Schedules

SCHEDULE - A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1. The Site

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

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

1.3 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.

1.4 The alignment plans of the Project Highway are specified in Annex-III. 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 improve/upgrade the Road Profile as indicated in Annexure-III based on site/design requirement.

1.5 The status of the environment clearances obtained or awaited is given in Annex IV.

Annex - I

(Schedule-A)

Site

1. The Site

The Site of the Project Highway comprises the section of National Highway -39 (New NH-2) from Sekmai (Ex. Km299+538) to Nilakuthi (Ex. Km311+082) in the state of Manipur. The contract package of the project comprises the rehabilitation and up-gradation of existing two lanes to 4 lane divided carriageway configuration. The land, carriageway and structures comprising the Site are described below:

2. Land

The Site of the Project Highway comprises the land (existing right of way (ROW)) as described below:

S. No	Existing Chainage (Km)		Existing ROW (m)	Remarks
	From	To		
1	299+538	311+082	30	

3. Carriageway

The present carriageway of the Project Highway is generally Two Lane carriageway. The type of the existing pavement is flexible and road width details of package-5are as below:

S No	Existing Chainage		Length	Terrain		Carriageway	
	From	To	(m)	LHS	RHS	Type	Width (m)
1	297+700	297+800	100	Rolling	Rolling	BT	6.8
2	297+800	301+200	3400	Rolling	Rolling	BT	7
3	301+200	301+600	400	Hilly	Rolling	BT	7
4	301+600	302+000	400	Rolling	Rolling	BT	7
5	302+000	304+000	2000	Rolling	Rolling	BT	6.8
6	304+000	304+200	200	Hilly	Rolling	BT	6.8
7	304+200	304+400	200	Hilly	Rolling	BT	7.5
8	304+400	306+400	2000	Rolling	Rolling	BT	7.5
9	306+400	306+800	400	Rolling	Hilly	BT	7.5
10	306+800	309+000	2200	Rolling	Rolling	BT	7.5
11	309+000	310+400	1400	Valley	Hilly	BT	7.5
12	310+400	310+600	200	Valley	Rolling	BT	7.5
13	310+600	311+082	482	Rolling	Rolling	BT	7.5

4. Major Bridges

The Site includes the following Major Bridges:

S No.	Ex. Chainage	Ex. Span arrangement (No. x Span)	Total Outer Width (m)	Type of Structure		
				Superstructure	Substructure	Foundation
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	Remarks
		Found-ation	Super-structure				
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	Super structure		
NIL					

7. Minor bridges

The Site includes the following minor bridges:

S. No.	Ex. Chainage (Km)	Ex. Span arrangement (No. x Span)	Total Outer Width of Deck (m)	Type of Structure		
				Superstructure	Substructure	Foundation
1	305+629	1x13.0+1x17 + 1x13	8.5	RCC T-Beam	RCC wall type	Open

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location/ Existing Chainage (KM)	Remarks
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)
NIL				

10. Culverts

10.1 Pipe Culverts:

The Site has the following existing pipe culverts:

S. No.	Ex. Chainages (Km)	Type of Culvert	No. of Pipes	Pipe Dia (m)	Carriageway Width (m)	Remarks
Nil						

10.2 Slab Culverts

The Site has the following existing slab culverts:

S. No.	Ex. Chainages (Km)	Type of Culvert	Thickness of Slab (m)	No. of Span	Clear Span (m)	Carriageway Width (m)	Remarks
1	301+607	Slab	0.2	1	1	7.2	Blocked-L
2	301+895	Slab	0.2	1	0.6	7	
3	302+334	Slab	0.3	1	1.1	7	
4	302+443	slab	0.3	1	1.4	7	
5	304+060	slab	0.5	1	2.7	9.2	
6	304+338	Slab	0.5	1	5.8	7.5	Canel
7	305+193	Slab	0.5	1	2.7	10	
8	305+909	Slab	0.5	1	2.5	10.4	Repairing Required (Broken)
9	306+404	Slab	0.5	1	2.6	9.8	
10	306+765	Slab	0.5	1	2.5	10.1	
11	308+985	Slab	0.5	1	2.4	11	
12	309+425	Slab	0.5	1	2.5	9.8	
13	309+689	Slab	0.5	1	2.5	10.8	
14	310+204	Slab	0.5	1	2.8	10	

S. No.	Ex. Chainages (Km)	Type of Culvert	Thickness of Slab (m)	No. of Span	Clear Span (m)	Carriageway Width (m)	Remarks
15	310+468	Slab	0.5	1	2.8	11	
16	310+637	Slab	0.5	1	2.5	10.6	

10.3Other Culverts

S. No.	Ex. Chainages (Km)	Type of Culvert	Thickness of Slab (m)	Span Arrangement	Clear Span (m)	Carriageway Width (m)	Remarks
1	303+814	Arch	0.3	1	1.1	6.6	

11. Bus bays& Bus Shelters

The details of bus stops on the site are as follows:

S.No	Ex. Chainages (Km)	Ex. Bus Stop	Side	Remarks
1	300+100	Ex.bus stop	LHS	Konglatongbi
2	301+225	Ex.bus stop	RHS	Konglatongbi
3	301+456	Ex.bus stop	LHS	Konglatongbi
4	302+345	Ex.bus stop	LHS	Sekmai
5	302+638	Ex.bus stop	LHS	Sekmai
6	304+446	Ex.bus stop	RHS	Tendongyan
7	304+618	Ex.bus stop	RHS	Tendongyan
8	305+825	Ex.bus stop	RHS	Tendongyan
9	307+012	Ex.bus stop	RHS	Pheidinga
10	307+325	Ex.bus stop	RHS	Awang Leikainthambi
11	307+383	Ex.bus stop	LHS	Awang Leikai
12	307+650	Ex.bus stop	LHS	Awang Leikai
13	307+910	Ex.bus stop	RHS	Awang Leikai
14	308+412	Ex.bus stop	LHS	Khonghampat
15	310+790	Ex.bus stop	LHS	Koirengei

12. Truck Lay byes

The details of truck lay byes are as follows:

S. No.	Existing Chainage (km)	Length(m)	Left Hand Side	Right Hand Side
NIL				

13. Road side drains

S. No.	Existing Chainage(Km)		Type	
	From	To	Masonry/cc (Pucca)	Earthen (Kutcha)
Nil				

14. Major junctions

The details of Major junctions are as follows:

SN	Ex. Chainage (Km)	At Grade/ Grade Separated	Details of Cross Road		Starts From
			Direction (LHS/RHS)	Road Type (NH/SH/MDR)	
1	301+053	At Grade	Both side	MDR	Sekmai
2	310+716	At Grade	Both side	MDR	Imphal

15. Minor junctions

The details of the minor junctions are as follows:

S. No	Existing Chainage (Km)	Type of Junction	Width of Cross Road	Side	Village/Town Name
1	302+256	Y	3.3	RHS	Tendongyan
2	302+368	T	2.6	RHS	Pheidinga
3	303+695	T	2.9	RHS	Pheidinga
4	304+572	T	5.6	LHS	Awang Leikainthambi
5	305+137	Y	3.3	RHS	Khoirentampak
6	305+930	Y	3.7	RHS	Khoirentampak
7	305+990	T	3.8	LHS	Khoirentampak
8	306+230	T	2.8	LHS	Khoirentampak
9	306+498	Y	2.7	RHS	Khoirentampak

16. Bypasses

The details of the bypasses are as follows:

S. No.	Name of bypass (town)	Chainage (km)	Length	Carriageway	
		From ----to	(in Km)	Width (m)	Type
Nil					

17. Other structures

- Nil –

18. Referencing

The relationship between the "Existing Chainage" as per field survey and "Design Chainage" is given below:

S. No.	Existing Chainage (Km)	Design Chainage (Km)	Remarks
1	299+538	297+700	Start of Package-5b
2	300+000	298+280	
3	301+000	299+187	
4	302+000	300+095	
5	303+000	301+003	
6	304+000	301+909	
7	304+595	302+500	Bridge Re-alignment
8	305+703	303+700	
9	306+000	303+993	
10	307+000	304+918	
11	308+000	305+971	
12	309+000	306+970	
13	310+000	307+770	
14	311+000	308+660	
15	311+082	308+729	End of Package-5b

Annex - II

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

S. No	Ex Chainage (Km)		Design Chainage(Km)		Length (m)	PROW width (m)	Date of Providing ROW*
	From	To	From	To			
1	299+538	299+608	297+700	297+770	70	41.3	90% land will be available at the time of appointed date.
2	299+608	299+688	297+770	297+850	80	47.5	
3	299+688	299+1038	297+850	298+200	350	42.5	
4	299+1038	300+119	298+200	298+400	200	42	
5	300+119	300+169	298+400	298+450	50	40.8	
6	300+169	300+600	298+450	298+880	430	38.8	
7	300+600	300+610	298+880	298+890	10	50.5	
8	300+610	300+620	298+890	298+900	10	45	
9	300+620	300+711	298+900	298+990	90	37.5	
10	300+711	300+771	298+990	299+050	60	55	
11	300+771	300+821	299+050	299+100	50	60	
12	300+821	300+871	299+100	299+150	50	48.8	
13	300+871	301+033	299+150	299+220	70	37.5	
14	301+033	300+771	299+220	299+050	-170	55	
15	300+771	300+821	299+050	299+100	50	60	
16	300+821	300+871	299+100	299+150	50	48.8	
17	300+871	301+033	299+150	299+220	70	37.5	
18	301+033	301+043	299+220	299+230	10	43.6	
19	301+043	301+053	299+230	299+240	10	78.9	
20	301+053	301+063	299+240	299+250	10	98.2	
21	301+063	301+073	299+250	299+260	10	43.9	
22	301+073	301+513	299+260	299+700	440	37.5	
23	301+513	302+055	299+700	300+150	450	45	
24	302+055	302+135	300+150	300+230	80	57.5	
25	302+135	304+133	300+230	302+040	1810	45	
26	304+133	304+236	302+040	302+140	100	52.5	
27	304+236		302+140	302+700	560	45	
28			302+700	302+710	10	64.3	
29			302+710	302+720	10	58.9	
30			302+720	302+730	10	53.5	
31			302+730	302+740	10	46	
32			302+740	302+750	10	41.3	
33			302+750	302+760	10	41.3	
34			302+760	302+900	140	50	
35			302+900	303+240	340	45	

S. No	Ex Chainage (Km)		Design Chainage(Km)		Length (m)	PROW width (m)	Date of Providing ROW*
	From	To	From	To			
36			303+240	303+250	10	64.3	
37			303+250	303+260	10	58.9	
38			303+260	303+270	10	53.5	
39			303+270	303+280	10	46	
40			303+280	303+300	20	41.3	
41		305+790	303+300	303+800	500	37.5	
42	305+790	305+890	303+800	303+900	100	47	
43	305+890	305+990	303+900	304+000	100	38.8	
44	305+990	306+137	304+000	304+150	150	45	
45	306+137	306+186	304+150	304+200	50	93	
46	306+186	306+236	304+200	304+250	50	68	
47	306+236	306+387	304+250	304+400	150	45	
48	306+387	306+445	304+400	304+450	50	56	
49	306+445	306+640	304+450	304+600	150	76.1	
50	306+640	306+751	304+600	304+690	90	45.1	
51	306+751	306+912	304+690	304+850	160	40	
52	306+912	306+962	304+850	304+900	50	38.8	
53	306+962	307+721	304+900	305+650	750	37.5	
54	307+721	307+911	305+650	305+840	190	41.3	
55	307+911	308+522	305+840	306+490	650	37.5	
56	308+522	308+532	306+490	306+500	10	33.9	
57	308+532	308+832	306+500	306+800	300	30	
58	308+832	308+842	306+800	306+810	10	30.7	
59	308+842	308+852	306+810	306+820	10	31.7	
60	308+852	308+862	306+820	306+830	10	31.0	
61	308+862	308+872	306+830	306+840	10	31.1	
62	308+872	308+882	306+840	306+850	10	31.8	
63	308+882	308+892	306+850	306+860	10	31.7	
64	308+892	308+902	306+860	306+870	10	30.4	
65	308+902	308+912	306+870	306+880	10	30.0	
66	308+912	308+922	306+880	306+890	10	30.6	
67	308+922	308+932	306+890	306+900	10	30.3	
68	308+932	308+962	306+900	306+930	30	30.0	
69	308+962	308+972	306+930	306+940	10	30.3	
70	308+972	308+982	306+940	306+950	10	30.3	
71	308+982	308+992	306+950	306+960	10	31.1	
72	308+992	309+000	306+960	306+970	10	32.4	
73	309+000	309+010	306+970	306+980	10	32.4	
74	309+010	309+020	306+980	306+990	10	32.3	
75	309+020	309+030	306+990	307+000	10	32.2	
76	309+030	309+040	307+000	307+010	10	31.7	
77	309+040	309+050	307+010	307+020	10	31.4	
78	309+050	309+060	307+020	307+030	10	31.1	

