Schedules

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1 The Site

(i) Site of the Two-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. The existing Ch. Has been measure with respect to existing Centre

1. *Site*

The Site of the Two-Lane Project Highway comprises the section of National Highway-217 (Old NH-51) Road, "Package-II" Assam Meghalaya State Boarder to Marak Nursery Gokul Village, North Garo Hills District., Meghalaya, from Km 21+050 to Km 48+625 (From Design Ch .Km 20.900 to Km 47.075, Design Length = 26.175 Km) in the State of Meghalaya. The land, carriageway and structures comprising the Site are described below.

2. *Land*

The Site of the Project Highway comprises the land as described below:

Sl. No.	Existing Chainage		ROW		Total Width of ROW (m)	Remarks
	From	To	LHS (m)	RHS (m)		
(1)	(4)	(5)	(6)	(7)	(8)	(9)
1	21+050	23+123	10.67	10.67	21.34	
2	23+123	24+606	10.67	10.67	21.34	Bajengdoba Bypass
3	24+606	48+625	10.67	10.67	21.34	

3. *Carriageway*

The present carriageway of the Project Highway consists of two lanes/two lanes with paved shoulders with bituminous pavement and earthen shoulders configuration from Ex. Ch. Km 21+050 to Ex. Ch. Km 48+625. 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	21+050	48+625	2-lanes/ 2-lanes with Paved shoulders	7.0 CW/ 10.0 m CW

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	Super-structure			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	21+400*	open	Wall Type	Slab	2X7.80	12.40	
2	26+735	open	Wall Type	RCC Girder	1X21.0	7.50	
3	27+950	open	Wall Type	Slab	1X10.0	7.90	
4	30+225	open	Wall Type	Slab	1X8.0	7.70	
5	32+545	open	Wall Type	RCC Girder	1X12.0	8.60	

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)
6	34+380	open	Wall Type	Slab	3X6.5	8.60	
7	37+190	open	Wall Type	Slab	1X10.0	8.60	
8	38+165	open	Wall Type	Slab	3X5.50	8.65	
9	39+700	open	Wall Type	Slab	1X10.0	8.45	
10	40+390	open	Wall Type	RCC Girder	1X12.0	8.45	
11	41+575	open	Wall Type	RCC Girder	1X12.55	8.45	

Note

* The Project Highway Alignment is being modified at these Minor Bridge locations. The contractor shall maintain this existing bridge in Traffic worthiness during construction.

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	21+44	Slab	1x1.0	12.00	
2	22+105*	PIPE	1x0.8	15.00	
3	22+325	PIPE	1x0.8	15.00	

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)
4	22+660	PIPE	1x1.0	13.00	
5	22+850	PIPE	1x1.0	11.75	
6	23+085	PIPE	1x0.9	16.80	
7	24+550*	PIPE	1x1.0	10.45	
8	24+575*	PIPE	1x0.8	10.70	
9	24+590*	PIPE	1x1.0	13.00	
10	24+750	SLAB	1x3.1	12.70	
11	24+840	PIPE	1x1.0	11.80	
12	24+865	PIPE	1x1.0	10.45	
13	25+090	PIPE	2x1.0	10.50	
14	25+240	PIPE	1x1.0	10.40	
15	25+415	PIPE	2x1.0	10.50	
16	25+450	PIPE	1x0.8	10.45	
17	25+605	SLAB	1x1.8	10.30	
18	25+650	PIPE	1x0.8	10.40	
19	25+920	PIPE	2x0.9	10.50	
20	26+280	PIPE	1x0.9	11.80	
21	26+400	SLAB	1x1.0	10.50	
22	26+875	PIPE	1x1.0	10.60	
23	26+965	PIPE	1x1.0	10.40	
24	27+515	SLAB	1x6.0	9.15	
25	27+935	PIPE	1x1.0	9.25	
26	28+140	SLAB	1x1.1	10.45	
27	28+200	PIPE	1x1.0	9.20	
28	28+575	PIPE	1x1.0	9.20	
29	28+935	SLAB	1x1.4	10.50	
30	29+125	PIPE	1x1.0	10.45	
31	29+240	PIPE	2x1.0	10.50	
32	29+415	PIPE	1x1.0	10.45	
33	29+665	SLAB	1x1.45	10.50	
34	29+820	PIPE	1x1.0	10.45	
35	30+120	PIPE	2x1.0	10.65	
36	30+785	PIPE	2x1.0	10.55	
37	30+925	PIPE	2x1.0	11.60	
38	31+055	SLAB	1x6.0	11.10	
39	31+145	SLAB	1x2.0	11.20	
40	31+340	SLAB	1x6.0	11.20	
41	31+665	PIPE	2x1.0	10.50	
42	32+275	PIPE	1x1.0	11.60	
43	35+460	PIPE	1x1.1	11.60	
44	32+680	PIPE	1x1.0	10.45	
45	32+875	PIPE	2x1.0	10.60	

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)
46	32+990	PIPE	1x1.0	10.60	
47	33+200	PIPE	2x1.0	10.60	
48	33+265	PIPE	1x1.0	10.50	
49	33+315	PIPE	2x1.0	9.35	
50	33+625	SLAB	1x4.8	10.95	
51	33+735	PIPE	1x1.0	10.00	
52	34+040	PIPE	1x1.0	10.45	
53	34+125	PIPE	1x1.0	10.42	
54	34+155	PIPE	2x1.0	11.10	
55	34+290	PIPE	2x1.0	10.50	
56	34+555	PIPE	2x1.0	10.45	
57	34+765	PIPE	1x1.0	10.15	
58	35+735	PIPE	1x0.8	10.60	
59	36+070	PIPE	1x0.8	10.50	
60	36+250	Pipe	1x0.8	10.65	
61	36+575	Pipe	2x1.0	18.20	
62	36+670	Pipe	1x0.8	13.10	
63	36+745	Pipe	1x0.8	10.45	
64	36+835	Pipe	2x1.0	10.50	
65	36+905	SLAB	1x3.0	10.20	
66	37+050	Pipe	1x0.8	10.40	
67	37+300	SLAB	1x4.8	8.90	
68	37+375	Pipe	1x0.8	10.20	
69	37+425	Pipe	1x1.0	11.64	
70	37+550	Pipe	1x1.0	10.50	
71	37+700	SLAB	1x5.5	11.90	
72	37+740	SLAB	1x2.50	9.10	
73	38+925	Pipe	1x1.0	9.30	
74	39+140	SLAB	1x6.0	11.95	
75	39+330	Pipe	1x1.0	10.57	
76	39+410	Pipe	1x1.0	11.00	
77	39+500	Pipe	1x1.0	10.45	
78	39+850	Pipe	2x1.0	10.80	
79	40+000	Pipe	1x0.8	10.55	
80	40+130	Pipe	1x1.0	10.5	
81	40+635	Pipe	1x1.0	10.60	
82	40+775	Pipe	1x0.8	10.00	
83	41+060	SLAB	1x2.65	10.50	
84	41+335	Pipe	1x1.0	9.87	
85	41+480	Pipe	2x1.0	10.65	
86	41+715	Pipe	1x1.0	13.00	
87	41+890	Pipe	1x1.0	10.55	

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)
88	41+975	Pipe	2x0.8	11.00	
89	42+150	Pipe	2x1.0	14.70	
90	42+410	Pipe	1x1.0	10.30	
91	42+570	Pipe	1x1.0	10.70	
92	42.670	Pipe	1x1.0	10.5	
93	42+735	Pipe	1x0.8	12.90	
94	42+900	Pipe	1x1.0	10.65	
95	43+005	Pipe	1x1.0	13.00	
96	43+165	Pipe	1x0.8	8.90	
97	43+200	SLAB	1x1.7	10.70	
98	43+235	Pipe	2x1.0	13.00	
99	43+450	Pipe	1x1.0	10.20	
100	43+475	Pipe	1x1.0	13.00	
101	43+600	Pipe	1x1.0	10.00	
102	43+675	SLAB	1x2.0	13.00	
103	43+810	Pipe	2x1.0	10.45	
104	44+000	Pipe	1x1.0	12.90	
105	44+075	Pipe	1x1.0	10.0	
106	44+200	Pipe	2x1.0	10.40	
107	44+270	Pipe	1x0.8	10.58	
108	44+360	Pipe	1x1.0	10.40	
109	44+455	Pipe	1x1.0	10.50	
110	44+550	SLAB	1x2.0	16.00	
111	44+620	Pipe	1x1.0	10.32	
112	44+715	SLAB	1x3.0	9.70	
113	44+875	Pipe	1x1.0	10.40	
114	44+990	Pipe	1x1.0	10.30	
115	45+155	Pipe	1x1.0	10.65	
116	45+275	Pipe	1x0.8	10.30	
117	45+400	SLAB	1x3.15	9.00	
118	45+525	Pipe	1x1.0	13.35	
119	45+560	SLAB	1x1.0	9.10	
120	45+625	Pipe	1x1.0	10.65	
121	45+860	Pipe	1x1.0	10.40	
122	45+900	Pipe	2x1.0	11.67	
123	45+980	Pipe	1x0.8	10.15	
124	46+040	Pipe	1x0.8	12.18	
125	46+150	Pipe	2x1.0	10.95	
126	46+265	Pipe	1x1.0	10.5	
127	46+715	Pipe	1x1.0	10.60	
128	47+010	SLAB	1x2.85	10.60	

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)
129	47+145	Pipe	2x1.0	10.70	
130	47+270	Pipe	1x0.8	10.45	
131	47+525	SLAB	1x3.0	10.50	
132	47+795	SLAB	1x1.75	10.30	
133	47+860	SLAB	1x1.8	10.35	
134	48+070	SLAB	1x0.85	9.17	
135	48+140	SLAB	1x0.85	9.50	
136	48+310	SLAB	1x0.85	9.50	

* Left out culverts due to realignment and Bypass at these locations.

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:

S .No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
1	21+665	21+680	RHS	RCC/PCC/Stone Masonry	
2	22+070	22+195	LHS	RCC/PCC/Stone Masonry	
3	23+63*	23+715	RHS	RCC/PCC/Stone Masonry	
4	23+635*	23+85	LHS	RCC/PCC/Stone Masonry	
5	23+735*	23+845	RHS	RCC/PCC/Stone Masonry	
6	24+148	24+378	RHS	RCC/PCC/Stone Masonry	
7	24+255	24+43	LHS	RCC/PCC/Stone Masonry	
8	24+427	24+55	RHS	RCC/PCC/Stone Masonry	

S .No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
9	24+88	25+05	LHS	RCC/PCC/Stone Masonry	
10	25+600	25+78	LHS	RCC/PCC/Stone Masonry	
11	26+535	26+68	LHS	RCC/PCC/Stone Masonry	
12	26+575	26+7	RHS	RCC/PCC/Stone Masonry	
13	28+565	28+62	LHS	RCC/PCC/Stone Masonry	
14	32+88	32+92	LHS	RCC/PCC/Stone Masonry	
15	33+21	33+3	LHS	RCC/PCC/Stone Masonry	
16	33+925	34+03	LHS	RCC/PCC/Stone Masonry	
17	34+55	34+65	RHS	RCC/PCC/Stone Masonry	
18	34+57	34+638	LHS	RCC/PCC/Stone Masonry	
19	35+865	36+045	LHS	RCC/PCC/Stone Masonry	
20	36+945	37+050	LHS	RCC	
21	37+785	38+005	LHS	RCC	
22	39+235	39+330	RHS	RCC	
23	40+885	41+035	LHS	RCC	
24	41+975	41+985	LHS	RCC	
25	43+070	43+130	LHS	RCC	
26	43+250	43+450	LHS	RCC	
27	47+085	47+145	LHS	RCC	

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	23+725		At grade (T)				MDR	

(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**		**Sides**	**Type**	
	From km	**To km**		**T -junction**	**Cross road**
(1)	(2)	(3)	**(4)**	(5)	
1	21+084			X	VR
2	21+894			T	VR
3	23+064			Y	VR
4	26+669			T	VR
5	27+790			T	VR
6	28+665			T	VR

7	29+215			T	VR
8	30+896			T	VR
9	31+907			T	VR
10	32+107			T	VR
11	32+464			Y	VR
12	32+494			Y	VR
13	33+237			T	VR
14	34+087			T	VR
15	34+262			T	VR
16	34+416			Y	VR
17	34+516			T	VR
18	34+854			T	VR
19	35+069			Y	VR
20	35+293			T	VR
21	35+843			T	VR
22	39+053			Y	VR
23	40+252			T	VR
24	41+320			T	VR
25	41+530			Y	VR
26	42+987			Y	VR
27	44+227			T	VR
28	47+128			Y	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.

S. No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
1	21+57	21+625	RHS	RRM	
2	21+595	21+675	LHS	RRM	
3	21+685	21+775	LHS	RRM	
4	21+83	21+85	RHS	RRM	
5	21+86	21+9	LHS	RRM	
6	21+92	21+95	LHS	RRM	
7	22+06	22+155	RHS	RRM	
8	22+065	22+11	LHS	RRM	

S. No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
9	22+15	22+19	LHS	RRM	
10	22+3	22+395	RHS	RRM	
11	22+33	22+34	LHS	RRM	
12	22+415	22+45	LHS	RRM	
13	22+415	22+455	RHS	RRM	
14	22+635	22+68	BHS	RRM	
15	22+82	22+935	RHS	RRM	
10	22+835	22+91	LHS	RRM	
16	23+05	23+23	RHS	RRM	
17	23+07	23+22	LHS	RRM	
18	23+985	23+99	LHS	RRM	
19	24+09	24+105	LHS	RRM	
20	24+255	24+345	LHS	RRM	
21	24+51	24+62	LHS	RRM	
22	24+79	24+8	LHS	RRM	
23	25+815	25+82	RHS	RRM	
24	26+055	26+065	RHS	RRM	
25	26+7	26+725	RHS	RRM	
26	28+015	28+085	RHS	RRM	
27	28+47	28+515	LHS	RRM	
28	28+585	28+62	LHS	RRM	
29	28+69	28+765	RHS	RRM	
30	29+05	29+1	RHS	RRM	
31	29+42	29+43	LHS	RRM	
32	30+1	30+12	LHS	RRM	
33	31+03	31+13	RHS	RRM	
34	31+525	31+55	LHS	RRM	
35	31+535	31+56	RHS	RRM	
36	31+73	31+84	RHS	RRM	
37	32+225	32+26	LHS	RRM	
38	32+245	32+3	RHS	RRM	
39	33+55	33+625	RHS	RRM	
40	34+285	34+355	RHS	RRM	
41	34+475	34+62	LHS	RRM	
42	34+675	34+69	RHS	RRM	
43	34+9	34+92	LHS	RRM	
44	35+2	35+35	LHS	RRM	
45	35+41	35+425	RHS	RRM	
46	35+64	35+66	LHS	RRM	
47	36+250	36+260	LHS	RCC	
48	36+635	36+670	RHS	RCC	
49	36+715	36+770	RHS	RCC	
50	36+725	36+770	LHS	RCC	

S. No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
51	36+945	36+985	LHS	RCC	
52	37+060	37+115	LHS	RCC	
53	37+540	37+550	RHS	RCC	
54	37+600	37+625	RHS	RCC	
55	37+670	37+690	RHS	RCC	
56	37+980	38+005	RHS	RRM	
57	38+060	38+120	RHS	RCC	
58	38+070	38+100	LHS	RCC	
59	38+175	38+185	LHS	RCC	
60	38+230	38+270	LHS	RCC	
61	38+750	38+780	LHS	RCC	
62	38+820	38+840	RHS	RCC	
63	38+905	38+925	RHS	RCC	
64	39+100	39+110	LHS	RCC	
65	39+195	39+205	RHS	RCC	
66	39+235	39+320	LHS	RCC	
67	39+235	39+245	RHS	RCC	
68	39+320	39+350	RHS	RCC	
69	39+500	39+525	RHS	RCC	
70	39+565	39+615	RHS	RCC	
71	39+770	39+800	RHS	RCC	
72	40+050	40+060	RHS	RCC	
73	40+130	40+140	RHS	RCC	
74	40+885	41+020	LHS	RCC	
75	41+375	41+420	RHS	RCC	
76	41+465	41+500	RHS	RCC	
77	41+710	41+725	RHS	RCC	
78	42+340	42+350	RHS	RCC	
79	42+400	41+410	RHS	RCC	
80	42+475	42+485	RHS	RCC	
81	43+075	43+130	LHS	RCC	
82	43+290	43+300	RHS	RCC	
83	43+300	43+345	LHS	RCC	
84	43+700	43+720	RHS	RCC	
85	43+810	43+865	RHS	RCC	
86	44+065	44+095	RHS	RCC	
88	44+145	44+160	RHS	RCC	
89	44+695	44+725	RHS	RCC	
90	44+810	44+835	RHS	RCC	
91	44+825	44+850	RHS	RCC	
92	44+975	45+025	RHS	RCC	
93	45+220	45+230	RHS	RCC	

S. No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
94	45+425	45+520	LHS	RCC	
95	45+520	45+525	RHS	RCC	
96	45+620	45+625	RHS	RCC	
97	46+820	45+835	RHS	RCC	
98	45+875	45+895	LHS	RCC	
99	46+270	46+280	LHS	RCC	
100	46+555	46+567	RHS	RCC	
101	47+350	47+370	RHS	RCC	
102	47+520	47+530	LHS	RCC	

RRM =Random Rubble Masonry, RCC= Reinforce cement Concrete

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

(i) Electrical utilities

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/LT Lines)

Sr. No.	Design Chainage (km)		Length (Km)				Crossing (m)			Transformers	
	From	To	11 KV (HT)	33 KV (HT)	LT	RHS/LHS	11 KV (HT)	33 KV (HT)	LT	Number	Capacity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)
1	23.22	23.485		0.265		RHS					
2	36.719	37.190		0.471		RHS					
3	37.190	38.320		1.130		LHS					
4	38.320	39.128		0.808		RHS					
5	39.320	39.450		0.130		LHS					
6	39.480	39.830		0.350		RHS					
7	40.048	40.202		0.154		RHS					
8	40.301	40.400		0.099		LHS					
9	40.400	40.677		0.277		RHS					
10	40.677	40.971		0.294		LHS					
11	41.046	41.155		0.109		RHS					
12	41.440	41.600		0.160		RHS					

Sr. No.	Design Chainage (km)		Length (Km)				Crossing (m)			Transformers	
	From	To	11 KV (HT)	33 KV (HT)	LT	RHS/LHS	11 KV (HT)	33 KV (HT)	LT	Number	Capacity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)
13	41.600	41.780		0.180		LHS					
14	43.025	43.560		0.535		RHS					
15	43.560	44.880		1.320		LHS					
16	44.880	45.185		0.305		RHS					
17	45.185	45.820		0.635		LHS					
18	45.820	46.010		0.190		RHS					
19	46.010	46.180		0.170		LHS					
20	46.180	46.965		0.770		RHS					
21	21.605							66.14			
22	33.815							41.67			
23	35.960							71.57			
24	37.130							103.98			
25	37.910							139.8			
26	37.985										
27	38.350							90			
28	39.235							197.35			
29	39.235							122.61			
30	39.845							66.21			
31	39.945							106.53			
32	40.010							77.4			
33	40.240							99.81			
34	40.365							113.47			

Sr. No.	Design Chainage (km)		Length (Km)				Crossing (m)			Transformers	
	From	To	11 KV (HT)	33 KV (HT)	LT	RHS/LHS	11 KV (HT)	33 KV (HT)	LT	Number	Capacity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)
35	40.740							141.57			
36	41.010							79.98			
37	41.560							123.84			
38	41.800							50.81			
39	43.555							60			
40	44.970							179.93			
41	45.135							134.12			
42	45.585							157.4			
43	45.695							145.95			
44	45.920							184.08			
45	46.060							94.75			
46	46.205							65.28			
47	46.840							205			
48	27.52	28.11	0.59			LHS					
49	30.995	31.5	0.505			LHS					
50	34.835	35.13	0.295			LHS					
51	25.2	25.58	0.38			RHS					
52	25.715	26.355	0.64			RHS					
53	27.34	27.435	0.095			RHS					
54	28.195	28.295	0.1			RHS					
55	28.675	29.815	1.14			RHS					

Sr. No.	Design Chainage (km)		Length (Km)				Crossing (m)			Transformers	
	From	To	11 KV (HT)	33 KV (HT)	LT	RHS/LHS	11 KV (HT)	33 KV (HT)	LT	Number	Capacity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)
56	30.535	30.94	0.405			RHS					
57	31.97	32.095	0.125			RHS					
58	32.56	32.7	0.14			RHS					
59	33.29	33.38	0.09			RHS					
60	35.315	35.375	0.06			RHS					
61	35.375	35.870	0.495			RHS					
62	40.750	40.795	0.045			RHS					
63	43.780	43.915	0.135			LHS					
64	44.445	44.805	0.360			RHS					
65	45.190	46.965	1.760			RHS					
66	21.66						66.75				
67	22.935						73.54				
68	23.4						75.33				
69	24.435						70.05				
70	26.05						15.6				
71	26.875						13.98				
72	27.435						89.43				
73	28.11						85.78				
74	28.555						53.66				
75	29.635						17.15				
76	30.53						16.87				
77	30.94						61.26				

Sr. No.	Design Chainage (km)		Length (Km)				Crossing (m)			Transformers	
	From	To	11 KV (HT)	33 KV (HT)	LT	RHS/LHS	11 KV (HT)	33 KV (HT)	LT	Number	Capacity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)
78	31.44						18.88				
79	31.815						60				
80	32.56						13.35				
81	33.75						39.6				
82	34.835						32.16				
83	35.13						26.39				
84	35.13						77.44				
85	36.680						42.98				
86	37.960						17.89				
87	39.270						68.41				
88	40.795						16.26				
89	41.055						19.25				
90	41.470						46.73				
91	43.775						57.64				
92	21.37	22.95			1.58	LHS					
93	24.208	25.58			1.372	LHS					
94	26.705	26.85			0.145	LHS					
95	26.875	27.355			0.48	LHS					
96	28.01	28.235			0.225	LHS					
97	28.955	29.41			0.455	LHS					
98	30.915	31.375			0.46	LHS					
99	31.53	31.7			0.17	LHS					

Sr. No.	Design Chainage (km)		Length (Km)				Crossing (m)			Transformers	
	From	To	11 KV (HT)	33 KV (HT)	LT	RHS/LHS	11 KV (HT)	33 KV (HT)	LT	Number	Capacity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)
100	32.255	32.325			0.07	LHS					
101	32.6	32.645			0.045	LHS					
102	32.69	33.678			0.988	LHS					
103	33.785	33.965			0.18	LHS					
104	34.025	35.355			1.33	LHS					
105	35.375	35.475			0.100	LHS					
106	35.442	35.462			0.020	RHS					
107	36.905	37.000			0.095	LHS					
108	38.612	39.315			0.703	LHS					
109	39.287	39.507			0.220	RHS					
110	40.203	40.395			0.192	RHS					
111	40.639	40.758			0.119	RHS					
112	40.915	40.955			0.040	LHS					
113	45.090	45.605			0.515	LHS					
114	45.650	46.025			0.375	RHS					
115	46.155	46.525			0.370	LHS					
116	21.4	21.462			0.062	RHS					
117	23.945	24.11			0.165	RHS					
118	25.58	25.975			0.395	RHS					
119	26.355	26.675			0.32	RHS					
120	27.78	28.01			0.23	RHS					
121	28.675	28.902			0.227	RHS					

Sr. No.	Design Chainage (km)		Length (Km)				Crossing (m)			Transformers	
	From	To	11 KV (HT)	33 KV (HT)	LT	RHS/LHS	11 KV (HT)	33 KV (HT)	LT	Number	Capacity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)
122	29.665	30.21			0.545	RHS					
123	30.85	30.98			0.13	RHS					
124	31.305	31.53			0.225	RHS					
125	35.442	35.462			0.02	RHS					
126	39.287	39.507			0.22	RHS					
127	40.203	40.395			0.192	RHS					
128	40.639	40.758			0.119	RHS					
129	45.65	46.025			0.375	RHS					
130	21.505								15.11		
131	21.565								62.996		
132	21.675								24.24		
133	21.915								18.84		
134	21.915								18.74		
135	22.15								32.66		
136	22.308								16.23		
137	22.593								32.4		
138	25.58								16.43		
139	25.715								9.98		
140	25.935								23.92		
141	26.395								25.21		
142	26.44								25.99		
143	26.6								21		

Sr. No.	Design Chainage (km)		Length (Km)				Crossing (m)			Transformers	
	From	To	11 KV (HT)	33 KV (HT)	LT	RHS/LHS	11 KV (HT)	33 KV (HT)	LT	Number	Capacity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)
144	26.675								32.43		
145	26.85								31.33		
146	27.355								26.88		
147	28.01								35.6		
148	28.9								42.43		
149	29.775								34.49		
150	29.91								20.156		
151	30.105								38.64		
152	30.98								23.77		
153	31.135								29		
154	31.53								59.5		
155	31.625								17.63		
156	32.605								30.34		
157	32.645								22.28		
158	32.745								22		
159	32.99								26.2		
160	33.555								44.38		
161	33.845								31.88		
162	33.965								13.96		
163	34.025								13.24		
164	34.135								34.23		
165	34.275								18.72		
166	34.375								28.98		

Sr. No.	Design Chainage (km)		Length (Km)				Crossing (m)			Transformers	
	From	To	11 KV (HT)	33 KV (HT)	LT	RHS/LHS	11 KV (HT)	33 KV (HT)	LT	Number	Capacity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)
167	34.485								36.12		
168	34.58								26.44		
169	34.825								18.49		
170	35.355								38.52		
171	35.440								18.16		
172	37.161								31.29		
173	38.840								67.16		
174	39.286								20.86		
175	39.742								29.78		
176	40.206								22.13		
177	40.595								42.1		
178	40.660								37.71		
179	40.937								28.99		
180	45.295								29.78		
181	46.925								42		
182	21.66									1+2HTLSGI	
183	24.415									6HTLSGI	
184	24.415									7HTLSGI	
185	25.58									17HTGIRS	
186	25.58									18HTGIRS	
187	26.355									28GIHTRS	
188	26.355									29GIHTRS	

Sr. No.	Design Chainage (km)		Length (Km)				Crossing (m)			Transformers	
	From	To	11 KV (HT)	33 KV (HT)	LT	RHS/LHS	11 KV (HT)	33 KV (HT)	LT	Number	Capacity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)
189	28.01									46HILSGI	
190	28.01									47HILSGI	
191	29.815									74HTGIRS	
192	31.25									92HTLSGI	
193	31.25									93HTLSGI	
194	31.435									98HTRSGI	
195	32.595									119HTRSGI	
196	32.595									120HTRSGI	
197	34.81									126HTRSGI	
198	34.81									127HTRSGI	
199	39.745					RHS				16HTRSGI	11 KV
200	39.745					RHS				15HTRSGI	11 KV
201	41.490					LHS				32HTLSGI	11 KV
202	46.321					LHS				63HTLSGI	11 KV
203	46.321					LHS				64HTLSGI	11 KV

Total LT poles =311, Total HT poles 11KV=187, Total HT Poles 33 KV=100 Total Transformers=29 Nos.

