days Retro reflectivity: 100 mcd/m^2/lux Minimum Threshold Level: 50 mcd/m^2/lux					
	Skid Resistance	Initial and Minimum performance for SkidResistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation,transversebarmarkings etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboardshouldbeclearlyvisiblefor the design speed of thesection.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as perrequirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	hange of ignboard	48 hours in case of Mandatory	RC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequencyof Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				Signboard using Retro Reflectivity Measuring Device. Inaccordance with ASTM D 4956-09.		Signs, Cautionary and Informatory Signs (Singleand Dual post-signs) 1 Month in case of Gantry/Cantilever Signboards	
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Pavement Markers(Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014,IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning ofguardrailasintended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of	Functionality: Functioning of End Treatment asintended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84-2014,

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	TestingMethod	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Traffic Safety Barriers			backup			IRC:119-2015
	Attenuators	Functionality: Functioning ofAttenuators asintended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119-2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	Functionality:FunctioningofTraffic Blinkers asintended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequencyof Measurement	TestingMethod	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Trees and Plantation including median plantation	Obstruction in aminimum head-roomof 5.5 m above carriageway or obstructionin visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstructionbyvegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects inel ectrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	

Asset Type	Performance Parameter	Level of Service (LOS)	Frequencyof Measurement	TestingMethod	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays,bus-shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

Table 4: Maintenance Criteria for Structures and Culverts:

Asset Type	PerformanceParameter	Level of Service (LOS)	Frequencyof Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	SpecificationsandStandards
Pipe/box/slab culverts	Free waterway/ unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and Recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrelbefore rainy season.	15 days before onset of monsoon and within 30 days after endofrainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansionjoints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or beforeonset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurallysound	Spalling of concrete not more than 0.25 sqm	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followedas perIRC: SP:40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause 2800
		Delamination of concrete not more than 0.25 sq.m.					
		Cracks wider than 0.3 mm not more than 1m aggregatelength					

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged apronsandpitching	30 days after defect observation or 2 weeks before onset of rainy season whicheveris earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge -Super Structure	Bumps	No bump at expansionjoint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier andguard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

	Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concreteportionwith epoxy mortar / concrete.	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m					
	Delamination	Not more than0.50 sq.m					
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH Specifications 2600 & 2700.
	Deflection due to permanent loads and	Within design limits.	Once in every 10 years for spansmore	Load test method	Carry out major rehabilitation works on bridge to retain original design loadscapacity	6 months	IRC SP: 51-1999.

	live loads		than 40 m						
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spansbetween 15m to 30m	Laser displacement sensors or laser vibro-meters	Strengthening structure	of	super	4 months	AASHTO LRFD specifications
	Leakagein Expansion joints	No damage toelastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buriedand asphalt plugand copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace	seal	in	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal	No dust or debris in expansion joint	Monthly	Detailed condition survey as per IRC SP:35-1990 using	Cleaning of expansion joint gapsthoroughly			3 days	MORTH specifications 2600 and

	expansion joint	gap.		Mobile Bridge InspectionUnit			IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging ofdrainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainagespout if any leakages observed.	3 days	MORTH specification 2700.
Bridge-substructure	Cracks/spalling of concrete/ rusted steel	No cracks, spalling of concrete and rustedsteel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on typeof defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.

	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture ofreinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on tobearings.	3 months	MORTH specification 2810and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wellsinmajor Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014,MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a year (beforeand after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged apronsandpitching.	30 days after defect observation or 2	IRC: SP 40-1993 and IRC:SP:13-2004.

		sq.m, damage to solid apron (concrete apron) not more than 1 sq.m				weeks before onset of rainy season whichever is earlier.	
Note: AnyStructureduringtheentirecontractperiodwhichisfoundthatdoesnotcomplieswithallrequirementsofthis Tablewillbeprepared, rehabilitated or even reconstructed under the scope ofthecontractor.							

Table 5: Maintenance Criteria for Hill Roads

In addition to above, for hill roads the following provisions for maintenance is also to done.

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

<u>Note:</u> For all tables 1 to 5 above, latest BIS & IRC standards (even those not indicated herewith) along with MoRTH specifications shall be binding for all maintenance activities.

A. FlexiblePavement

Nature of Defect or deficiency		Time limit for repair/ rectification
(b)	**Granular earth shoulders, side slopes, drains andculverts**	
(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 (twenty four) hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Road side furniture including road sign and pavementmarking**	
(i)	Damage to shape or position, poor visibility or loss of retro- reflectivity	48 (forty eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road 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 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e)	**Trees andplantation**	

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiringreplacement	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 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g)	**[TollPlaza]**	
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings,[TrafficAidPosts,MedicalAidPosts]and serviceroads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of themobilecrane	4 (four) hours
Bridges		
(a)	**Superstructure**	
(i)	Any damage, cracks, spalling/ scaling Temporarymeasures Permanentmeasures	within 48 (forty eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls andwingwalls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic)ofbridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in ayear
(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 deteriorationin approach slabs, pitching, apron, toes, floor orguidebunds	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

Nature of Defect or deficiency		Time limit for repair/ rectification
(iii)	Snow requiring clearance	24 (twenty four) hours

[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 4.1 (vii)(a))

Applicable Permits

1. ApplicablePermits

(i) The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:

(a) PermissionoftheStateGovernmentforextractionofbouldersfromquarry;

(b) PermissionofVillagePanchayatsandPollutionControlBoardforinstallation ofcrushers;

(c) Licence for use ofexplosives;

(d) PermissionoftheStateGovernmentfordrawingwaterfromriver/reservoir;

(e) LicencefrominspectoroffactoriesorothercompetentAuthorityforsetting up batchingplant;

(f) ClearanceofPollutionControlBoardforsettingupbatchingplant;

(g) ClearanceofVillagePanchayatsandPollutionControlBoardforsettingup asphalt plant;

(h) PermissionofVillagePanchayatsandStateGovernmentforborrowearth;and

(i) AnyotherpermitsorclearancesrequiredunderApplicableLaws.

(ii) Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of thisAgreement.