S. No	Ex Chainage (Km)		Design Chainage(Km)		Length (m)	PROW width (m)	Date of Providing ROW*
	From	To	From	To			
79	309+060	309+070	307+030	307+040	10	30.8	
80	309+070	309+080	307+040	307+050	10	30.5	
81	309+080	309+090	307+050	307+060	10	30.2	
82	309+090	309+230	307+060	307+200	140	30.0	
83	309+230	309+240	307+200	307+210	10	30.3	
84	309+240	309+250	307+210	307+220	10	30.0	
85	309+250	309+260	307+220	307+230	10	30.5	
86	309+260	309+270	307+230	307+240	10	30.1	
87	309+270	309+280	307+240	307+250	10	30.6	
88	309+280	309+290	307+250	307+260	10	30.1	
89	309+290	309+300	307+260	307+270	10	31.5	
90	309+300	309+310	307+270	307+280	10	32.5	
91	309+310	309+320	307+280	307+290	10	33.1	
92	309+320	309+330	307+290	307+300	10	33.3	
93	309+330	309+340	307+300	307+310	10	32.9	
94	309+340	309+350	307+310	307+320	10	32.7	
95	309+350	309+360	307+320	307+330	10	32.4	
96	309+360	309+370	307+330	307+340	10	30.7	
97	309+370	309+380	307+340	307+350	10	30.0	
98	309+380	309+390	307+350	307+360	10	30.4	
99	309+390	309+400	307+360	307+370	10	30.7	
100	309+400	309+410	307+370	307+380	10	32.2	
101	309+410	309+420	307+380	307+390	10	36.0	
102	309+420	309+430	307+390	307+400	10	37.2	
103	309+430	309+440	307+400	307+410	10	38.3	
104	309+440	309+450	307+410	307+420	10	36.7	
105	309+450	309+460	307+420	307+430	10	36.5	
106	309+460	309+470	307+430	307+440	10	34.4	
107	309+470	309+480	307+440	307+450	10	33.4	
108	309+480	309+490	307+450	307+460	10	32.7	
109	309+490	309+500	307+460	307+470	10	31.4	
110	309+500	309+510	307+470	307+480	10	30.2	
111	309+510	309+520	307+480	307+490	10	30.2	
112	309+520	309+530	307+490	307+500	10	30.2	
113	309+530	309+540	307+500	307+510	10	30.0	
114	309+540	309+550	307+510	307+520	10	31.4	
115	309+550	309+560	307+520	307+530	10	32.1	
116	309+560	309+570	307+530	307+540	10	34.8	
117	309+570	309+580	307+540	307+550	10	36.9	
118	309+580	309+590	307+550	307+560	10	38.4	
119	309+590	309+600	307+560	307+570	10	39.1	
120	309+600	309+610	307+570	307+580	10	39.1	

S. No	Ex Chainage (Km)		Design Chainage(Km)		Length (m)	PROW width (m)	Date of Providing ROW*
	From	To	From	To			
121	309+610	309+620	307+580	307+590	10	38.2	
122	309+620	309+630	307+590	307+600	10	36.8	
123	309+630	309+640	307+600	307+610	10	35.6	
124	309+640	309+650	307+610	307+620	10	34.4	
125	309+650	309+660	307+620	307+630	10	32.2	
126	309+660	309+670	307+630	307+640	10	30.8	
127	309+670	309+680	307+640	307+650	10	30.0	
128	309+680	309+690	307+650	307+660	10	31.2	
129	309+690	309+700	307+660	307+670	10	30.4	
130	309+700	309+710	307+670	307+680	10	30.1	
131	309+710	309+720	307+680	307+690	10	30.4	
132	309+720	309+730	307+690	307+700	10	30.0	
133	309+730	309+740	307+700	307+710	10	30.2	
134	309+740	309+750	307+710	307+720	10	30.0	
135	309+750	309+760	307+720	307+730	10	30.1	
136	309+760	309+770	307+730	307+740	10	30.2	
137	309+770	309+780	307+740	307+750	10	30.6	
138	309+780	309+790	307+750	307+760	10	30.0	
139	309+790	310+000	307+760	307+770	10	30.6	
140	310+000	310+010	307+770	307+780	10	30.8	
141	310+010	310+020	307+780	307+790	10	31.9	
142	310+020	310+030	307+790	307+800	10	33.1	
143	310+030	310+040	307+800	307+810	10	34.2	
144	310+040	310+050	307+810	307+820	10	35.3	
145	310+050	310+060	307+820	307+830	10	34.3	
146	310+060	310+070	307+830	307+840	10	32.1	
147	310+070	310+080	307+840	307+850	10	30.5	
148	310+080	310+090	307+850	307+860	10	30.3	
149	310+090	310+100	307+860	307+870	10	30.1	
150	310+100	310+320	307+870	308+090	220	30.0	
151	310+320	310+330	308+090	308+100	10	30.4	
152	310+330	310+340	308+100	308+110	10	31.4	
153	310+340	310+350	308+110	308+120	10	31.8	
154	310+350	310+360	308+120	308+130	10	31.9	
155	310+360	310+370	308+130	308+140	10	32.1	
156	310+370	310+380	308+140	308+150	10	32.6	
157	310+380	310+390	308+150	308+160	10	33.6	
158	310+390	310+400	308+160	308+170	10	34.1	
159	310+400	310+410	308+170	308+180	10	34.8	
160	310+410	310+420	308+180	308+190	10	36.1	
161	310+420	310+430	308+190	308+200	10	37.7	
162	310+430	310+440	308+200	308+210	10	39.7	
163	310+440	310+450	308+210	308+220	10	39.7	

S. No	Ex Chainage (Km)		Design Chainage(Km)		Length (m)	PROW width (m)	Date of Providing ROW*
	From	To	From	To			
164	310+450	310+460	308+220	308+230	10	39.7	
165	310+460	310+470	308+230	308+240	10	39.8	
166	310+470	310+480	308+240	308+250	10	39.8	
167	310+480	310+490	308+250	308+260	10	37.9	
168	310+490	310+500	308+260	308+270	10	34.9	
169	310+500	310+510	308+270	308+280	10	32.4	
170	310+510	310+520	308+280	308+290	10	31.4	
171	310+520	310+740	308+290	308+510	220	30.0	
172	310+740	310+750	308+510	308+520	10	40.3	
173	310+750	310+760	308+520	308+530	10	72.3	
174	310+760	310+770	308+530	308+540	10	90.7	
175	310+770	310+780	308+540	308+550	10	82.4	
176	310+780	310+790	308+550	308+560	10	73.9	
177	310+790	310+800	308+560	308+570	10	66.4	
178	310+800	310+810	308+570	308+580	10	66.1	
179	310+810	310+820	308+580	308+590	10	75.1	
180	310+820	310+830	308+590	308+600	10	47.7	
181	310+830	310+840	308+600	308+610	10	39.8	
182	310+840	311+082	308+610	308+729	119	31.0	

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

Annex - III

(Schedule-A)

Alignment Plans

The existing alignment of the Package-5b i.e. Sekmai to Nilakuthi section of Project Highway shall be modified as per the Alignment plan.

The proposed Alignment Plan and Profile of the Project Highway is available on e-Portal. Finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL.

Annex - IV

(Schedule-A)

Environment Clearances

As per GoI, MoEF notification No. 21-270/2008-IA, III dated 22nd August 2013, proposed project involves expansion of 11.029 km existing National Highway (less than 100 Km). As a result Environmental clearances will not be required from MoEF.

However, forest clearance is required for Tree cutting.

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 as Four lane divided carriageway

Rehabilitation and Up-gradation shall include Four lane divided carriageway of project highway as described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

The Project Highway shall be designed and constructed in conformity with the Specifications and Standards specified in Annex-I of Schedule-D.

Annex – I
(Schedule-B)

Description of Four-Laning

1.1. Widening of the Existing Highway

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

1.2. Width of Carriageway

1.2.1 Four laning with paved shoulder from Sekmai (Ex. Km299+538 of NH-39/Design Chainage Km297+700) to Nilakuthi (Ex. Km311+082 of NH-39/Design Chainage Km308+729) shall be undertaken. The width of paved carriageway shall be 2x9.0mwide in accordance with the Typical Cross Section (TCS) drawings presented in ***Appendix B1- Typical Cross Sections*** or Manual referred to in the Schedule-D (herein after called the "Manual") unless otherwise specified in this Schedule-B and Schedule-D.

The total roadway width of project highway shall be 18 m wide.

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

S. No.	Built-up stretch (Township)	Design Chainage (Km)		Length (m)	Paved Width (m)	(Typical cross section) (Ref. to Schedule B Appendix B-1)
		From	To			
1	Sekmai	298+400	299+240	840	2x9.0m Main Carriageway +2x6.0m Service Road	TCS-11 & TCS-12

1.2.2 Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.2.1 above.

2. Geometric Design and General Features

2.1. General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual (IRC:SP:84-2014).

2.2. Design speed

The design Speed for the project highway adopted for plain/rolling terrain is 80-100km/hr. However due to certain site constraints, the minimum design speed adopted for plain/rolling terrain is 40km/hr at locations mentioned in Schedule D.

2.3. Improvement of the existing road geometrics

The alignment of existing road has been improved at many locations along the route either by eliminating sharp curves and/or increasing the radii of horizontal curves. Also, at few locations the existing steep gradient have been improved through cutting/filling so as to conform the requirement of IRC:SP:84-2014 and achieving ruling gradient for plain/rolling terrain. So the reconstruction of road shall follow the improved alignment as enclosed in the bid document.

Sl. No.	Design Chainage (Km)		Type of deficiency	Remarks
	From Km	To Km		
As per Alignment Plan (Annex-III, Schedule A)				

2.3.1 Details of proposed Realignments:

S. No	Design Chainage(Km)		Side	Design Length (Km)	Remarks
	From	To			
As per Alignment Plan (Annex-III, Schedule A)					

2.3.2 Details of Proposed Bypasses:

S. No	Design Chainage(Km)		Side	Design Length (km)	Remarks
	From	To			
Nil					

2.4. Right of Way

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

2.5. Type of shoulders

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

S. No.	Design Chainage (Km)		Length (m)	(Typical cross section) (Ref. to Schedule B Appendix B-1)
	From	To		
1	298+400	299+240	840	TCS-11 & TCS-12

(b) In open country, paved shoulders of 1.5 m width shall be provided with same pavement layers of carriageway and balance 2.0m wide earthen shoulder shall be covered with 150mm thick compacted layer of granular/hard material. The granular sub-base(GSB) layer to be extended till side slope.

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

2.6. Lateral and vertical clearances at Underpasses

2.6.1 Lateral and vertical clearances at underpasses and provisions of guard rails/ crash barriers shall be as per the paragraph 2.10 of the Manual.

2.6.2 Lateral Clearance: The width of the openings at underpasses shall be as follows:

S. No.	Location (Chainage)	Span/opening (m)	Remarks
Nil			

2.7. Lateral and vertical clearances at overpasses

2.7.1 Lateral and vertical clearances at overpasses and provision of guard rails/crash barriers shall be as per the paragraph 2.11 of the Manual.

2.7.2 Lateral Clearance: The size of the openings at overpasses shall be as follows:

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

2.8. Service roads / Slip roads

Service roads/Slip roads shall be constructed at the locations and for the lengths

indicated below:

S. No.	Design Chainage (km)		Side	Length (m)
	from	to		
1	298+400	299+240	Both Side	840

2.9. Grade separated structures:

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

S. No.	Location of Structure	Deck Width (m)	Number and length of spans	Approach gradient
NIL				

2.10. Cattle and Pedestrian under pass / over pass

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

S. No.	Location	Type of crossing
NIL		

2.11. Typical Cross Section of the Project Highway

Typical Cross Sections (TCS) have been developed showing configuration along with a schedule of their applicability is presented in Appendix B-1 to this Schedule-B.

3. Intersections and Grade Separators

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

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

(a) At-grade intersections

Major Junctions: -

S. No	Existing Chainage (Km)	Design Chainage (Km)	Type of Junction	Side	Remarks
1	301+053	299+244	4-arm	Both side	Khurkhul Awang Sekmai Lambi road
2		300+417	Y	LHS	Maharabi Mayai Lambi
3	304+677	302+582	3-arm (Y)	Left side	Start of Pheidinga Bridge Realignment
4		303+286	3-arm (Y)	Right side	Pheiding-Leimakhong Road junction
5	305+677	303+671	3-arm (T)	Left side	End of Pheidinga Bridge Realignment
6	310+716	308+550	Roundabout	Both side	

Minor Junctions: -

S. No	Existing Chainage	Design Chainage	Type of Junction	Side	Proposed Width	Village/Town Name
1	299+710	297+874	Y	RHS	2.8	Kanglatongbi
2		298+175	Y	LHS	3.6	Sekmai
3		298+492	T	LHS	3	Sekmai
4	300+213	298+502	Y	RHS	3.7	Sekmai
5	300+346	298+634	T	RHS	2.4	Sekmai
6	300+631	298+898	Y	LHS	3.5	Sekmai
7	300+700	298+978	Y	RHS	3.2	Sekmai
8	300+725	299+009	Y	LHS	2.7	Sekmai
9	300+837	299+116	Y	RHS	3.9	Sekmai
10	301+000	299+188	T	RHS	2.3	Sekmai
11	301+050	299+400	T	LHS	3.5	Tendongyan
12	304+350	302+256	Y	RHS	3.3	Tendongyan
13	304+463	302+368	T	RHS	2.6	Pheidinga
14	305+663	303+695	T	RHS	2.9	Pheidinga
15	305+687	304+572	T	LHS	5.6	Awang Leikainthambi
16	307+210	305+137	Y	RHS	3.3	Khoirentampak
17	307+980	305+930	Y	RHS	3.7	Khoirentampak
18	308+025	305+990	T	LHS	3.8	Khoirentampak
19	308+525	306+230	T	LHS	2.8	Khoirentampak
20	310+824	306+498	Y	RHS	2.7	Khoirentampak

For the drainage, additional Pipe Culvert (NP4 class) shall be provided on cross roads as per site condition.