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE

SL.NO	EXISTING CHAINAGE	DESIGN CHAINAGE	SIDE	DETAIL (MILD STEAL/ GALVANIZES IRON)	NO. OF POLES	NORTHING	EASTING	REMARKS
1	21+660	21.450	LHS	GI (SP) (SHIFTING) LT	1	2867550.172	252259.79	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
2	21+690	21.480	LHS	GI (SP) (SHIFTING) LT	2	2867525.392	252249.067	
3	21+720	21.510	LHS	GI (SP) (SHIFTING) LT	3	2867498.172	252235.201	
4	21+720	21.510	RHS	GI (SP) (SHIFTING) LT	4	2867508.594	252224.258	
5	21+720	21.510		GI LHS TO RHS (CROSSING) 440 V		2867503.908	252228.85	
6	21+750	21.540	LHS	GI (SP) (SHIFTING) LT	5	2867476.195	252221.249	
7	21+755	21.545	RHS	MS (SP) (SHIFTING) LT	6	2867477.169	252203.065	
8	21+765	21.555		MS LHS TO RHS (CROSSING) 440 V		2867465.296	252205.675	
9	21+775	21.565	LHS	GI (SP) (SHIFTING) LT	7	2867454.327	252206.742	
10	21+775	21.565	LHS	MS (SP) (SHIFTING) LT	8	2867454.327	252206.742	
11	21+825	21.610	LHS	GI (SP) (SHIFTING) LT	9	2867409.64	252189.907	
12	21+870	21.660	LHS	MS (SP) (SHIFTING) LT	10	2867364.202	252181.919	
13	21+890	21.680	LHS	GI (SP) (SHIFTING) LT	11	2867347.528	252170.21	
14	21+890	21.680		GI LHS TO RHS (CROSSING) 440 V		2867349.209	252164.751	
15	21+900	21.690	LHS	GI (SP) (SHIFTING) LT	12	2867333.408	252166.11	
16	21+915	21.705	LHS	GI (SP) (SHIFTING) LT	13	2867322.628	252161.419	
17	21+960	21.750	LHS	MS/GI (DP) (SHIFTING) LT	14/15	2867276.781	2867276.781	
18	22+010	21.800	LHS	MS (SP) (SHIFTING) LT	16	2867233.238	252135.733	
19	22+050	21.835	LHS	MS (SP) (SHIFTING) LT	17	2867202.248	252112.199	
20	22+125	21.905		MS LHS TO RHS (CROSSING) 440 V		2867141.182	252065.555	
21	22+130	21.910	LHS	MS (SP) (SHIFTING) LT	18	2867132.717	252072.264	
22	22+135	21.915		GI LHS TO RHS (CROSSING) 440 V		2867130.486	252063.605	
23	22+180	21.960	LHS	MS (SP) (SHIFTING) LT	21	2867085.775	252066.294	
24	22+220	22.000	LHS	GI (SP) (SHIFTING) LT	22	2867045.098	252046.242	
25	22+270	22.060	LHS	GI (SP) (SHIFTING) LT	23	2867002.755	252013.678	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
26	22+300	22.090	LHS	GI (SP) (SHIFTING) LT	24	2866989.499	251983.85	
27	22+320	22.110	LHS	MS (SP) (SHIFTING) LT	25	2866985.498	251968.017	
28	22+360	22.145		MS LHS TO RHS (CROSSING) 440 V		2866985.528	251927.31	
29	22+360	22.150	LHS	MS (SP) (SHIFTING) LT	26	2866978.89	251925.539	
30	22+400	22.200	LHS	GI (SP) (SHIFTING) LT	27	2866968.735	251882.605	
31	22+450	22.240	LHS	GI (SP) (SHIFTING) LT	28	2866919.681	251803.759	
32	22+520	22.305		GI LHS TO RHS (CROSSING) 440 V		2866951.671	251849.618	
33	22+520	22.310	LHS	MS (SP) (SHIFTING) LT	29	2866917.034	251788.584	
34	22+510	22.300	RHS	MS (SP) (SHIFTING) LT	30	2866927.424	251786.242	
35	22+540	22.330	LHS	MS (SP) (SHIFTING) LT	31	2866898.837	251768.496	
36	22+560	22.350	LHS	MS (SP) (SHIFTING) LT	32	2866889.364	251752.156	
37	22+600	22.390	LHS	MS (SP) (SHIFTING) LT	33	2866870.8	251718.902	
38	22+670	22.450	LHS	MS (SP) (SHIFTING) LT	34	2866831.112	251668.435	
39	22+720	22.500	LHS	MS (SP) (SHIFTING) LT	35	2866794.918	251636.067	
40	22+760	22.550	LHS	GI (SP) (SHIFTING) LT	36	2866762.745	251607.748	
41	22+810	22.590	LHS	GI (SP) (SHIFTING) LT	37	2866730.919	251572.074	
42	22+810	22.595		GI LHS TO RHS (CROSSING) 440 V		2866734.483	251566.141	
43	22+860	22.650	RHS	GI (SP) (SHIFTING) LT	38	2866738.25	251559.191	
44	22+910	22.690	LHS	GI (SP) (SHIFTING) LT	39	2866694.505	251530.411	
45	22+915	22.705	LHS	MS (SP) (SHIFTING) LT	40	2866666.621	251495.296	
46	22+970	22.750	LHS	MS (SP) (SHIFTING) LT	41	2866660.843	251488.551	
47	23+005	22.790	LHS	GI (SP) (SHIFTING) LT	42	2866629.21	251450.066	
48	23+050	22.835	LHS	GI (SP) (SHIFTING) LT	43	2866602.483	251420.749	
49	23+090	22.880	LHS	GI (SP) (SHIFTING) LT	44	2866573.728	251388.924	
50	23+110	22.900	LHS	MS (SP) (SHIFTING) LT	44A	2866542.465	251353.995	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
52	24+570	23.960	RHS	MS (SP) (SHIFTING) LT	46	2865840.651	250602.323	
53	24+600	24.000	RHS	GI (SP) (SHIFTING) LT	47	2865809.262	250569.633	
54	24+670	24.070	RHS	MS (SP) (SHIFTING) LT	48	2865749.392	250549.099	
55	24+710	24.110	RHS	MS (SP) (SHIFTING) LT	49	2865709.472	250535.253	
56	24+700	24.110		MS RHS TO LHS (CROSSING) 440 V		2865709.306	250540.879	
57	24+700	24.100	LHS	MS (SP) (SHIFTING) LT	50	2865709.108	250549.468	
58	24+760	24.160	RHS	MS (SP) (SHIFTING) LT	51	2865657.573	250513.979	
59	24+765	24.165		MS RHS TO LHS (CROSSING) 440 V		2865655.899	250518.396	
60	24+800	24.200		MS LHS TO RHS (CROSSING) 440 V		2865625.255	250501.594	
62	24+860	24.250	LHS	MS (SP) (SHIFTING) LT	53	2865588.236	250458.808	
63	24+880	24.270	LHS	MS (SP) (SHIFTING) LT	54	2865575.985	250440.44	
64	24+910	24.300	LHS	MS (SP) (SHIFTING) LT	55	2865557.463	250411.171	
65	24+950	24.340	LHS	MS (SP) (SHIFTING) LT	56	2865536.856	250383.515	
66	24+990	24.390	LHS	MS (SP) (SHIFTING) LT	57	2865506.201	250350.305	
67	25+010	24.410	LHS	MS (SP) (SHIFTING) LT	58	2865489.785	250337.937	
68	25+050	24.440	LHS	MS (SP) (SHIFTING) LT	59	2865468.854	250310.287	
69	25+110	24.500	LHS	MS (SP) (SHIFTING) LT	60	2865440.981	250255.165	
70	25+160	24.560	LHS	MS (SP) (SHIFTING) LT	61	2865416.784	250204.957	
71	25+510	24.600	LHS	MS (SP) (SHIFTING) LT	62	2865396.759	250167.064	
72	25+250	24.650	LHS	MS (SP) (SHIFTING) LT	63	2865370.777	250132.676	
73	25+280	24.670	LHS	MS (SP) (SHIFTING) LT	64	2865347.184	250118.038	
74	25+320	24.710	LHS	MS (SP) (SHIFTING) LT	65	2865317.44	250099.536	
75	25+370	24.760	LHS	MS (SP) (SHIFTING) LT	66	2865270.411	250086.945	
76	25+410	24.800	LHS	MS (SP) (SHIFTING) LT	67	2865225.787	250091.816	
78	25+590	24.960	LHS	MS (SP) (SHIFTING) LT	69	2865088.88	250020.18	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
79	25+640	25.000	LHS	MS (SP) (SHIFTING) LT	70	2865069.727	249974.433	
80	25+670	25.030	LHS	MS (SP) (SHIFTING) LT	71	2865058.768	249947.961	
81	25+700	25.050	LHS	MS (SP) (SHIFTING) LT	72	2865050.215	249924.484	
82	25+730	25.090	LHS	MS (SP) (SHIFTING) LT	73	2865033.724	249896.193	
83	25+760	25.120	LHS	MS (SP) (SHIFTING) LT	74	2865013.748	249866.405	
84	25+800	25.155	LHS	MS (SP) (SHIFTING) LT	75	2864986.981	249845.022	
85	25+830	25.180	LHS	MS (SP) (SHIFTING) LT	76	2864960.795	249826.502	
86	25+870	25.230	LHS	MS (SP) (SHIFTING) LT	77	2864926.977	249808.503	
87	25+930	25.280	LHS	MS (SP) (SHIFTING) LT	78	2864880.309	249785.082	
88	25+970	25.330	LHS	GI (SP) (SHIFTING) LT	79	2864834.914	249771.998	
89	26+000	25.360	LHS	MS (SP) (SHIFTING) LT	80	2864808.201	249765.899	
90	26+040	25.400	LHS	MS (SP) (SHIFTING) LT	81	2864766.755	249757.123	
91	26+110	25.470	LHS	MS (SP) (SHIFTING) LT	82	2864701.001	249744.496	
92	26+160	25.520	LHS	MS (SP) (SHIFTING) LT	83	2864648.334	249735.822	
93	26+220	25.580	LHS	MS (SP) (SHIFTING) LT	84	2864589.417	249724.168	
94	26+225	25.580		MS RHS TO LHS (CROSSING) 440 V		2864590.066	249719.603	
95	26+220	25.580	RHS	MS (SP) (SHIFTING) LT	85	2864591.129	249707.831	
96	26+270	25.620	RHS	MS (SP) (SHIFTING) LT	86	2864546.624	249704.391	
97	26+310	25.670	RHS	MS (SP) (SHIFTING) LT	87	2864504.748	249698.416	
98	26+360	25.715		MS RHS TO LHS (CROSSING) 440 V		2864456.385	249698.879	
99	26+360	25.710	LHS	MS (SP) (SHIFTING) LT	88	2864456.32	249703.025	
100	26+400	25.750	RHS	MS (SP) (SHIFTING) LT	89	2864417.72	249691.708	
101	26+480	25.840	RHS	MS (SP) (SHIFTING) LT	89A	2864328.057	249693.382	
102	26+530	25.890	RHS	MS (SP) (SHIFTING) LT	90	2864282.787	249701.303	
103	26+580	25.940	RHS	MS (SP) (SHIFTING) LT	91	2864239.1	249687.862	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
104	26+580	25.930		MS RHS TO LHS (CROSSING) 440 V		2864239.699	249699.48	
105	26+570	25.930	LHS	MS (SP) (SHIFTING) LT	92	2864240.207	249711.758	
106	26+620	25.980	RHS	MS (SP) (SHIFTING) LT	93	2864204.669	249676.526	
107	27+000	26.360	RHS	MS (SP) (SHIFTING) LT	94	2864035.591	249351.926	
108	27+020	26.380	LHS	MS (SP) (SHIFTING) LT	95	2864010.415	249340.63	
109	27+030	26.385		MS RHS TO LHS (CROSSING) 440 V		2864016.023	249324.599	
110	27+035	26.390	RHS	GI (SP) (SHIFTING) LT	96	2864018.578	249316.779	
111	27+080	26.440	RHS	GI (SP) (SHIFTING) LT	97	2863998.431	249275.581	
112	27+085	26.445		MS RHS TO LHS (CROSSING) 440 V		2863991.002	249274.113	
113	27+100	26.460	RHS	GI (SP) (SHIFTING) LT	98	2863973.461	249268.373	
114	27+120	26.480	RHS	GI (SP) (SHIFTING) LT	99	2863979.277	249240.944	
115	27+160	26.520	RHS	GI (SP) (SHIFTING) LT	100	2863960.294	249206.875	
116	27+200	26.560	RHS	GI (SP) (SHIFTING) LT	101	2863942.475	249171.06	
117	27+240	26.600	RHS	GI (SP) (SHIFTING) LT	102	2863927.504	249135.85	
118	27+240	26.600		MS RHS TO LHS (CROSSING) 440 V		2863921.082	249136.824	
119	27+245	26.605	LHS	MS (SP) (SHIFTING) LT	103	2863906.648	249138.933	
120	27+280	26.640	RHS	GI (SP) (SHIFTING) LT	104	2863914.492	249096.978	
121	27+320	26.680	RHS	GI (SP) (SHIFTING) LT	105	2863904.913	249062.977	
122	27+335	26.690		GI LHS TO RHS (CROSSING) 440 V		2863893.739	249048.233	
123	27+350	26.710	RHS	GI (SP) (SHIFTING) LT	106	2863887.187	249035.82	
124	27+380	26.740	LHS	MS (SP) (SHIFTING) LT	107	2863879.662	249002.541	
125	27+435	26.790	LHS	MS (SP) (SHIFTING) LT	108	2863862.621	248955.7	
126	27+495	26.850	LHS	MS (SP) (SHIFTING) LT	109	2863818.193	248914.444	
127	27+500	26.855		MS LHS TO RHS (CROSSING) 440 V		2863820.512	248907.226	
128	27+520	26.880	LHS	MS (SP) (SHIFTING) LT	110	2863790.743	248911.952	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
129	27+550	26.910	LHS	MS (SP) (SHIFTING) LT	111	2863772.165	248884.99	
130	27+610	26.965	LHS	MS (SP) (SHIFTING) LT	112	2863724.156	248853.87	
131	27+650	27.010	LHS	MS (SP) (SHIFTING) LT	113	2863685.731	248831.325	
132	27+710	27.060	LHS	MS (SP) (SHIFTING) LT	114	2863639.288	248804.672	
133	27+750	27.110	LHS	MS (SP) (SHIFTING) LT	115	2863603.002	248778.451	
134	27+790	27.145	LHS	MS (SP) (SHIFTING) LT	116	2863572.002	248755.553	
135	27+860	27.210	LHS	MS (SP) (SHIFTING) LT	117	2863525.997	248701.777	
136	27+920	27.275	LHS	MS (SP) (SHIFTING) LT	118	2863484.803	248653.315	
137	28+000	27.350	LHS	MS (SP) (SHIFTING) LT	119	2863450.076	248581.266	
138	28+010	27.360		MS RHS TO LHS (CROSSING) 440 V		2863455.572	248570.719	
139	28+430	27.780	RHS	MS (SP) (SHIFTING) LT	120	2863279.205	248184.876	
140	28+480	27.830	RHS	MS (SP) (SHIFTING) LT	121	2863245.827	248149.946	
141	28+520	27.870	RHS	MS (SP) (SHIFTING) LT	122	2863220.111	248123.3	
142	28+555	27.905	RHS	MS (SP) (SHIFTING) LT	123	2863197.866	248093.564	
143	28+590	27.940	RHS	MS (SP) (SHIFTING) LT	124	2863174.474	248062.871	
144	28+630	27.980	RHS	MS (SP) (SHIFTING) LT	125	2863151.131	248032.678	
145	28+660	28.010	RHS	MS (SP) (SHIFTING) LT	126	2863124.961	248014.575	
146	28+660	28.010		MS LHS TO RHS (CROSSING) 440 V		2863119.791	248019.841	
147	28+660	28.010	RHS	MS (SP) (SHIFTING) LT	126A	2863132.728	248006.164	
148	28+660	28.010	LHS	GI (SP) (SHIFTING) LT	126B	2863105.131	248034.321	
149	28+720	28.070	LHS	MS (SP) (SHIFTING) LT	127	2863064.575	247986.698	
150	28+770	28.120	LHS	MS (SP) (SHIFTING) LT	128	2863032.45	247953.362	
151	28+825	28.170	LHS	MS (SP) (SHIFTING) LT	129	2862993.956	247914.83	
152	28+885	28.235	LHS	MS (SP) (SHIFTING) LT	130	2862943.212	247881.241	
153	29+380	28.730	RHS	MS (SP) (SHIFTING) LT	131	2862568.936	247552.935	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
154	29+550	28.900	RHS	MS (SP) (SHIFTING) LT	132	2862406.485	247495.196	
155	29+575	28.920		MS RHS TO LHS (CROSSING) 440 V		2862387.02	247493.274	
156	29+590	28.940	RHS	MS (SP) (SHIFTING) LT	133	2862364.353	247490.194	
157	29+610	28.960	RHS	MS (SP) (SHIFTING) LT	134	2862355.665	247471.949	
158	29+670	29.020	LHS	MS (SP) (SHIFTING) LT	135	2862293.896	247478.146	
159	29+700	29.050	LHS	MS (SP) (SHIFTING) LT	136	2862262.302	247485.752	
160	29+770	29.120	LHS	MS (SP) (SHIFTING) LT	137	2862198.078	247498.605	
161	29+830	29.170	LHS	MS (SP) (SHIFTING) LT	138	2862144.254	247508.75	
162	29+880	29.220	LHS	MS (SP) (SHIFTING) LT	139	2862093.35	247509.025	
163	29+940	29.280	LHS	MS (SP) (SHIFTING) LT	140	2862030.79	247499.181	
164	29+970	29.310	LHS	MS (SP) (SHIFTING) LT	141	2861999.728	247492.535	
165	30+005	29.345	LHS	MS (SP) (SHIFTING) LT	142	2861966.209	247483.524	
166	30+320	29.660	RHS	MS (SP) (SHIFTING) LT	143	2861723.09	247274.959	
167	30+380	29.730	RHS	MS (SP) (SHIFTING) LT	144	2861669.17	247240.816	
168	30+435	29.780	RHS	MS (SP) (SHIFTING) LT	145	2861626.958	247213.939	
169	30+435	29.775		MS RHS TO LHS (CROSSING) 440 V		2861623.523	247222.739	
170	30+470	29.820	RHS	MS (SP) (SHIFTING) LT	146	2861595.101	247194.194	
171	30+510	29.850	RHS	MS (SP) (SHIFTING) LT	147	2861565.701	247177.475	
172	30+430	29.770	LHS	GI (SP) (SHIFTING) LT	148	2861613.784	247245.812	
173	30+550	29.900	LHS	MS (SP) (SHIFTING) LT	149	2861513.441	247165.803	
174	30+565	29.905		MS RHS TO LHS (CROSSING) 440 V		2861513.837	247155.378	
175	30+565	29.910	RHS	MS (SP) (SHIFTING) LT	150	2861514.3	247145.665	
176	30+630	29.970	RHS	MS (SP) (SHIFTING) LT	151	2861458.638	247117.053	
177	30+680	30.020	RHS	MS (SP) (SHIFTING) LT	152	2861410.141	247096.932	
178	30+730	30.070	RHS	MS (SP) (SHIFTING) LT	153	2861363.7	247080.281	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
179	30+765	30.110	RHS	GI (SP) (SHIFTING) LT	154	2861324.522	247073.101	
180	30+775	30.115		MS RHS TO LHS (CROSSING) 440 V		2861316.502	247086.314	
181	30+780	30.125	LHS	GI (SP) (SHIFTING) LT	155	2861304.575	247106.193	
182	30+815	30.160	RHS	MS (SP) (SHIFTING) LT	156	2861273.708	247076.557	
183	30+870	30.210	RHS	MS (SP) (SHIFTING) LT	157	2861222.187	247077.815	
184	31+515	30.850	RHS	MS (SP) (SHIFTING) LT	158	2860981.957	246562.567	
185	31+560	30.900	RHS	MS (SP) (SHIFTING) LT	159	2860987.639	246509.533	
186	31+610	30.940	RHS	MS (SP) (SHIFTING) LT	160	2860983.792	246467.766	
187	31+610	30.940	LHS	GI (SP) (SHIFTING) LT	160A	2860957.246	246471.48	
188	31+580	30.920	LHS	GI (SP) (SHIFTING) LT	160B	2860956.812	246495.02	
189	31+660	30.990	RHS	MS (SP) (SHIFTING) LT	161	2860965.237	246417.302	
190	31+665	30.990		MS LHS TO RHS (CROSSING) 440 V		2860955.06	246416.332	
191	31+700	31.030	RHS	MS (SP) (SHIFTING) LT	162	2860913.492	246396.218	
192	31+750	31.070	LHS	MS (SP) (SHIFTING) LT	163	2860876.93	246382.457	
193	31+780	31.100	LHS	MS (SP) (SHIFTING) LT	164	2860843.017	246373.408	
194	31+810	31.130	LHS	GI (SP) (SHIFTING) LT	165	2860818.062	246359.16	
195	31+815	31.135		MS LHS TO RHS (CROSSING) 440 V		2860820.061	246353.564	
196	31+870	31.190	LHS	MS (SP) (SHIFTING) LT	166	2860760.01	246341.725	
197	31+910	31.230	LHS	MS (SP) (SHIFTING) LT	167	2860724.564	246330.895	
198	31+930	31.250	LHS	MS (SP) (SHIFTING) LT	168	2860701.524	246318.507	
199	31+990	31.310	RHS	MS (SP) (SHIFTING) LT	169	2860662.321	246279.366	
200	32+000	31.330	RHS	MS (SP) (SHIFTING) LT	170	2860639.752	246284.113	
201	32+020	31.350	RHS	GI (SP) (SHIFTING) LT	171	2860630.844	246261.704	
202	32+050	31.380	LHS	MS (SP) (SHIFTING) LT	172	2860597.786	246258.333	
203	32+060	31.385	RHS	GI (SP) (SHIFTING) LT	173	2860599.226	246241.019	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
204	32+095	31.420	RHS	GI (SP) (SHIFTING) LT	174	2860571.841	246222.534	
205	32+110	31.435	RHS	GI (SP) (SHIFTING) LT	174A	2860559.581	246207.675	
206	32+120	31.445	RHS	GI (SP) (SHIFTING) LT	175	2860545.386	246210.035	
207	32+140	31.460	RHS	GI (SP) (SHIFTING) LT	176	2860534.713	246202.761	
208	32+170	31.490	RHS	GI (SP) (SHIFTING) LT	177	2860504.784	246184.67	
209	32+210	31.530	RHS	GI (SP) (SHIFTING) LT	178	2860467.309	246170.221	
210	32+215	31.530		GI RHS TO LHS (CROSSING) 440 V		2860465.051	246176.826	
211	32+215	31.540	RHS	GI (SP) (SHIFTING) LT	179	2860462.775	246182.304	
212	32+250	31.570	LHS	GI (SP) (SHIFTING) LT	180	2860428.482	246180.809	
213	32+270	31.600	LHS	GI (SP) (SHIFTING) LT	181	2860402.098	246182.531	
214	32+305	31.630	LHS	GI (SP) (SHIFTING) LT	182	2860370.692	246188.008	
215	32+305	31.625		CROSSING		2860370.579	246182.202	
216	32+310	31.630	RHS	GI (SP) (SHIFTING) LT	183	2860367.884	246170.606	
217	32+340	31.660	LHS	GI (SP) (SHIFTING) LT	184	2860339.41	246195.768	
218	32+380	31.700	LHS	GI (SP) (SHIFTING) LT	185	2860292.916	246200.456	
219	33+290	32.590	RHS	MS (SP) (SHIFTING) LT	187	2859881.728	245491.756	
220	32+295	32.595		MS LHS TO RHS (CROSSING) 440 V		2859869.534	245487.468	
221	33+310	32.610	LHS	MS (SP) (SHIFTING) LT	188	2859853.023	245481.915	
222	33+345	32.645	LHS	MS (SP) (SHIFTING) LT	189	2859842.526	245448.627	
223	33+340	32.640		MS LHS TO RHS (CROSSING) 440 V		2859852.786	245445.881	
224	33+340	32.640	RHS	MS (SP) (SHIFTING) LT	190	2859864.238	245443.604	
225	33+390	32.690	LHS	MS (SP) (SHIFTING) LT	191	2859808.029	245416.923	
226	33+450	32.740	LHS	GI (SP) (SHIFTING) LT	192	2859769.896	245380.142	
227	33+455	32.750		MS LHS TO RHS (CROSSING) 440 V		2859770.535	245370.883	
228	33+460	32.760	RHS	GI (SP) (SHIFTING) LT	193	2859772.41	245358.27	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
229	33+500	32.800	LHS	WOODEN (SP) (SHIFTING) LT	194	2859731.395	245346.091	
230	33+520	32.820	LHS	MS (SP) (SHIFTING) LT	195	2859713.27	245326.87	
231	33+550	32.850	LHS	MS (SP) (SHIFTING) LT	196	2859698.388	245309.11	
232	33+590	32.890	LHS	MS (SP) (SHIFTING) LT	197	2859677.143	245270.064	
233	33+640	32.940	LHS	MS (SP) (SHIFTING) LT	198	2859658.974	245223.959	
234	33+690	32.990	LHS	MS (SP) (SHIFTING) LT	199	2859645.142	245172.146	
235	33+690	32.990		MS LHS TO RHS (CROSSING) 440 V		2859652.333	245171.954	
236	33+690	32.990	RHS	MS (SP) (SHIFTING) LT	200	2859671.29	245170.371	
237	33+750	33.050	LHS	MS (SP) (SHIFTING) LT	201	2859625.243	245122.678	
238	33+790	33.090	LHS	WOODEN (SP) (SHIFTING) LT	202	2859599.943	245082.669	
239	33+850	33.150	LHS	MS (SP) (SHIFTING) LT	203	2859568.87	245041.432	
240	34+410	33.400	LHS	MS (SP) (SHIFTING) LT	204	2859362.397	244916.97	
241	34+255	33.555		MS LHS TO RHS (CROSSING) 440 V		2859239.579	244814.692	
242	34+270	33.570	LHS	MS (SP) (SHIFTING) LT	205	2859222.979	244810.591	
243	34+300	33.600	LHS	MS (SP) (SHIFTING) LT	206	2859207.456	244778.763	
244	34+340	33.640	LHS	MS (SP) (SHIFTING) LT	207	2859187.999	244749.024	
245	34+490	33.790	LHS	MS (SP) (SHIFTING) LT	208	2859136.198	244607.492	
246	34+550	33.850	LHS	MS (SP) (SHIFTING) LT	209	2859110.38	244553.021	
247	34+550	33.845		MS LHS TO RHS (CROSSING) 440 V		2859116.723	244548.349	
248	34+600	33.900	LHS	MS (SP) (SHIFTING) LT	210	2859085.681	244503.363	
249	34+630	33.930	LHS	MS (SP) (SHIFTING) LT	211	2859065.653	244483.973	
250	34+665	33.965	LHS	MS (SP) (SHIFTING) LT	212	2859038.085	244465.171	
251	34+670	33.965		MS LHS TO RHS (CROSSING) 440 V		2859041.305	244460.133	
252	34+670	33.970	RHS	MS (SP) (SHIFTING) LT	213	2859044.942	244453.007	
253	34+730	34.030	LHS	MS (SP) (SHIFTING) LT	214	2858988.762	244428.556	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
254	34+725	34.025		MS LHS TO RHS (CROSSING) 440 V		2858993.802	244425.134	
255	34+725	34.025	RHS	MS (SP) (SHIFTING) LT	215	2858999.541	244420.872	
256	34+780	34.080	LHS	GI (SP) (SHIFTING) LT	216	2858952.869	244389.18	
257	34+840	34.140	LHS	MS (SP) (SHIFTING) LT	217	2858915.782	244343.909	
258	34+840	34.140		MS LHS TO RHS (CROSSING) 440 V		2858920.917	244341.641	
259	34+870	34.170	LHS	MS (SP) (SHIFTING) LT	218	2858894.702	244316.299	
260	34+930	34.230	LHS	MS (SP) (SHIFTING) LT	219	2858865.421	244270.146	
261	34+980	34.280	LHS	MS (SP) (SHIFTING) LT	220	2858839.44	244227.425	
262	34+980	34.280		MS LHS TO RHS (CROSSING) 440 V		2858842.026	244221.108	
263	34+990	34.290	LHS	MS (SP) (SHIFTING) LT	221	2858846.907	244210.254	
264	35+030	34.330	LHS	MS (SP) (SHIFTING) LT	222	2858808.048	244186.342	
265	35+080	34.380	LHS	MS (SP) (SHIFTING) LT	223	2858770.68	244160.713	
266	35+075	34.370		MS LHS TO RHS (CROSSING) 440 V		2858777.644	244154.611	
267	35+135	34.440	LHS	GI (SP) (SHIFTING) LT	224	2858715.321	244153.02	
268	35+190	34.490	LHS	MS (SP) (SHIFTING) LT	225	2858663.837	244151.701	
269	35+185	34.485		MS LHS TO RHS (CROSSING) 440 V		2858666.089	244143.928	
270	35+240	34.540	LHS	MS (SP) (SHIFTING) LT	226	2858613.151	244155.131	
271	35+280	34.580	LHS	MS (SP) (SHIFTING) LT	227	2858571.956	244157.462	
272	35+285	34.580		MS LHS TO RHS (CROSSING) 440 V		2858569.317	244151.483	
273	35+330	34.635	LHS	MS (SP) (SHIFTING) LT	228	2858518.123	244168.555	
274	35+390	34.690	LHS	MS (SP) (SHIFTING) LT	229	2858460.474	244176.725	
275	35+440	34.730	LHS	MS (SP) (SHIFTING) LT	230	2858418.549	244154.35	
276	35+490	34.780	LHS	MS (SP) (SHIFTING) LT	231	2858376.518	244127.78	
277	35+530	34.830	RHS	GI (SP) (SHIFTING) LT	232	2858343.906	244090.21	
278	35+540	34.830		MS LHS TO RHS (CROSSING) 440 V		2858333.361	244095.444	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
279	35+560	34.940	LHS	MS (SP) (SHIFTING) LT	233	2858275.877	244007.174	
280	35+800	35.090	LHS	MS (SP) (SHIFTING) LT	234	2858227.991	243871.654	
281	35+850	35.135	LHS	MS (SP) (SHIFTING) LT	235	2858222.828	243814.039	
282	35+845	35.130		MS LHS TO RHS (CROSSING) 440 V		2858217	243823.015	
283	35+900	35.190	LHS	MS (SP) (SHIFTING) LT	236	2858166.938	243797.68	
284	35+950	35.235	LHS	MS (SP) (SHIFTING) LT	237	2858126.287	243773.444	
285	35+990	35.280	LHS	GI (SP) (SHIFTING) LT	238	2858081.798	243760.429	
286	36+070	35.360	LHS	MS (SP) (SHIFTING) LT	239	2858015.374	243723.635	
287	36+080	35.360		MS LHS TO RHS (CROSSING) 440 V		2858014.886	243711.263	
288	36+090	35.375	RHS	MS (SP) (SHIFTING) LT	240	2858013.809	243685.145	
289	36+110	35+395	RHS	MS(SP)(SHIFTING)	1	2857985	243697.9	
290	36+160	35+435		MS(CROSSING LHS TO RHS) 440V		2857952	243669.6	
291	36+150	35+436	LHS	GI(SP)(SHIFTING)	2	2857951	243673.1	
292	36+160	35+444	RHS	GI(SP)(SHIFTING)	3	2857954	243655.1	
293	36+180	35+463	RHS	MS(SP)(SHIFTING)	4	2857939	243640.9	
294	36+190	35+475	LHS	MS(SP)(SHIFTING)	5	2857918	243652.3	
295	37+730	36+905	LHS	MS(SP)(SHIFTING)	5A	2856798	243528.2	
296	37+770	36+950	LHS	MS(SP)(SHIFTING)	6	2856772	243489.6	
297	37+810	36+983	LHS	MS(SP)(SHIFTING)	7	2856752	243464.6	
298	37+990	37+160		MS(CROSSING LHS TO RHS) 440V		2856604	243378.9	
299	37+980	37+161	LHS	MS(SP)(SHIFTING)	8	2856616	243359.2	
300	37+980	37+164	RHS	MS(SP)(SHIFTING)	9	2856600	243386.1	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
301	38+370	37+542	RHS	MS(SP)(SHIFTING)	10	2856336	243111.3	
302	39+480	38+640	LHS	MS(SP)(SHIFTING)	11	2855336	242803.5	
303	39+590	38+672	LHS	MS(SP)(SHIFTING)	12	2855310	242781.5	
304	39+540	38+700	LHS	MS(SP)(SHIFTING)	13	2855295	242754.8	
305	39+560	38+720	LHS	MS(SP)(SHIFTING)	14	2855281	242734.5	
306	39+660	38+817	RHS	MS(SP)(SHIFTING)	15	2855265	242635.7	
307	39+680	38+825		MS(CROSSING RHS TO LHS) 440V		2855255	240632.2	
308	39+720	38+882	LHS	MS(SP)(SHIFTING)	16	2855202	242611.4	
309	39+780	38+930	LHS	MS(SP)(SHIFTING)	17	2855158	242594.7	
310	39+840	39+000	LHS	MS(SP)(SHIFTING)	17A	2855085	242573.3	
311	39+860	39+020	LHS	MS(SP)(SHIFTING)	18	2855076	242548.7	
312	39+910	39+069	LHS	MS(SP)(SHIFTING)	19	2855060	242505	
313	39+940	39+095	LHS	MS(SP)(SHIFTING)	20	2855052	242476.3	
314	39+990	39+150	LHS	MS(SP)(SHIFTING)	21	2855028	242430.2	
315	40+050	39+211	LHS	MS(SP)(SHIFTING)	22	2854993	242381.7	
316	40+100	39+258	LHS	MS(SP)(SHIFTING)	23	2854968	242342.4	
317	40+130	39+285		MS(CROSSING RHS TO LHS) 440V		2854957	242316.1	
318	40+130	39+285	LHS	MS(SP)(SHIFTING)	24	2854951	242320.9	
319	40+135	39+286	RHS	MS(SP)(SHIFTING)	24A	2854967	242307.6	
320	40+160	39+315	LHS	MS(SP)(SHIFTING)	25	2854931	242297.7	
321	40+170	39+325	RHS	MS(SP)(SHIFTING)	26	2854943	242276.1	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
322	40+210	39+366	RHS	MS(SP)(SHIFTING)	27	2854919	242243.9	
323	40+230	39+392	RHS	MS(SP)(SHIFTING)	28	2854906	242221.9	
324	40+260	39+418	RHS	MS(SP)(SHIFTING)	29	2854888	242200.2	
325	40+310	39+468	RHS	MS(SP)(SHIFTING)	29A	2854837	242182.9	
326	40+350	39+507	RHS	MS(SP)(SHIFTING)	30	2854797	242182.2	
327	40+330	39+495	RHS	MS(SP)(SHIFTING)	30A	2854816	242163.4	
328	40+550	39+695	RHS	MS(SP)(SHIFTING)	30B	2854639	242084.7	
329	40+555	39+700		MS(CROSSING LHS TO RHS) 440V		2854608	242092.9	
330	40+600	39+740		MS(CROSSING RHS TO LHS) 440V		2854597	242065.3	
331	40+600	39+742	RHS	MS(SP)(SHIFTING)	31	2854603	242052.2	
332	41+120	40+205	RHS	MS(SP)(SHIFTING)	32	2854273	241764.4	
333	41+120	40+206	LHS	MS(SP)(SHIFTING)	33	2854262	241783.5	
334	41+125	40+210		MS(CROSSING RHS TO LHS) 440V		2854268	241772.8	
335	41+150	40+245	RHS	MS(SP)(SHIFTING)	34	2854231	241746.6	
336	41+215	40+305	RHS	MS(SP)(SHIFTING)	35	2854178	241727	
337	41+265	40+350	RHS	MS(SP)(SHIFTING)	36	2854138	241707.7	
338	41+515	40+600	RHS	GI(SP)(SHIFTING)	38	2853911	241705.7	
339	41+510	40+594	RHS	GI(SP)(SHIFTING)	39	2853894	241744.3	
340	41+510	40+595		MS(CROSSING LHS TO RHS) 440V		2853906	241719.4	
341	41+555	40+639	LHS	MS(SP)(SHIFTING)	40	2853866	241700.2	
342	41+600	40+680	RHS	MS(SP)(SHIFTING)	41	2853846	241668.5	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
343	41+635	40+715	RHS	MS(SP)(SHIFTING)	42	2853829	241634.9	
344	41+675	40+750	RHS	MS(SP)(SHIFTING)	43	2853824	241602.4	
345	41+680	40+759	RHS	MS(SP)(SHIFTING)	44	2853813	241595.6	
346	41+710	40+790	RHS	MS(SP)(SHIFTING)	45	2853796	241564.4	
347	41+850	40+931	LHS	GI(SP)(SHIFTING)	47	2853653	241518.3	
348	41+855	40+935		MS(CROSSING LHS TO RHS) 440V		2853656	241499	
349	41+865	40+945	RHS	GI(SP)(SHIFTING)	48	2853657	241489.6	
350	46+775	45+225	LHS	GI(SP)(SHIFTING)	48A	2850575	239745.2	
351	46+715	45+155	LHS	GI(SP)(SHIFTING)	48B	2850628	239790.4	
352	46+840	45+292	LHS	GI(SP)(SHIFTING)	49	2850533	239696.3	
353	46+845	45+295		MS(CROSSING LHS TO RHS) 440V		2850535	2396871	
354	46+865	45+305	RHS	GI(SP)(SHIFTING)	50	2850539	239667.1	
355	46+850	45+292	LHS	MS(SP)(SHIFTING)	51	2850529	239705.6	
356	46+915	45+358	LHS	MS(SP)(SHIFTING)	52	2850480	239653.9	
357	47+110	45+555	RHS	MS(SP)(SHIFTING)	53	2850406	239467.6	
358	47+135	45+580	LHS	GI(SP)(SHIFTING)	54	2850356	239458.7	
359	47+210	45+655	RHS	MS(SP)(SHIFTING)	55	2850327	239388	
360	47+380	45+825	RHS	MS(SP)(SHIFTING)	56	2850172	239312.2	
361	47+770	46+210	RHS	MS(SP)(SHIFTING)	57	2849788	239314.9	
362	47+840	46+275	RHS	MS(SP)(SHIFTING)	58	2849722	239297	
363	47+860	46+300	LHS	MS(SP)(SHIFTING)	59	2849673	239288.3	