SCHEDULE - G

(See Clauses 7.1.and 19.2)

FORM OF BANK GUARANTEE

Annexure-I

(See Clause 7.1)

[Performance Security/Additional Performance Security]

The Managing Director,
NationalHighways&InfrastructuralDevelopmentCorporationLtd. PTI
Building, 3rdFloor,
4, Parliament Street
New Delhi - 110001

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "Contractor") and National Highways and Infrastructure Development Corporation Ltd. , (here in after called the "Authority") have entered into an agreement (here in after called the "Agreement") for "Widening/Improvement to 4 (Four) Lane with Paved Shoulder from Ch. 00.000 km to Ch.21.350 km (Design Ch.00.000 km to Ch.21.200 Km.) Package-1 of Paikan- Tura National Highway Road (NH 217)inthestateofAssam
"subjecttoandinaccordancewiththeprovisionsoftheAgreement

(B) TheAgreementrequirestheContractortofurnishaPerformanceSecurityfordueand 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 PerformanceSecurity.

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 performanceoftheContractor'sobligationsduringthe{ConstructionPeriod/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 writtendemand,andwithoutanydemur,reservation,recourse,contestorprotest,and withoutanyreferencetotheContractor,suchsumorsumsuptoanaggregatesumof 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 specifiedtherein.

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the National Highways & Infrastructure Development Corporation Limited, 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 AgreementanditsdecisionthattheContractorisindefaultshallbefinalandbinding

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. InordertogiveeffecttothisGuarantee,theAuthorityshallbeentitledtoactasifthe 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,shallnotinanywayormanneraffecttheliabilityorobligationoftheBank under thisGuarantee.

4. ItshallnotbenecessaryandtheBankherebywaivesanynecessity,fortheAuthority toproceedagainsttheContractorbeforepresentingtotheBankitsdemandunderthis 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 fromitsliabilityandobligationunderthesepresentsbyanyexercisebytheAuthority ofthelibertywithreferencetothemattersaforesaidorbyreasonoftimebeinggiven to the Contractor or any other forbearance, indulgence, act or omission on the part of theAuthorityorofanyothermatterorthingwhatsoeverwhichunderanylawrelating tosuretiesandguarantorswouldbutforthisprovisionhavetheeffectofreleasingthe Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any suchlaw.

6. This Guarantee is in addition to and not in substitution of any other guarantee or securitynoworwhichmayhereafterbeheldbytheAuthorityinrespectoforrelating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under theAgreement.

7. NotwithstandinganythingcontainedhereinbeforetheliabilityoftheBankunderthis 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 liabilitieshereunder.

8. TheGuaranteeshallceasetobeinforceandeffecton……[$].Unlessademandor claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilitieshereunder.

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 thatithasthepowertoissuethisGuaranteeandtheundersignedhasfullpowerstodo so on behalf of theBank.

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,itshallbesufficienttoprovethattheenvelopecontainingthenoticewasposted andacertificatesignedbyanofficeroftheAuthoritythattheenvelopewassoposted shall beconclusive.

11. ThisGuaranteeshallcomeintoforcewithimmediateeffectandshallremaininforce and effect for up to the date specified in paragraph 8 above or until it is released earlierbytheAuthoritypursuanttotheprovisionsoftheAgreement.

12. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the detailsbelow:-

Sl.	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1st Parliament street, New Delhi-110001

Signedandsealedthis…….dayof…...20……at……..

SIGNED , SEALED ANDDELIVERED

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 theguarantee.

(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.

Schedule-H

Annexure – II
(Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

The ManagingDirector,
NationalHighways&InfrastructuralDevelopmentCorporationLtd. PTI Building, 3rdFloor,
4, Parliament Street
New Delhi - 110001

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the National Highways and Infrastructure Corporation Ltd., (hereinafter called the "**Authority**") for the **"**Widening/Improvement to 4 (Four) Lane with Paved Shoulder from Ch. 00.000 km to Ch.21.350 km (Design Ch.00.000 km to Ch.21.200 Km.) Package-1 of Paikan- Tura National Highway Road (NH 217) in the state of Assam subject to and in accordance with the provisions of theAgreement

(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 isRs.------cr.(Rupees------crore)andtheamountofthisGuaranteeisRs.-------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") for the GuaranteeAmount.

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 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 specifiedtherein.

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways& Infrastructure Development Corporation Limited], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment 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. InordertogiveeffecttothisGuarantee,theAuthorityshallbeentitledtoact asifthe 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,shallnotinanywayormanneraffectttheliabilityorobligationoftheBank under thisGuarantee.

3 ItshallnotbenecessaryandtheBankherebywaivesanynecessity,fortheAuthority toproceedagainsttheContractorbeforepresentingtotheBankitsdemandunderthis 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 ofthetermsandconditionscontainedintheAgreementand/orthesecuritiesavailable 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 wouldbutforthisprovisionhavetheeffectofreleasingtheBankfromitsliabilityand obligationunderthisGuaranteeandtheBankherebywaivesallofitsrightsunderany suchlaw.

5 This Guarantee is in addition to and not in substitution of any other guarantee or securitynoworwhichmayhereafterbeheldbytheAuthorityinrespectoforrelating to the AdvancePayment.

6 Notwithstandinganythingcontainedhereinbefore,theliabilityoftheBankunderthis 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 liabilitieshereunder.

7 The Guarantee shall cease to be in force and effect on ****.[$] 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 liabilitieshereunder.

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 thatithasthepowertoissuethisGuaranteeandtheundersignedhasfullpowerstodo so on behalf of theBank.

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 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,itshallbesufficienttoprovethattheenvelopecontainingthenoticewasposted andacertificatesignedbyanofficeroftheAuthoritythattheenvelopewassoposted shall beconclusive.

10. This Guarantee shall come into force with immediate effect and shall remain in force andeffectuptothedatespecifiedinparagraph8aboveoruntilitisreleasedearlier

by the Authority pursuant to the provisions of the Agreement.