(b) Grade separated intersection with/without ramps

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

4. Road Embankment and Cut Section

4.1 The reconstruction of the existing road and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in section 4 of the Manual and the specified cross sectional details. Deficiencies in the Plan and Profile of the existing road shall be corrected.

4.2 Raising of the Existing Road

The profile of the existing road at the following locations shall be raised:

S. No.	Chainage		Length	Extent of raising
	From	To		
As per Alignment Plan & Profile (Annex-III, Schedule A)				

5. Pavement Design

5.1. Pavement design

Pavement design shall be carried out in accordance with Section 5 of the Manual and IRC: 37-2018.

5.2. Type of pavement

Flexible pavement should be provided on entire project length.

5.3. Design requirements

Pavement design shall be as per section 5 of the Manual and IRC: 37: 2018.

Design Period and Strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of ***15***

years. Stage construction shall not be permitted.

5.3.1 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for minimum design traffic of ***30*** Million Standard Axles (MSA).

5.4. Reconstruction stretches

The entire length of the Project road requires 'reconstruction' following the Alignment Plan (Annex III-Schedule A). The entire road shall be designed as new flexible pavement.

6. Roadside Drainage

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

The locations of open lined drains are as below:

Chainage		Length	Road side		
From	To		LHS	RHS	BS
299240	299420	180	180		
299500	299560	60	60		
299640	299660	20	20		
300040	300160	120	120		
300300	300400	100	100		
301880	301920	40	40		
302020	302180	160	160		
302460	302490	30		30	
303690	303740	50		50	
303800	303900	100		100	
303960	304160	200		200	
304160	304220	60			60
304220	304240	20		20	
304410	304440	30		30	
304440	304500	60			60
304500	304570	70	70		
304900	306500	1600		1600	
306500	308729	2229			2229
			750	2030	2349
			Total =	**7478**	

The locations of earthen drains are as below:

Chainage		Length	Road side		
From	To		LHS	RHS	Both Side
297700	298400	700			700
299240	299420	180		180	
299420	299500	80			80
299500	299560	60		60	
299560	299640	80			80
299640	299660	20		20	
299660	300040	380			380
300040	300160	120		120	
300160	300300	140			140
300300	300400	100		100	
300400	301880	1480			1480
301880	301920	40		40	
301920	302020	100			100
302020	302180	160		160	
302180	302460	280			280
302460	302490	30	30		
302490	302775	285			285
302820	303690	870			870
303690	303740	50	50		
303740	303800	60			60
303800	303900	100	100		
303900	303960	60			60
303960	304160	200	200		
304220	304240	20	20		
304240	304410	170			170
304410	304440	30	30		
304500	304570	70		70	
304570	304900	330			330
304900	306500	1600	1600		
			2030	750	5015
			Total =		**12810**

The locations of RCC covered drains are as below:

Chainage		Length	TCS
From	To		
298+400	298+670	270	11
298+670	298+750	80	12
298+750	298+840	90	11
298+840	299+240	400	12
		840	

The locations of median drains are as below:

Curve Element	Chainage		Length	Radius	Hand of ARC
	From	To			
Transition	298435.784	298525.784	90.000		
Arc	298525.784	298714.220	188.436	-530	Left
Transition	298714.220	298804.220	90.000		
Transition	298842.993	298907.993	65.000		
Arc	298907.993	298954.673	46.680	360	Right
Transition	298954.673	299019.673	65.000		
Transition	301977.935	302062.935	85.000		
Arc	302062.935	302151.416	88.481	-550	Left
Transition	302151.416	302236.416	85.000		
Transition	302315.092	302445.092	130.000		
Arc	302445.092	302572.464	127.372	360	Right
Transition	302572.464	302702.464	130.000		
Transition	302953.595	303083.595	130.000		
Arc	303083.595	303481.114	397.519	-360	Left
Transition	303481.114	303611.114	130.000		
Transition	304062.822	304127.822	65.000		
Arc	304127.822	304449.083	321.261	750	Right
Transition	304449.083	304514.083	65.000		

7. Design of Structures

7.1. General

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

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

S. No.	Bridge (Km)	Carriageway width and Cross section Features
As per GAD		

7.1.3 The following structures shall be provided with footpaths:

S. No.	Bridge (Km)	Carriageway width and Cross section Features
As per GAD		

7.1.4 All bridges shall be high-level bridges.

7.1.5 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
To be finalized as per the site condition, during the execution, in consultation with the Authority Engineer.			

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

7.2. Culverts

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

7.2.2 Reconstruction of Existing Culverts:

(i) Reconstruction of Pipe Culvert to Pipe Culvert

The following pipe culverts are proposed for reconstruction to pipe culverts:

S.No.	Location		Proposed Span (m)	Type	Remarks
	Existing	Proposed			
NIL					

(ii) Reconstruction of Pipe/Slab Culvert to Box Culvert

The following pipe/slab culverts are proposed for reconstruction to box culverts:

S No	Chainage (Km)		Type	Proposed Span (m)	Remark
	Existing	Design			
1.	301+607	299+887	Box Culvert	1x3.0x3.0 m	
2.	302+443	300+538	Box Culvert	1X3.0x4.0 m	
3.	303+814	301+817	Box Culvert	1x3.0x3.0 m	
4.	304+060	301+980	Box Culvert	1X3.0x4.0 m	
5.	306+404	304+400	Box Culvert	1x3.0x3.0 m	
6.	306+765	304+681	Box Culvert	1x3.0x3.0 m	
7.	309+425	307+389	Box Culvert	1x3.0x3.0 m	

S No	Chainage (Km)		Type	Proposed Span (m)	Remark
	Existing	Design			
8.	309+689	307+559	Box Culvert	1x3.0x3.0 m	
9.	310+204	307+975	Box Culvert	1x3.0x3.0 m	
10.	310+468	308+234	Box Culvert	1x3.0x3.0 m	

7.2.3 Widening of Existing Culverts:

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in Appendix B-1 to this Schedule-B. Repairs and strengthening of existing structures where required shall be carried out.

(a) Retaining / widening of Pipe Culverts.

S No	Chainage (Km)		Type	(Nos x dia in m)	Remark
	Existing	Design			
Nil					

(b) Retaining / widening of Slab Culverts

S No	Chainage (Km)		Type	Span	Remark
	Existing	Design			
1	304+338	302+241	Slab	1X5.8 m	Widened Both side
2	305+909	303+902	Slab	1X2.5 m	Widened Both side
3	308+985	306+953	Slab	1x2.4m	Widened Both side
4	310+637	308+401	Slab	1x2.5m	Widened Both side

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

S No	Design Chainage (Km)	Type	Proposed Span (m)	Remark
1	297+800	Box Culvert	1x2.0x2.0 m	
2	298+010	Box Culvert	1x3.0x3.0 m	
3	298+160	Box Culvert	1x3.0x3.0 m	
4	298+500	Box Culvert	1x2.0x2.0 m	
5	298+640	Box Culvert	1x2.0x2.0 m	
6	298+810	Box Culvert	1x3.0x3.0 m	
7	299+020	Box Culvert	1x2.0x2.0 m	
8	299+330	Box Culvert	1x3.0x3.0 m	
9	299+660	Box Culvert	1x2.0x2.0 m	
10	300+270	Box Culvert	1x2.0x2.0 m	

S No	Design Chainage (Km)	Type	Proposed Span (m)	Remark
11	300+900	Box Culvert	1x2.0x2.0 m	
12	301+370	Box Culvert	1x2.0x2.0 m	
13	301+630	Box Culvert	1x2.0x2.0 m	
14	302+440	Box Culvert	1x2.0x2.0 m	
15	303+200	Box Culvert	1x2.0x2.0 m	
16	303+630	Box Culvert	1x2.0x2.0 m	
17	304+260	Box Culvert	1x2.0x2.0 m	
18	304+850	Box Culvert	1x2.0x2.0 m	
19	305+110	Box Culvert	1x2.0x2.0 m	
20	305+340	Box Culvert	1x2.0x2.0 m	
21	305+560	Box Culvert	1x2.0x2.0 m	
22	305+780	Box Culvert	1x2.0x2.0 m	
23	306+040	Box Culvert	1x2.0x2.0 m	
24	306+240	Box Culvert	1x2.0x2.0 m	
25	306+440	Box Culvert	1x2.0x2.0 m	
26	306+670	Box Culvert	1x2.0x2.0 m	

One additional culvert shall also be provided at each 'T' or 'Y' shape junction and two additional pipe culvers at each cross roads as per site condition for drainage requirement.

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

Sl. No.	Location		Type	Size	Type of repair required
	Existing	Proposed			
Necessary repair and rehabilitation / strengthening works are to be carried out for all widening and retained culverts as per site condition and as directed by Authority's Engineer.					

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

7.3. Bridges

7.3.1 Existing bridges to be re-constructed

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

a) Major Bridges:

S.No.	Location		Type of Existing structure	Span Arrangement		Deck width
	Existing	Proposed		Existing	Proposed	
NIL						

b) Minor Bridges:

S. No.	Location		Type of Existing structure	Span Arrangement		Deck width
	Existing	Proposed		Existing	Proposed	
NIL						

(ii)The following bridges shall be retained / widened:

a) Major Bridges:

S. No	Chainage (km)		Span Arrangement (m)	Outer Width (m)	Super Struc. Type	Remarks
	Design	Existing				
NIL						

b) Minor Bridges:

S. No	Chainage (km)		Span Arrangement	Outer Width	Super Structure Type	Super Structure Type
	Design	Existing	(m)	(m)		
Nil						

Note: Necessary repair and rehabilitation/ strengthening works are to be carried out for all widening and retained bridges as per site condition and as directed by the Authority's Engineer

7.3.2 Additional New bridges:

New bridges at the following locations on the Project Highway shall be constructed. The GADs of new bridges are attached in Volume II: Drawings folder.

S. No.	Design Chainage (km)	Proposed Span (m)	Outer Width (m)	Type of Structure	Remarks

1	302+800	3x20.50	11.0+11.0	RCC T-Beam	New 4L bridge is proposed.

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

S. No.	Location at km	Remarks
NIL		

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

S.No.	Location		Type of Existing structure	Span Arrangement	Remarks
	Existing	Proposed			
As per Note given under clause 7.3.1					

7.3.5 Drainage system for bridge decks

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

7.3.6 Structures in marine environment

Sl. No.	Location at km	Remarks
NIL		

7.4. Rail-road bridges- NIL

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

7.4.2 *Road over-bridges- NIL*

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

S. No.	Chainage	Proposed Span	Type of Superstructure	Deck Width	Remarks
NIL					

7.4.3 *Road under-bridges*

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

S. No.	Location of Level crossing	Proposed Span arrangement
NIL		

7.5. 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
Repair of wearing course and partially damaged railing most of existing bridge location. Vegetation growth need to be removed from existing structure.		

B. ROB / RUB

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

C. Overpasses/Underpasses and other structures

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

7.6. W- Beam Metal Crash Barrier

The W beam crash Barriers are proposed where the embankment height is more than 3m height. The locations are as below:

S. No.	Design Chainage (Km)		TCS Type	Length (m)
	From	To		
Left Hand Side (LHS)				

S. No.	Design Chainage (Km)		TCS Type	Length (m)
	From	To		
1.	297+700	297+730	TCS - 1	30
2.	297+730	297+880	TCS - 8	150
3.	297+880	298+100	TCS - 1	220
4.	298+100	298+180	TCS - 8	80
5.	298+180	298+280	TCS - 1	100
6.	302+730	302+740	TCS - 1	10
7.	302+740	302+775	TCS - 7	35
8.	302+820	302+860	TCS - 7	40
9.	302+860	302+930	TCS - 1	70
10.	303+600	303+660	TCS - 1	60
11.	304+260	304+370	TCS - 6	110
12.	307+400	307+488		88
13.	308+180	308+223		43
RIGHT HAND SIDE (RHS)				
1.	298+190	298+260	TCS - 1	70
2.	298+280	298+300	TCS - 1	20
3.	298+300	298+400	TCS-1 to TCS-11	100
4.	298+400	298+530	TCS - 11	130
5.	299+800	300+020	TCS - 1	220
6.	302+730	302+740	TCS - 1	10
7.	302+740	302+775	TCS - 7	35
8.	302+820	302+860	TCS - 7	40

7.7. Protection Work

The Stone Masonry Breast wall have been proposed on hill side section along the roadway edge where cutting is required or cutting is more than available ROW.