DETAILS OF EXISTING ELECTRICAL (LT 440 V POLES) BERUBARI TO SANALGRE								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
364	47+930	46+360	LHS	MS(SP)(SHIFTING)	60	2849645	239258.5	
365	47+950	46+389	LHS	MS(SP)(SHIFTING)	61	2849634	239227.5	
366	47+990	46+425	LHS	MS(SP)(SHIFTING)	62	2849611	239196.2	
367	48+035	46+465	LHS	MS(SP)(SHIFTING)	63	2849583	239170.3	
368	48+485	46+925	RHS	MS(SP)(SHIFTING)	64	2849557	238758.1	
369	48+485	46+925	LHS	MS(SP)(SHIFTING)	65	2849518	238773.6	
370	48+490	46+926		MS(CROSSING RHS TO LHS) 440V		2849543	238763.8	
				TOTAL NO. (LT LINE 440 V) POLES=311				

DETAILS OF EXISTING ELECTRICAL HT 11 KV POLES) BERUBARI TO GOKUL								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
1	21+870	21+660	LHS	MS (DP) (SHIFTING) SUB- STATION(25 KVA)	1&2	2867361.393	252182	
2	21+870	21+660		MS LHS TO RHS (CROSSING) 11 KV		2867368.575	252172	
3	22+810	22+590	RHS	GI (DP) (SHIFTING) SUB- STATION(53 KVA)	3&4	2866744.754	251557	
4	23+150	22+940		MS LHS TO RHS (CROSSING) 11 KV		2866497.396	251298	
5	23+151	22+941	RHS	MS (SP) (SHIFTING) HT	5	2866508.009	251298	
6	BAYPASS	23+400		MS RHS TO LHS (CROSSING) 11 KV		2866311.185	250888	
7	25+030	24+420		MS RHS TO LHS (CROSSING) 11 KV		2865487.345	250317	

DETAILS OF EXISTING ELECTRICAL HT 11 KV POLES) BERUBARI TO GOKUL								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
8	25+900	25+260	RHS	MS (SP) (SHIFTING) HT	9	2864915.336	249774	
9	25+940	25+290	RHS	GI (SP) (SHIFTING) HT	10	2864875.945	249764	
10	26+000	25+360	RHS	GI (DP) (SHIFTING) HT	11&12	2864811.647	249751	
11	26+050	25+410	RHS	MS (SP) (SHIFTING) HT	13	2864757.873	249741	
12	26+100	25+460	RHS	MS (SP) (SHIFTING) HT	14	2864713.579	249733	
13	26+170	25+530	RHS	GI (DP) (SHIFTING) HT	15&16	2864643.013	249719	
14	26+230	25+590	RHS	GI (DP) (SHIFTING) SUB- STATION(63 KVA)	17&18	2864591.191	249706	
15	26+360	25+710	RHS	MS (SP) (SHIFTING) HT	19	2864457.169	249693	
16	26+430	25+790	RHS	MS (SP) (SHIFTING) HT	20	2864386.698	249692	
17	26+580	25+930	RHS	MS (DP) (SHIFTING) HT	20A&20B	2864246.468	249677	
18	26+690	26+050	RHS	MS (DP) (SHIFTING) HT	21&22	2864144.918	249638	
19	26+695	26+055		MS LHS TO RHS (CROSSING) 11 KV		2864147.97	249632	
20	26+700	26+060	RHS	MS (SP) (SHIFTING) HT	23	2864149.119	249624	
21	26+870	26+230	RHS	MS (DP) (SHIFTING) HT	24&25	2864093.495	249462	
22	26+940	26+300	RHS	MS (DP) (SHIFTING) HT	26&27	2864063.357	249403	
23	27+000	26+360	RHS	GI (DP) (SHIFTING) SUB- STATION(25KVA)	28&29	2864037.881	249353	
24	27+520	26+880	RHS	GI (DP) (SHIFTING) HT	30&31	2863797.486	248903	
25	27+520	26+875		GI RHS TO LHS (CROSSING) 11 KV		2863803.484	248898	
26	27+520	26+880	RHS	GI (DP) (SHIFTING) HT	32&33	2863807.194	248893	
27	28+020	27+370	RHS	MS (DP) (SHIFTING) HT	34&35	2863461.324	248557	
28	28+080	27+430	RHS	MS (SP) (SHIFTING) HT	36	2863428.967	248502	
29	28+130	27+480		MS RHS TO LHS (CROSSING) 11 KV		2863406.964	248462	
30	28+170	27+520	LHS	MS (SP) (SHIFTING) HT	37	2863386.814	248423	
31	28+180	27+530	LHS	MS (DP) (SHIFTING) HT	38&39	2863382.238	248419	
32	28+250	27+600	LHS	GI (DP) (SHIFTING) HT	40&41	2863340.424	248358	
33	28+530	27+880	LHS	MS (SP) (SHIFTING) HT	44	2863184.503	248138	

DETAILS OF EXISTING ELECTRICAL HT 11 KV POLES) BERUBARI TO GOKUL								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
34	28+620	27+970	LHS	MS (SP) (SHIFTING) HT	45	2863129.818	248063	
35	28+660	28+010	LHS	MS (DP) (SHIFTING) SUB- STATION(25KVA)	46&47	2863106.156	248030	
36	28+760	28+110	LHS	MS (DP) (SHIFTING) HT	48&49	2863040.462	247957	
37	28+800	28+150		MS LHS TO RHS (CROSSING) 11 KV		2863016.171	247928	
38	28+850	28+200	RHS	MS (SP) (SHIFTING) HT	50	2862984.243	247892	
39	28+950	28+300	RHS	MS(DP)(SHIFTING)HT	51&52	2862903.331	247832	
40	29+210	28+560		MS RHS TO LHS (CROSSING) 11 KV		2862690.36	247682	
41	29+220	28+570	LHS	MS(DP)(SHIFTING)HT	53&54	2862668.513	247686	
42	29+380	28+730	RHS	MS(SP)(SHIFTING)HT	55	2862567.201	247554	
43	29+450	28+800	RHS	MS(SP)(SHIFTING)HT	56	2862506.884	247531	
44	29+510	28+850	RHS	MS(SP)(SHIFTING)HT	57	2862453.522	247510	
45	29+570	28+920	RHS	MS(TP)(SHIFTING)HT	58	2862394.299	247490	
46	29+690	29+040	RHS	WOODEN(DP)(SHIFTING)HT	59&60	2862282.352	247452	
47	29+820	29+160	RHS	MS(DP)(SHIFTING)HT	61&62	2862152.934	247480	
48	30+140	29+480	RHS	MS(SP)(SHIFTING)HT	63	2861876.138	247372	
49	30+280	29+630	RHS	GI(DP)(SHIFTING)HT	64/65	2861752.622	247295	
50	30+280	29+630	RHS	GI/MS(DP)(SHIFTING)HT	66/67	2861755.28	247292	
51	30+285	29+635		MS RHS TO LHS (CROSSING) 11 KV		2861744.453	247298	
52	30+300	29+640	LHS	GI(DP)(SHIFTING)HT	68/69	2861736.241	247300	
53	30+410	29+750		WOODEN(DP)(SHIFTING)HT	70/71	2861652.162	247225	
54	30+470	29+820	RHS	(DP)(SHIFTING)(SUB STATION) 63KVA	72/73	2861594.96	247192	
55	30+530	29+880	RHS	MS(SP)(SHIFTING)HT	74	2861543.238	247161	
56	30+640	29+980	RHS	MS(SP)(SHIFTING)HT	75	2861452.194	247107	
57	31+190	30+530	LHS	GI(DP)(SHIFTING)HT	76/77	2860997.604	246861	
58	31+195	30+530		GI RHS TO LHS (CROSSING) 11 KV		2861002.57	246854	
59	31+200	30+530	RHS	GI(DP)(SHIFTING)HT	78/79	2861007.707	246847	

DETAILS OF EXISTING ELECTRICAL HT 11 KV POLES) BERUBARI TO GOKUL								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
60	31+340	30+670	RHS	MS(TP)(SHIFTING)HT	80/81/82	2860951.607	246729	
61	31+410	30+740	RHS	MS(SP)(SHIFTING)HT	83	2860956.632	246661	
62	31+480	30+810	RHS	MS(SP)(SHIFTING)HT	84	2860970.565	246596	
63	31+580	30+910	RHS	MS(SP)(SHIFTING)HT	85	2860988.475	246498	
64	31+620	30+950	RHS	MS(DP)(SHIFTING)HT	86/87	2860983.476	246460	
65	31+630	30+960		MS RHS TO LHS (CROSSING) 11 KV		2860970.262	246446	
66	31+670	31+000	LHS	MS(DP)(SHIFTING)HT	88/89	2860941.249	246416	
67	31+750	31+070	LHS	MS(SP)(SHIFTING)HT	90	2860877.52	246388	
68	31+830	31+150	LHS	MS(SP)(SHIFTING)HT	91	2860801.543	246357	
69	31+930	31+250		(DP)(SHIFTING)(SUB STATION) 25 KVA	92/93	2860705.573	246318	
70	31+940	31+260	LHS	GI(DP)(SHIFTING)HT	94/95	2860695.229	246313	
71	32+010	31+330	LHS	MS(SP)(SHIFTING)HT	96	2860636.288	246280	
72	32+100	31+420	LHS	MS(SP)(SHIFTING)HT	97	2860562.212	246236	
73	32+120	31+440		GI(DP)(SHIFTING)(SUB STATION)63 KVA	98/99	2860556.187	246211	
74	32+120	31+440		MS LHS TO RHS (CROSSING) 11 KV		2860547.219	246220	
75	32+120	31+440		MS(DP)(SHIFTING)HT	100/101	2860542.442	246224	
76	32+180	31+500		MS(DP)(SHIFTING)HT	102/103	2860491.748	246197	
77	32+185	31+505		MS LHS TO RHS (CROSSING) 11 KV		2860488.963	246186	
78	32+500	31+810	RHS	MS(DP)(SHIFTING)HT	104/105	2860201.673	246128	
79	32+500	31+815		MS LHS TO RHS (CROSSING) 11 KV		2860196.313	246134	
80	32+500	31+810	LHS	MS(DP)(SHIFTING)HT	106/107	2860193.224	246137	
81	32+720	32+030	RHS	MS(DP)(SHIFTING)HT	108/109	2860132.593	245928	
82	32+760	32+080	RHS	MS(DP)(SHIFTING)HT	110/111	2860109.072	245888	
83	33+260	32+560	RHS	GI(TP)(SHIFTING)HT	112/113/114	2859885.803	245518	
84	33+265	32+560		MS RHS TO LHS (CROSSING) 11 KV		2859879.083	245520	
85	33+260	32+560	LHS	GI(DP)(SHIFTING)HT	115/116	2859872.882	245522	

DETAILS OF EXISTING ELECTRICAL HT 11 KV POLES) BERUBARI TO GOKUL								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
86	33+290	32+590	RHS	GI(DP)(SHIFTING)HT	117/118	2859885.95	245494	
87	33+300	32+610		MS(DP)(SHIFTING)(SUB STATION) 63KVA	119/120	2859881.315	245485	
88				MS(SP)(SHIFTING)HT	120A			
89	33+350	32+650		MS(SP)(SHIFTING)HT	121	2859854.759	245435	
90	34+060	33+360	RHS	MS(DP)(SHIFTING)HT	122/123	2859409.924	244903	
91	34+450	33+750	RHS	MS(DP)(SHIFTING)HT	124/125	2859159.426	244636	
92	34+450	33+745		MS RHS TO LHS (CROSSING) 11 KV		2859155.939	244640	
93	35+520	34+810	RHS	MS (DP)(SHIFTING)(SUB STATION) 25 KVA	126/127	2858359.422	244096	
94	35+535	34+825		MS LHS TO RHS (CROSSING) 11 KV		2858337.751	244098	
95	35+550	34+840	LHS	MS(DP)(SHIFTING)HT	128/129	2858326.978	244099	
96	35+590	34+870	LHS	MS(DP)(SHIFTING)HT	130/131	2858292.889	244074	
97	35+750	35+040	LHS	MS(DP)(SHIFTING)HT	132/133	2858249.182	243912	
98	35+850	35+130	LHS	MS(DP)(SHIFTING)HT	134/135	2858206.236	243835	
99	36+070	35+350		MS(DP)(SHIFTING)(SUB STATION)25 KVA	136/137	2858225.749	243814	
1	36+190	35+475	RHS	MS(SP)(SHIFTING)HT	1	2857926	243633.4	
2	37+485	36+675	LHS	MS(DP)(SHIFTING)HT	7&8	2857010	243659.2	
3	37+500	36+685		MS(CROSSING RHS TO LHS) 11KV		2856981	243644.6	
4	37+515	36+700	LHS	MS(DP)(SHIFTING)HT	9&10	2856971	243639.1	
5	38+790	37+960		MS(CROSSING LHS TO RHS) 11KV		2855924	243130.6	
6	38+790	37+960	LHS	GI(DP)(SHIFTING)HT	11&12	2855921	243139.9	
7	38+789	37+959	RHS	GI(DP)(SHIFTING)HT	13/14	2855927	243122.7	
8	40+110	39+270		MS(CROSSING LHS TO RHS) 11KV		2854966	242330.8	
9	40+620	39+755	RHS	TF 25 KVA MS(SUB STATION)	15/16	2854605	242047.5	