Signedandsealedthis…….dayof……..,20……at……. SIGNED,

SEALED ANDDELIVERED

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 theguarantee.

ii. The address, telephone number and other details of the head office of the Bank as wellasofissuingbranchshouldbementionedonthecoveringletterofissuingbranch

Schedule-H

(See Clauses 10.1 (iv) and 19.3)

Contract Price Weightages

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

1.2 Proportions of the Contract Price for different stages of Construction of the Project Highway shall be as specifiedbelow:

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road Works includingCulverts, widening and repair ofculverts	58.67 %	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of the sub- grade	27.89%
		(2) Sub-base Course (CTSB) and GSB	22.35 %
		(3) Non bituminous Base course (CTB)	8.00%
		(4)Non bituminous Base course (WMM)	6.52%
		(5) Bituminous Base course	[Nil]
		(6) Wearing Coat	18.58%
		(7) Widening and repair of culverts	0.00%
		B.1-Reconstruction/New 4-Lane Realignment /Bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Non bituminous Base course	[Nil]
		(4) Bituminous Base course	[Nil]
		(5) Wearing Coat	[Nil]
		B.2-Reconstruction/New 4-Lane Realignment/ Bypass (Rigid Pavement)	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Dry Lean Concrete (DLC) Course	[Nil]
		(4) Pavement Quality Control (PQC) Course	[Nil]
		C.1-Reconstruction/ New Service Road (Flexible Pavement)	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Non bituminous Base course	[Nil]
		(4) Bituminous Base course	[Nil]
		(5) Wearing Coat	[Nil]
		C.2- Reconstruction/New Service road (Rigid Pavement)	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Dry Lean Concrete (DLC) Course	[Nil]
		(4) Pavement Quality Control (PQC) Course	[Nil]
		D- Reconstruction & New Culverts on existingroad,realignments,bypasses Culverts (length<6m)	16.67%
Minorbridge/ Underpasses/ Overpasses	13.20 %	**A.1-widening and repairing of Minor Bridges (length >6 m&<60m)**	
		Minor Bridges	0.70%
		A.2- New Minor bridges (length >6 mand<60m)	
		(1) Foundation: On completion of the foundationwork.	56.40 %
		(2) Sub-Structure: On completion of the Substructurework	
		(3) Super-structure: On completion of the super-structure in all respects including wearingcoat, bearings, expansion joints, hand rails, crash barriers, road, signs & markings, tests on completionetc. Complete in all respect.	19.19%
		(4) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	22.91%
		(5) Guide Bund sand River Training Works: On completion of Guide Bunds and river Training works complete in all respects.	0.81%
		B.1- Widening and repairs of underpasses/overpasses	
		Underpasses/ Overpasses	[Nil]
		B.2-New Underpasses/Overpasses	
		(1) Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls,abutments, Piers up-to the abutment/pier cap.	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(2) Super-structure: On completion of the super-structure in all respects including wearingcoat, bearings, expansion joints, hand rails, crash barriers, roadsigns & markings, tests on completion etc. complete in allrespect. Wearing Coat (a) in case of Overpass- wearing coat including expansion joints completeinallrespectsasspecifiedand(b) in case of underpass- rigid pavement including drainage facility complete in all respects asspecified.	[Nil]
		(3) Approaches: Oncompletionofapproaches including Retaining walls/Reinforced Earth walls, stone pitching,protection works complete in all respect and fit foruse.	[Nil]
Major bridge(length>60 m) works and ROB/RUB/elevated sections/flyovers including viaducts, if any	0.00 %	**A.1- Widening and repairs of Major Bridges**	
		(1) Foundation	[Nil]
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4) Wearing Coating excluding expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Guide bunds, River Training works etc.	[Nil]
		(8) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]
		A.2-New Major Bridges	
		(1) Foundation	[Nil]
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4) Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Guide bunds, River Training works etc.	[Nil]
		(8) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]
		B.1-Widening and repairs of (a) ROB (b) RUB	
		(1) Foundations	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(2) Sub-Structure	[Nil]
		(3) Super-Structure (Including bearings)	[Nil]
		(4) Wearing Coat(a)in case of ROB-wearing coat including expansion joints completeinallrespectsasspecifiedand(b) in case of RUB-rigid pavement under RUB including drainage facility complete inall respects as specified	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7) Approaches (Including Retaining walls, Stone Pitching and protection works)	[Nil]
		B.2-New ROB/RUB	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-Structure (Including bearings)	[Nil]
		(4) Wearing Coat (a) in case of ROB-wearing coat including expansion joints completeinallrespectsasspecifiedand(b) in case of RUB-rigid pavement under RUB including drainage facility complete inall respects as specified	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-Structure (Including bearings)	[Nil]
		(4) Wearing Coating excluding expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7) Approaches (including Retaining walls/ReinforcedEarthwall,stonepitching and protection works)	[Nil]
		C.2- New Elevated Section/Flyovers/Grade Separators	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(3) Super-Structure (Including bearings)	[Nil]
		(4) Wearing Coating excluding expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7)Approaches(includingRetainingwalls/ Reinforced Earthwall, stone pitching and protection works)	[Nil]
Other Works	26.39%	(i) Toll Plaza	[Nil]
		(ii) Roadside drains (RCC, PCC & Unlined)	11.94%
		(iii) Road signs, markings, km stones, safetydevices safety Barriers etc	63.42%
		(iv) Project facilities	
		a) Bus Bays	[Nil]
		b) Truck Lay-byes	0.36 %
		c) Passenger Shelter	0.37%
		d) Rest Area	[Nil]
		e) Roadside Amenities	[Nil]
		f) Streetlight	0.45%
		g) Utility Duct	0.24%
		(v) Retaining Wall	[Nil]
		(vi) Roadside Plantation	[Nil]
		(vii)Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]
		(viii) Boundary wall	[Nil]
		(ix) Safety & Traffic Management during const.	[Nil]
		(x) Breast Wall	[Nil]
		(xi) Site Clearance & Dismantling	0.65%
		(xii) Reinforced Earth Wall	[Nil]
		(xiii) Junction	1.02%
		(xiv) Seeding & Mulching	[Nil]
		(xv) Surface Drains in Soil	[Nil]
		(xvi) Ground Improvement Works	[Nil]
		(xvii) Protection Works	21.56%
		(xviii) Gabian Structure	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Electrical utilities and public Health Utilities (Water pipe lines and sewage lines)	1.74%	(i) EHT line	[Nil]
		(ii) EHT crossings	[Nil]
		(iii) HT/ LT line	96.08 %
		(iv) HT/ LT crossings	
		(v) Water pipeline	3.92 %
		(vi) Water pipeline crossings	

1.3 Procedure of estimating the value of workdone

1.3.1 Roadworks

Procedure for estimating the value of road work done shall be as follows:

Table1.3.1

Stage of Payment	Percentage weightage	Payment Procedure
A- Widening &Strengthening of road		Unit of measurement is linear length. Payment ofeachstageshallbemadeonproratebasison completion of a stage in a length of not less than 5(five) percent of the totallength.
(1) Earthwork up to top of the sub-grade	27.89 %	
(2) Sub-base Course (CTSB)	22.35 %	
(3) Non bituminous Base course (CTB)	8.00%	
(4)Non bituminous Base course (WMM)	6.52%	
(5) Bituminous Base course	[Nil]	
(6) Wearing Coat	18.58%	
(7) Widening and repair of culverts	0.00%	Cost of ten completed culverts shall be Determined on pro rata basis with respect to the total number of culverts.
B.1- Reconstruction/New2- Lane Realignment/Bypass (Flexible Pavement)		Unit of measurement is linear length. Payment ofeachstageshallbemadeonproratebasison completion of a stage in full length or 5(five) km length, whichever isless.
(1) Earthwork up to top of the sub-grade	[Nil]	
(2) Sub-base Course	[Nil]	
(3) Non bituminous Base course	[Nil]	
(4) Bituminous Base course	[Nil]	
(5) Wearing Coat	[Nil]	
B.2- Reconstruction/New 8- Lane Realignment/Bypass (Rigid Pavement)		
(1) Earthwork up to top of the sub-grade	[Nil]	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 5(five) km length, whichever is less.
(2) Sub-base Course	[Nil]	
(3) Dry Lean Concrete (DLC) Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
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 1(one) km length, whichever is less.
(1) Earthwork up to top of the sub-grade	[Nil]	
(2) Sub-base Course	[Nil]	
(3) Non bituminous Base course	[Nil]	
(4) Bituminous Base course	[Nil]	
(5) Wearing Coat	[Nil]	

Stage of Payment	Percentage weightage	Payment Procedure
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 1(one) km length, whichever is less.
(1) Earthwork up to top of the sub-grade	[Nil]	
(2) Sub-base Course	[Nil]	
(3) Dry Lean Concrete (DLC)Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
D- Reconstruction & New Culverts on existing road, realignments, bypasses		Cost of each culverts shall be determined on pro rata basis with respect to the totalnumber ofculverts. Payment shall be made on the completion of at least oneculvert.
Culverts (length <6m)	16.67%	

@ 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 d u e 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 le ng th for payment purposes. The total length calculated here is only for payment purposes and will not affect and referred in other clauses of the ContractAgreement.

1.3.2 Minor Bridges and Underpasses /Overpasses.

Procedure for estimating the value of Minor bridge and Underpasses/Overpasses shall be as stated in table1.3.2:

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
1	2	3
A.1-Widening and repairs Of Minor Bridges(length>6m&<60m)	0.70%	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 the completion of widening & repair works of a minor bridge

Stage of Payment	Weightage	Payment Procedure
1	2	3
A.2- New Minor Bridges(length>6m& <60m)		
(1) Foundation: On Completion of the foundation work.	56.40 %	Foundation: Cost of each minor bridge shall be determined on pro-rata basis with respect to the total linear length (m)of the minor bridges. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of each bridge. Incasewhereloadtestingisrequiredforfoundation, the trigger of first payment shall include load testing also wherespecified.
(2) Sub-Structure: On completion of the Substructure work		Sub-structure: Cost of each minor bridge shall be determined on pro-rata basis with respect to the total linear length (m)of the minor bridges. Payment against substructure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of sub-structure of each bridge.
(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road, signs & markings, tests on completion etc. complete in allrespect.	19.19%	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 respects as specified in the column of "Stage of Payment" in this sub-clause. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(3) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	22.91%	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 Bund sand River Training Works :On completion of Guide Bunds and river training works complete in all respects	0.81%	Guide Bunds and River Training Works: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bund sandRivertrainingWorksinallrespectsasspecified
B.1- Widening and repairs of underpasses/overpasses	[Nil]	Cost of each underpass/overpass shall be determinedonproratabasiswithrespecttothetotal linear length of the underpasses/ overpasses. Payment shall be made on the completion of widening&repairworksofaunderpass/overpass.

Stage of Payment	Weightage	Payment Procedure
1	2	3
B.2- New Underpasses/Overpasses		
(1) Foundation + Sub-Structure: On completion of the Foundation work including foundations for wing and return walls, abutments,piers up to the abutment/piercap.	[Nil] [Nil]	Foundation: Cost of each Underpass/ Overpass shall be determined on pro- rata basis with respect to the total linear length (m) of the Underpasses/Overpasses. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of each Underpasses/ Overpasses. Incasewhereloadtestingisrequiredforfoundation, the trigger of first payment shall include load testing also wherespecified.
(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, handrails, crash barriers, road signs & Markings, tests oncompletion etc. complete in all respect. Wearing Coat (a) in case of Overpass-wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass- rigid pavement including Drainage facility complete in all respects asspecified.	[Nil] [Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structureofatleastonespaninallrespectsas specified in the column of "Stage of Payment" In this sub-clause. In case of structures where pre-cast girders have been proposed by the Contractor,50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified asabove
(3) Approaches: On completion of approaches including Retaining walls/ Reinforced Earthwalls, stone pitching, protection workscomplete in all Respect and fit for use.	[Nil]	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified

1.3.3 Major Bridge works, ROB/RUB andStructures.

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 of Payment	Weightage	Payment Procedure
A.1- Widening and repairs of Major Bridges		
(1) Foundation	[Nil]	Foundation: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundationshallbemadeonpro-ratabasisoncompletion of a stage i.e., not less than 25% of the scope of foundationof the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also wherespecified.
(2) Sub-structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of major bridge.
(3) Super-structure (including bearings)	[Nil]	Super-structure:Paymentshallbemadeonpro-ratabasis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respectsasspecified.Incaseofstructureswherepre-cast girdershavebeenproposedbytheContractor,50%ofthe stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified asabove
(4) Wearing Coating excluding expansionjoints	[Nil]	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markingsetc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	[Nil]	Wingwalls/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.	[Nil]	Guide Bunds, River Training works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	Approaches: Payments shall be made on pro rata basis on completion of 10% of the scope of each stage.