Retaining walls are proposed to restrict the earth along the filling section where normal side slope crosses the available ROW. The PCC toe walls are adopted upto the height of 2m and RCC retaining wall where the required height of wall at site is more than 2m.

The project section where the hill cut heights of side slope is more than 25m, Surficial protection and Erosion Control measures have been considered and details of Typical measures for soil and Rocky surface are presented in Appendix B-1 of this Schedule B.

Breast wall and Retaining wall shall be provided in accordance with section 13 of the Manual.

1. Breast wall

The Stone masonry Breast Wall shall be provided at the following locations**:**

S. No.	Design Chainage (Km)		TCS type	Breast Wall height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
1	302+050	302+060	6	1.5		10	
2	302+060	302+070	6	1.5		10	
3	302+070	302+080	6	1.5		10	
4	302+080	302+090	6	3		10	
5	302+090	302+100	6	3		10	
6	302+100	302+110	6	3		10	
7	302+110	302+120	6	3		10	
8	302+120	302+130	6	3		10	
9	302+130	302+140	6	3		10	
10	302+140	302+150	6	3		10	
11	302+150	302+160	6	1.5		10	
12	303+970	303+980	6		3		10
13	303+980	303+990	6		3		10
14	303+990	304+000	6		1.5		10
15	304+000	304+010	6		3		10
16	304+010	304+020	6		1.5		10
17	304+020	304+030	6		3		10
18	304+160	304+170	2		3		10
19	304+170	304+180	2	1.5	3	10	10
20	304+180	304+190	2	3	3	10	10
21	304+190	304+200	2	3	3	10	10
22	304+200	304+210	2	3	3	10	10
23	304+210	304+220	6	3		10	
24	304+410	304+420	6		3		10
25	304+420	304+430	6		3		10
26	304+430	304+440	6		3		10
27	304+440	304+450	2	1.5	3	10	10
28	304+450	304+460	2	3		10	
29	304+460	304+470	2	3		10	
30	304+470	304+480	2	3		10	
31	304+480	304+490	2	3		10	
32	304+490	304+500	2	3		10	
33	304+500	304+510	2	3		10	
34	304+510	304+520	2	3		10	
35	304+520	304+530	2	3		10	
36	304+530	304+540	2	3		10	
37	304+540	304+550	2	3		10	
38	304+550	304+560	2	3	3	10	10
39	304+560	304+570	2	1.5	3	10	10

S. No.	Design Chainage (Km)		TCS type	Breast Wall height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
40	307+160	307+170	6		1.5		10
41	307+170	307+180	6		1.5		10
42	307+180	307+190	6		1.5		10
43	307+190	307+200	6		3		10
44	307+200	307+210	6		3		10
45	307+210	307+220	6		3		10
46	307+220	307+230	6		3		10
47	307+230	307+240	6		3		10
48	307+240	307+250	6		3		10
49	307+250	307+260	6		3		10
50	307+260	307+270	6		1.5		10
51	307+340	307+350	6		1.5		10
52	307+350	307+360	6		1.5		10
53	307+360	307+370	6		1.5		10
54	307+370	307+380	6		1.5		10
55	307+480	307+490	6		1.5		10
56	307+490	307+500	6		1.5		10
57	307+500	307+510	6		3		10
58	307+510	307+520	6		3		10
59	307+520	307+530	6		1.5		10
60	307+630	307+640	6		1.5		10
61	307+640	307+650	6		3		10
62	307+650	307+660	6		3		10
63	307+660	307+670	6		3		10
64	307+670	307+680	6		3		10
65	307+680	307+690	6		3		10
66	307+690	307+700	6		3		10
67	307+700	307+710	6		3		10
68	307+710	307+720	6		3		10
69	307+720	307+730	6		1.5		10
70	307+730	307+740	6		1.5		10
71	307+740	307+750	6		1.5		10
72	307+750	307+760	6		1.5		10
73	307+760	307+770	6		1.5		10
74	307+850	307+860	6		1.5		10
75	307+860	307+870	6		1.5		10
76	307+870	307+880	6		1.5		10
77	307+880	307+890	6		1.5		10
78	307+890	307+900	6		1.5		10

S. No.	Design Chainage (Km)		TCS type	Breast Wall height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
79	308+030	308+040	6		1.5		10
80	308+040	308+050	6		1.5		10
81	308+050	308+060	6		1.5		10
82	308+060	308+070	6		1.5		10
83	308+070	308+080	6		1.5		10
84	308+080	308+090	6		1.5		10
85	308+280	308+290	6		1.5		10
86	308+290	308+300	6		3		10
87	308+300	308+310	6		3		10
88	308+310	308+320	6		3		10
89	308+320	308+330	6		1.5		10
90	308+330	308+340	6		1.5		10
91	308+340	308+350	6		1.5		10
92	308+350	308+360	6		1.5		10

2. Toe/Retaining wall:

Retaining walls shall be designed considering appropriate height as per site condition. The PCC walls have been adopted upto the height of 2m only and RCC retaining walls for height more than 2m.The proposal shall be got approved from the Authority Engineer. The minimum length and height details of Toe Wall are as below:

Details of Toe Walls:

S. No.	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
1	297+730	297+740	8	0.681		10	
2	297+740	297+750	8	0.983		10	
3	297+750	297+760	8	1.032		10	
4	297+760	297+770	8	1.069		10	
5	297+770	297+780	8	1.073		10	
6	297+780	297+790	8	1.041		10	
7	297+790	297+800	8	0.964		10	
8	297+800	297+810	8	0.872		10	
9	297+810	297+820	8	0.800		10	
10	297+820	297+830	8	0.790		10	
11	297+830	297+840	8	0.749		10	

S. No.	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
12	297+840	297+850	8	0.615		10	
13	297+850	297+860	8	0.494		10	
14	297+860	297+870	8	0.345		10	
15	297+870	297+880	8	0.267		10	
16	298+100	298+110	8	0.199		10	
17	298+110	298+120	8	0.430		10	
18	298+120	298+130	8	0.484		10	
19	298+130	298+140	8	0.537		10	
20	298+140	298+150	8	0.535		10	
21	298+150	298+160	8	0.322		10	
22	298+160	298+170	8	0.372		10	
23	298+170	298+180	8	0.132		10	
24	302+740	302+750	7	0.088		10	
25	302+750	302+760	7	0.684	0.328	10	10
26	302+760	302+770	7	1.186	0.865	10	10
27	302+770	302+775	7	1.660	1.294	5	5
28	302+820	302+830	7	1.640	1.988	10	10
29	302+830	302+840	7	1.039	1.339	10	10
30	302+840	302+850	7	0.492	0.704	10	10
31	302+850	302+860	7	0.278	0.317	10	10
32	302+860	302+870	7	0.088	0.126	10	10
33	306+500	306+510	13a	1.085	1.239	10	10
34	306+510	306+520	13a	0.944	1.167	10	10
35	306+520	306+530	13a	1.013	1.094	10	10
36	306+530	306+540	13a	1.19	1.121	10	10
37	306+540	306+550	13a	1.333	1.216	10	10
38	306+550	306+560	13a	0.857	1.466	10	10
39	306+560	306+570	13a	1.03	1.557	10	10
40	306+570	306+580	13a	0.946	1.552	10	10
41	306+580	306+590	13a		1.759		10
42	306+590	306+600	13a		1.678		10
43	306+600	306+610	13a	0.491	1.89	10	10
44	306+610	306+620	13a	0.426		10	
45	306+620	306+630	13a	0.631		10	
46	306+630	306+640	13a	0.996	1.921	10	10
47	306+640	306+650	13a	1.171	1.603	10	10
48	306+650	306+660	13a	0.631	1.78	10	10
49	306+660	306+670	13a	0.588	1.947	10	10
50	306+670	306+680	13a	0.81	1.89	10	10

S. No.	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
51	306+680	306+690	13a	0.868	1.614	10	10
52	306+690	306+700	13a	0.745	1.31	10	10
53	306+700	306+710	13a to 13b	0.997	1.174	10	10
54	306+710	306+720	13a to 13b	1.177	1.645	10	10
55	306+720	306+730	13b	1.176	1.638	10	10
56	306+730	306+740	13b	0.964		10	
57	306+740	306+750	13b	0.781	1.699	10	10
58	306+750	306+760	13b	0.781	1.429	10	10
59	306+760	306+770	13b	0.835	1.399	10	10
60	306+770	306+780	13b	0.918	1.413	10	10
61	306+780	306+790	13b	1.022	1.353	10	10
62	306+790	306+800	13b	1.225	1.298	10	10
63	306+800	306+810	13b	1.643	1.233	10	10
64	306+810	306+820	13b	1.881	1.079	10	10
65	306+820	306+830	13b	1.301	1.03	10	10
66	306+830	306+840	13b	1.077	1.16	10	10
67	306+840	306+850	13b	0.896	1.178	10	10
68	306+850	306+860	13b	0.757	1.096	10	10
69	306+860	306+870	13b	1.031	1.099	10	10
70	306+870	306+880	13b	1.301	0.95	10	10
71	306+880	306+890	13b	1.364	0.763	10	10
72	306+890	306+900	13b		0.327		10
73	306+900	306+910	13c	1.66		10	
74	306+910	306+920	13c	1.301		10	
75	306+920	306+930	13c	1.164		10	
76	306+930	306+940	13c	0.343		10	
77	306+990	307+000	13e		0.591		10
78	307+000	307+010	13b		0.638		10
79	307+010	307+020	13b		0.456		10
80	307+020	307+030	13b	0.315	0.355	10	10
81	307+030	307+040	13b	0.367		10	
82	307+040	307+050	13b	0.409		10	
83	307+050	307+060	13b	0.531	0.341	10	10
84	307+060	307+070	13b	0.687	0.749	10	10
85	307+070	307+080	13b	0.87	1.005	10	10
86	307+080	307+090	13b	1.051	0.945	10	10
87	307+090	307+100	13b	1.021	0.88	10	10
88	307+100	307+110	13b	1.129	0.813	10	10
89	307+110	307+120	13b	1.234	0.856	10	10
90	307+120	307+130	13b	1.267	0.919	10	10

S. No.	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
91	307+130	307+140	13b	1.26	0.895	10	10
92	307+140	307+150	13b	1.251	0.443	10	10
93	307+150	307+160	13b	1.33		10	
94	307+160	307+170	13b	1.417		10	
95	307+170	307+180	13c	1.524		10	
96	307+190	307+200	13c	1.324		10	
97	307+200	307+210	13c	0.952		10	
98	307+210	307+220	13c	0.8		10	
99	307+220	307+230	13c	0.678		10	
100	307+230	307+240	13c	0.705		10	
101	307+240	307+250	13c	0.465		10	
102	307+260	307+270	13c	1.253		10	
103	307+270	307+280	13c	1.576		10	
104	307+280	307+290	13c	1.687		10	
105	307+290	307+300	13c	1.692		10	
106	307+320	307+330	13c	1.615		10	
107	307+330	307+340	13c	1.318		10	
108	307+340	307+350	13c	0.867		10	
109	307+350	307+360	13c	0.573		10	
110	307+360	307+370	13c	0.709		10	
111	307+370	307+380	13c	1.179		10	
112	307+380	307+390	13c		0.766		10
113	307+390	307+400	13c		0.971		10
114	307+400	307+410	13c		1.383		10
115	307+410	307+420	13c		1.45		10
116	307+420	307+430	13c		1.16		10
117	307+430	307+440	13c		0.94		10
118	307+440	307+450	13c		0.776		10
119	307+450	307+460	13c		0.639		10
120	307+460	307+470	13c		0.475		10
121	307+500	307+510	13c	0.783		10	
122	307+530	307+540	13c	0.52	0.364	10	10
123	307+540	307+550	13c	1.711		10	
124	307+620	307+630	13c	1.872		10	
125	307+630	307+640	13c	0.719		10	
126	307+640	307+650	13c	0.918		10	
127	307+650	307+660	13c	0.558		10	