DETAILS OF EXISTING ELECTRICAL HT 11 KV POLES) BERUBARI TO GOKUL								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
10	40+610	40+750	RHS	MS(DP)(SHIFTING)HT	17/18	2853825	241598.2	
11	40+660	40+790		MS(CROSSING RHS TO LHS) 11KV		2853787	241567.6	
12	40+660	40+790	RHS	MS(DP)(SHIFTING)HT	21/22	2853795	241566.4	
13	40+665	40+795	LHS	MS(DP)(SHIFTING)HT	23/24	2853779	241570.4	
14	41+975	41+055	LHS	GI(DP)(SHIFTING)HT	25/26	2853603	241395.4	
15	41+970	41+050	RHS	GI(DP)(SHIFTING)HT	27/28	2853622	241396.9	
16	41+975	41+055		MS(CROSSING RHS TO LHS) 11KV		2853611	241937	
17	41+985	41+065	RHS	GI(SP)(SHIFTING)HT	26A	2853585	241395.2	
18	42+450	41+470		MS(CROSSING LHS TO RHS) 11KV		2853322	241119.6	
19	42+450	41+470	LHS	MS(DP)(SHIFTING)HT	29/30	2853309	241147	
20	42+460	41+485	LHS	TF 25 KVA MS(SUB STATION)	31/32	2853294	241187.8	
21	45+060	43+775	LHS	GI(DP)(SHIFTING)HT	33/34	2851783	240140.2	
22	45+240	43+810	LHS	GI(SP)(SHIFTING)HT	35	2851771	240182.7	
23	45+165	43+770		MS(CROSSING RHS TO LHS) 11KV		2851796	240098.7	
24	45+270	43+845	LHS	GI(DP)(SHIFTING)HT	36/37	2851761	240228.6	
25	45+330	43+875	LHS	GI(DP)(SHIFTING)HT	38/39	2851738	240274	
26	45+965	44+445	RHS	MS(DP)(SHIFTING)HT	40/41	2851209	239854.7	
27	46+200	44+675	RHS	MS(DP)(SHIFTING)HT	42/43	2851055	239880.7	
28	46+790	45+240	RHS	MS(SP)(SHIFTING)HT	44	2850589	239696.9	
29	46+840	45+285	RHS	MS(SP)(SHIFTING)HT	45	2850554	239671.6	
30	47+100	45+540	RHS	MS(DP)(SHIFTING)HT	46/47	2850411	239481.6	
31	47+140	45+585	RHS	MS(SP)(SHIFTING)HT	48	2850376	239447.2	

DETAILS OF EXISTING ELECTRICAL HT 11 KV POLES) BERUBARI TO GOKUL								
SL.NO	**EXISTING CHAINAGE**	**DESIGN CHAINAGE**	**SIDE**	**DETAIL (MILD STEAL/ GALVANIZES IRON)**	**NO. OF POLES**	**NORTHING**	**EASTING**	**REMARKS**
32	47+170	45+620	RHS	MS(DP)(SHIFTING)HT	49/50	2850348	239419.9	
33	47+210	45+660	RHS	MS(SP)(SHIFTING)HT	51	2850322	239393.7	
34	47+385	45+835	RHS	MS(SP)(SHIFTING)HT	52	2850154	239318.2	
35	47+540	45+975	RHS	MS(DP)(SHIFTING)HT	53/54	2850022	239325.1	
36	47+560	46+000		MS(CROSSING RHS TO LHS) 11KV		2849988	239346.6	
37	47+565	46+005	RHS	MS(DP)(SHIFTING)HT	55/56	2849995	239322	
38	47+565	46+005	RHS	MS(DP)(SHIFTING)HT	57/58	2849990	239338.9	
39	47+565	46+005	LHS	MS(DP)(SHIFTING)HT	59/60	2849987	239353.6	
40	47+620	46+060	RHS	MS(SP)(SHIFTING)HT	61	2849939	239319.1	
41	47+695	46+135	RHS	MS(SP)(SHIFTING)HT	62	2849866	239298.3	
42	47+880	46+320	RHS	TF 25 KVA MS(SUB STATION)	63/64	2849671	239288.3	
				TOTAL NO. HT (HIGH TENSION) POLES =187				

DETAILS OF EXISTING ELECTRICAL (HT 33 KV POLES) BERUBARI TO GOKUL								
SL.NO	EXISTING CHAINAGE	DESIGN CHAINAGE	SIDE	DETAIL (MILD STEAL/ GALVANIZES IRON)	NO. OF POLES	NORTHING	EASTING	REMARKS

1	21+815	21.610	LHS	MS (DP) (SHIFTING) HT	1&2	2867415.296	252192.159	
2	21+815	21.610		MS LHS TO RHS(CROSSING) 33KV		2867415.942	252186.928	
3	34+510	33.810	LHS	MS (DP) (SHIFTING) HT	4&5	2859124.994	244582.719	
4	34+510	33.810		MS RHS TO LHS(CROSSING) 33KV		2859131.347	244584.247	
1	36+760	35+950		MS(CROSSING LHS TO RHS)33KV		2857499	243800.2	
2	37+560	36+725	RHS	MS(SP)(SHIFTING)HT	1	2856971	243596.6	
3	37+835	37+015	RHS	MS (DP)(SHIFTING)HT	3&4	2856752	243414.7	
4	37+910	37+085	RHS	MS (SP)(SHIFTING)HT	5	2856679	243397.8	
5	37+860	37+035		MS(CROSSING LHS TO RHS)33KV		2856725	243407.6	
6	38+010	37+185	LHS	MS (TP)(SHIFTING)HT	6/7&8	2856579	243367.7	
7	38+180	37+355	LHS	MS (SP)(SHIFTING)HT	8A	2856459	243257	
8	38+245	37+415	LHS	MS (SP)(SHIFTING)HT	9	2856416	243219.3	
9	38+370	37+540	LHS	MS (DP)(SHIFTING)HT	10&11	2856320	243131.8	
10	38+490	37+660	LHS	MS (DP)(SHIFTING)HT	12&13	2856216	243095.9	
11	38+710	37+880	LHS	MS (DP)(SHIFTING)HT	14&15	2856006	243130.3	
12	38+750	37+925		MS(CROSSING LHS TO RHS)33KV		2855961	243129.3	
13	38+830	38+000		MS(CROSSING RHS TO LHS)33KV		2855886	243127.3	
14	38+845	38+015	LHS	MS (DP)(SHIFTING)HT	16&17	2855867	243126.7	
15	38+925	38+095	LHS	MS (SP)(SHIFTING)HT	18	2855798	243076	
16	39+030	38+200	LHS	MS (SP)(SHIFTING)HT	19	2855716	243014.6	
17	39+150	38+320	LHS	MS (DP)(SHIFTING)HT	20&21	2855619	242942.8	
18	39+180	38+345		MS(CROSSING RHS TO LHS)33KV		2855606	242924.2	
19	39+240	38+400	RHS	MS (DP)(SHIFTING)HT	22&23	2855569	242867.3	
20	39+720	38+875	RHS	MS (DP)(SHIFTING)HT	24&25	2855217	242588.3	
21	39+965	39+125	RHS	MS (DP)(SHIFTING)HT	26A/26B	2855064	242437.4	
22	40+070	39+235		MS(CROSSING RHS TO LHS)33KV		2854986	242353.4	
23	40+160	39+320	LHS	MS (DP)(SHIFTING)HT	26/27	2854931	242291.4	
24	40+310	39+475		MS(CROSSING LHS TO RHS)33KV		2854828	242199.1	
25	40+670	39+800	RHS	MS (DP)(SHIFTING)HT	28/29	2854591	241988.4	
26	40+690	39+830		MS(CROSSING RHS TO LHS)33KV		2854574	241969.1	
27	40+750	39+890	LHS	MS (DP)(SHIFTING)HT	30/31	2854527	241922.8	

28	40+780	39+920		MS(CROSSING LHS TO RHS)33KV		2854518	241896.8	
29	40+860	39+980		MS (DP)(SHIFTING)HT	32/33	2854498	241820.8	
30	40+870	39+990		MS(CROSSING RHS TO LHS)33KV		2854483	241817.3	
31	40+930	40+050	RHS	MS (DP)(SHIFTING)HT	34/35	2854423	241802.7	
32	41+115	40+200	RHS	MS (SP)(SHIFTING)HT	36	2854272	241768.5	
33	41+130	40+220		MS(CROSSING RHS TO LHS)33KV		2854253	241764.5	
34	41+210	40+300	LHS	MS (DP)(SHIFTING)HT	37/38	2854175	241746.8	
35	41+300	40+380		MS(CROSSING LHS TO RHS)33KV		2854103	241703.4	
36	41+425	40+500	RHS	MS (DP)(SHIFTING)HT	41/42	2853990	241735.4	
37	41+515	40+600	RHS	MS (SP)(SHIFTING)HT	43	2853913	241698.3	
38	41+580	40+675	RHS	MS (DP)(SHIFTING)HT	44/45	2853848	241666	
39	41+630	40+715		MS(CROSSING RHS TO LHS)33KV		2853823	241635.3	
40	41+740	40+820	LHS	MS (DP)(SHIFTING)HT	46/47	2853758	241556.4	
41	41+890	40+970	LHS	MS (DP)(SHIFTING)HT	48/49	853622.2	241483.6	
42	41+925	41+010		MS(CROSSING LHS TO RHS)33KV		2853618	241438.5	
43	41+970	41+050	RHS	MS (DP)(SHIFTING)HT	50/51	2853617	241404.9	
44	42+540	41+565		MS(CROSSING RHS TO LHS)33KV		2853216	241132.3	
45	42+590	41+600	LHS	MS (DP)(SHIFTING)HT	52/53	2853180	241144.4	
46	42+770	41+715	RHS	MS (DP)(SHIFTING)HT	54/55	2853082	241085.6	
47	42+830	41+770	LHS	MS (SP)(SHIFTING)HT	56	2853022	241076.8	
48	42+835	41+775		MS(CROSSING LHS TO RHS)33KV		2852993	241072.6	
49	42+840	41+800	RHS	MS (DP)(SHIFTING)HT	57/58	2852972	241068.9	
50	44+980	43+635	LHS	MS (SP)(SHIFTING)HT	59	2851845	240274.3	
51	44+930	43+575		MS(CROSSING RHS TO LHS)33KV		2851928	240312.5	
52	44+950	43+600	LHS	MS (DP)(SHIFTING)HT	60/61	2851883	240294.2	
53	45+460	43+950	LHS	MS (DP)(SHIFTING)HT	62/63	2851644	240275.1	
54	45+620	44+130	LHS	MS (DP)(SHIFTING)HT	64/65	2851445	240179.1	
55	46+010	44+485	LHS	MS (DP)(SHIFTING)HT	66/67	2851238	239941	
56	46+080	44+555	LHS	MS (DP)(SHIFTING)HT	68/69	2851178	239898.2	
57	46+130	44+600	LHS	MS (SP)(SHIFTING)HT	69A	2851140	239907.3	
58	46+200	44+675	LHS	MS (SP)(SHIFTING)HT	70	2851076	239918.7	
59	46+300	44+765	LHS	MS (DP)(SHIFTING)HT	71/72	2850990	239943.7	

60	46+410	44+865	RHS	MS (DP)(SHIFTING)HT	73/74	2850885	239919.8	
61	46+470	44+925		MS(CROSSING LHS TO RHS)33KV		2850824	239888	
62	46+610	45+055	RHS	MS (DP)(SHIFTING)HT	75/76	2850727	239834.7	
63	46+710	45+155		MS(CROSSING RHS TO LHS)33KV		2850646	239774.9	
64	46+745	45+190	LHS	MS (SP)(SHIFTING)HT	77	2850619	239755	
65	46+840	45+290	LHS	MS (DP)(SHIFTING)HT	78/79	2850540	239696.1	
66	47+150	45+600		MS(CROSSING LHS TO RHS)33KV		2850354	239443.7	
67	47+170	45+620	RHS	MS (DP)(SHIFTING)HT	80/81	2850349	239427.1	
68	47+260	45+695		MS(CROSSING RHS TO LHS)33KV		2850281	239399.7	
69	47+320	45+765	LHS	MS (DP)(SHIFTING)HT	82/83	2850214	239371.3	
70	47+380	45+820	LHS	MS (DP)(SHIFTING)HT	84/85	2850165	239363.3	
71	47+465	45+910		MS(CROSSING LHS TO RHS)33KV		2850083	239350.1	
72	47+570	46+010	RHS	MS (DP)(SHIFTING)HT	86/87	2849983	239334	
73	47+625	46+065		MS(CROSSING RHS TO LHS)33KV		2849929	239326.3	
74	47+665	46+105	LHS	MS (SP)(SHIFTING)HT	88	2849890	239320	
75	47+740	46+180	LHS	MS (DP)(SHIFTING)HT	89/90	2849820	239306.9	
76	47+770	46+210		MS(CROSSING LHS TO RHS)33KV		2849788	239296.7	
77	47+800	46+240	RHS	MS (SP)(SHIFTING)HT	91	2849758	239285.8	
78	47+850	46+290	RHS	MS (DP)(SHIFTING)HT	92/93	2849713	239271	
79	48+150	46+585	RHS	MS (DP)(SHIFTING)HT	94/95	2849510	239074.2	
80	48+400	46+835		MS(CROSSING RHS TO LHS)33KV		2849539	238850.1	
81	48+465	46+895		MS(CROSSING LHS TO RHS)33KV		2849554	238790.9	
				TOTAL NO. HT 33 KV (HIGH TENSION) =100 POLES				
				TRANSFORMER = 25				

(i) Public Health utilities (Water/Sewage pipe Lines)

* The site includes the following Public Health utilities:

Sr.No	Design Chainage (km)		LHS/RHS	Length(Km)			Crossings		
				Water Supply line			Water Supply line		
	From	To		With Pumping	With Gravity flow	DIA	With Pumping	With Gravity flow	DIA

Sr.No	Design Chainage (km)		LHS/RHS	Length(Km)			Crossings		
				Water Supply line			Water Supply line		
	From	To		With Pumping	With Gravity flow	DIA	With Pumping	With Gravity flow	DIA
1	21.66	21.86	LHS		200	15			
2	21.725	21.855	LHS		130	25			
3	21.865								25
4	21.865	21.95	LHS		85	25			
5	21.96	22.33	LHS		370	50			
6	22.025	22.09	LHS		65	50			
7	22.09								15
8	22.09	22.995	LHS		905	40			
9	23.9	24.75	RHS		850	80			
10	25.275	25.72	RHS		445	80			
11	25.35	25.525	LHS		175	50			
12	25.35	25.525	LHS		175	40			
13	25.725								15
14	25.725								80
15	26.225								100
16	26.225	30.1	RHS		3875	100			
17	27.9	30.105	LHS		2205	150			
18	28.73								50
19	28.735								25
20	30.95	33.39	RHS		2440	100			
21	30.96	33.435	RHS		2475	150			
22	30.875	31.01	RHS		135	40			
23	31.42	31.49	RHS		70	15			
24	31.555								40
25	31.49	31.61	RHS		120	40			
26	32.535								20
27	32.538								50

Sr.No	Design Chainage (km)		LHS/RHS	Length(Km)			Crossings		
				Water Supply line			Water Supply line		
	From	To		With Pumping	With Gravity flow	DIA	With Pumping	With Gravity flow	DIA
28	32.54	32.7	RHS		160	50			
29	32.58								25
30	32.7	32.76	RHS		60	25			
31	34.245	35.375	RHS		1130	100			
32	34.225	34.615	RHS		390	40			
33	34.33	34.82	RHS		490	50			
34	34.82	35.375	RHS		555	80			
35	34.685	34.82	LHS		135	50			
36	34.82	34.99	LHS		170	80			
37	34.99								80
38	35375	36895	RHS		1520	180			
39	35375	36890	RHS		1515	100			
40	35375	36890	RHS		1515	80			
41	35497							49	20
42	35983							68	150
43	36295	36340	LHS		45	50			
44	36345	36580	LHS		235	50			
45	36845	36980	LHS		135	65			
46	36845	36887	LHS		42	65			
47	36888							54	80
48	36889							70	50
49	36890	36965	LHS		75	100			
50	36890							45	100
51	36892							51	100
52	36893							43	150
53	36895	38355	LHS		1460	180			
54	36895							49	150
55	37107							45	25

Sr.No	Design Chainage (km)		LHS/RHS	Length(Km)			Crossings		
				Water Supply line			Water Supply line		
	From	To		With Pumping	With Gravity flow	DIA	With Pumping	With Gravity flow	DIA
56	38067							45	65
57	38975	39515	RHS		540	50			
58	39325	39513	RHS		188	100			
59	39515	40525	RHS		1010	80			
60	39515	39550	RHS		35	65			
61	39551	39977	RHS		426	100			
62	39752							45	20
63	39753							45	80
64	39975	40290	RHS		315	50			
65	40115							60	20
66	40290	40525	RHS		235	100			
67	40525	40620	LHS		95	100			
68	40526							52	100
69	40527							52	80
70	40630	40770	RHS		140	50			
71	40630	40705	RHS		75	40			
72	40630							54	50

The summary of existing water supplies Pipe lines need to be shifted

S.No	Description	Unit	Nos.
1	Water pipe line 150 mm dia	mtr	8183
2	Water pipe line 100 mm dia	mtr	8817
3	Water pipe line 80 mm dia	mtr	4555
4	Water pipe line 65 mm dia	mtr	356
5	Water pipe line 50 mm dia	mtr	3220
6	Water pipe line 40 mm dia	mtr	1610
7	Water pipe line 25 mm dia	mtr	599

S.No	Description	Unit	Nos.
8	Water pipe line 15 mm dia	mtr	504

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 Existing Ch. km. 21+050 to Km. 48+625	27.575	As per Clause 1.2 of Schedule-A, Anne-I ROW Details	90 % On appointed date
(ii) Part Right of Way (part width)				
(a) Stretch				
(iii) Balance Right of Way (width)				10 % within 150 days from appointed date
(a) Stretch				

The detail of land after Land acquisition is as follows:

Sl. No.	Design Chainage		ROW		Total Width of ROW (m)	Remarks
	From	To	LHS (m)	RHS (m)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	20900	21660	22.5	22.5	45	Minor Realignment
2	21660	22394	18	18	36	Berubari Built-Up Area
3	22394	32631	22.5	22.5	45	
4	32631	33355	18	18	36	Mendul Built-Up Area
5	33355	33743	22.5	22.5	45	
6	33743	34056	18	18	36	Gokul Built-Up Area

7	34056	35000	22.5	22.5	45	
8	35000	35889	22.500	22.500	45.000	
9	35889	36089	40.000	25.000	65.000	
10	36089	39294	22.500	22.500	45.000	
11	39294	40166	18.000	18.000	36.000	Rari Built Up Area
12	40166	40231	30.000	30.000	60.000	
13	40231	41284	25.000	25.000	50.000	
14	41284	41731	50.000	25.000	75.000	
15	41731	41933	50.000	50.000	100.000	
16	41933	42480	50.000	25.000	75.000	
17	42480	42892	50.000	40.000	90.000	
18	42892	43802	50.000	25.000	75.000	
19	43802	43957	50.000	40.000	90.000	
20	43957	44292	50.000	25.000	75.000	
21	44292	44698	50.000	40.000	90.000	
22	44698	46525	22.500	22.500	45.000	
23	46525	47054	30.000	20.000	50.000	
24	47054	47075	22.500	22.500	45.000	

*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**
1	Start Chainage (km)	21+050	20.900
2	End Chainage (km)	48+625	47.075
	Length (km)	27.575	26.175

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)

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.

3. ***Forest Clearances****:*

   Not Applicable

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 Two-Laning with Paved Shoulders 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 "Two-Laning"

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) Provided that in the built-up areas 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	Berubari	21.650	22.600	2X7.0 m CW +2x1.5 m Footpath Cum Drain +2.5 m median	TCS-8
2	Mendal	32.650	33.100		TCS-8
3	Gokul	33.800	34.100		TCS-8
4	Rari	39.425	39.575		TCS-8

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

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

(c) 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 50 km/hr for Mountainous and Steep terrain, as per IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision). This provision is in deviation from Manual.

At following locations, speed shall be below 50 km/hr. 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)	(6)
1	39.026	39.147	100	40	Speed

(iii) Improvement of the existing road geometrics

Ruling minimum Radius is 80m as per IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision. This provision is in deviation from Manual.

In the following sections, where improvement of the existing road geometrics to the prescribed standards (Minimum Desirable Radii / Ruling Minimum Radii 80 m) 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)
NIL					

(a) Extra Widening on Curves

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

Table 6.10 of IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision). This provision is in deviation from Manual and the Deviation is also specified in Schedule-D.

(ii) The width of carriageway at existing/ retained/ reconstructed/ additional new Minor Bridges, shall be same as specified in TCS 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)
1	From Km. 22.900 to Km. 24.000	1.100	

Total length of Bypasses = 1.100 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 21.025 to Km 21.65	0.625	Minor Realignment
2	From Km 21.825 to Km 21.925	0.100	Minor Realignment
3	From Km 24.825 to Km 24.950	0.125	Minor Realignment
4	From Km 31.000 to Km 31.150	0.150	Minor Realignment
5	From Km 35.825 to Km 36.325	0.500	Minor Realignment
6	From Km 36.800 to Km 37.025	0.225	Minor Realignment
7	From Km 37.250 to Km 37.300	0.050	Minor Realignment
8	From Km 38.350 to Km 38.550	0.200	Minor Realignment
9	From Km 38.750 to Km 39.000	0.250	Minor Realignment
10	From Km 39.825 to Km 39.875	0.050	Minor Realignment
11	From Km 40.050 to Km 40.925	0.875	Minor Realignment
12	From Km 41.100 to Km 41.675	0.575	Minor Realignment
13	From Km 41.775 to Km 44.400	2.625	Minor Realignment
14	From Km 44.650 to Km 44.775	0.125	Minor Realignment
15	From Km 44.900 to Km 45.225	0.325	Minor Realignment

Sl. No.	Stretch Design Chainage (from km tom)	Length (Km)	Remarks
16	From Km 45.725 to Km 45.825	0.100	Minor Realignment
17	From Km 46.425 to Km 46.700	0.275	Minor Realignment
	Total length of realignment =	Km 7.175	

(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 to km)		Fully paved shoulders/ footpaths	Reference to cross section
(1)	(2)	(3)	(4)	**(5)**
1	21.650	22.600	2x1.50 Footpath cum Drain	TCS 8
2	32.650	33.100	2x1.50 Footpath cum Drain	TCS 8
3	33.800	34.100	2x1.50 Footpath cum Drain	TCS 8
4	39.425	39.575	2x1.50 Footpath cum Drain	TCS 8

b. 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	21.650	22.600	Minimum 2.5 m Raised Median including Kerb Shyness of 0.50 m on each Side with Metal Beam Crash BarriersINGF	TCS 8
2	32.650	33.100		
3	33.800	34.100		
4	39.425	39.575		

(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			

(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	TYPICAL CROSS SECTION -1 Both Side Widening of the Existing Road to 2 Lane with Paved Shoulders on Both Sides	TCS-1
2	TYPICAL CROSS SECTION -2 LHS Widening of Existing Road for 2 Lane with Paved Shoulders on Both Sides	TCS-2
	TYPICAL CROSS SECTION -2A New Construction of One Lane with Paved Shoulders on LHS for 2 Lane with Paved Shoulders on Both Sides	TCS-2A

Sr. No.	Particular of TCS	TCS Codes
3	TYPICAL CROSS SECTION -3 RHS Widening of Existing Road for 2 Lane with Paved Shoulders on Both Sides	TCS-3
	TYPICAL CROSS SECTION -3A New Construction of One Lane with Paved Shoulders on RHS for 2 Lane with Paved Shoulders on Both Sides	TCS-3A
4	TYPICAL CROSS SECTION -4 New Construction of 2 Lane Road with Paved Shoulders on Both Side	TCS-4
5	TYPICAL CROSS SECTION -5 New Construction of 2 Lane Road with Paved Shoulders on Both Side with High Embankment	TCS-5
6	TYPICAL CROSS SECTION -6 Construction of 2 Lane Road with Paved Shoulders on Both Side with High Embankment in Water Logged Areas	TCS-6
	TYPICAL CROSS SECTION -6A Construction of 2 Lane Road with Paved Shoulders on Both Side with Concrete Block on One Side at Elephant Crossing Location	TCS-6A
	TYPICAL CROSS SECTION -6E Construction of 2 Lane Road with Paved Shoulders on Both Side with Concrete Block at Elephant Crossing Location	TCS-6E
7	TYPICAL CROSS SECTION -7 TYPE I Construction of 2 Lane Road with Hill Cutting on Both Side with 4.0 m Gabion Wall with Hill Slope Protection Work	TCS-7 (Type I)
	TYPICAL CROSS SECTION -7 TYPE II Construction of 2 Lane Road with High Hill Cutting on Both Side with 6.0 m Gabion Wall with Hill Slope Protection Work	TCS-7 (Type II)
	TYPICAL CROSS SECTION -7 TYPE IV Construction of 2 Lane Road with Hill Cutting on One Side with 4.0 m Gabion Wall with Hill Slope Protection Work	TCS-7 (Type IV)
8	TYPICAL CROSS SECTION -8 Construction of 4 Lane Road in Built Up Area	TCS-8
9	2-lane Minor 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	20900	21000	100	TCS 1
2	21000	21288	288	TCS 4
3	21288	21312	24	MNB
4	21312	21650	338	TCS 4

Chainagewise TCS details				
Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code
	From	To		
(1)	(2)	(3)	(4)	(5)
5	21650	22600	950	TCS 8
6	22600	22800	200	TCS 3A
7	22800	23100	300	TCS 5
8	23100	23800	700	TCS 6
9	23800	24000	200	TCS 4
10	24000	24600	600	TCS 1
11	24600	24925	325	TCS 3A
12	24925	26099	1174	TCS 1
13	26099	26129	30	MNB
14	26129	26175	46	TCS 1
15	26175	26225	50	TCS 3A
16	26225	27323	1098	TCS 1
17	27323	27338	15	MNB
18	27338	28175	837	TCS 1
19	28175	28225	50	TCS 2
20	28225	28500	275	TCS 1
21	28500	28575	75	TCS 2
22	28575	29125	550	TCS 1
23	29125	29225	100	TCS 3A
24	29225	29300	75	TCS 3A
25	29300	29588	288	TCS 1
26	29588	29596	8	MNB
27	29596	29750	154	TCS 2
28	29750	29975	225	TCS 1
29	29975	30250	275	TCS 3
30	30250	30300	50	TCS 3A
31	30300	30375	75	TCS 3A
32	30375	30450	75	TCS 3
33	30450	30850	400	TCS 2
34	30850	31175	325	TCS 4
35	31175	31400	225	TCS 2
36	31400	31700	300	TCS 1
37	31700	31878	178	TCS 3
38	31878	31890	12	MNB
39	31890	31921	31	TCS 3
40	31921	32000	79	TCS 2
41	32000	32040	40	TCS 6A
42	32040	32175	135	TCS 2
43	32175	32225	50	TCS 1
44	32225	32300	75	TCS 2
45	32300	32400	100	TCS 3
46	32400	32475	75	TCS 4