Stage of Payment	Weightage	Payment Procedure
A.2-New Major Bridges		
(1) Foundation	[Nil]	Foundation: Cost of each Major Bridge shall be determined on pro rat abasis with respect to the total linear length (m) of the Major Bridge. Payment against foundationshallbemadeonpro-ratabasisoncompletion of a stage i.e., not less than 25% of the scope of foundation of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also wherespecified.
(2) Sub-structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e., not lessthan25% of the scope of sub- structure of major bridge.
(3) Super-structure (including bearings)	[Nil]	Super-structure:Paymentshallbemadeonpro-ratabasis on completion of a stage i.e., completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stagespecified as above
(4) Wearing Coating excluding expansionjoints	[Nil]	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markingsetc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	[Nil]	Wingwalls/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.	[Nil]	Guide Bunds, River Training works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8)Approaches (includingRetaining walls, stone pitching and protectionworks)	3.61%	Approaches: Payments shall be made on pro rata basis on completion of 10% of the scope of each stage.
B.1- Widening and repairsof (a)ROB (b)RUB		

Stage of Payment	Weightage	Payment Procedure
(1) Foundations	[Nil]	Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m)of theROB/RUB.Paymentagainstfoundationshallbemadeon pro-rata basis on completion of a stage i.e. Not less than 25%ofthescopeoffoundationoftheROB/RUB. In case where load testing is required for foundation, the triggeroffirstpaymentshallincludeloadtestingalsowhere specified.
(2) Sub-Structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. Not lessthan25%ofthescopeofsub-structureofROB/RUB.
(3) Super-Structure (Including bearings)	[Nil]	Super-structure:Paymentshallbemadeonpro-ratabasis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respectsasspecified.Incaseofstructureswherepre-cast girders have been proposed by the Contractor,50%ofthe stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stagespecified as above
(4) Wearing Coat(a)in case of ROB- wearing coat including expansion joints complete in all respects asspecified and (b)in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	[Nil]	Wearing Coat: Payment shall be made on completion (a) incaseofROB-wearingcoatincludingexpansion joints complete in all respects asspecified and (b) incaseofRUB-rigidpavementunderRUBincluding drainagefacilitycompleteinallrespectsasspecified.
(5) Miscellaneous Items like handrails, crash barrier, road markingsetc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wingwalls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (Including Retaining walls, Stone Pitchingand protection works)	[Nil]	Payments shall be made on prorate basis on completion of 20% of the total area.
B.2-NewROB/RUB		

Stage of Payment	Weightage	Payment Procedure
(1) Foundation	[Nil]	Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m)oftheROB/RUB.Paymentagainstfoundationshallbe made on pro-rata basis on completion of a stage i.e. Not lessthan25%ofthescopeoffoundationoftheROB/RUB.
(2) Sub-structure	[Nil]	Sub-structure: Payment against sub- structure shall bemade on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of sub- structure of ROB/RUB.
(3) Super-structure (including bearing)	[Nil]	Super-structure:Paymentshallbemadeonpro-ratabasis on completion of a stage i.e., Completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre- cast girders have been proposed by the Contractor,50% of the stage payment shall be due and payable on casting ofgirdersforeachspanandbalance50%ofthestage payment shall be made on completion of stage specified as above
(4) Wearing Coat (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 asspecified	[Nil]	WearingCoat:Paymentshallbemadeoncompletion (a) in case of ROB-wearing coat including expansion joints completeinallrespectsasspecifiedand(b) In case of RUB-rigid pavement under RUB including drainage facility complete in all respects asspecified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wingwalls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
C.1-Wideningandrepairs of Elevated Section/ Flyovers/Grade Separators		

Stage of Payment	Weightage	Payment Procedure
(1) Foundations	[Nil]	Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m)of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e., not less than 25% of the scope of foundation of thestructure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-Structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure.
(3) Super-Structure (Including bearings)	[Nil]	Super-structure:Paymentshallbemadeonpro-ratabasis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respects a specified case of structures where pre-cast girdershavebeenproposedbytheContractor,50%ofthe stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stagespecified as above
(4) Wearing Coating excludingexpansion joints	[Nil]	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. Complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wingwalls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
C.2- New Elevated Section/ Flyovers/Grade Separators		
(1) Foundations	[Nil]	Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of thestructure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.

Stage of Payment	Weightage	Payment Procedure
(2) Sub-Structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure.
(3) Super-Structure (Including bearings)	[Nil]	Super-structure:Paymentshallbemadeonpro-ratabasis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respectsasspecified.Incaseofstructureswherepre-cast girdershavebeenproposedbytheContractor,50%ofthe stage payment shall be due and payable on casting of girders foreach span and balance 50% of thestage payment shall be made on completion of stage specified as above
(4) Wearing Coat including expansion joints	[Nil]	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wingwalls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	Payments shall be made on pro rata basis on completion of 20% of the total area.

Note: (1) In case of innovate Major Bridge projects like cable suspension/cable stayed/Extra Dozedandexceptionallylongspanbridges,theschedulemaybemodifiedasper siterequirementsbeforebiddingwithdueapprovalofCompetentAuthority.

(2) The Schedule for exclusive tunnel projects may be prepared as per site requirementsbeforebiddingwithdueapprovalofCompetentAuthority.

1.3.4 Otherworks.

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

Table1.3.4

Stage of Payment	Weightage	Payment Procedure
1	2	3
(1) Toll Plaza	[Nil]	Unit of measurement is each completed tollplaza.Paymentofeachtollplazashall be made on pro rata basis with respecttothe total of all toll plaza.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(2) Roadside drains	11.94 %	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 5 % (five percent) of the total length.
(3) Road signs, markings, km stones, safety devices etc	63.42 %	
(4) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus Bays	[Nil]	
b) Truck Lay-byes	0.36 %	
c) Passenger Shelter	0.37%	
d) Rest Area	[Nil]	
e) Roadside Amenities	[Nil]	
f) Streetlight	0.45%	
g) Utility Duct	0.24%	
(5) Retaining Wall	[Nil]	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 5% (five percent)of the totallength.
(6) Roadside Plantation including Horticulture in Wayside Amenities	[Nil]	
(7) Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]	
(8) Boundary wall	[Nil]	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 5% (five percent) of the totallength
(9) Safety and traffic management during construction	[Nil]	Payment shall be made on prorate basis every sixmonths.
(10) Breast Wall	[Nil]	Unit of measurement is linear length. Payment shall be made onproratabasisoncompletionofastage in a length of not less than 5%(five Percent) of the total length.
(11) Site Clearance & Dismantling	0.65%	Unit of measurement is linear length. Payment shall be made onproratabasisoncompletionofastage in a length of not less than 5%(five Percent) of the total length.
(12) Reinforced Earth Wall	0.00%	Unit of measurement is linear length. Payment shall be made onproratabasisoncompletionofastage in a length of not less than 5%(five Percent)of the total length.
(13) Junction	1.02%	Cost of each Junction shall bedetermined on pro rata basis with respect to the total number of junctions. Paymentshallbemadeonthecompletion of at least five junctions.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(14) Seeding & Mulching	[Nil]	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 than5% (Fivepercent) of the total length.
(15) Surface drains in soil	[Nil]	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 than5% (Five percent) of the total length
(16) Ground Improvement	[Nil]	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 5 % (five percent) of the Total length.
(17) Protection Work	21.56%	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 5 % (five percent) of the Total length.
(18)Gabian Structure	[Nil]	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion ofa Stage in a length of not less than 5% (five percent)of the totallength.