S. No.	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
128	307+660	307+670	13c	0.41		10	
129	307+670	307+680	13c	0.17		10	
130	307+680	307+690	13c	1.022		10	
131	307+690	307+700	13c	1.732		10	
132	307+700	307+710	13c	1.796		10	
133	307+710	307+720	13c	1.728		10	
134	307+720	307+730	13c	1.705		10	
135	307+730	307+740	13c	1.663		10	
136	307+740	307+750	13c	1.526		10	
137	307+750	307+760	13c	1.183		10	
138	307+760	307+770	13c	0.769		10	
139	307+770	307+780	13c	0.927		10	
140	307+780	307+790	13c	1.992		10	
141	307+830	307+840	13c	1.421		10	
142	307+840	307+850	13c	0.813		10	
143	307+850	307+860	13c	0.343		10	
	307+900	307+910	13c	0.51		10	
	307+910	307+920	13b		0.841		10
144	307+920	307+930	13b		0.953		10
145	307+930	307+940	13b		1.093		10
146	307+940	307+950	13b		1.178		10
147	307+950	307+960	13b		1.226		10
148	307+960	307+970	13b	1.889	1.245	10	10
149	307+970	307+980	13b	1.683	1.994	10	10
150	307+980	307+990	13b	1.381	1.361	10	10
151	307+990	308+000	13b	0.961		10	
152	308+000	308+010	13e	0.53		10	
153	308+100	308+110	13b	0.467		10	
154	308+110	308+120	13b	0.906	0.396	10	10
155	308+120	308+130	13b	1.346	0.727	10	10
156	308+130	308+140	13b	1.336	0.884	10	10
157	308+140	308+150	13b	1.248	1.028	10	10
158	308+150	308+160	13b	1.634	1.148	10	10
159	308+160	308+170	13b		1.314		10
160	308+170	308+180	13b		1.409		10
161	308+180	308+190	13b		1.413		10
162	308+190	308+200	13b		1.339		10
163	308+200	308+210	13b		1.27		10
164	308+210	308+220	13b		1.248		10
165	308+220	308+230	13b		1.164		10

S. No.	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
166	308+230	308+240	13b		1.064		10
167	308+240	308+250	13b		0.966		10
168	308+250	308+260	13b		0.864		10
169	308+260	308+270	13b		0.579		10
170	308+270	308+280	13b		0.308		10
171	308+300	308+310	13c	0.731		10	
172	308+310	308+320	13c	0.669		10	
173	308+320	308+330	13c to 13b	0.712		10	
174	308+330	308+340	13c to 13b	0.788		10	
175	308+340	308+350	13c to 13b	0.769		10	
176	308+350	308+360	13b	0.77		10	
177	308+360	308+370	13b	0.788		10	
178	308+370	308+380	13b	0.768	0.353	10	10
179	308+380	308+390	13b	0.478	0.486	10	10
180	308+390	308+400	13b	0.501	0.544	10	10
181	308+400	308+410	13b	0.52	0.608	10	10
182	308+410	308+420	13b	0.541	0.677	10	10
183	308+420	308+430	13b	0.492	0.456	10	10
184	308+430	308+440	13b	0.422	0.593	10	10
185	308+440	308+450	13b	0.372	0.801	10	10
186	308+450	308+460	13b	0.322	0.827	10	10
187	308+460	308+470	13b	0.272	0.77	10	10
188	308+470	308+480	13b	0.222	0.717	10	10
189	308+480	308+490	13b	0.617	0.711	10	10
190	308+490	308+500	13b	1.436	0.735	10	10
191	308+500	308+510	13b	1.548	0.766	10	10
192	308+510	308+520	13b	1.635	0.812	10	10
193	308+520	308+530	13b	0.259	0.92	10	10
194	308+530	308+540	13b	0.747	0.792	10	10
195	308+540	308+550	13b	0.713	0.641	10	10
196	308+570	308+580	13d	0.542		10	
197	308+580	308+590	13d	0.726		10	
198	308+590	308+600	13d	0.891		10	
199	308+600	308+610	13d	0.928		10	
200	308+610	308+620	13d	0.918		10	
201	308+620	308+630	13d	0.831		10	
202	308+630	308+640	13d	0.658		10	
203	308+640	308+650	13d	0.519		10	
204	308+650	308+660	13d	0.407		10	

S. No.	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
205	308+660	308+670	13d	0.316		10	
206	308+680	308+690	13d	0.461		10	

Details of Retaining Walls:

S No	Design Chainage (Km)		TCS type	Retaining Wall height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
1	306+610	306+620	13a		2.5		10
2	306+620	306+630	13a		2.5		10
3	306+730	306+740	13b		2.5		10
4	306+890	306+900	13b	2.5		10	
5	307+180	307+190	16c	2.5		10	
6	307+300	307+310	16c	2.5		10	
7	307+310	307+320	16c	2.5		10	
8	307+380	307+390	16c	2.5		10	
9	307+390	307+400	16c	2.5		10	
10	307+400	307+410	16c	3.5		10	
11	307+410	307+420	16c	3.5		10	
12	307+420	307+430	16c	3.5		10	
13	307+430	307+440	16c	5		10	
14	307+440	307+450	16c	5		10	
15	307+450	307+460	16c	3.5		10	
16	307+460	307+470	16c	5		10	
17	307+470	307+480	16c	5		10	
18	307+480	307+490	16c	5		10	
19	307+490	307+500	16c	2.5		10	
20	307+550	307+560	16c	2.5		10	
21	307+560	307+570	16c	3.5		10	
22	307+570	307+580	16c	5		10	
23	307+580	307+590	16c	5		10	
24	307+590	307+600	16c	5		10	
25	307+600	307+610	16c	3.5		10	
26	307+610	307+620	16c	2.5		10	
27	307+790	307+800	16c	2.5		10	
28	307+800	307+810	16c	3.5		10	

29	307+810	307+820	16c	2.5		10	
30	307+820	307+830	16c	2.5		10	
31	307+910	307+920	13b	2.5		10	
32	307+920	307+930	13b	2.5		10	
33	307+930	307+940	13b	2.5		10	
34	307+940	307+950	13b	2.5		10	
35	307+950	307+960	13b	2.5		10	
36	308+160	308+170	13b	2.5		10	
37	308+170	308+180	13b	2.5		10	
38	308+180	308+190	13b	3.5		10	
39	308+190	308+200	13b	3.5		10	
40	308+200	308+210	13b	3.5		10	
41	308+210	308+220	13b	5		10	
42	308+220	308+230	13b	5		10	
43	308+230	308+240	13b	5		10	
44	308+240	308+250	13b	7		10	
45	308+250	308+260	13b	7		10	
46	308+260	308+270	13b	7		10	
47	308+270	308+280	13b	5		10	
48	308+280	308+290	16c	3.5		10	
49	308+290	308+300	16c	2.5		10	

3. Stone Pitching

The Stone pitching has been adopted to protect the erosion of embankment side slope where the river stream are very close and may damage the side slope. The minimum locations on the project highway are as below:

S. No.	Design Chainage (Km)		Length (m)	Avg. height (m)	Side
	From	To			
Nil					

4. Surficial Protection and Erosion Control Measures (Cut Height of Side Slope >25m)

The Hill side surficial protection and erosion control measures is proposed at locations where the cut height of side slope is more than 25m.

The minimum details of locations with length and average height are as below and may be finalized in consultation with the Authority Engineer.

S No	Design Chainage (m)		Length (m)	Average Height (m)
	From	To		
LHS				
1	304450	304460	10	21.055
2	304460	304470	10	23.437
3	304470	304480	10	24.810
4	304480	304490	10	26.618
5	304490	304500	10	28.158
6	304500	304510	10	28.577
7	304510	304520	10	28.461
8	304520	304530	10	28.568
9	304530	304540	10	29.015
10	304540	304550	10	26.214

Hill side Typical Surficial Protection and Erosion Control Measures for cut height of side slope more than 25m are presented in Appendix-1 of this Schedule B and described below:

(a) Hill side Toe Gabion wall for Isolated Soil Strata- Mechanically woven Zn+10%Al with PVC coated steel wire mesh gabion toe wall with minimum height of wall 3.0 m shall be constructed for the locations wherever soil strata is encountered after cutting at the toe of hill side slope. Gabion toe wall shall be constructed along with non-woven geotextile behind the gabion for filtration & separation and road edge drain.

(b) Surficial Protection for Rocky Strata -Continuously threaded anchors shall be installed wherever rocky strata are encountered on the slope. Surficial protection with secured drapery system shall be done for full length and height of cut slope surface developed by cutting the rock with slope angle of 80 degree with horizontal after excavation, wherever rocky strata is encountered. Surface protection for rocky strata shall be done by high resistance double twisted hexagonal Zn+5%Al coated wire mesh with top, bottom and surface continuously threaded anchors. Top, bottom and surface anchors shall have minimum length and minimum diameter as 3.0 m and 25 mm respectively. Top and bottom anchors shall be provided at a maximum spacing of 1.5 m and 3.0 m c/c in longitudinal direction respectively. Surface anchors shall be provided with maximum spacing of 3 m c/c in longitudinal and vertical directions for total area. All rock anchors shall be fully grouted. Minimum yield strength of anchorages shall be 500 MPa.

(c) Erosion Control Measures for Soil Surface - Self drilling anchors shall be installed wherever collapsible strata is encountered on the slope. Erosion control measures shall be adopted for cut slope wherever soil strata is encountered at the surface and slope angle shall be limited to 45 degrees or flatter with horizontal after the excavation upto proposed right of way. Three dimensional reinforced synthetic geomat shall be used for erosion control measures along with hydraulically applied erosion control measures. Self Drilling Anchors shall be used for supporting geomat along with u-pins. Minimum length and outer diameter of self drilling anchors shall be 1 m and 32 mm respectively. Self drilling anchors shall be provided with maximum spacing of 3 m c/c in longitudinal and vertical directions.

(d) Drainage Measures for Cut Slopes - Drainage measures for internal seepage in the cut slope shall be adopted by installing PVC pipes inside the slope. PVC pipes for internal seepage shall be half perforated and lined with geotextile. PVC pipes shall be installed for minimum 4 m length at spacing of 4 m c/c in longitudinal direction in minimum 4 layers at the bottom of the cut slope. Top drain shall also be constructed at the toe wherever soil strata is encountered after rocky strata. In addition to the above mentioned drainage measures, suitable surface drainage measures shall be adopted as per the site condition.

8. Traffic Control Devices and Road Safety Works

Traffic control devices and road safety works shall be provided in accordance with Section 9 of the Manual.

8.1. Traffic signs, Pavement marking and Safety barriers

a) **Traffic Signs:**

Traffic signs include roadside signs, overhead signs and curb mounted signs along the entire Project Highway as per section 9 of Manual.

b) **Pavement marking:**

Pavement markings shall cover road marking for the entire Project Highway as per section 9 of Manual

c) **Safety Barrier:**

Provide W-beam crash barrier, and parapet walls along the project highway as suggested in the section 9 of Manual.

8.2. Specifications of the Reflective Sheeting

The prismatic Reflective sheeting shall be provided in accordance with the para 9.2.3 of the Manual.

9. Roadside Furniture

a. Roadside furniture shall be provided in accordance with the provisions of Section 9and 12 of the Manual and as given in Schedule-C.

b. Overhead traffic signs: location and size

Overhead traffic signs are provided as per site requirement according to paragraph 9.2.5 of the Manual and as given in Schedule-C.
Major Road Junctions

a) Delineators: Delineators for the entire Project Highway

10. Compulsory Afforestation

NIL

11. Hazardous Locations

The hazardous locations those require safety barriers are the locations such as Road Side obstacles, Sharp Curves, Bridge approaches and any other locations identified in consultation with Authority Engineer during the execution of project highway.

(a) The safety barriers shall be provided on both side of curves with radius upto 450m as per clause 9.7.1 of Manual at the following hazardous locations on:

LEFT Side Outer Edge				RIGHT Side Outer Edge				No. of side	Total Length in curve
S No	CHAINAGE		Length	S No	CHAINAGE		Length		
	Start	End			Start	End			
1	298823	299039.7	216.68	1	302933.6	303631.1	697.519	3	2742.597
2	302295.1	302722.5	427.372	2	306520.1	306679.8	159.671	3	1761.129
3	307144.2	307320	175.786	3	306688.1	307057.7	369.65	1	545.436
4	307487.9	307828.8	340.962	4	307284	307494.4	210.36	1	551.322
5	308222.7	308422.7	199.993	5	307807.4	308008.5	201.108	1	401.101
6	308470.7	308706.5	235.774	6	308086.9	308258.5	171.592	1	407.366

12. Special Requirement for Hill Roads

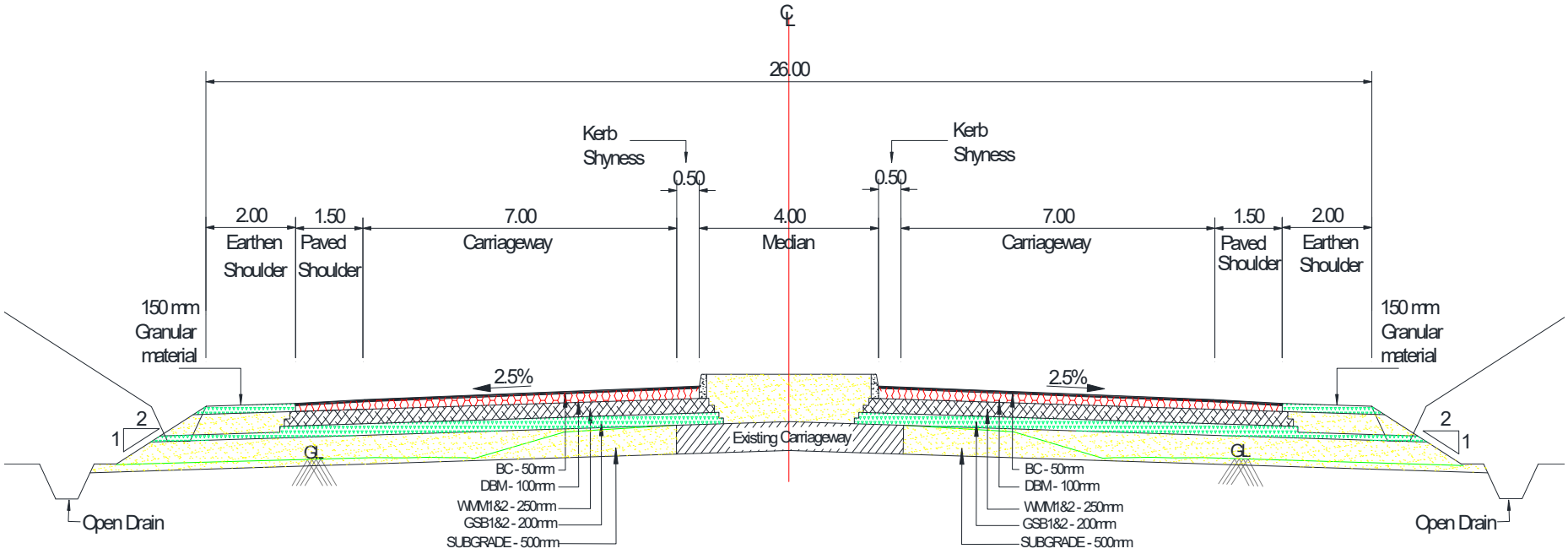
In accordance with the Section 13 of the Manual and recommended practices for treatment of Embankment and road side slope erosion control.