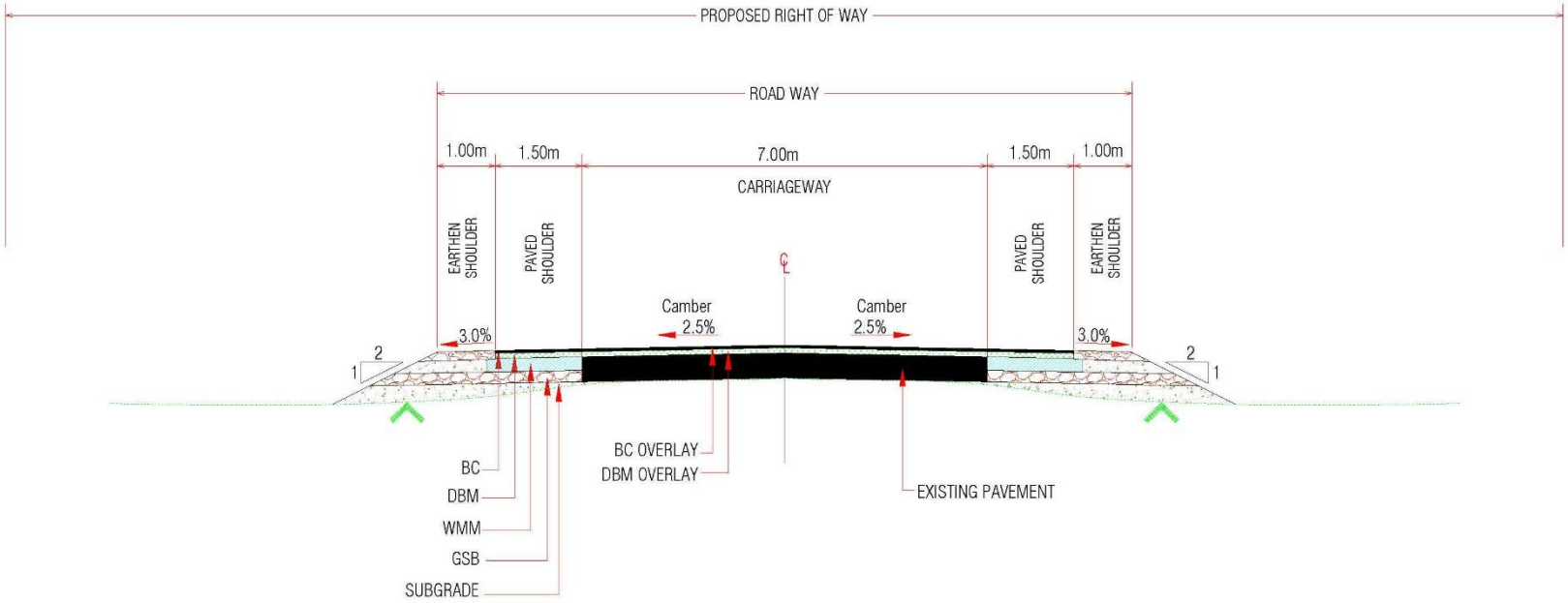
Chainagewise TCS details				
Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code
	From	To		
(1)	(2)	(3)	(4)	(5)
47	32475	32650	175	TCS 3A
48	32650	33100	450	TCS 8
49	33100	33736	636	TCS 1
50	33736	33755	19	MNB
51	33755	33800	45	TCS 1
52	33800	34100	300	TCS 8
53	34100	34725	625	TCS 1
54	34725	34800	75	TCS 3A
55	34800	34900	100	TCS 1
56	34900	35000	100	TCS 3
57	35000	35775	775	TCS 1
58	35775	36210	435	TCS 4
59	36210	36285	75	TCS 6E
60	36285	36350	65	TCS 2
61	36350	36420	70	TCS 1
62	36420	36430	10	MNB
63	36430	36700	270	TCS 1
64	36700	36800	100	TCS 2
65	36800	37025	225	TCS 4
66	37025	37150	125	TCS 2A
67	37150	37225	75	TCS 1
68	37225	37325	100	TCS 4
69	37325	37387	62	TCS 2
70	37387	37403	16	MNB
71	37403	37500	97	TCS 3
72	37500	38175	675	TCS 1
73	38175	38370	195	TCS 2A
74	38370	38380	10	MNB
75	38380	38410	30	TCS 2A
76	38410	38450	40	TCS 6E
77	38450	38575	125	TCS 4
78	38575	38725	150	TCS 1
79	38725	38800	75	TCS 3
80	38800	38850	50	TCS 1
81	38850	38920	70	TCS 2A
82	38920	38930	10	MNB
83	38930	39035	105	TCS 2A
84	39035	39085	50	TCS 6E
85	39085	39350	265	TCS 2
86	39350	39425	75	TCS 1
87	39425	39575	150	TCS 8
88	39575	39603	28	TCS 4

Chainagewise TCS details				
Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code
	From	To		
(1)	(2)	(3)	(4)	(5)
89	39603	39615	12	MNB
90	39615	39800	185	TCS 1
91	39800	39900	100	TCS 4
92	39900	40025	125	TCS 2
93	40025	40729	704	TCS 4
94	40729	40741	12	MNB
95	40741	40950	209	TCS 4
96	40950	41025	75	TCS 2
97	41025	41100	75	TCS 3
98	41100	45225	4125	TCS 7 type II
99	45225	45400	175	TCS 1
100	45400	45525	125	TCS 3
101	45525	45600	75	TCS 3A
102	45600	45725	125	TCS 3
103	45725	45825	100	TCS 4
104	45825	45900	75	TCS 2
105	45900	45975	75	TCS 4
106	45975	46275	300	TCS 1
107	46275	46375	100	TCS 3
108	46375	46425	50	TCS 2
109	46425	46600	175	TCS 7 type I
110	46600	47075	475	TCS 7 type IV
Total Length			26.175	

Note:

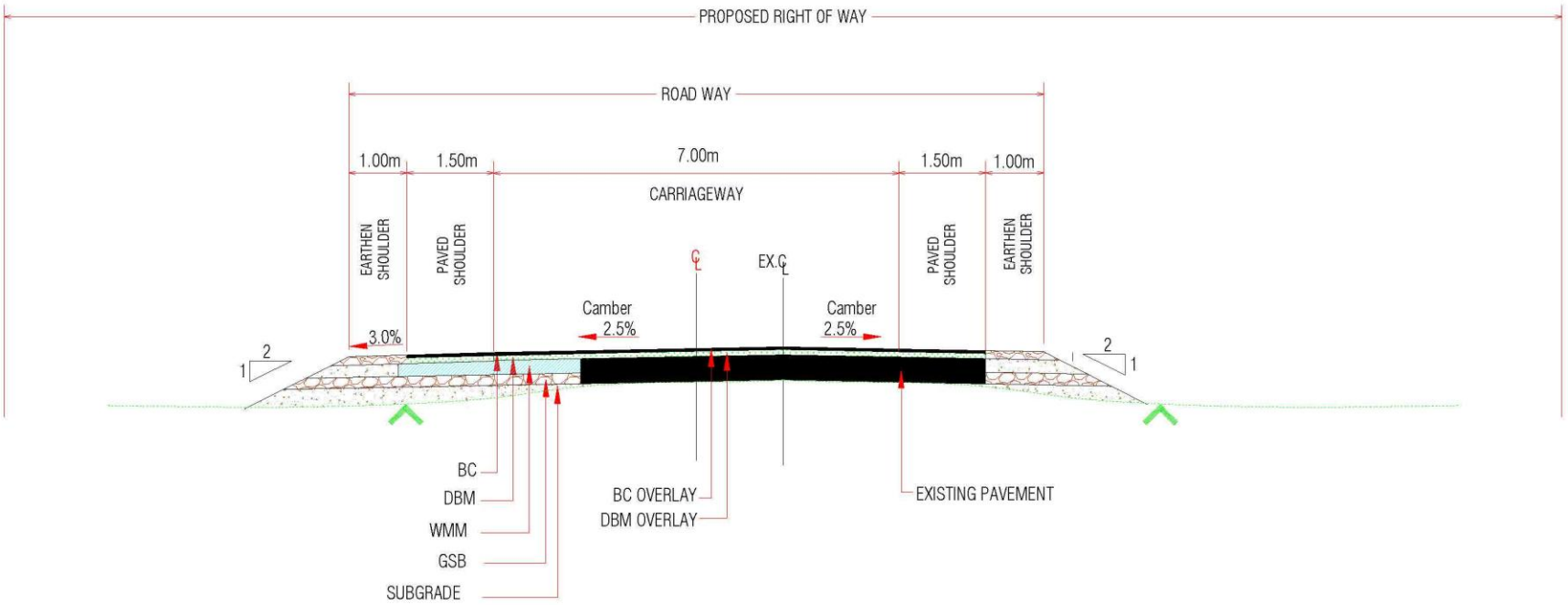
1) The cross-section and Design chainages as given in above table are indicative and stretches may increase or decrease in length depending upon profile designed by contractor, however, this shall not be treated as change of scope.
2) All the cross-sectional elements are to be accommodated within the 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-II

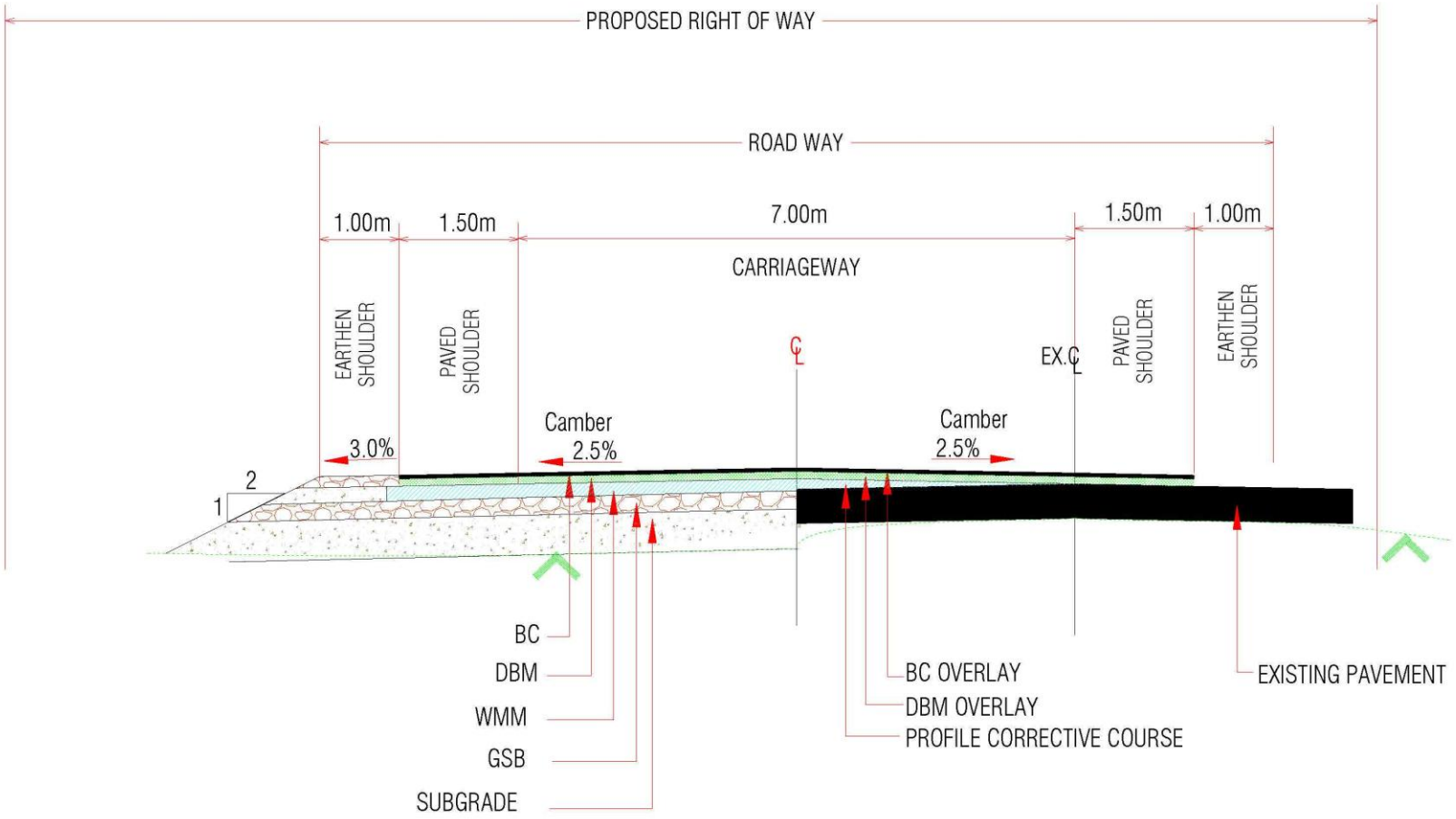


TYPICAL CROSS SECTION -1

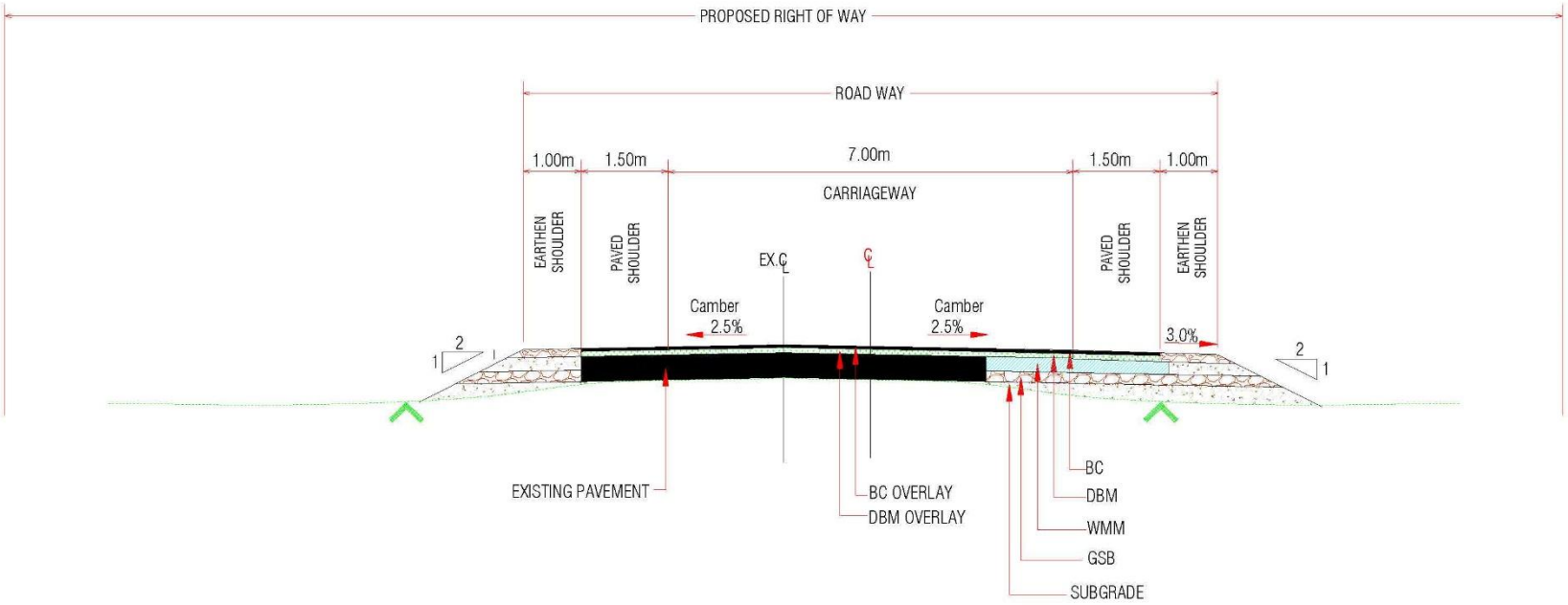
(OPEN COUNTRY MOUNTAINOUS TERRAIN)
BOTH SIDE WIDENING OF THE EXSITING 2 LANE CARRIAGEWAY TO 2 LANE WITH PAVED SHOULDER