1.3.5 Utilities Shifting Works.

Procedure for estimating the value of **Utility Shifting** works done shall be as stated in table 1.3.5:

Table 1.3.5

Stage of Payment	Weightage	Payment procedure
1	2	3
Utilities Shifting	100 %	
(i) EHT line	0.00 %	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rate basis as per its weightage with reference to total cost of EHT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of Pol es-20%, (ii) Conductor stringing including laying of cable- 30%, (iii) DTR erection (if involved)-15% and (iv) Charging of line including dismantling and site clearance-35% (with DTR) and 50% without DTR)
(ii) EHT crossings	96.08 %	Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 4 crossings.
(iii) HT/ LT line (including transformers if any)		Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of LT/

Stage of Payment	Weightage	Payment procedure
1	2	3
Utilities Shifting	100 %	
		HT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of Poles-20% (ii) Conductor stringing including laying of cable- 30%, (iii) DTR erection (if involved)-10% and (iv) Charging of line including dismantling and site clearance-40% (with DTR) and 50% without DTR)
(iv) HT/ LT crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the Crossings subject to a minimum of 10 crossings.
(v) Water pipeline	3.92%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe li ne. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)
(vi) water pipeline crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 2S% of the crossings subject to a minimum of 8 crossings.
(vii) Sewage lines	0.00 %	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-SO%, Charging of line including all miscellaneous works and Dismantling and site clearance-SO%)
(viii) Sewage line crossings	0.00%	Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for completed activity. (The average weightage of major activities in shifting work is laying pipe-SO%, Charging of line including all miscellaneous works and Dismantling and site clearance-SO %)

2. Procedure for payment forMaintenance

2.1 The cost for maintenance shall be as stated inClause14.1.1.

2.2 Payment for Maintenance shall be made in quarterly installments in accordance with the provisions of Clause19.7.

Schedule - I

(See Clause 10.2 (IV))

Drawings

1. Drawings

In compliance of the obligations set forth in Clause 10.2 of this Agreement, the ContractorshallfurnishtotheAuthority'sEngineer,freeofcost,allDrawingslistedin Annex-I of thisSchedule-I.

2. AdditionalDrawings

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 maybynoticerequiretheContractortoprepareandfurnishsuchdrawingsforthwith.
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 thisSchedule-I.

Annex – I

(Schedule - I)

List of Drawings

All the Drawings that the Contractor is required to furnish under Clause 10.2 specifying the Drawings for Four-Laning are as under:

A minimum list of the drawings of the various components / elements of the Project Highway and project facilities required to be submitted by the Contractor is given below

(a) Horizontal and Vertical Alignment with details of reference pillars. Horizontal Intersection Point, Vertical Intersection Points, elements of curves, and sight distances.

(b) Cross-section at 10m interval along the alignment within ROW

(c) Typical Cross-section with details of pavement structures

(d) Detailed drawings for individual Minor Bridge/ culverts

(e) Detailed layout drawings for intersections

(f) Drawings for Road sign, Markings, Bus bays, Parking areas, Truck lay-byes

(g) Landscaping & Tree Plantation

(h) Traffic Management drawings for safety in construction zones

(i) Detailed drawings of road side furniture and safety structures

(j) Detailed drawings of all protection works

(k) Detailed drawings of Drainage including RCC covered drains as per standard specifications.

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project CompletionSchedule

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. ProjectMilestone-I

(i) ProjectMilestone-Ishalloccuronthedatefallingonthe**256**^{the}dayfromtheAppointed Date (the "**ProjectMilestone-I**").

(ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly preparedStagePaymentStatementsforanamountnotlessthan10%(tenpercent)of the ContractPrice.

3. ProjectMilestone-II

(i) Project Milestone-II shall occur on the date falling on the **438**thday from the Appointed Date (the "**ProjectMilestone-II**").

(ii) Prior to the occurrence of Project Milestone-II, 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 35% (thirty fivepercent)oftheContractPriceandshouldhavestartedconstructionofallbridges

4. ProjectMilestone-III

(i) Project Milestone-III shall occur on the date falling on the **620**thday from the Appointed Date (the "**ProjectMilestone-III**").

(ii) 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 validlypreparedStagePaymentStatementsforanamountnotlessthan70%(seventy per cent) of the Contract Price and should have started construction of all project facilities.

5. Scheduled CompletionDate

(i) TheScheduledCompletionDateshalloccuronthe**730**thdayfromtheAppointedDate.

(ii) On or before the Scheduled Completion Date, the Contractor shall havecompleted

Construction in accordance with this Agreement.

6. Extension oftime

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 (ii))

Tests on Completion

1. Schedule forTests

(i) 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 tosubject theProjectHighwaytoTests,andnolaterthan10(ten)dayspriortotheactualdateof Tests, furnish to the Authority's Engineer and the Authority detailed inventory and particulars of all works and equipment forming part ofWorks.

(ii) 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 thisSchedule-K.

2. Tests

(i) Visual and physical test: The Authority's Engineer shall conduct a visual and physical checkofconstructiontodeterminethatallworksandequipmentformingpartthereof conformtotheprovisionsofthisAgreement.Thephysicaltestsshallinclude[***].

(ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a Network Survey Vehicle (NSV) fitted with latest equipment's and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for eachkilometer.

(iii) 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 BoardonNondestructiveTestingTechniques,attwospotsineveryspan,tobechosen at random by the Authority's Engineer. Bridges with a span of 15 (fifteen) metres or more shall also be subjected to loadtesting.

(iv) Othertests:TheAuthority'sEngineermayrequiretheContractortocarryoutorcause to be carried additional tests, in accordance with Good Industry Practice, for determiningthecomplianceoftheProjectHighwaywithSpecificationsandStandards, except tests as specified in clause 5, but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testingequipment.