The length of Structures, bridges and slope protection works whatsoever in terms of retaining wall, toe wall, breast wall and special requirement of hill slope specified hereinabove shall be treated as an approximate assessment. The actual lengths and height as required on the basis of detailed investigations shall be determined by the Contractor in consultation with Authority Engineer and in accordance with the Specifications and Standards. Any variations in the lengths and height specified in this Schedule-B shall not constitute a Change of Scope. In case of negative variations, appropriate credit shall be given to the Authority's estimate.

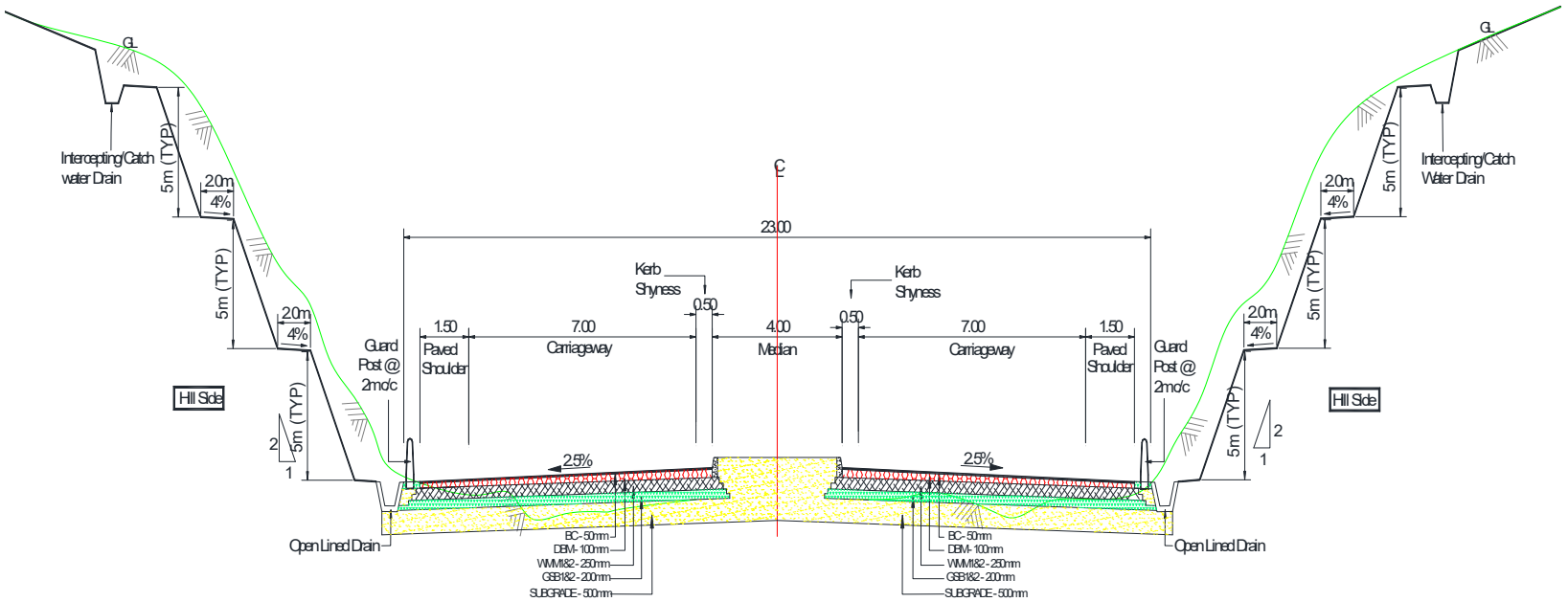
13. Change of Scope

The length of Structures and bridges specified hereinabove shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule-B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

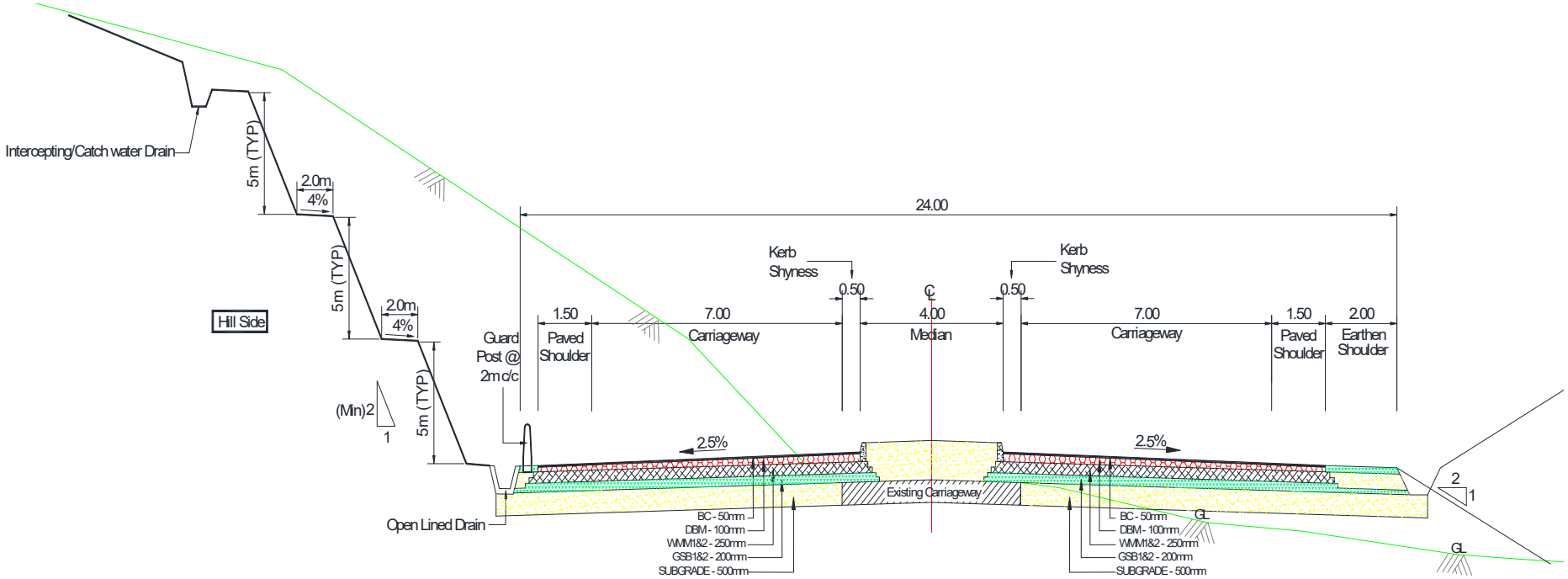
Appendix B1 - Typical Cross Sections



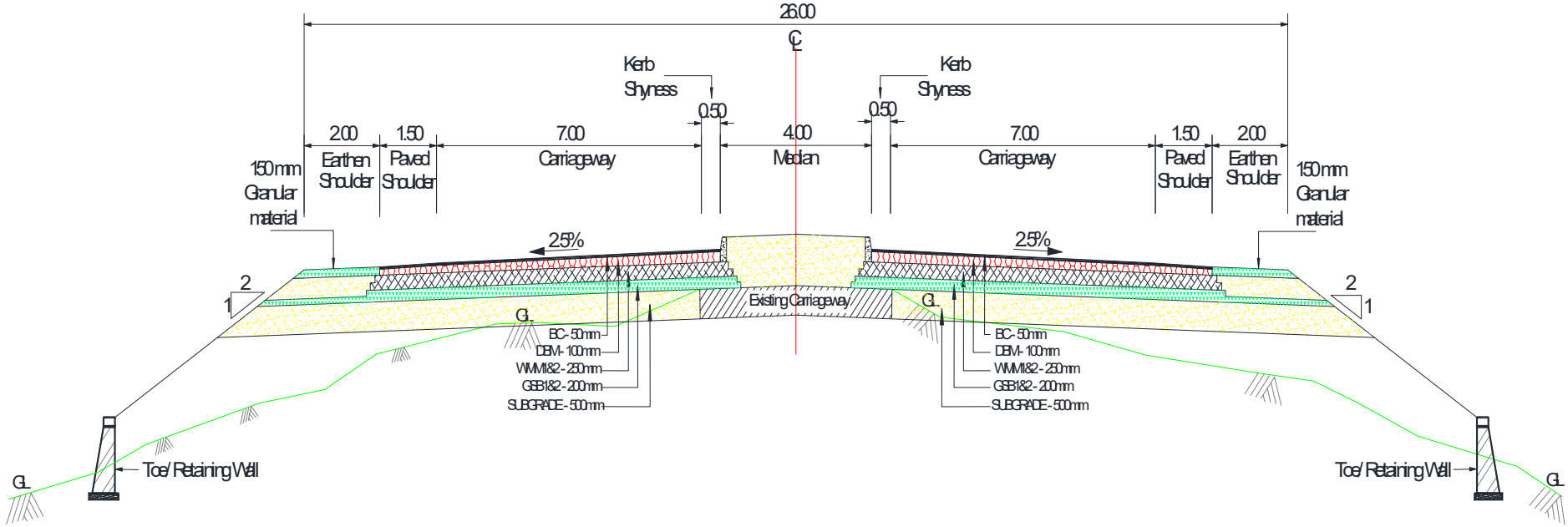
TCS-1 : 4-Lane Divided Carriageway with 4m raised Media
(Normal Fill/Cut Section – Rural Section)



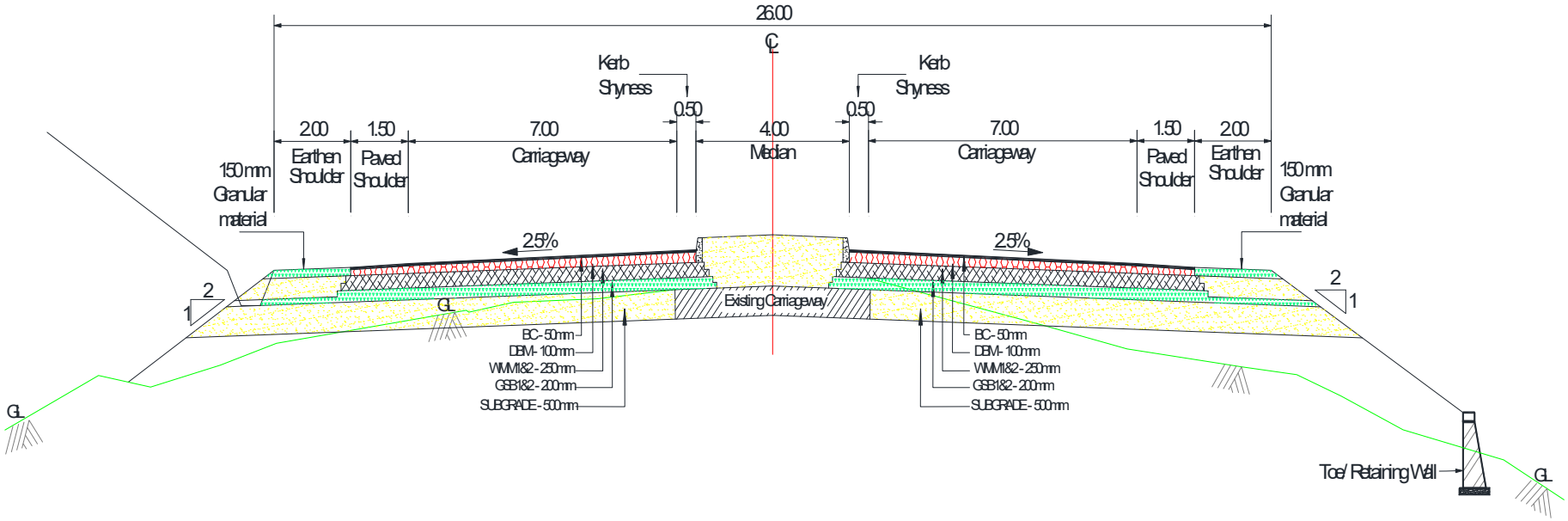
TCS-2: 4-Lane Divided Carriageway with 4m raised Median and Both-side Cutting