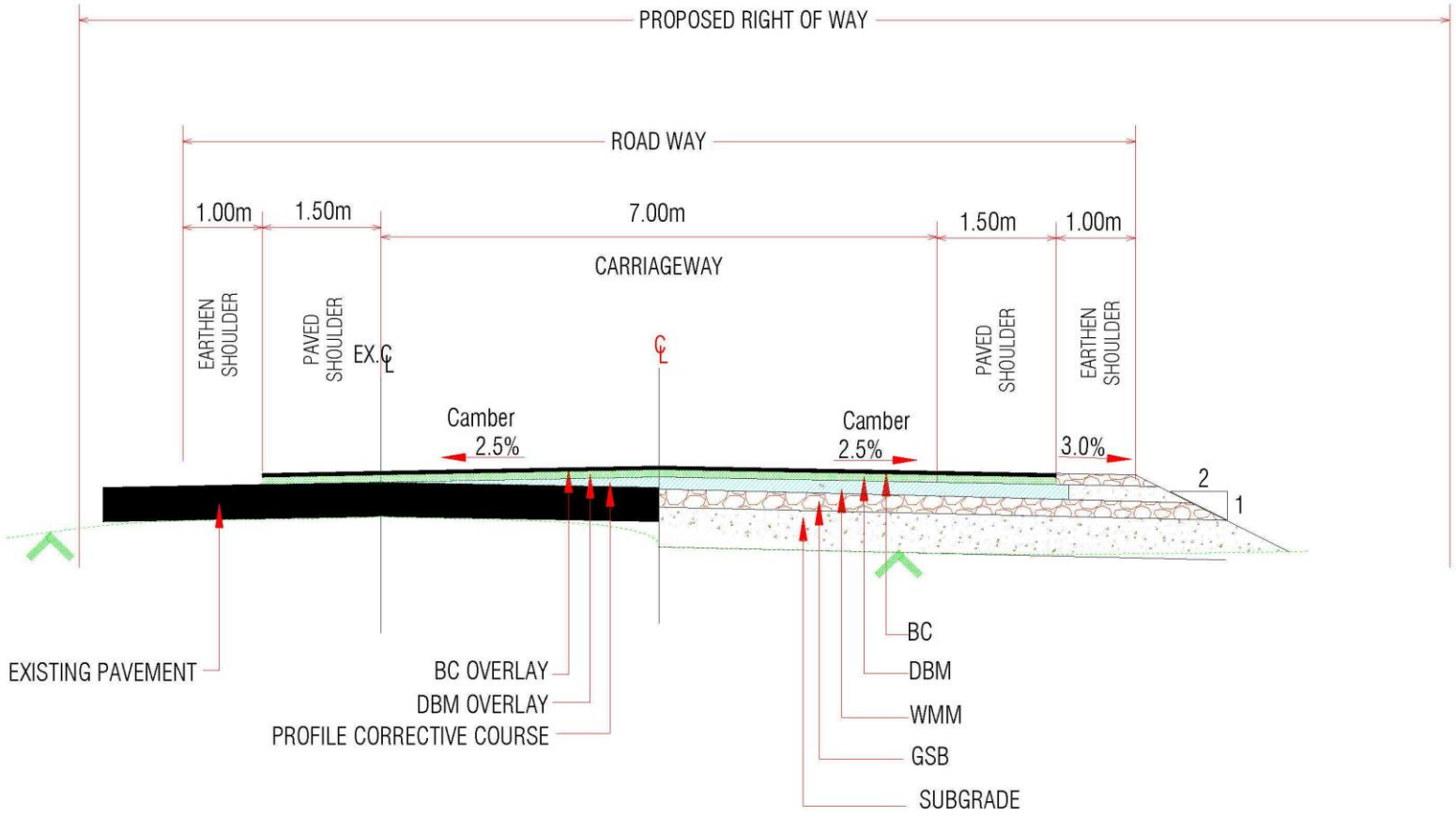
TYPICAL CROSS SECTION -2



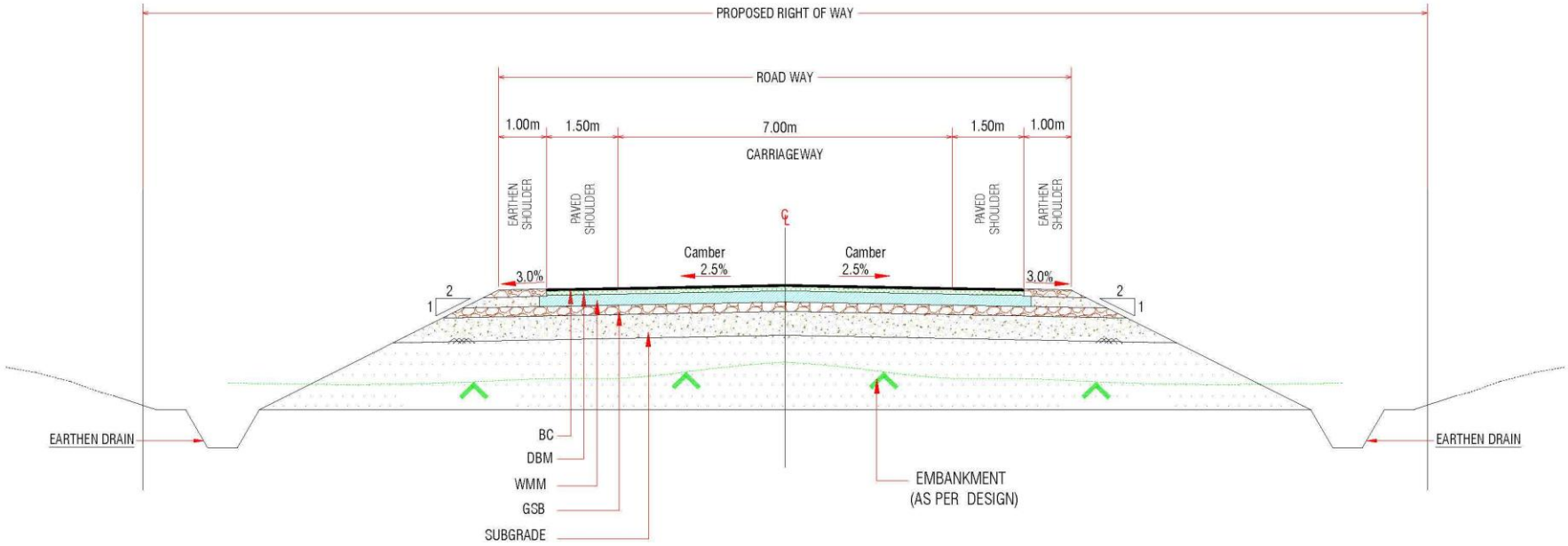
TYPICAL CROSS SECTION -2A



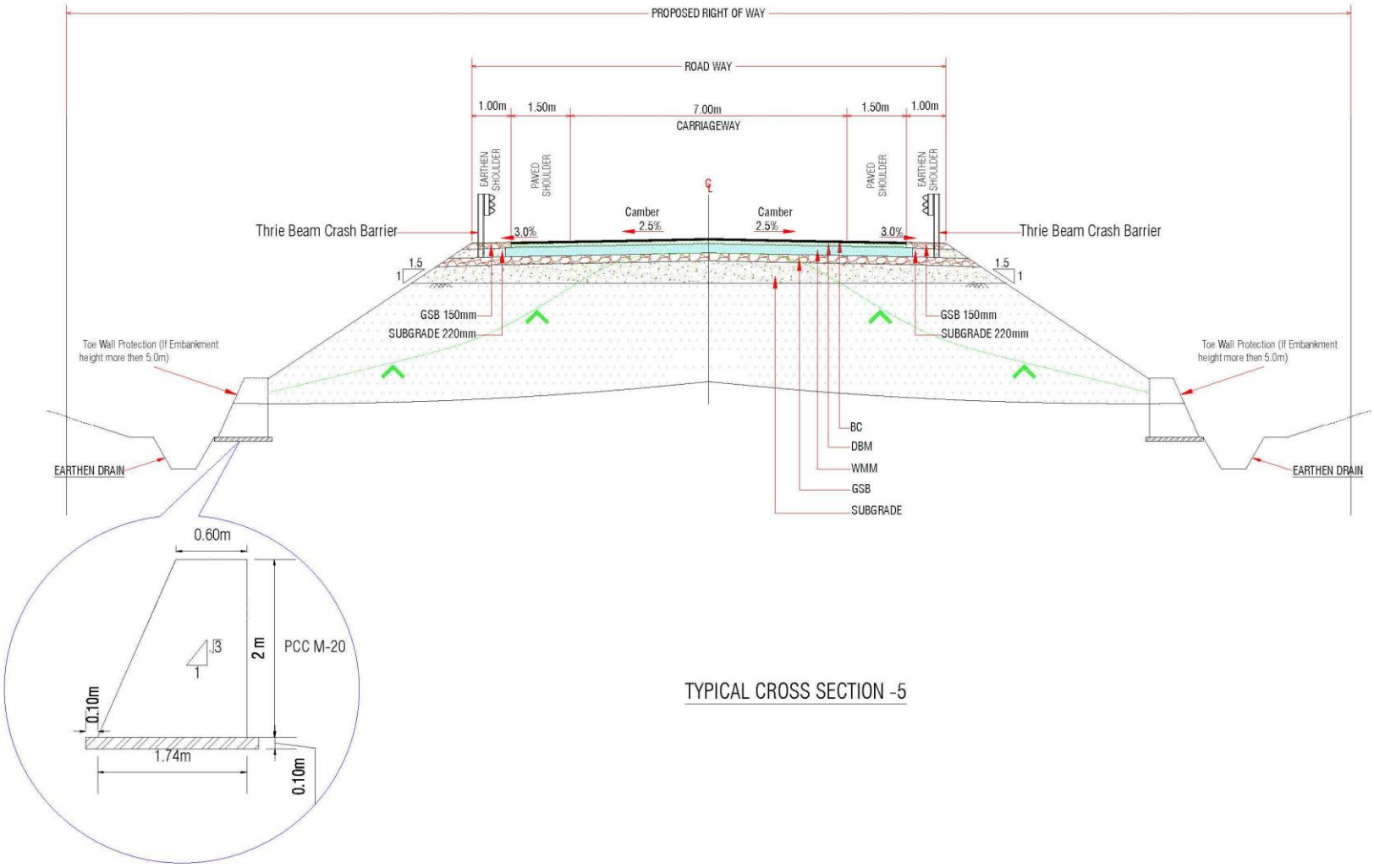
TYPICAL CROSS SECTION -3



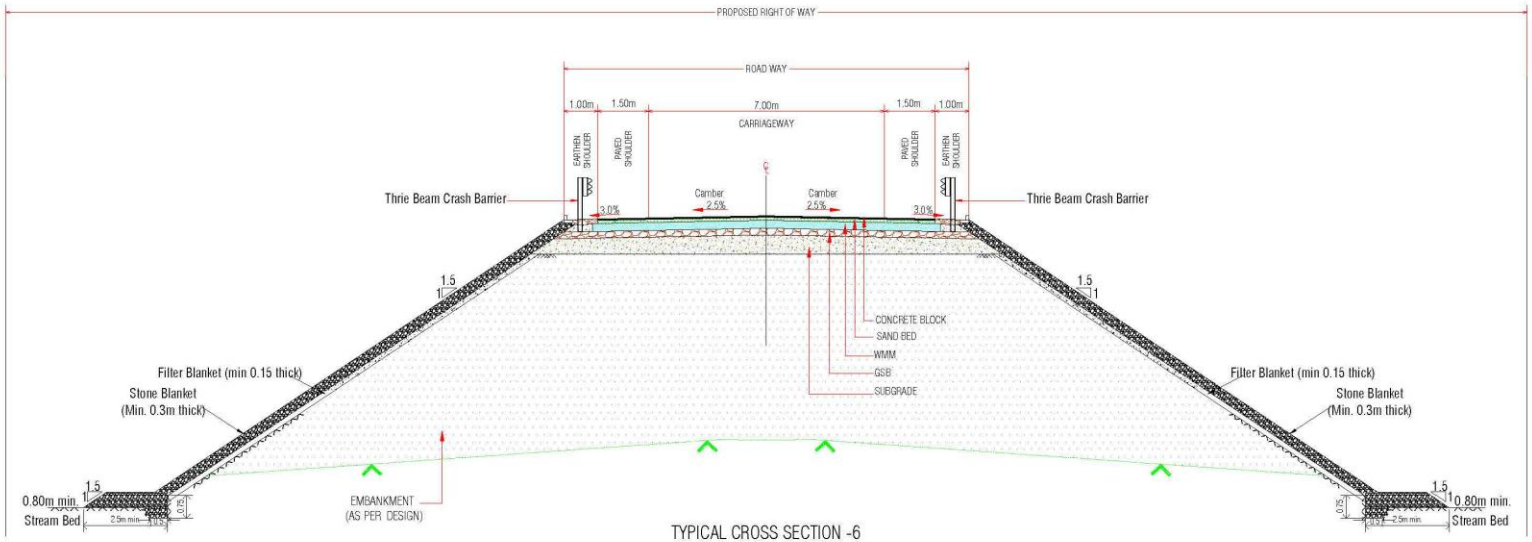
TYPICAL CROSS SECTION -3A



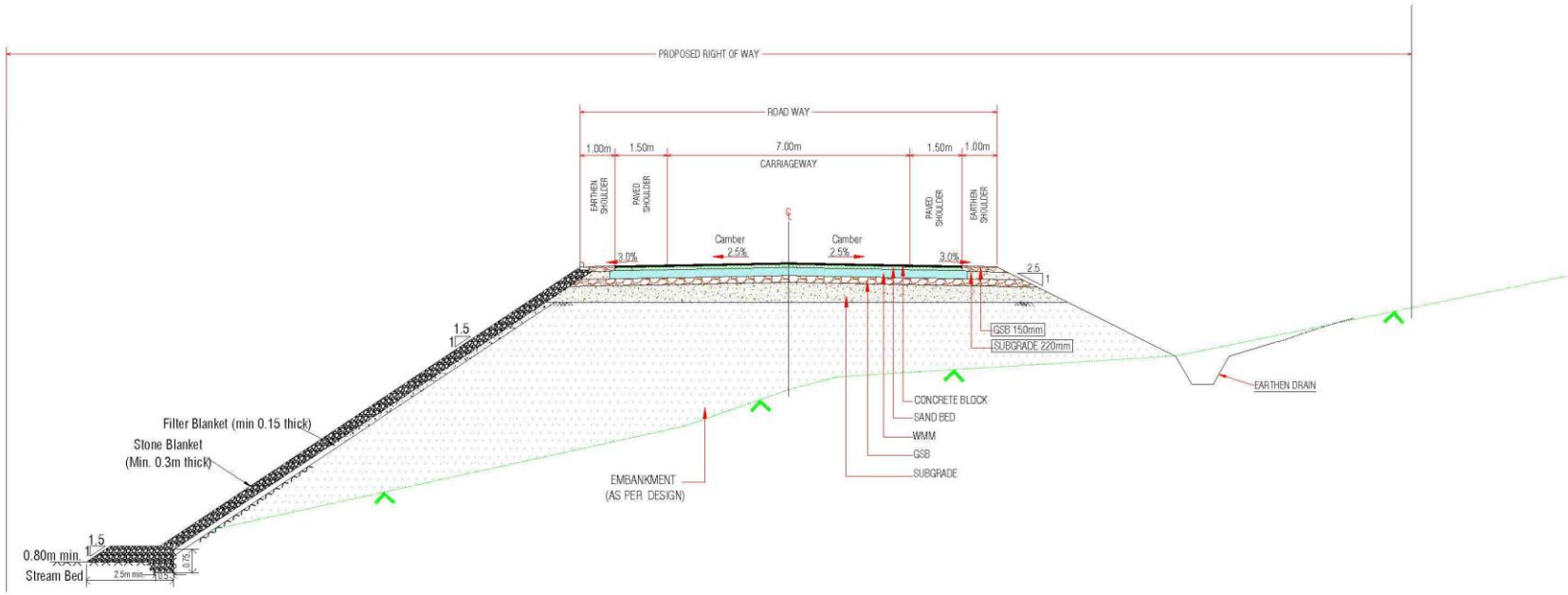
TYPICAL CROSS SECTION -4



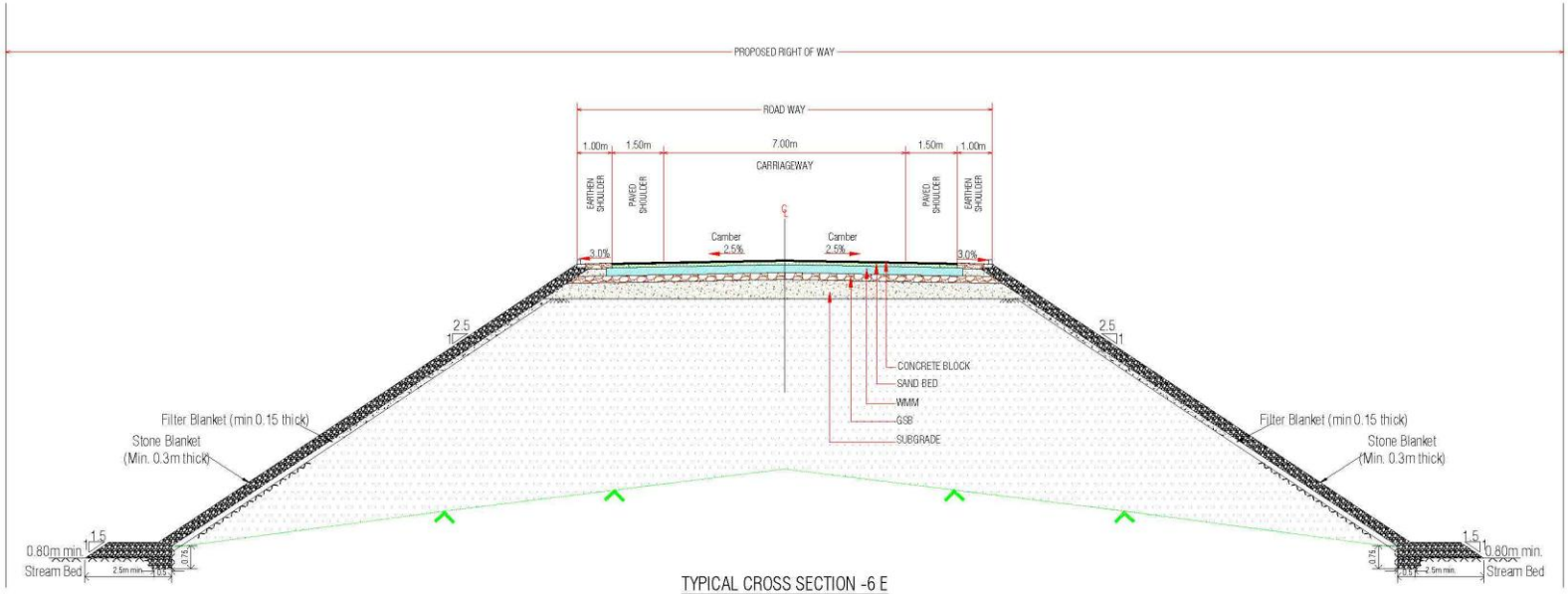
TYPICAL CROSS SECTION -5



TYPICAL CROSS SECTION -6



TYPICAL CROSS SECTION -6 A



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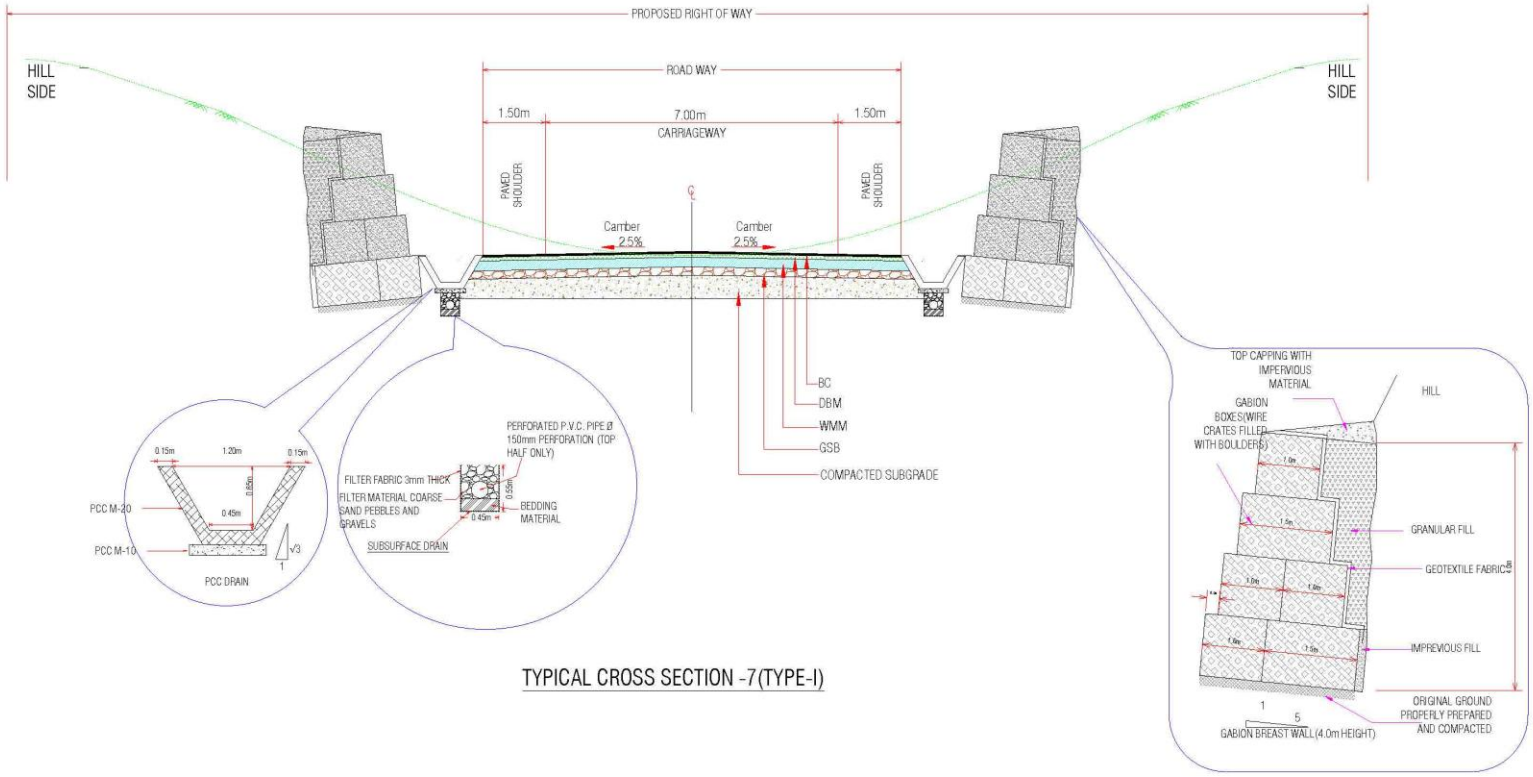

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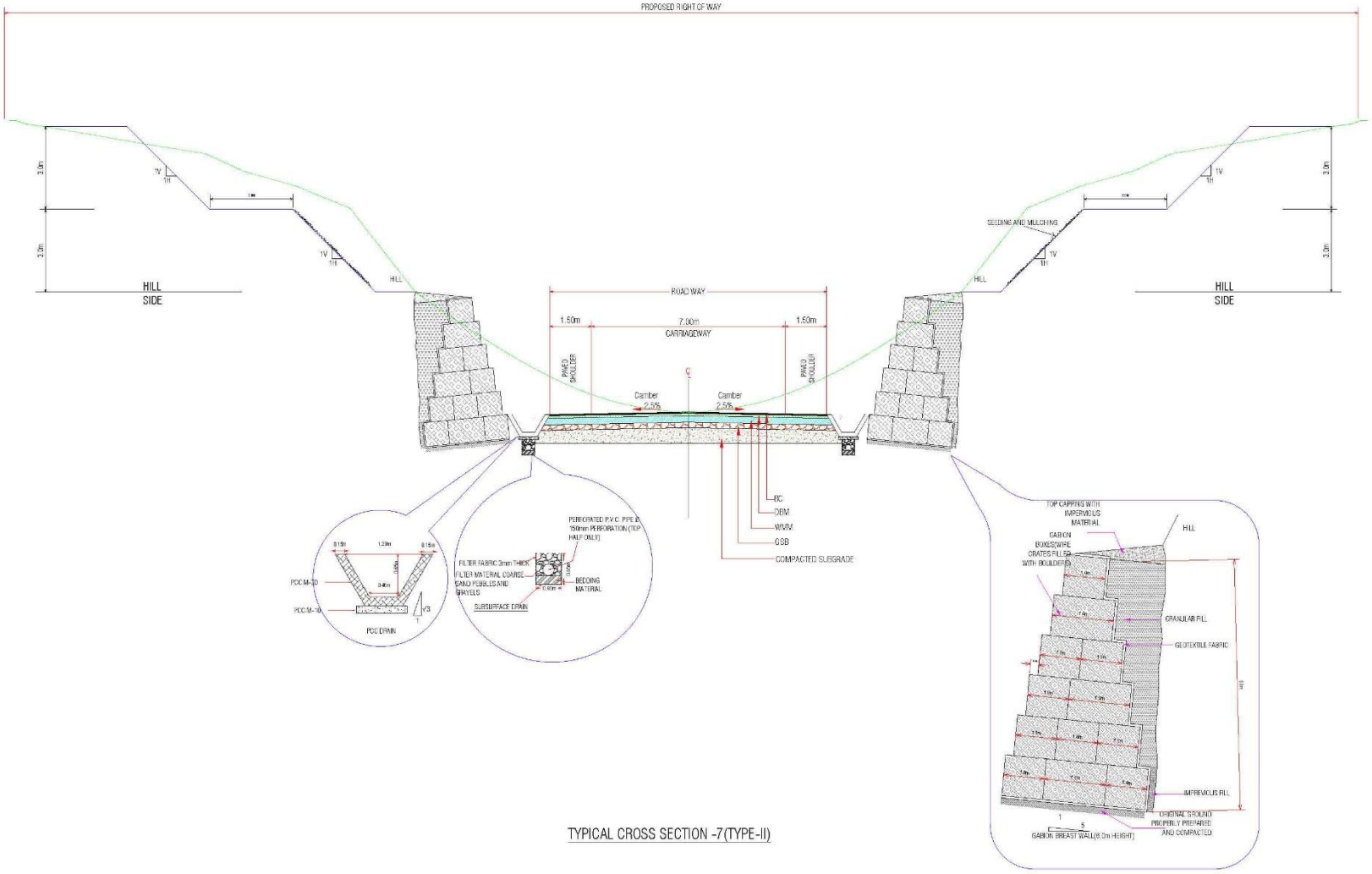

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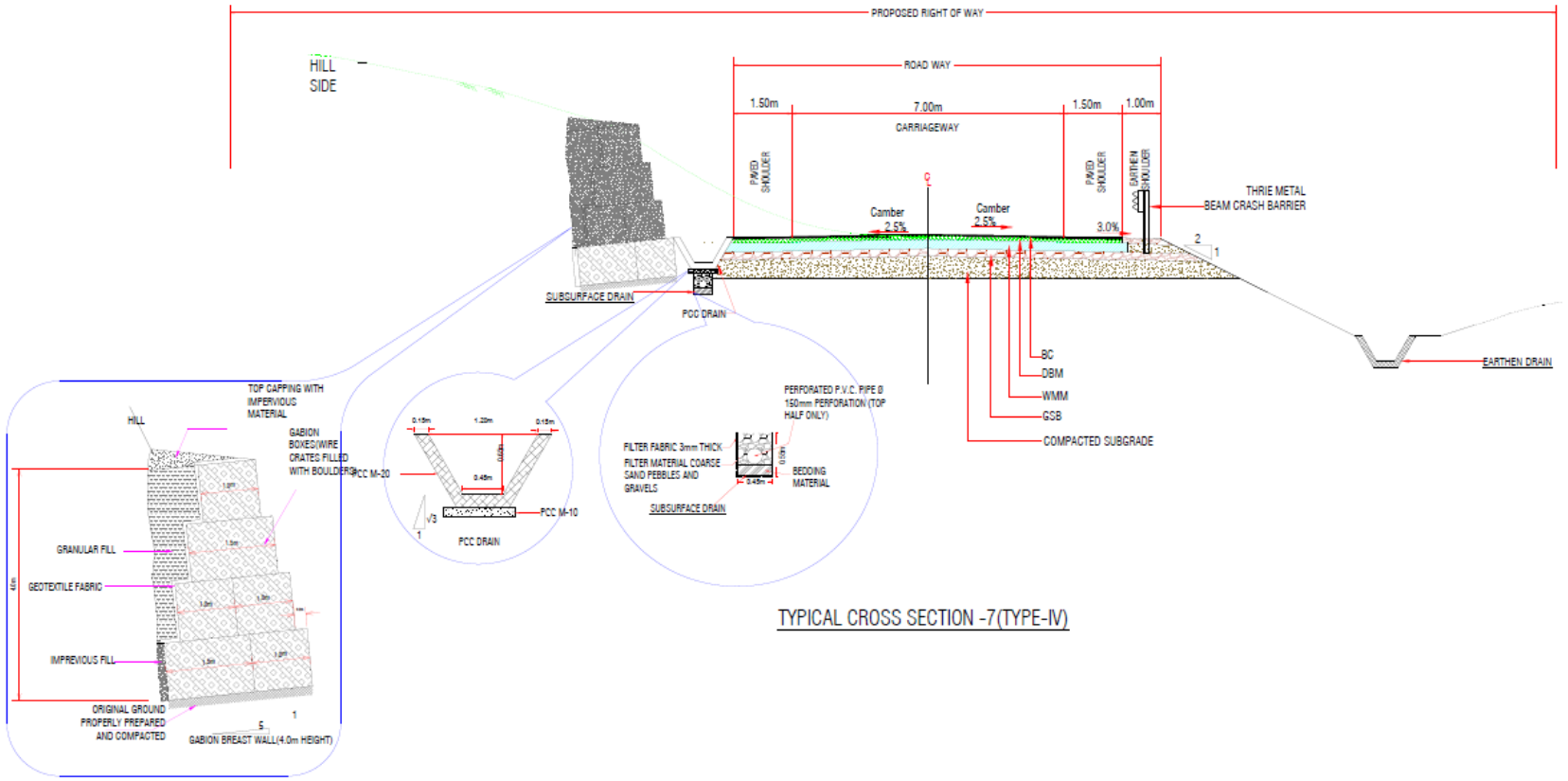

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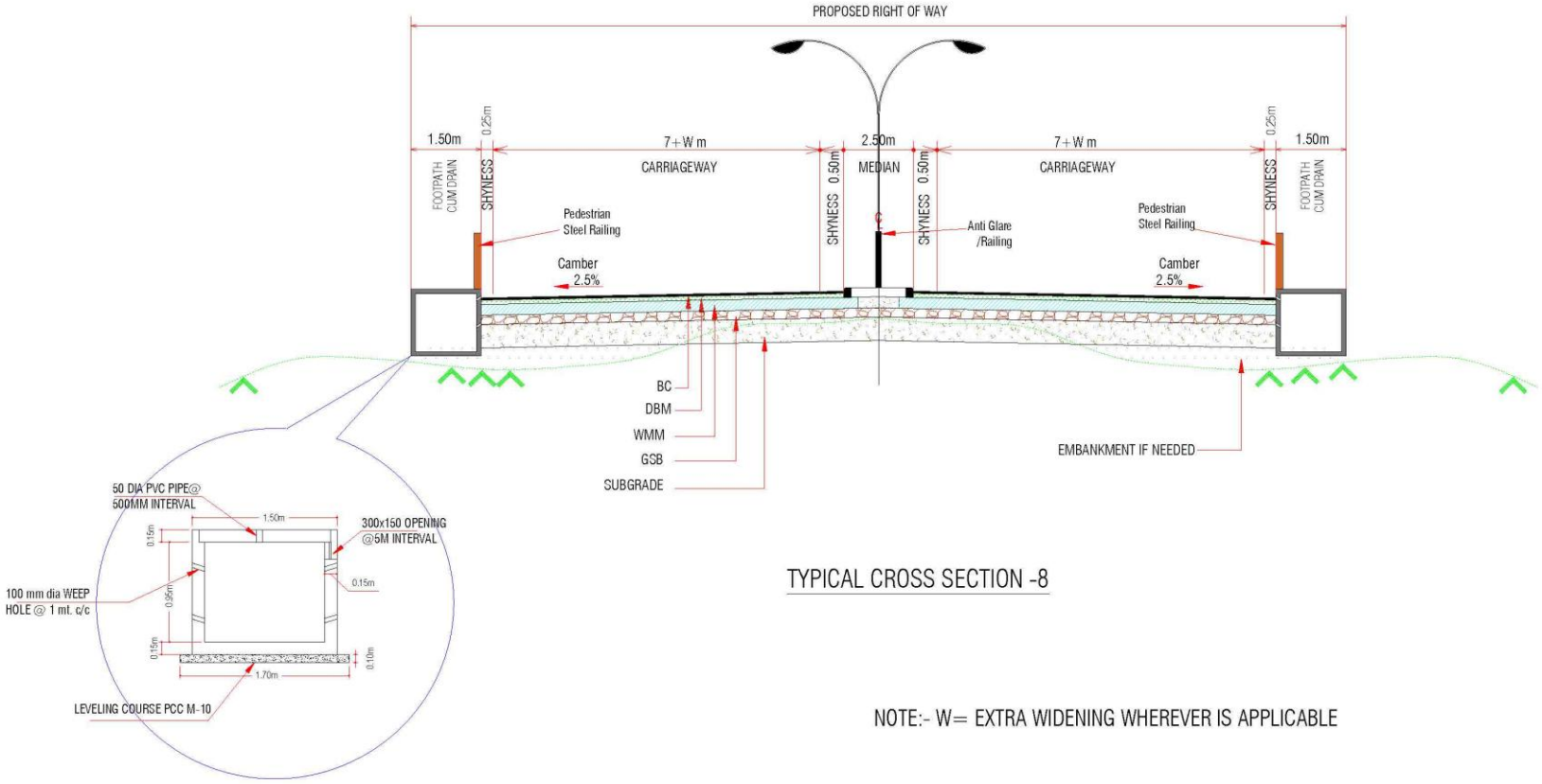
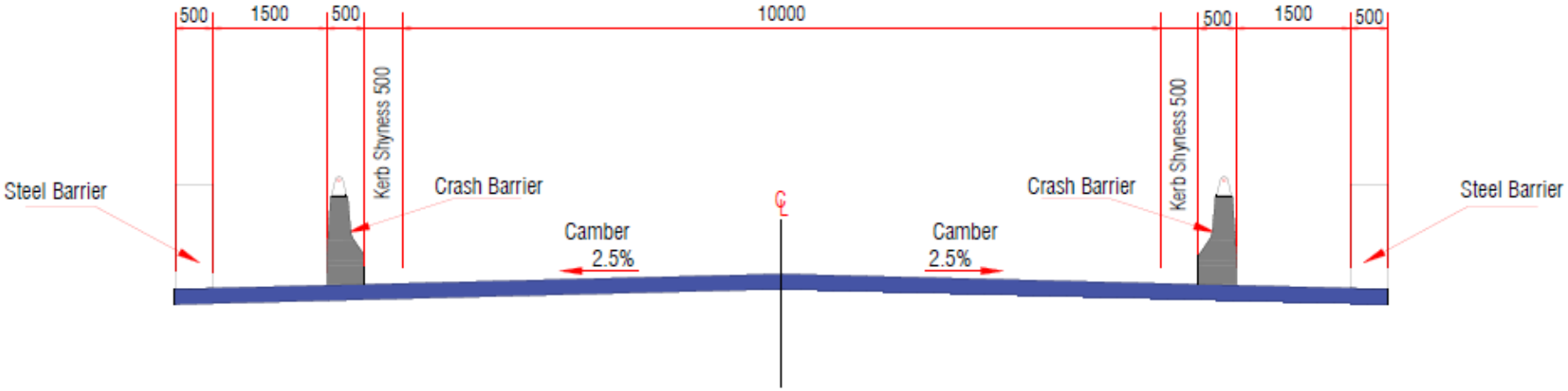


TYPICAL CROSS SECTION -8

NOTE:- W= EXTRA WIDENING WHEREVER IS APPLICABLE



TYPICAL CROSS SECTION 9

2-Lane Bridge With Footpath on Both Side

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	22.800	Y	Bypass Start point
2	23.425	X	MDR
3	23.975	Y	Bypass End point
Minor Intersections			
1	20.940	X	VR
2	21.680	T	VR
3	22.845	Y	VR
4	26.055	T	VR
5	27.175	T	VR
6	28.050	T	VR
7	28.600	T	VR
8	30.275	T	VR
9	31.275	T	VR
10	31.475	T	VR
11	31.830	Y	VR
12	31.860	Y	VR
13	32.595	T	VR
14	33.445	T	VR
15	33.620	T	VR
16	33.725	Y	VR
17	33.875	T	VR
18	34.210	T	VR
19	34.425	Y	VR
20	34.650	T	VR
21	35.195	T	VR
22	38.295	Y	VR
23	39.485	T	VR
24	40.500	T	VR
25	40.700	Y	VR
26	41.950	Y	VR
27	43.025	T	VR
28	45.625	Y	VR

(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) 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 Numbers, locations & type of junctions shown in above table are minimum and may increase as per actual site conditions. Any increase in number will not constitute change of Scope.
2) 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.
3) At proposed Major Junction at Km. 23.425 need to be developed by contractor. The MDR has single lane road with 4 m embankment and local traffic is plying on this. The FRL of the CROSS road bridge on LHS (63 m away from center of our Highway) & RHS (50 m away from Centre of Project Highway) are 64.6 m and 63 m respectively. The Profile of the cross road will be modified in 113 m length including 45m our ROW. The Junction Development and the incidental work shall be included in scope of work. The addition land in will acquired for Junction development.