(v) 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 ApplicablePermits.

(vi) 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 IndustryPractice.

3. Agency for conductingTests

AllTestssetforthinthisSchedule-KshallbeconductedbytheAuthority'sEngineeror suchotheragencyorpersonasitmayspecifyinconsultationwiththeAuthority.

4. CompletionCertificate

UponsuccessfulcompletionofTests,theAuthority'sEngineershallissuethe CompletionCertificateinaccordancewiththeprovisionsofArticle12.

5. The Authority Engineer will carry out tests with following equipment at his own cost in the presence of contractor'srepresentative.

Sr. No.	Key metrics of Asset	Equipment to be used	Frequency of condition survey
1	Surface defects of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
2	Roughness of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
3	Strength of pavement	Falling Weight Deflectometer(FWD)	At least once a year
4	Bridges	Mobile Bridge InspectionUnit(MBU)	At least twice a year (As per survey months defined for the state basis rainy season)
5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basis rainy season)

ThefirsttestingwiththehelpofNSVshallbeconductedatthetimeofissueof CompletionCertificate.

Schedule - L

(See Clause 12.2)

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 "Widening/Improvement to 4 (Four) Lane with Paved Shoulder from Ch. 00.000 km to Ch.21.350 km (Design Ch.00.000 km to Ch.21.200 Km.) Package-1 of Paikan- Tura National Highway Road (NH 217) in the state of Assam on EPC mode "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 Usersthereof.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of ProjectHighwayhavebeencompleted,andtheProjectHighwayisherebydeclaredfit forentryintooperationonthisthe…….dayof…….20…,ScheduledCompleted Date for which was the ……. day of …….20…..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Authority's Engineerby:

(Signature)

(Name)

(Designation)(Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

1. Paymentreductionfornon-compliancewiththeMaintenance Requirements

(i) Monthly lump sum payments for maintenance shall be reduced in the case of non-compliancewiththeMaintenanceRequirementssetforthinSchedule-E.

(ii) Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shallcontinuetobemadeeverymonthuntilcomplianceisdone.

(iii) 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 Paragraph2.

2. Percentage reductions in lump sum payments on monthlybasis

(i) The following percentages shall govern the paymentreduction:

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%

S. No.	Item/Defect/Deficiency	Percentage
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th kmstones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallentrees,roadblockadesormalfunctioningofmobilecrane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

(ii) The amount to be deducted from monthly lump-sum payment for non- compliance of particular item shall be calculatedasunder:

$$R = {}^{P}/_{100} \times (M1 \text{ or } M2) \times {}^{L1}/_{L}$$

Where,

P= Percentage of particular item/Defect/deficiency fordeduction

M1= Monthly lump-sum payment in accordance para 1.2 above of this Schedule

M2= Monthly lump-sum payment in accordance para 1.2 above of this Schedule

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

Thetotalamountofreductionshallbearrivedatbysummationofreductionsforsuch items/Defects/deficiency ornon-compliance.

ForanyDefectinapartofonekilometer,thenon-conforminglengthshallbetakenas onekilometer.

Schedule - N

(See Clause 18.1 (I))

Selection of Authority's Engineer

1. Selection of Authority'sEngineer

(i) 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'sEngineer.

(ii) IntheeventofterminationoftheTechnicalConsultantsappointedinaccordancewith theprovisionsofParagraph1.1,theAuthorityshallappointanotherfirmofTechnical Consultants forthwith and may engage a government-owned entity in accordance with the provisions of Paragraph 3 of thisSchedule-N.

2. Terms ofReference

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'sEngineer

Notwithstanding anything to the contrary contained in this Schedule, the Authority mayinitsdiscretionappointagovernment-ownedentityastheAuthority'sEngineer; 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'sEngineer.

Annex – I

(Schedule - N)

Terms of Reference for Authority's Engineer

1. Scope

(i) TheseTermsofReference(the"**TOR**")fortheAuthority'sEngineerarebeingspecified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been enteredintobetweenthe[nameandaddressoftheAuthority](the"**Authority**")and ..... (the "**Contractor**")# for "Widening/Improvement to 4 (Four) Lane with Paved Shoulder from Ch. 00.000 km to Ch.21.350 km (Design Ch.00.000 km to Ch.21.200 Km.) Package-1 of Paikan- Tura National Highway Road (NH 217) in the state of Assam on EPC mode "and a copy of which is annexed hereto and marked as Annex-A to form part of thisTOR.

#-IncasethebidofAuthority'sEngineerisinvitedsimultaneouslywiththebidofEPCproject, then the status of bidding of EPC project only to beindicated

(ii) TheTORshallapplytoconstructionandmaintenanceoftheProjectHighway.

2. Definitions andinterpretation

(i) Thewordsandexpressionsbeginningwithorincapitallettersandnotdefinedherein butdefinedintheAgreementshallhave,unlessrepugnanttothecontext,themeaning respectively assigned to them in theAgreement.

(ii) 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 thisTOR.

(iii) The rules of interpretation stated in Article 1 of the Agreement shall apply, mutatis mutandis, to thisTOR.

3. General

(i) 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 IndustryPractice.

(ii) 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 beforedetermining:

(a) any TimeExtension;

(b) anyadditionalcosttobepaidbytheAuthoritytotheContractor;

(c) the Termination Payment;or

(d) issuance of Completion Certificateor

(e) Any other matter which is not specified in (a), (b), (c) or (d) above and which creates a financial liability on eitherParty.

(iii) 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 everymonth.

(iv) 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,thatitshallnotdelegatetheauthoritytoreferanymatterfortheAuthority's priorapprovalinaccordancewiththeprovisionsofClause18.2.

(v) The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope underArticle13.

(vi) 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

(i) During the Construction Period, the Authority's Engineer shall review and approve 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 (VI). The Authority's Engineer shall complete such review and approval and send its observationstotheAuthorityandtheContractorwithin15(fifteen)daysofreceiptof such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended up to 30 (thirty) days. In particular,suchcommentsshallspecifytheconformityorotherwiseofsuchDrawings withtheScopeoftheProjectandSpecificationsandStandards.

(ii) TheAuthority'sEngineershallreviewandapproveanyrevisedDrawingssenttoitby the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.