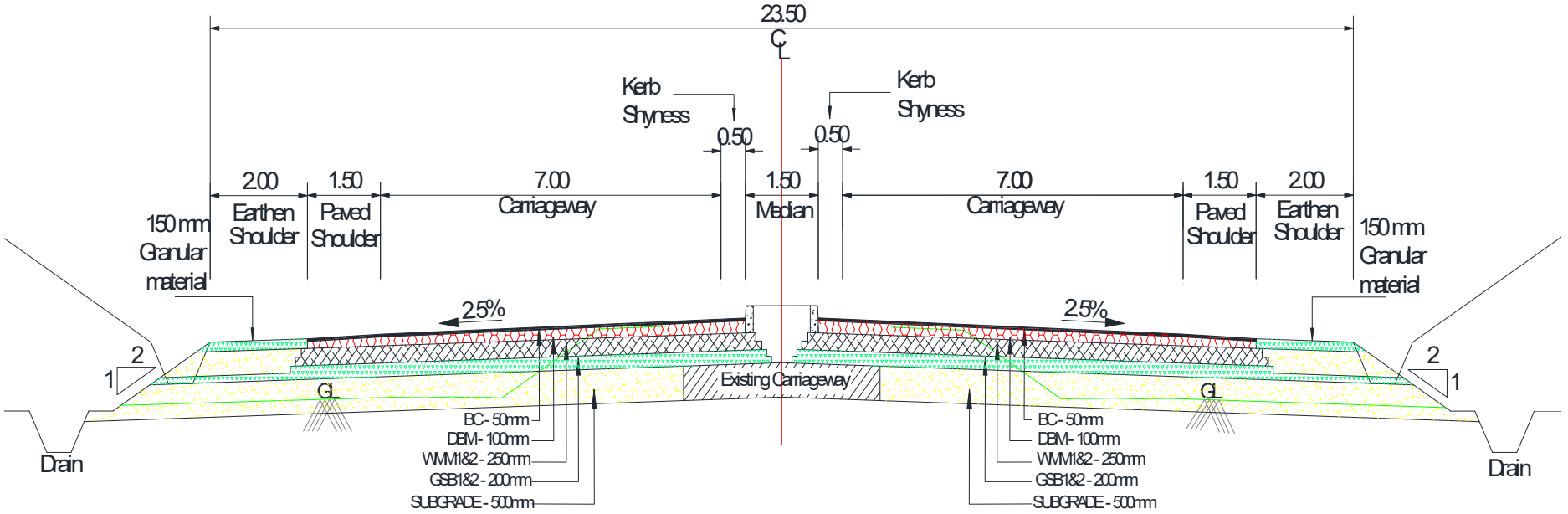
TCS-6 : 4-Lane Divided Carriageway with 4m raised Median
(One Side Hill Cutting and Other Side normal Cut/Fill Section)



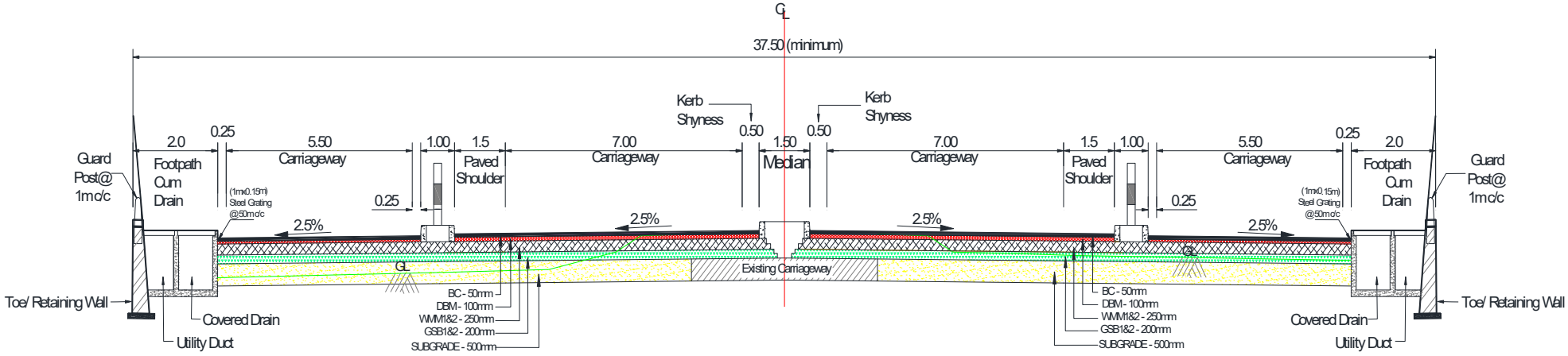
TCS-7: 4-Lane Divided Carriageway with 4m raised Median
(Both side Toe/Retaining Walls)



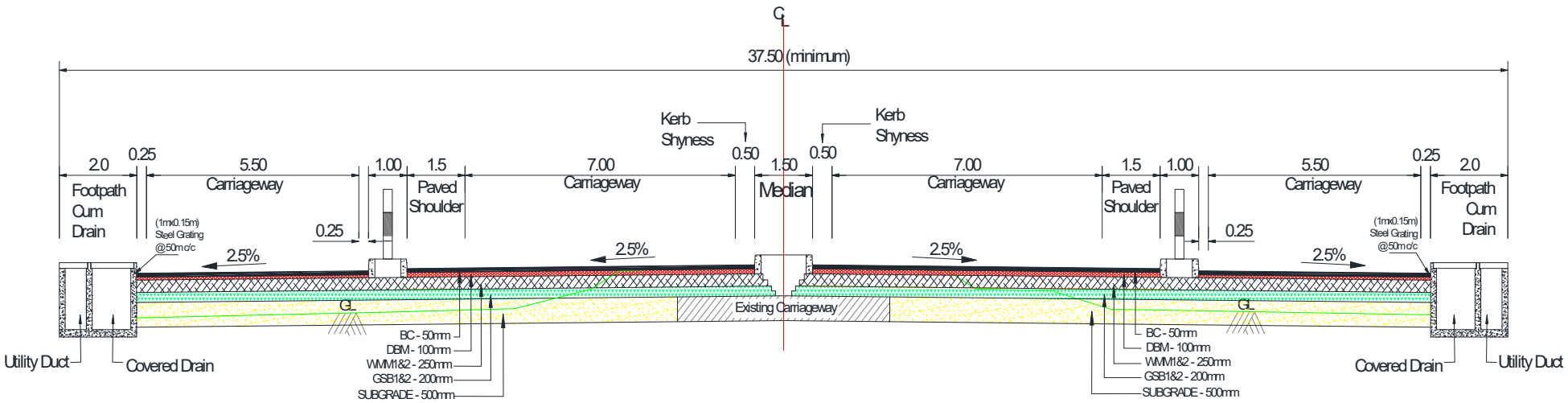
TCS-8 : 4-Lane Divided Carriageway with 4m raised Median
(One Side Retaining Wall and Other Side normal Cut/Fill Section)



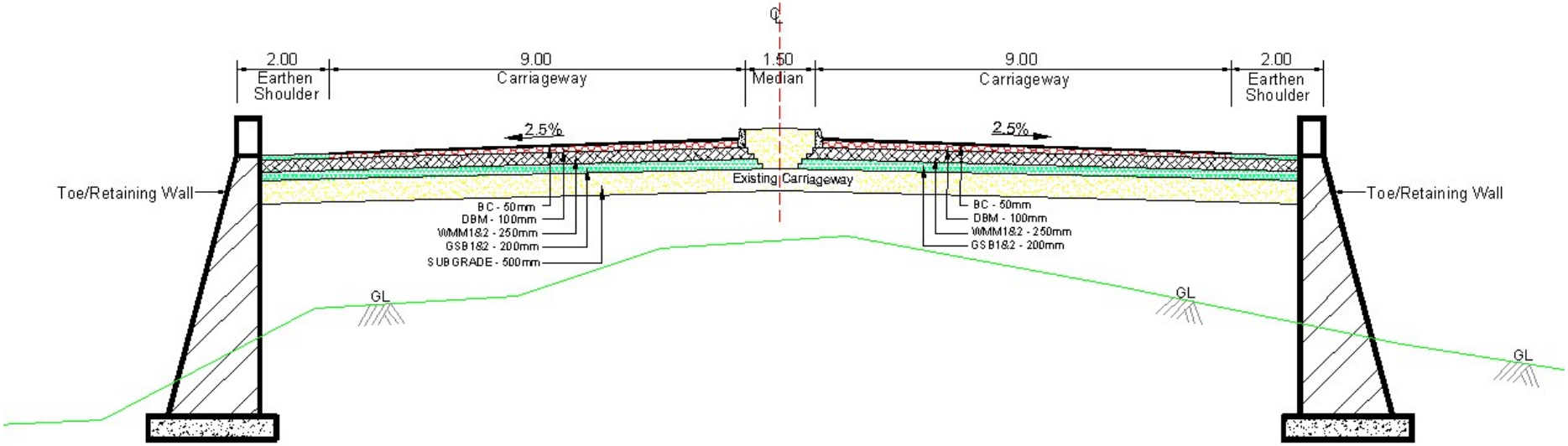
TCS-9: 4-Lane Divided Carriageway with 1.5m raised Median and Cut/Fill (Semi Built up Area)



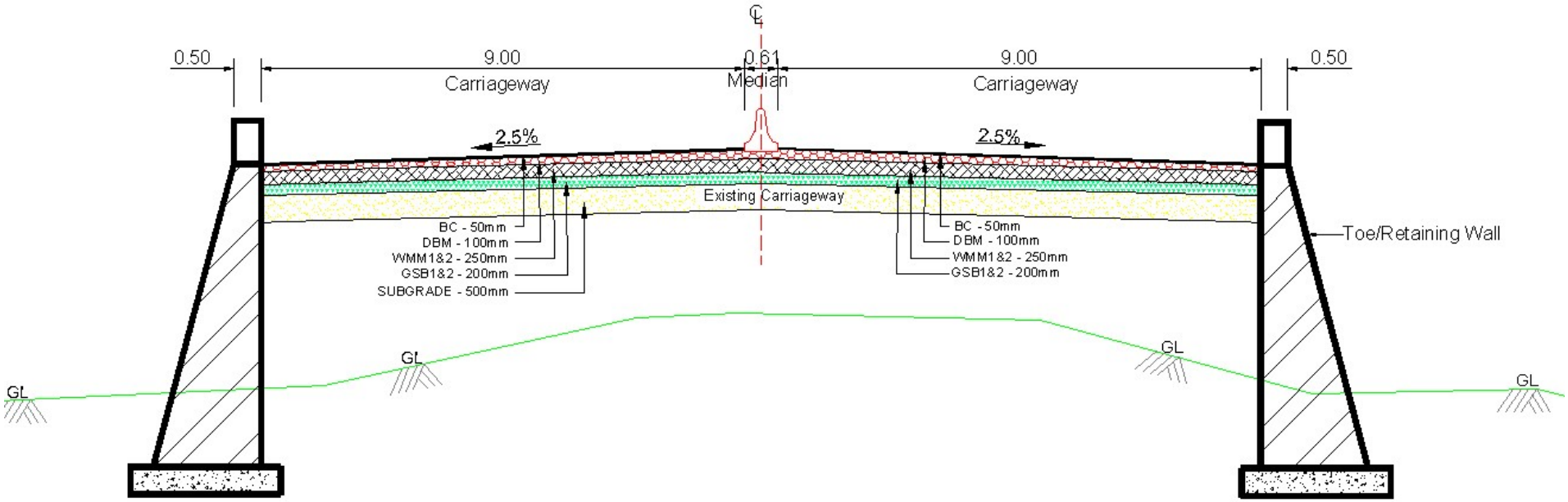
TCS-11: 4-Lane Divided Carriageway with 1.5m raised Median and bothside Service Road (Built up Area) (With Toe / Retaining wall or Breast wall as per Site Condition)