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.

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

(iii) Project Specific Provisions

(a) The slopes shall be protected with turfing/geo synthetics /geo green blanket/geo cells/stone pitching or any other method according to the site requirement. 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.

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 Two-lane with Paved Shoulder Project Highway for Main carriageway, Service road, 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		Length (km)	Remarks
	From	**To**		
(1)	(2)	(3)	(4)	(5)
1	21.650	21.825	0.175	The existing 2-lane shall be reconstructed as new pavement.
2	21.925	22.600	0.675	
3	32.400	32.475	0.075	
4	32.650	33.100	0.450	
5	33.800	34.100	0.300	
6	35.775	35.825	0.050	
7	39.425	39.575	0.150	
8	39.575	39.615	0.040	
9	41.675	41.775	0.100	
10	44.400	44.650	0.250	
11	44.775	44.900	0.125	
12	45.900	45.975	0.075	
13	46.700	47.075	0.375	
		Total	**2.840**	
1	32000	32040	0.040	The interlocking block pavement shall be provided as per IRC: SP: 63-2018, for Elephant at Grade crossing. The minimum block Thickness 80-100 mm.
2	39035	39085	0.050	
		Total	**0.090**	

Note:

1) 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: 73, 2018) as per the Design Traffic as specified (20 MSA).

Sr. No.	Stretch Design Chainage From km to km		Remarks
	From	**To**	Length (m)
(1)	(2)	(3)	(4)
1	20.900	21.025	0.125
2	22.600	22.900	0.300
3	24.000	24.825	0.825
4	24.950	31.000	6.050
5	31.150	32.000	0.850

6	32.040	32.400	0.360
7	32.475	32.650	0.175
8	33.100	33.800	0.700
9	34.100	35.775	1.675
10	36.325	36.800	0.475
11	37.025	37.250	0.225
12	37.300	38.350	1.050
13	38.550	38.750	0.200
14	39.000	39.035	0.035
15	39.085	39.425	0.340
16	39.615	39.825	0.210
17	39.875	40.050	0.175
18	40.925	41.100	0.175
19	45.225	45.725	0.500
20	45.825	45.900	0.075
21	45.975	46.425	0.450
		Total	14.970

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 the 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,

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 designed as per IRC SP 42, Section 5 Subsurface drainage.
b) Longitudinal Sub Surface Drain: Subsurface drain with perforated pipe of 150 mm internal diameter of PVC, closely jointed, perforations ranging from 3 mm to 6 mm depending upon size of material surrounding the pipe, with 150 mm

bedding below the pipe and 300 mm cushion above the pipe, cross section of excavation 450 x 550 mm. Excavated material to be utilized in roadway at site.

(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

The Minimum length of line/unlined drains surface & Sub-surface and other type of drains shall be constructed as follows:

S. No.	Proposed Type	Remarks	Length (m)
(1)	(2)	(3)	(4)
1	RCC Rectangular drain Cum Foot PATH	TCS 8	2X1850
2	PCC Trapezoid Lined Drain on Hill Sides	TCS 7 (TYPE I) TCS 7 (TYPE II) TCS 7 (TYPE IV)	2X175 2X4125 1X475
3	Longitudinal Subsurface Drain	TCS 7 (TYPE I) TCS 7 (TYPE II) TCS 7 (TYPE IV)	2X175 2X4125 1X475

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.

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	21.300	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
2	26.114	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
3	27.330	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
4	29.592	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
5	31.884	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
6	33.745	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
7	36.425	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
8	37.395	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
9	38.375	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
10	38.925	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
11	39.609	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
12	40.735	TCS 9: 1x10.0 m (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)

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

Sl. No.	Location at km	Remarks
(1)	(2)	(3)
	Minor Bridge	
1	21.300	TCS-9, 2x1.5 m wide Footpath
2	26.114	TCS-9, 2x1.5 m wide Footpath
3	27.330	TCS-9, 2x1.5 m wide Footpath
4	29.592	TCS-9, 2x1.5 m wide Footpath
5	31.884	TCS-9, 2x1.5 m wide Footpath
6	33.745	TCS-9, 2x1.5 m wide Footpath
7	36.425	TCS-9, 2x1.5 m wide Footpath
8	37.395	TCS-9, 2x1.5 m wide Footpath
9	38.375	TCS-9, 2x1.5 m wide Footpath
10	38.925	TCS-9, 2x1.5 m wide Footpath
11	39.609	TCS-9, 2x1.5 m wide Footpath
12	40.735	TCS-9, 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 have raised footpath on both sides of the structure for the arrangement of utility services.			

(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 culverts:

Sl. No.	Design Chainage (Km)	No. of Spans x Clear Span (m)/Opening (mxm)	Remarks If any*
-1	-2	-3	-4
1	21.875	1x1.2	Pipe
2	22.095	1x1.2	Pipe
3	22.420	1x2x2	Box
4	24.625	1x1.2	Pipe
5	24.890	1x1.2	Pipe
6	27.511	1x1.2	Pipe
7	31.793	1x3x3	Box
8	33.895	1x1.2	Pipe
9	34.088	1x1.2	Pipe
10	35.575	1x1.2	Pipe
11	35.892	2x1	Pipe
12	35.985	1x1.2	Pipe
13	36.000	1x1.2	Pipe
14	36.282	1x1.2	Pipe
15	36.612	1x2x2	Box
16	36.975	1X3X3	Box
17	39.208	1x1.2	Pipe
18	39.357	1x2x2	Box
19	39.979	1x1.2	Pipe
20	41.130	1x1.2	Pipe
21	41.668	1x1	Pipe
22	41.771	1x2x2	Box
23	41.811	1x1.2	Pipe
24	41.967	1x1	Pipe
25	42.133	1x1.2	Pipe
26	43.025	1x3x3	Box
27	43.087	1x1.2	Pipe
28	43.300	1x2x2	Box
29	43.897	1x1.2	Pipe
30	43.959	1x5x3	Box
31	44.150	1x1.2	Pipe
32	44.414	1x1	Pipe
33	44.464	2x1	Pipe
34	44.529	1x1.2	Pipe
35	44.593	1x1.2	Pipe
36	44.809	1x2x2	Box
37	45.809	1x1.2	Pipe
38	46.608	1x2x2	Box
39	46.680	1x2x2	Box
40	46.850	1x2x2	Box

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

Note:

1) The proposed locations are minimum in number. Any change in number/length/span/height shall not be treated as change in scope of work.
2) 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.
3) 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.
4) 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.
5) 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 retain wall on U/S & D/S Side, Catch pit, chute, Guide wall and Apron as per IRC: SP:48, 1998, as per the site requirement.
6) On the Culvert location at the end of roadway edges, Only RCC Crash Barriers shall be provided of minimum 1.1 m height.
7) 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**:

Repairs and strengthening of existing structures where required shall be carried out. This shall not constitute any Change of Scope. The list of widening culverts is as follows:

S/No.	**Culvert location (km)**	No. of Spans x Clear Span (m)	**Remarks, if any*any ***
(1)	(2)	(3)	(4)
1	22.615	1x1	Pipe
2	22.845	1x0.9	Pipe
3	24.125	1x1	Pipe
4	24.215	2x1	Pipe
5	24.235	1x1	Pipe
6	24.465	2x1	Pipe
7	24.795	1x2	Box
8	24.973	2x0.9	Pipe
9	25.286	1x1	Pipe
10	25.650	1x1	Pipe

S/No.	Culvert location (km)	No. of Spans x Clear Span (m)	Remarks, if any*any *
(1)	(2)	(3)	(4)
11	25.757	1x1	Pipe
12	26.250	1x6	Box
13	26.336	1x1	Pipe
14	26.875	1x1.2	Pipe
15	27.300	1x1	Pipe
16	27.568	1x1.5	Box
17	27.936	1x1	Pipe
18	28.307	2x1	Pipe
19	28.480	1x1	Pipe
20	28.607	1x1.5	Box
21	28.781	1x1	Pipe
22	29.031	2x1	Pipe
23	29.180	2x1	Pipe
24	29.479	2x1	Pipe
25	30.500	2x1	Pipe
26	31.015	1x1	Pipe
27	31.613	2x1	Pipe
28	32.021	1x1	Pipe
29	32.215	2x1	Pipe
30	32.321	1x1	Pipe
31	32.545	2x1	Pipe
32	32.650	1x1	Pipe
33	32.960	1x1	Pipe
34	33.075	1x1	Pipe
35	33.450	2x1	Pipe
36	33.495	2x1	Pipe
37	33.625	1x1	Pipe
38	36.782	1x1	Pipe
39	36.930	1x1	Pipe
40	38.156	1x1	Pipe
41	38.550	1x1	Pipe
42	38.631	1x1	Pipe
43	39.066	2x1	Pipe
44	39.856	1x1	Pipe
45	40.632	2x1	Pipe
46	40.870	1x1	Pipe
47	45.250	1x1	Pipe
48	45.549	1x3	Box
49	45.689	2x1	Pipe
50	46.055	1x3	Box
51	46.325	1x2	Box
52	46.394	1x2	Box

(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	22.545	1x3x3	Box
2	22.920	1x2x2	Box
3	23.015	1x2x2	Box
4	23.220	1x2x2	Box
5	23.370	1x3x2	Box
6	23.495	1x2x2	Box
7	23.645	1x2x2	Box
8	23.820	1x5x3	Box
9	23.920	1x1.2	Pipe
10	23.945	1x4x4	Box
11	34.757	1x2x2	Box
12	36.075	1X3X3	Box
13	36.150	1X3X3	Box
14	36.522	1x5x4	Box
15	40.217	1x3x3	Box
16	40.492	1x1	Pipe
17	41.295	1x3x3	Box
18	41.534	1x2x2	Box
19	41.875	1x1	Pipe
20	42.198	1x3x3	Box
21	42.275	2x1	Pipe
22	42.496	1x2x2	Box
23	42.547	1x2x2	Box
24	42.639	1x2x2	Box
25	42.753	1x3x3	Box
26	42.85	1x2x2	Box
27	42.925	1x2x2	Box
28	43.150	1x2x2	Box
29	43.198	1x2x2	Box
30	43.381	1x2x2	Box
31	43.466	1x3x3	Box
32	43.618	1x2x2	Box
33	43.718	1x2x2	Box
34	43.845	1x2x2	Box
35	44.115	1x1	Pipe
36	44.225	1x2x2	Box
37	44.711	2x1	Pipe

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

Note:

1) The proposed locations are minimum in number. Any change in number/length/span/height shall not be treated as change in scope of work.

2) 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.

3) 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.

4) 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.

5) 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 retain wall on U/S & D/S Side, Catch pit, chute, Guide wall and Apron as per IRC: SP:48, 1998, as per the site requirement.

6) On the Culvert location at the end of roadway edges, Only RCC Crash Barriers shall be provided of minimum 1.1 m height.

7) 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.

(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)
1	23.995	Pipe	1x1.0	
2	25.027	Pipe	1x0.9	
3	30.139	SLAB	1x6.0	
4	30.283	SLAB	1x2.0	
5	30.411	SLAB	1x6.0	
6	30.696	Pipe	1x1.0	
7	32.605	SLAB	1x4.8	
8	33.375	Pipe	2x1.0	
9	35.065	SLAB	1x6.0	
10	35.395	SLAB	1x5.5	
11	36.662	Pipe	1x1.0	
12	38.725	Pipe	1x1.0	
13	41.040	Pipe	1x1.0	
14	42.446	Pipe	1x1.0	

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, etc*	Remarks
1	**2**	**3**	**4**	**5**
Minor Bridge				
1	26.114	1x21	2x15.0	Reconstruction with as per TCS-9
2	27.330	1x10	1X15.0	
3	29.592	1x10	1X10.0	
4	38.375	1x10	1X10.0	

*Attached Tentative GAD

Note: The span and opening of these bridges as specified are indicative. The design of waterway has to be done as per the site requirements. Any change in this configuration shall not attract provisions of Article 13 of this Agreement

(ii) The following narrow bridges shall be widened:

Sl. No.	Location (km)	Type of Structure	Proposal	Existing width (m)
(1)	(2)	(3)	(4)	(5)
1	31.884	Minor Bridge	Widen and Retain	8.60
2	33.745	Minor Bridge	Widen and Retain	8.60
3	36.425	Minor Bridge	Widen and Retain	8.60
4	37.395	Minor Bridge	Widen and Retain	8.65
5	38.925	Minor Bridge	Widen and Retain	8.45
6	39.609	Minor Bridge	Widen and Retain	8.45
7	40.735	Minor Bridge	Widen and Retain	8.45

~~@ 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	21.300	24 m	TCS-9

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 developed the existing Village road of proposed width of 3.75 m at 21.200 with Minimum 10 MSA traffic. The contractor shall keep 5.5 m Minimum Vertical clearance below Bridge. The contractor shall construct the village road I LHS end of the ROW and correct with existing NH as Y Junctions.
3) The span and opening of these bridges as specified are indicative. The design of waterway has to be done as per site hydraulic requirement. Any change in this configuration shall not attract any change of Scope.
4) The Start of Bridge shall be match with End of Package-1. The contractor shall do proper coordination with nearby package contractor for smooth construction of Highway. Any incidental work in this regard shall deemed included in scope of work.

(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 Contractor.

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)
		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)
NIL		

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)	(2)	(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		

8. *Traffic Control Devices and Road Safety Works*

(i) Traffic control devices and road safety works

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 trees should be planted by the Agency as compensatory afforestation according to The Forest Conservation Act, decided by Forest Department.

11. *Hazardous Locations*

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

Sl. N.	**Design Chainage (Km)**		**LH/RHS/Both**
	From	**To**	
	NIL		

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) Stone Pitching

Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code	Remarks
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
1	23100	23800	700	TCS 6	Both sides of embankment slopes
2	32000	32040	40	TCS 6A	One side of embankment slopes
3	36210	36285	75	TCS 6E	Both sides of embankment slopes
4	38410	38450	40	TCS 6E	Both sides of embankment slopes
5	39035	39085	50	TCS 6E	Both sides of embankment slopes

b) Toe Wall (PCC Toe wall of Minimum 2m Height)

Sr. No.	Chainage (Km)		Design Length (Km	TCS Code	Remarks
	From	To			
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1	22800	23100	300	TCS 5	Both side

c) Seeding and Mulching

Sr. No.	Chainage (Km)		Design Length (Km	TCS Code	Remarks
	From	To			
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1	41100	45225	4125	TCS 7 Type II	Both Side

d) Hill Side Gabion Wall

Sr. No.	Design Ch. (Km)		Length (Km)	TCS	Remarks
	From	To			
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1	41100	45225	4125	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
2	46425	46600	175	TCS 7 type I	Minimum 4 m Height Gabion Wall both side of Hill cutting
3	46600	47075	475	TCS 7 type IV	Minimum 4 m Height Gabion Wall one side of Hill cutting
Total Length OF 4 m wall in Km.			=2x0.175+1x0.475=0.825		
Total Length OF 6 m wall in Km.			=2x4.125=8.25		

14. Change of Scope

The length of Slope protection measures, 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, 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. 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:73-2018 (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.

Retaining walls & breast wall

Hill protection

(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 enclosed Approved estimate of MePDCL	**(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 enclosed Approved estimate of PHE	**(LHS/RHS)**
C	Felling of Tress	Nos.	6000	**(LHS/RHS)**

As per the existing and Proposed Utilities shifting plan given in Schedule-B

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 Owning Department is part of the scope of work of the Contractor~~/Contractor*~~. The bidders may visit the site and assess the quantum 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 and followed.

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 Meghalaya Power Distribution Company Limited (MePDCL)) and it is to be agreed solely between the Contractor ~~/ Contractor*~~ 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 in comparison to those in the existing work or for making any overhead crossings to underground as per requirement of utility owning department and/or construction of project highway. The Contractor~~/Contractor*~~ 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~~/Contractor*~~ to utility owning department whenever asked by the Contractor~~/Contractor*.~~ The decision/ approval of utility owning department shall be binding on the Contractor~~/Contractor*.~~

(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/~~Contractor*~~ furnishes demand of Utility Owning Department along with a copy of estimated cost given by the later.

(c) The dismantled material/scrap of existing Utility to be shifted/ dismantled shall belong to the Contractor~~/ Contractor*~~ who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor ~~/Contractor*~~ 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~~/Contractor*~~ as per estimate agreed between them.

(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 are concerned.

Note -II **Copy of utility shifting plans enclosed as Annexure-II 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 73 2018) 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: 2 No's**

S/ No.	Chainage (Km)	Location	Size
(1)	(2)	(3)	(4)
1	22.900	At the Start of Bypass	1.8 m x 1.2 m
2	24.000	At the end of Bypass	1.8 m x 1.2 m

- **Cantilever Overhead Signs: 16**

- **Project Information Sign Board : 2 No's**

S/ No.	Chainage (Km)	Location	Size
(1)	(2)	(3)	(4)
1	20.900	At the Start of Project Road	1.8 m x 1.2 m
2	47.075	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)
	Main Road		
1	**Right Hand Side Curve**	**Nos.**	Number of sign boards as per Traffic Signage 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.	

Sl No	Traffic Signage, Road Marking and other appurtenances	unit	Quantity
(1)	(2)	(3)	(4)
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 Signage 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.
- The Number of Signage given in the traffic signages plan are tentative and any change in the number of signboard will not be treated as Change of Scope.

(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 1.50 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. (minimum 6000 nos.) 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 @ 40m 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	30.200	1 Side (LHS)	
2	30.200	1 Side (RHS)	

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	21.850	LHS	Berubari
2	22.400	RHS	Berubari
3	32.800	LHS	Mandal
4	32.875	RHS	Mandal
5	33.850	LHS	Gokul
6	34.050	RHS	Gokul
7	39.425	LHS	Rari
8	39.575	RHS	Rari

Note: 1) 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)
-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 (One) 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.

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

vii. Others

(a) Measures for Elephant Crossing

The Contractor shall provide Eco sounding System and traffic calming measures and signage Plan at 4 elephant crossing locations in consultation of Forest Department.

(b) Toilet Block

The Contractor shall provide toilet Blocks at two locations as space identified by Authority.

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 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 Two Laning of Highways (IRC: SP: 73-2018), 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 Two-Laning of Highways with Paved Shoulders (IRC: SP: 73- 2018), 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 "Contractor", "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-73 2018</td><td>The Ruling Design speed shall be 50 Kmph for Project Highway for Mountainous Terrain as per Clause 6.5.1 Table 6.4 of IRC: 52-2019, Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision).</td></tr>
<tr><td>2</td><td>Extra Widening</td><td>Clause 2.7 & Table 2.4 of IRC SP-73 2018</td><td>The extra widening shall be provided as per Table 6.10 of IRC: 52- 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision)
<table>
<tr><td>Radii (m)</td><td>Extra Widening (m)</td></tr>
<tr><td>Upto 20</td><td>1.5</td></tr>
<tr><td>21 to40</td><td>1.5</td></tr>
<tr><td>41 to 60</td><td>1.2</td></tr>
<tr><td>61 to 100</td><td>0.9</td></tr>
<tr><td>101 to 300</td><td>0.6</td></tr>
<tr><td>Above 300</td><td>Nil</td></tr>
</table>
Note: Extra Widening shall not be provided at Major & Minor Bridges.</td></tr>
</table>

<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>3</td><td>Super elevation</td><td>Clause 2.9.3 of IRC SP-73 2018</td><td>The Super elevation shall be as per Clause 6.8.2 of IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision). L</td></tr>
<tr><td>4</td><td>Sight Distance</td><td>Clause 2.9.6 & Table 2.6 of IRC SP-73 2018</td><td>The desirable minimum sight distance for divided carriageway for various design speeds shall be provided as per Table 6.5 of IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision). The Vertical design, especially at grade change location, such as VUP/LVUP, ROB, Bridge locations shall be done using Intermediate Sight distance (Desirable Minimum Sight Distance).
<table>
<tr><th>Speed (km/h)</th><th>Intermediate Sight Distance Design values – meters</th></tr>
<tr><td>20</td><td>40</td></tr>
<tr><td>25</td><td>50</td></tr>
<tr><td>30</td><td>60</td></tr>
<tr><td>35</td><td>80</td></tr>
<tr><td>40</td><td>90</td></tr>
<tr><td>50</td><td>120</td></tr>
</table></td></tr>
<tr><td>5</td><td>Typical Cross-sections</td><td>Clause 2.16 of IRC SP-73 2018</td><td>Typical Cross-sections shall be as per Schedule B,</td></tr>
<tr><td>6</td><td>Flexible pavement - design period and strategy</td><td>Clause 5.4.1 of IRC:SP:73-2018</td><td>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.</td></tr>
<tr><td>7</td><td>Width of the Minor Bridges</td><td>Clause 7.3 iv) IRC:SP:73-2018</td><td>Width of the structures at deck Level for Minor Bridge shall be as per TCS-9 as provided in Schedule-B.</td></tr>
</table>

SCHEDULE - E

(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

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

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

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

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

Notwithstanding anything to the contrary specified in this Schedule-E, if the nature and extent of any Defect or deficiency justifies more time for its repair or rectification than the time specified herein, the Contractor shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the Authority's Engineer and conveyed to the Contractor and the Authority with reasons thereof.