(iii) The Authority's Engineer shall review and approve the Quality Assurance Plan submittedbytheContractorandshallconveyitscommentstotheContractorwithina periodof21(twentyone)daysstatingthemodifications,ifany,requiredthereto.

(iv) The Authority's Engineer shall complete the review and approve 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 theContractor.

(v) The Authority's Engineer shall grant written approval to the Contractor, where necessary,forinterruptionanddiversionoftheflowoftrafficintheexistinglane(s)of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions ofClause10.4.

(vi) The Authority's Engineer shall review the monthly progress report furnished by the ContractorandsenditscommentsthereontotheAuthorityandtheContractorwithin 7 (seven) days of receipt of suchreport.

(vii) 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,thecomplianceoftherecommendationsmadebytheSafetyConsultant.

(viii) TheAuthority'sEngineershallconductthepre-constructionreviewofmanufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer mayrequire.

(ix) 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 purposesofthisParagraph4(ix),thetestsspecifiedintheIRCSpecialPublication-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 there of shall be deemed to be tests conforming to Good Industry Practice for qualityassurance.

(x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

(xi) The timing of tests referred to in Paragraph 4 (ix), 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 maybecarriedoutbytheContractorforitsownqualityassuranceinaccordancewith Good IndustryPractice.

(xii) 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 remedialmeasures.

(xiii) 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.

(xiv) 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 orthwith.

(xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor'squalitycontrolrecordsanddocumentsbeforetheCompletionCertificate is issued pursuant toClause12.2.

(xvi) 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 recommendingwhetherornotthesuspensionhereundermayberevoked.

(xvii) In the event that the Contractor carries out any remedial measures to secure the safetyofsuspendedworksandUsers,andrequirestheAuthority'sEngineertoinspect 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, recommendingwhetherornotsuchsuspensionmayberevokedbytheAuthority.

(xviii) 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, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 andSchedule-K.

5. MaintenancePeriod

(i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programmed and for this purpose carry out a joint monthly inspection with theContractor.

(ii) 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 theContractor.

(iii) 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 thisbehalf.

(iv) 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 permissiblelimitofdeviationordeteriorationwithreferencetotheSpecificationsand Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissiblelimit.

(v) 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 tothe Authority underClause14.5.

6. Determination of costs andtime

(i) TheAuthority'sEngineershalldeterminethecosts,and/ortheirreasonableness,that are required to be determined by it under theAgreement.

(ii) TheAuthority'sEngineershalldeterminetheperiodofTimeExtensionthatisrequired to be determined by it under theAgreement.

(iii) The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions ofClause18.5.

7. Payments

(i) 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 (IV)(d).

(ii) Authority's Engineershall-

(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 InterimPaymentCertificatecertifyingtheamountdueandpayabletitle

Contractor,afteradjustmentsinaccordancewiththeprovisionsofClause 19.10.

(iii) 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'smonthlystatementandcertifytheamounttobepaidtotheContractorin accordance with the provisions of theAgreement.

(iv) 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 ofClause19.16.

8. Other duties andfunctions

TheAuthority'sEngineershallperformallotherdutiesandfunctionsasspecifiedin theAgreement.

9. Miscellaneous

(i) 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 thetestresultswithcommentsoftheAuthority'sEngineerthereon,shallbefurnished by the Authority's Engineer to the Authorityforthwith.

(ii) 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.

(iii) Within90(ninety)daysoftheProjectCompletionDate,theAuthority'sEngineershall 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-builtsurveyillustratingthelayoutoftheProjectHighwayandsetbacklines,ifany,of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receiptthereof.

(iv) 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 theParties.

(v) The Authority's Engineer shall in form the Authority and the Contractor of any event of Contractor's Default within one week of itsoccurrence.

Schedule - O

(See Clauses 19.4 (i), 19.6 (i), and 19.8 (i))

Forms of Payment Statements

1. Stage Payment Statement forWorks

The Stage Payment Statement for Works shall state:

(a) TheestimatedamountfortheWorksexecutedinaccordancewithClause19.3 (i) subsequent to the lastclaim;

(b) amounts reflecting adjustments in price for the a foresaidclaim;

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

(d) amountsreflectingadjustmentinprice,ifany,for(c)aboveinaccordancewith the provisions of Clause 13.2(iii)(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 up to the lastclaim:

i. For the Works executed (excluding Change of Scopeorders);

ii. For Change of Scope Orders,and

iii. Taxes deducted

2. Monthly Maintenance PaymentStatement

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 notdone;

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

(d) amounts reflecting adjustments in price under Clause19.12;and

(e) amount towards deduction oftaxes

3. Contractor's claim forDamages

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

Schedule - P

(See Clause20.1)

Insurance

1. Insurance during ConstructionPeriod

(i) The Contractor shall effect and maintain at its own cost, from the Appointed Date till thedateofissueoftheCompletionCertificate,thefollowinginsurancesforanylossor damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire andterrorism:

(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 theSite.

(ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph1.1otherthanriskswhicharenotinsurableatcommercialterms.

2. Insurance for Contractor's DefectsLiability

The Contractor shall effect and maintain insurance cover of not less than 15% of the ContractPricefortheWorksfromthedateofissueoftheCompletionCertificateuntil theendoftheDefectsLiabilityPeriodforanylossordamageforwhichtheContractor is liable and which arises from a cause occurring prior to the issue of the Completion Certificate.TheContractorshallalsomaintainotherinsurancesformaximumsumsas may be required under the Applicable Laws and in accordance with Good Industry Practice.

3. Insurance against injury to persons and damage toproperty

(i) The Contractor shall insure against its liability for any loss, damage, death or bodily injury,ordamagetoanyproperty(exceptthingsinsuredunderParagraphs1and2of thisScheduleortoanyperson(exceptpersonsinsuredunderClause20.9),whichmay 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 ofoccurrences.

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

(ii) 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) theAuthority'srighttohavetheconstructionworksexecutedon,over,under, inorthroughanyland,andtooccupythislandfortheWorks;and

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

4. Insurancetobeinjointnames

Theinsuranceunderparagraphs1to3aboveshallbeinthejointnamesofthe Contractor and theAuthority.

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Qualitytest:

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 kilometre.

2. Visual and physicaltest:

TheAuthority'sEngineershallconductavisualandphysicalcheckofconstruction 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 inSchedule-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 [construction of the ****section (km ** to km **) of

****] (the "**Project Highway**") 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 ANDDELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

******* End of theDocument*******