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

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					
Flexible Pavement (Pavement of MCW, Service Road, approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm indepth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	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
	Cracking	Nil	< 5 % subject to limit of 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 and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82- 2015
	Bleeding	Nil	< 0.1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Raveling / Stripping	Nil	< 0.1 % of area	Daily			7-15 days	IRC:82- 2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily	Scale, Tape, odometer etc.			IRC:82- 2015
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-			180 days	BS: 7941-1: 2006

				Annually	(Sideway-force Coefficient Routine Investigation Machine or equivalent)	Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment		
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82- 2015
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82- 2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflect meter	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade Structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Roughness BI	2200m m/km	2400mm /km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	RC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN	**Traffic Speed (Km/h)**					
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

Embankment/ Slope	Edge drop at shoulders	Nil	40 mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	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 side slope	Daily			7-15 days	MORT&H Specification 408.4
	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

In addition to the above performance criterion, the contractor shall strictly maintain the rigid pavements as per requirements in the following table

Table -2: Maintenance Criteria for Rigid Pavements:

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
CRACKING						
1.	Single Discrete Cracks Not intersecting with any joint	w = width of crack L = length of crack d = depth of crack D = depth of slab	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, and stitch if L > lm.
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car	Seal without delay	Within 7days
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m.	Staple or Dowel Bar Retrofit, FDR for affected portion.
			5	w > 3 mm.	Within 7 days	Within 15days
2.	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy.	Staple or Dowel Bar Retrofit.
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle	Within 7 days	Within 15 days
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit.	Full Depth Repair Dismantle and

			5	w > 6 mm, usually associated with spelling, and/or slab rocking under traffic	Within 15 days Not Applicable, as it may be full depth	reconstruct affected. Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
3	Single Longitudinal Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	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
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > l m. Within 15 days	
			3	w = 3.0 – 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic	depth	Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 15days

4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m.	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle	Within 15 days	
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate Sub-base, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken 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	Seal with epoxy seal with epoxy
			2	w < 1.5 mm; L < 0.6 m, only one corner broken	secure broken parts Within 7 days	Within 7 days
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken	IRC:SP: 83-2008) Within 15 days	
			5	three or four corners broken		Reinstate sub-base, and reconstruct the

						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	**Not Applicable, as it may be full depth**	No Action
			1	w < 0.5 mm; L < 3 m/m2		Seal with low viscosity epoxy to secure broken parts. Within 15 days
			2	either w > 0.5 mm or L < 3 m/m2		
			3	w > 1.5 mm and L < 3 m/m2		
			4	w > 3 mm, L < 3 m/m2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage Reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m2 and deformation		
7	Raveling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	No Action	
			1	r < 2 %	Local repair of areas Damaged	
			2	r = 2 - 10 %	and liable to be damaged. Within 15 days	
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if	

			4	r = 25 - 50 %	Affecting Within 30 days	
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	Scaling	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	Short Term No Action	Long Term
			1	r < 2 %	Local repair of areas Damaged and liable to be damaged. Within 7days Bonded Inlay within 15 Days	
			2	r = 2 - 10 %		
			3	r = 10 - 20%		
			4	r = 10 - 30%	Reconstruct slab within 30 days	
			5	r>30 % and h> 25mm		
9	Polished Surface/Glazing	t = texture depth, sand patch test	0		No action	
			1	t > 1 mm		

						Not Applicable
			2	t = 1 – 0.6 mm		
			3	t = 0.6 – 0.3 mm	Monitor rate of deterioration	
			4	t = 0.3 – 0.1 mm	Diamond Grinding if Affecting	
			5	t < 0.1 mm	50% or more slabs in a Continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m^2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m^2	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m^2	Partial depth repair 110mm i.e.10 mm more than the depth of the hole.	
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m^2		
			4	d = 100 - 300 mm; h > 100		

				mm; n < 1 per 5 m^2	Within 30 days	
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	
11	Joint Seal Defects	loss or damage L = Length as % total joint length	0	Difficult to discern.	No action.	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.	
			2	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in Selected locations. Within 7 days	
			4	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	Spalling of Joints	w = width on either side of the joint L = length of spalled portion (as % joint	0	Nil, not discernible	No action.	
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar	

		length)	2 3 4 5	w = 10 - 20 mm, L < 25% w = 20 - 40 mm, L > 25% w = 40 - 80 mm, L > 25% w > 80 mm, and L > 25%	in cracked portion. Within 7 days Partial Depth Repair. Within 15 days 30 - 50 mm deep, h = w + 20% of w, within 30 days 50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	Not Applicable
13	Faulting (or Stepping) in Cracks or Joints	f = difference of level	0 1	not discernible, < 1 mm f < 3 mm	No action.	No action.
			2 3	f = 3 - 6 mm f = 6 - 12 mm	Determine cause and observe, take action for diamond grinding Diamond Grinding	Replace the slab as appropriate. Within 30days

			4 5	f= 12 - 18 mm f> 18 mm	Raise sunken slab. Strengthen sub-grade and sub-base by grouting and raising sunken slab	Replace the slab as appropriate. Within 30days
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	No Action	
			1	h < 6 mm		
			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 more pieces	Replace broken slabs. Within 30 days	
15	Depression	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	
			1	h = 5 - 15 mm		

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

					Within 30 days	
17	Bump	h = vertical displacement from normal profile	0 1	h < 4 mm h = 4 - 7 mm	No action 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
			4	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level			**Short Term**	**Long Term**
			0	Nil, not discernible < 3mm	No Action	
			1 2	f = 3 - 10 mm f = 10 - 25 mm	Spot repair of shoulder within 7 days	

			3 4	f = 25 - 50 mm f = 50 - 75 mm	Fill up shoulder within 7 dayss	For any 100 m Stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			5	f > 75 mm		
Drainage						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2 3 to 4	slight/ occasional Nos < 10% appreciable/ Frequent 10 - 25%	Repair cracks and joints Without delay. Lift or jack slab within 30 days.	Inspect and repair sub-drainage at distressed sections and upstream.
			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	Availability of Safe Sight Distance	As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.			Monthly	Manual Measurements with O dometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments. 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 such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP 84-2014
		Design Speed, kmph	**Desirable Minimum Sight Distance (m)**	**Safe Stopping Sight Distance (m)**					
		100	360	180					
		80	260	130					
Pavement Marking	Wear	<70% of marking remaining			Bi-Annually	**Visual Assessment as per Annexure-F**	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect -	IRC:35-2015

<table>
<tr><td></td><td></td><td></td><td></td><td>of IRC:35-2015</td><td></td><td>within 2 months</td><td></td></tr>
<tr><td></td><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m2/lux
Bituminous Road - 100mcd/m2/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></td><td rowspan="6">Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u></td><td rowspan="6">Bi-Annually</td><td rowspan="6">As per Annexure-E of IRC:35-2015</td><td rowspan="6">Re - painting</td><td rowspan="6">Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months</td><td rowspan="6">IRC:35-2015</td></tr>
<tr><td></td><td>Design Speed</td><td>(RL) Retro Reflectivity (mcd/m2/lux)</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>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</td></tr>
<tr><td>Road Signs</td><td>Shape and Position</td><td>Shape and Position as per IRC:67-2012.
Signboard should be clearly visible for
the design speed of the section.</td><td>Daily</td><td>Visual with video/image backup</td><td>Improvement of shape, in case if shape is damaged.

Relocation as Per requirement</td><td>48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of</td><td>IRC:67-2012</td></tr>
</table>

						Gantry/Cantilever Sign boards	
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of Each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/ Cantilever Sign boards	IRC:67-2012
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	IRC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	IRC 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 of guardrail as intended	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	Rectification	Within 7 days	IRC:SP:84-2014,

				backup			IRC:119- 2015
	End Treatment of Traffic Safety Barriers	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119- 2015
	Attenuators	Functionality: Functioning of Attenuators as intended	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: Functioning of Traffic Blinkers as intended	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

Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in 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 obstruction by vegetation	Daily	Visual with video/image backup	Removal of trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, busshelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
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 barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	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 before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurally sound	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 followed as per IRC: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 (concreteapron) 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 aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is 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 expansion joint	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 and guard 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	**3** days	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 Inspection Unit	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 concrete portion with 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 than 0.50 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 Inspection Unit	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 Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads	6 months	IRC SP: 51-1999.

					capacity		
	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 spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specification s 2600 and IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes	3 days	MORTH specification 2700.

		silt, debris, clogging of drainage spout collection chamber.		Mobile Bridge Inspection Unit	with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed		
Bridge-substructure	Cracks/ spalling of concrete/ Rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	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 type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
	Bearings	Delaminating of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	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	3 months	MORTH specification 2810 and IRC SP: 40-199.

		side, no rupture of reinforcement or rubber			load transfer on to bearings.		
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 oubt, use Underwater camera for inspection of deep wells in major Rivers.	suitable protection works around pier/abutment	1 months	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 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days After defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Table 4: Maintenance Criteria for Structures and Culverts:

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

Note: 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. Flexible Pavement

Nature of Defect or deficiency		**Time limit for repair/ rectification**
(b) Granular earth shoulders, side slopes, drains and culverts		
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban areas	24 (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 pavement marking		
(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
(vi)	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 and plantation		
(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
(vi)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and	15 (fifteen) days

	road structures	
(f) Rest area		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g) [Toll Plaza]		
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a) Superstructure		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b) Foundations		
(i)	Scouring and/or cavitation	15 (fifteen) days
(c) Piers, abutments, return walls and wing walls		
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d) Bearings (metallic) of bridges		
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(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)
(vi)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g) Hill Roads		
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(iii)	Snow requiring clearance	24 (twenty four) hours
[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]		

Schedule-F

(See Clause 3.1.5(a))

APPLICABLE PERMITS

1. **Applicable Permits**

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

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

(b) Permission of Village Panchayat and Pollution Control Board for installation of crushers.

(c) License for use of explosives.

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

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

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

(g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant; (h) Permission of Village Panchayats and State Government for borrow earth; and

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

Applicable permits, as required, relating to environmental protection and conservation shall have been produced by the Authority in accordance with the provisions of this Agreement

SCHEDULE - G

(See Clauses 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I
(See Clause 7.1.1)
Performance Security

To, Authority

……,

……

……,
……

WHEREAS:

(A) _____[name and address of contractor] (hereinafter called the Contractor") and ……, (hereinafter called the "Authority") have entered into an agreement (hereinafter called the "Agreement") for the **"*Improvement/Widening to 2-lane with paved shoulders of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 81+740 to km 93+490 (design km 0+000 to km 10+670) & Improvement/Widening to 4-lane with paved shoulders of NH-44 from design length km 0+000 to km 0+930, total length of 11.600 km in the state of Meghalaya for execution of EPC mode under JICA funding (Package – I)-Balance Work*",** subject to and in accordance with the provisions of the Agreement

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

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

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

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

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall

be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

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

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

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

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the

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

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

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

12. This guarantee shall also be opera table at our …….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension/ renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation

13. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

S.No.	**Particulars**	**Details**
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062
4	Beneficiary Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature) (Name)

(Designation)

(Code Number)

(Address) NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.
(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

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

Form for Guarantee for Withdrawal of Retention Money

To,

Authority ……..

…….

WHEREAS:

(A) name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "Agreement") with ..... (hereinafter called the "**Authority**") **for the** ***"Improvement/Widening to 2-lane with paved shoulders of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 81+740 to km 93+490 (design km 0+000 to km 10+670) & Improvement/Widening to 4-lane with paved shoulders of NH-44 from design length km 0+000 to km 0+930, total length of 11.600 km in the state of Meghalaya for execution of EPC mode under JICA funding (Package – I)-Balance Work",*** subject to and in accordance with the provisions of the Agreement.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

12. This guarantee shall also be operatable at our…….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and

payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

S.No.	**Particulars**	**Details**
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Annex – III *(Schedule - G)*

(See Clause 19.2)

Form for Guarantee for Advance Payment

To, Authority

……,

……

……,
……

WHEREAS:

(A) name and address of contractor] (hereinafter called the "Contractor") has executed an agreement (hereinafter called the "Agreement") with ……, (hereinafter called the "Authority") for the **"Improvement/Widening to 2-lane with paved shoulders of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 81+740 to km 93+490 (design km 0+000 to km 10+670) & Improvement/Widening to 4-lane with paved shoulders of NH-44 from design length km 0+000 to km 0+930, total length of 11.600 km in the state of Meghalaya for execution of EPC mode under JICA funding (Package – I)-Balance Work",** subject to and in accordance with the provisions of the Agreement

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

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

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

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 specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager, in National Highways Authority of India), that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the installment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences

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

between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

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

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

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

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

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

12. This guarantee shall also be operatable at our…….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made

available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

S.No.	**Particulars**	**Details**
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the

Bank by: (Signature)

(Signature)

(Name) (Designation)

(Code Number)

(Address)

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

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

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 specified below:

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road Works including Culverts, widening and repair of culverts	64.65%	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of the sub- grade	7.87%
		(2) Sub-base Course and GSB	7.60%
		(3)Non bituminous Base course (WMM)	7.03%
		(4) Bituminous Base course	11.54%
		(5) Wearing Coat	7.12%
		(6) Widening and repair of Culverts	2.13%
		B.1-Reconstruction/New 2-Lane Realignment /Bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub- grade	30.09%
		(2) Sub-base Course and GSB	4.51%
		(3)Non bituminous Base course (WMM)	4.76%
		(4) Bituminous Base course	4.83%
		(5) Wearing Coat	3.12%
		B.2-Reconstruction/New 2-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 and GSB	[Nil]
		(3)Non bituminous Base course (WMM)	[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 existing road, realignments, bypasses Culverts (length <6m)	9.39%
Minor bridge/ Underpasses/ Overpasses	9.62 %	**A.1-widening and repairing of Minor Bridges (length >6 m&<60m)**	
		Minor Bridges	32.21%
		A.2- New Minor bridges (length >6 m and <60m)	
		(1) Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	43.72%
		(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 all respect.	13.96%
		(3) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	9.40%
		(4) Guide Bund sand River Training Works: On completion of Guide Bunds and river Training works complete in all respects.	0.71%
		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 wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion 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 as specified.	[Nil]
		(3) Approaches: On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[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 complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	[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 complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	[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/Reinforced Earth wall, stone pitching 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 (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
Other Works	23.85 %	(i) Toll Plaza	[Nil]
		(ii) Roadside drains (RCC, PCC, Sub-Surface & Unlined)	10.60%
		(iii) Road signs, markings, km stones, safety devices safety Barriers etc	12.47%
		(iv) Project facilities	
		a) Bus Bays	[Nil]
		b) Passenger Shelter	0.23%
		c) Truck Lay-byes	1.55%
		d) Rest Area	[Nil]
		e) Roadside Amenities	[Nil]
		f) Streetlight	0.32%
		g) Utility Duct	0.06%
		(v) Toe Wall	2.28%
		(vii)Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]
		(viii) Boundary stone	[Nil]
		(ix) Safety & Traffic Management during const.	[Nil]
		(x) Breast Wall	[Nil]
		(xi) Site Clearance & Dismantling	0.48 %
		(xii) Reinforced Earth Wall	[Nil]
		(xiii) Junction & Cross Road Development	2.38 %
		(xiv) Seeding & Mulching	6.74%
		(xvi) Ground Improvement Works	[Nil]
		(xvii) Gabion Structure	58.57%
		(xviii) Stone pitching	3.29%
		(xix) Tree falling	0.98%
		(xx) Muck Dumping	0.05%

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)	1.89 %	(i) EHT line	[Nil]
		(ii) EHT crossings	[Nil]
		(iii) HT/ LT line	89.01 %
		(iv) HT/ LT crossings	
		(v) Water pipeline	10.99 %
		(vi) Water pipeline crossings	

1.3 Procedure of estimating the value of work done

1.3.1 Road works

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

Table1.3.1

Stage of Payment	Percentage weightage	Payment Procedure
A- Widening &Strengthening of road		
(1) Earthwork up to top of the sub- grade	7.87%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub-base Course (GSB)	7.60%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3)Non bituminous Base course (WMM)	7.03%	
(4) Bituminous Base course	11.54%	
(5) Wearing Coat	7.12%	
(6) Widening and repair of culverts	2.13%	Cost of completed culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least five culverts.
B.1- Reconstruction/New 2- Lane Realignment/Bypass (Flexible Pavement)		
(1) Earthwork up to top of the sub-grade	30.09%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub-base Course	4.51%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3)Non bituminous Base course (WMM)	4.76%	
(4) Bituminous Base course	4.83%	
(5) Wearing Coat	3.12%	
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 a length of not less than 500 m.

		In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub-base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Dry Lean Concrete (DLC) Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
C.1- Reconstruction/New Service Road/ Slip Road (Flexible 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 a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub-base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3)Non bituminous Base course (WMM)	[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)		
(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 a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub-base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Dry Lean Concrete (DLC)Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
D- Reconstruction & New Culverts on existing road, realignments, bypasses including culvert protection work		Cost of each culverts shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least one culvert.
Culverts (length <6m)	9.39%	

@ 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 length for payment purposes. The total length calculated here is only for payment purposes and will not affect and referred in other clauses of the Contract Agreement.

1.3.2 Minor Bridges and Underpasses / Overpasses.

Procedure for estimating the value of Minor bridge and Underpasses/Overpasses shall be as stated in table 1.3.2:

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
1	2	3
A.1-Widening and repairs Of Minor Bridges(length>6m&<60m)	32.21 %	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 + Substructe : On Completion of the foundation work including wing and return walls, abutments, piers upto the abutment/pier cap.	43.72%	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 + sub-structure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation + sub-structure of each bridge subject to completion of atleast two foundations along with sub-structure upto abutments/pier cap level of each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) 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 all respect.	13.96%	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.
(3) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	9.40%	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	0.71%	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 sand River training Works in all respects as specified
B.1- Widening and repairs of underpasses/overpasses	[Nil]	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/ overpasses. Payment shall be made on the completion of widening &repair works of an underpass/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/pier cap.	[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. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(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 on completion 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 as specified.	[Nil] [Nil]	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/ Reinforced Earth walls, stone pitching, protection works complete 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 and Structures.

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

Table 1.3.3

Stage 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 prorata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of atleast two foundations of the major bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also were specified.
(2) Sub-structure	[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 the major bridge subject to completion of atleast two sub structures of abutment / pier cap level of the major bridge
(3) Super-structure (including bearings)	[Nil]	Super-structure: Payment shall be made on pro¬ rata basis on completion of a stage i.e. completion of super¬ structure including bearings of atleast one span in all respects as specified
(4) Wearing Coating excluding 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]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	[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 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 the major Bridge. 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 lessthan25% of the scope of sub- structure of major bridge.
(3) Super-structure (including bearings)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure including bearings of at least one span in all respects as specified. 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
(4) Wearing Coating excluding 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]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	[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.
B.1- Widening and repairs of (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 the ROB/RUB. 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 the ROB/RUB. 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 ROB/RUB.
(3) Super-Structure (Including bearings)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-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 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 as specified	[Nil]	Wearing Coat: Payment shall be made on completion (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
(5) Miscellaneous Items like 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]	Wing walls/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 Pitching and protection works)	[Nil]	Payments shall be made on prorate basis on completion of 20% of the total area.
B.2- New ROB/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) of the ROB/RUB. 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 the ROB/RUB.
(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 ROB/RUB.
(3) Super-structure (including bearing)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respects as specified. 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
(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 as specified	[Nil]	Wearing Coat: Payment shall be made on completion (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) In case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
(5) Miscellaneous Items like 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]	Wing walls/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- Widening and repairs 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 the structure. 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: Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respects a specified 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
(4) Wearing Coating excluding 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]	Wing walls/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 the structure. 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: Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respects as specified. 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
(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]	Wing walls/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 Dozed and exceptionally long span bridges, the schedule may be modified as per site requirements before bidding with due approval of Competent Authority.

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

1.3.4 Other works.

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

Table1.3.4

Stage of Payment	Weightage	Payment Procedure
1	2	3
(1) Toll Plaza	[Nil]	Payment of Toll Plaza shall be made on Pro rata basis as per following completed stages: (i) Rigid pavement upto DLC (LHS) - 12.5 % (ii) Rigid pavement upto DLC (RHS)- 12.5 %

		(iii) PQC (LHS)-25 % (iv) PQC (RHS)-25 % (v) Admin Building, Maintenance Building & Misc. Works-10% (vi) Canopy, Toll Booth, Safety Items & Miscellaneous Works-12.5 % (vii) Toll Plaza Tunnel-2.5 %

Stage of Payment	Weightage	Payment Procedure
1	2	3
(2) Roadside drains (RCC, PCC, Sub-Surface & Unlined)	10.60 %	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 05% (five percent) of the total length
(3) Road signs, markings, km stones, safety devices etc	12.47%	
(4) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus Bays	[Nil]	
b) Passenger Shelter	0.23%	
c) Truck Lay-byes	1.55%	
d) Rest Area	[Nil]	
e) Roadside Amenities	[Nil]	
f) Streetlight	0.32%	
g) Utility Duct	0.06 %	
(5) Toe Wall	2.28%	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 total length.
(6) Roadside Plantation including Horticulture in Wayside Amenities	0.00%	
(7) Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]	
(8) Boundary stone	[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 total length
(9) Safety and traffic management during construction	[Nil]	Payment shall be made on prorate basis every six months.
(10) Breast 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 total length.
(11) Site Clearance & Dismantling	0.48 %	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 total length.

(12) Reinforced Earth Wall	0.00 %	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 total length.
(13) Junction	2.38 %	Cost of each Junction shall be determined on pro rata basis with respect to the total number of junctions. Payment shall be made on the completion of at least five junctions.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(14) Seeding & Mulching	6.74%	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 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 than 5% (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 (Stone Pitching)	3.29%	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) Gabion Structure	58.57%	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 total length.
(19) Tree Falling	0.98%	Unit of measurement is in number. Payment shall be made on pro rata basis on completion of a Stage in a number of not less than 5% (five percent) of the total numbers.
(20) Muck Dumping	0.05%	Unit of measurement is in cumec quantity. Payment shall be made on pro rata basis on completion of a Stage in a cumec of not less than 5% (five percent) of the total quantity.

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	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	89.01 %	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/ 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	10.99 %	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

Stage of Payment	Weightage	Payment procedure
1	2	3
Utilities Shifting	100 %	
		of pipe-50%, Charging of line including all miscellaneous works and Dismantling and site clearance-50%)
(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-50%, Charging of line including all miscellaneous works and Dismantling and site clearance-50 %)

2. Procedure for payment for Maintenance

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

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

SCHEDULE - I

(See Clause 2.1)

DRAWINGS

1 Drawings

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

2 Additional Drawings

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

Annex - I (Schedule-I)

List of Drawings

A broad 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) Drawings of horizontal alignment, vertical profile and cross section.

b) Drawings of drainage plan and profile.

c) Drawing of cross drainage works.

d) Drawings of major intersections and ROB.

e) Drawing of toll plaza layout, toll collection systems and roadway near toll plaza

f) Drawings of bus-bay and bus shelters with furniture and drainage system.

g) Drawing of road furniture items including traffic signage, markings, safety barriers, etc.

h) Drawings of traffic diversion plans and traffic control measures.

i) Drawings of road drainage measures

j) Drawing of typical details slope protection measures.

k) Drawing of a landscaping and horticulture.

l) Drawings of pedestrian crossings

m) Drawings of street lighting.

n) General arrangement of Base camp and Administrative Block

o) Drawings of catch water drains check drains.

p) Any other drawings which Authority's Engineer may review.

SCHEDULE - J

(See Clause 10.3(ii))

PROJECT COMPLETION SCHEDULE

1 Project Completion Schedule

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

***2* Project Milestone-I**

(i) Project Milestone-I shall occur on the date falling on the 256th day from the Appointed Date (the "**Project Milestone-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 prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

***3* Project Milestone-II**

(i) Project Milestone-II shall occur on the date falling on the 438th day from the Appointed Date (the "**Project Milestone-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 per cent) of the Contract Price and should have started construction of all bridges.

***4* Project Milestone-III**

(i) Project Milestone-III shall occur on the date falling on the 621st day from the Appointed Date (the "**Project Milestone-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 validly prepared Stage Payment Statements for an amount not less than 70% (sixty per cent) of the Contract Price and should have started construction of all project facilities.

***5* Scheduled Completion Date**

(i) The Scheduled Completion Date shall occur on the 730th day from the Appointed Date.

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

***6* Extension of time**

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

Schedule-K

(See Clause 12.1.2)

Tests on Completion

1. Schedule for Tests

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

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

2 Tests

2.1 Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include (to be decided with Authority's Engineer at the time of physical tests as per relevant IRC/ Code Manual).

2.2 Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of NSV and the maximum permissible roughness for purposes of this Test shall be 2,000 (two thousand) mm for each kilometer.

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

2.4 Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards.

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

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

3 Agency for conducting Tests

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

4. Completion Certificate

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

The Authority Engineer will carry out tests with following equipment at his own cost in the presence of contractor's representative –

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 Inspection Unit (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)

The First testing with the help of NSV shall be conducted at the time of issue of completion certificate.

SCHEDULE - L

(See Clause 12.2 and 12.4)

PROVISIONAL CERTIFICATE

1 I, …….. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated.....(the **"Agreement"**), for the

"Up-gradation of National Highway No. 217 (Paikan – Tura Section) to two lane with paved shoulder in the state of Meghalaya Package II (Km 20.900 to Km 47.075 on EPC Mode through ADB Loan assistance "(the "Project Highway") on Engineering, Procurement and Construction (EPC) basis through.....(Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been undertaken to determine compliance of the Project Highway with the provisions of the Agreement.

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

3 In view of the foregoing, I am satisfied that the **Project Highway** ***Up-gradation of National Highway No. 217 (Paikan – Tura Section) to two lane with paved shoulder in the state of Meghalaya Package II (Km 20.900 to Km 47.075 on EPC Mode through ADB Loan assistance"*** can be safely and reliably placed in service of the Users thereof, and in terms of the Agreement, the Project Highway is hereby provisionally declared fit for entry into operation on this the ……. day of …….. 20…...

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

COMPLETION CERTIFICATE

1 I, …… (Name of the Authority's Engineer), acting as the Authority's `Engineer, under and in accordance with the Agreement dated …… (the "Agreement"), **for the *Up-gradation of National Highway No. 217 (Paikan – Tura Section) to two lane with paved shoulder in the state of Meghalaya Package II (Km 20.900 to Km 47.075 on EPC Mode through ADB Loan assistance"*** (the "Project Highway") on Engineering, Procurement and Construction (EPC) basis through …….. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

For and on behalf of

the Authority's Engineer by:

(Signature) (Name) (Designation) (Address)

SCHEDULE - M
(See Clauses 14.6, 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

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

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

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

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

2. Percentage reductions in lump sum payments

2.1 The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, rain cuts, 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%
S. No.	**Item/Defect/Deficiency**	**Percentage**
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	

(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidental vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

R=P/IOO x M x L1/L

Where P = Percentage of particular item/Defect/deficiency for

deduction M = Monthly lump-sum payment in accordance with the Bid

L1 = Non-complying length

L = Total length of the road,
R = Reduction (the amount to be deducted for non compliance for a particular item/Defect/deficiency The total amount of reduction shall be arrived at by summation of reductions for such items/Defects/deficiency or non compliance.

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

SCHEDULE - N
(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

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

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

2 Terms of Reference

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

3 Appointment of Government entity as Authority's Engineer

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

Annex – I
(Schedule - N)

TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

1 Scope

1.1 These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated.....(the "**Agreement**), which has been entered into between ..... **("**the **Authority")** and ..... (the "**Contractor**") for **the "Up-gradation of National Highway No. 217 (Paikan – Tura Section) to two lane with paved shoulder in the state of Meghalaya Package II (Km 20.900 to Km 47.075 on EPC Mode through ADB Loan assistance"** and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

1.2 The TOR shall apply to construction and maintenance of the Project Highway.

2 Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time Extension;
(b) any additional cost to be paid by the Authority to the Contractor;
(c) the Termination Payment; or
(d) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding Rs. 5,000,000 (Rs. fifty lakh).

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

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

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

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

4 Construction Period

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

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

4.3 The Authority's Engineer shall review the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty-one) days stating the modifications, if any, required thereto.

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

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

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

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

4.8 The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and

standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.

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

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

4.11 The timing of tests referred to in Paragraph 4.9, and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

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

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

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

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

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

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

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

5. Maintenance Period

5.1 The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly

Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.

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

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

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

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

6 Determination of costs and time

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

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

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

7. Payments

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

7.2 Authority's Engineer shall -

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

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

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

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

8. Other duties and functions

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

9 Miscellaneous

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

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

9.3 Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

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

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

SCHEDULE - O

(See Clauses 19.4.1, 19.6.1, and 19.8.1)
Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

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

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

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

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

(f) Deductions:

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

(ii) Any amount towards deduction of taxes; and

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

(g) Net claim: (e) – (f) (iii);

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

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

(ii) For Change of Scope Orders, and

(iii) Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule-P

(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

The insurance cover shall be not less than the value of the Contract Price.

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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 physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, …….. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …… (the "Agreement"), for **"Up-gradation of National Highway No. 217 (Paikan – Tura Section) to two lane with paved shoulder in the state of Meghalaya Package II (Km 20.900 to Km 47.075 on EPC Mode through ADB Loan assistance"** (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 AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

***** End of the Document *****