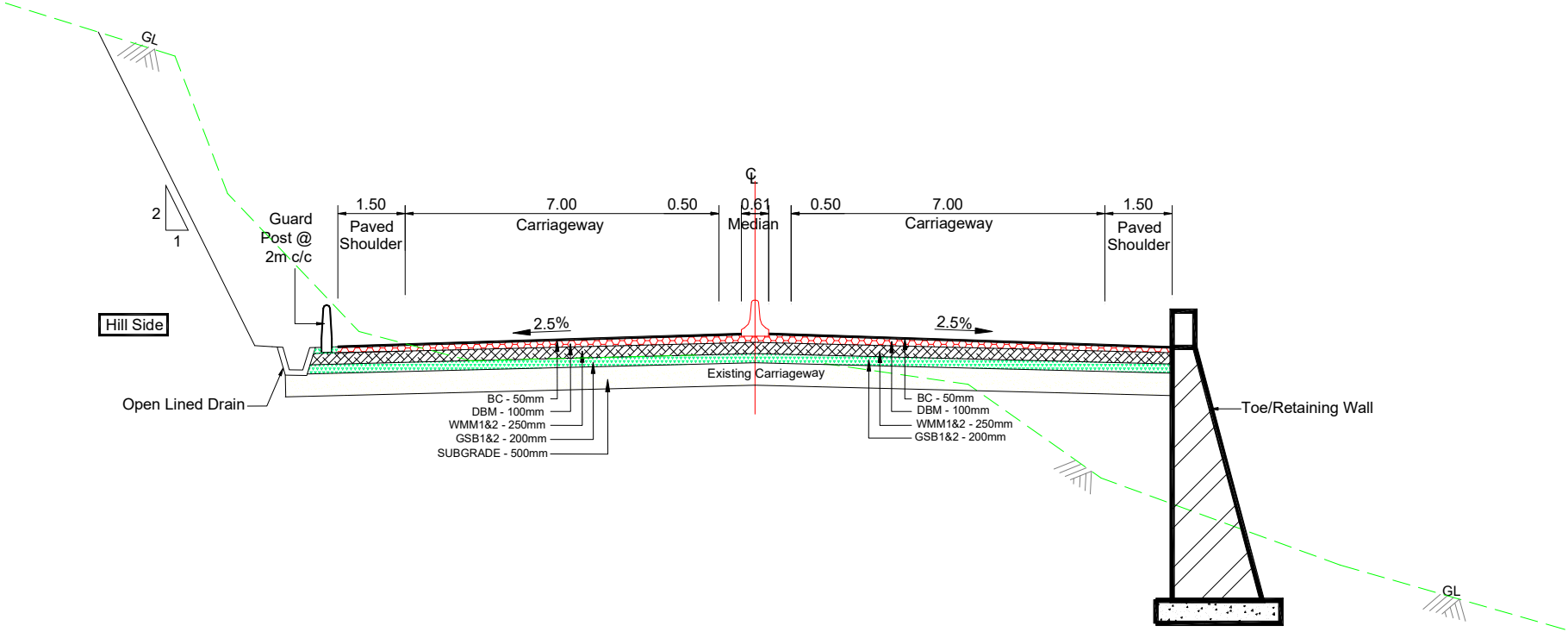
TCS-12: 4–Lane Divided Carriageway with 1.5m raised Median and both side Service Road (Market Area)



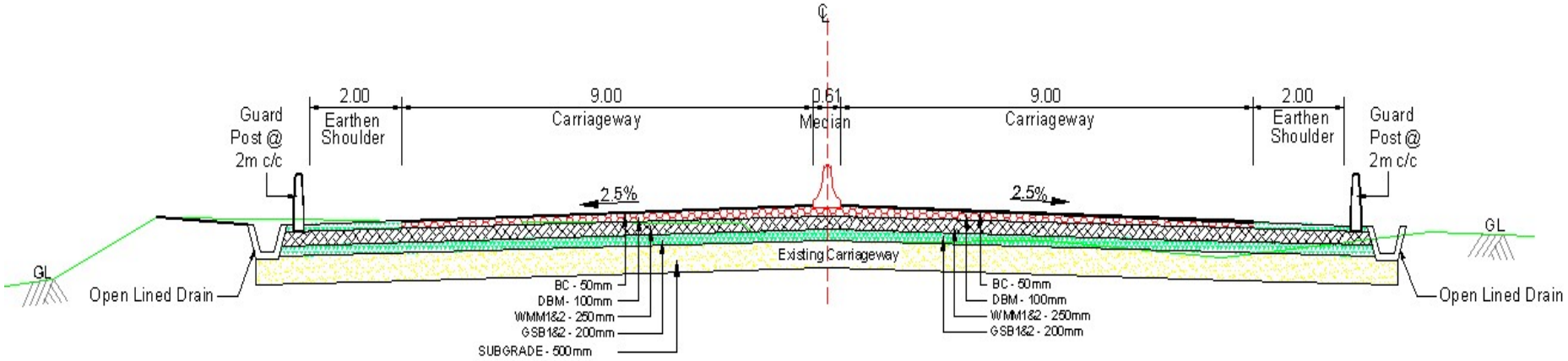
TCS - 13a : 4-Lane Divided Carriageway with 1.5m raised median
(Both Side Retaining wall and 2m Earthen Shoulder)



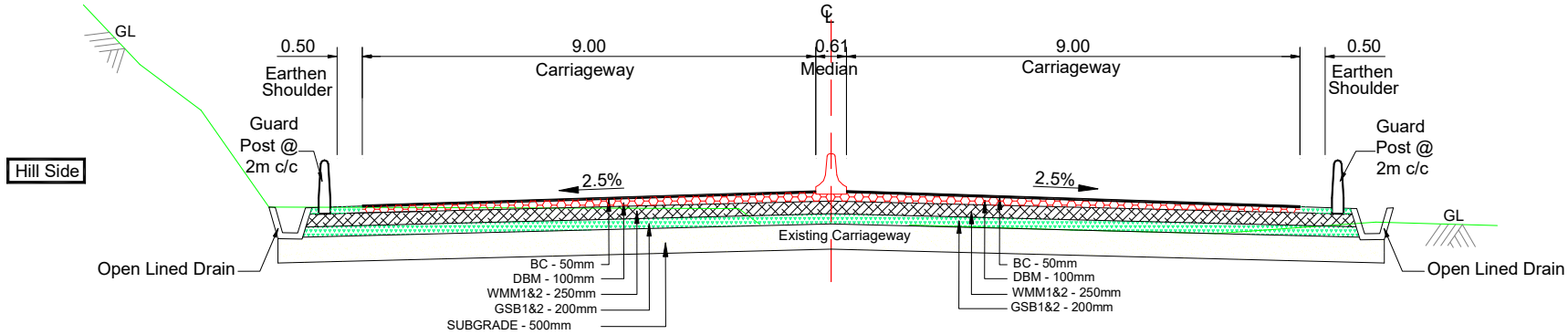
TCS - 13b : 4-Lane Divided Carriageway with 0.61m Median barrier
(Both Side Retaining wall)



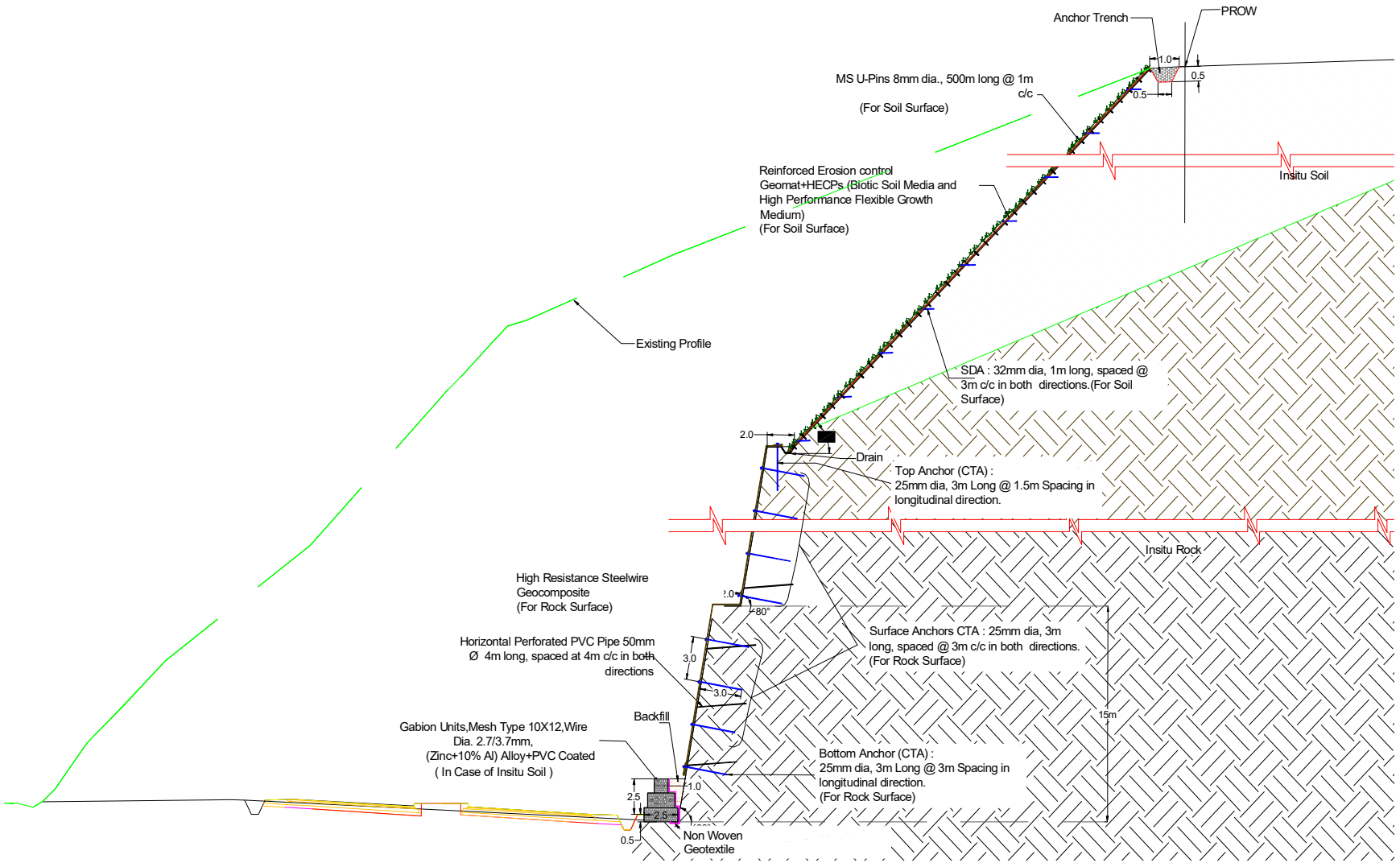
TCS - 13c : 4-Lane Divided Carriageway with 0.61m Median barrier
(One side Retaining wall and another side Open Lined drain)



TCS - 13d : 4-Lane Divided Carriageway with 0.61m Median barrier
(Both side open Lined drain with 2m Earthen Shoulder)



TCS - 13e : 4-Lane Divided Carriageway with 0.61m Median barrier (Both side open Lined drain)



Typical Surficial Protection and Erosion Control Measures(Cut Height of Side Slope > 25m)

Applicable Stretches of Typical Cross-section

S. No.	Design Chainage (Km)		Length (m)	TCS Type
	From	To		
1	297+700	297+730	30	1
2	297+730	297+880	150	8
3	297+880	298+100	220	1
4	298+100	298+180	80	8
5	298+180	298+300	120	1
6	298+300	298+400	100	1 to 11
7	298+400	298+670	270	11
8	298+670	298+750	80	12
9	298+750	298+840	90	11
10	298+840	299+240	400	12
11	299+240	299+340	100	12 to 1
12	299+340	302+040	2700	1
13	302+040	302+160	120	6
14	302+160	302+740	580	1
15	302+740	302+775	35	7
16	302+775	302+820	45	**Bridge**
17	302+820	302+860	40	7
18	302+860	303+970	1110	1
19	303+970	304+030	60	6
20	304+030	304+160	130	1
21	304+160	304+210	50	2
22	304+210	304+440	230	6
23	304+440	304+570	130	2
24	304+570	304+600	30	1
25	304+600	304+700	100	1 to 9
26	304+700	306+500	1800	9
27	306+500	306+690	190	13a
28	306+690	306+710	20	13a to 13b
29	306+710	306+900	190	13b
30	306+900	306+940	40	13c
31	306+940	307+000	60	13e
32	307+000	307+160	160	13b
33	307+160	307+910	750	13c
34	307+910	307+990	80	13b
35	307+990	308+100	110	13e
36	308+100	308+280	180	13b
37	308+280	308+320	40	13c
38	308+320	308+350	30	13c To 13b
39	308+350	308+550	200	13b
40	308+550	308+690	140	13d

S. No.	Design Chainage (Km)		Length (m)	TCS Type
	From	To		
41	308+690	308+700	10	13d to 9
42	308+700	308+729	29	9

Total Length (m) of each TCS:		
TCS-1	4920	4 Lane Divided Carriageway with 4m Raised Median- Normal Cut/Fill section in Rural Section
TCS-2	180	4 Lane Divided Carriageway with 4m Raised Median- Both side Hill Cutting with PCC Toe wall cum lined drain
TCS-6	410	4 Lane Divided Carriageway with 4m Raised Median- One side Hill Cutting with PCC Toe wall cum lined drain and other side Normal Cut/Fill
TCS-7	75	4 Lane Divided Carriageway with 4m Raised Median- Both side Toe/Retaining walls
TCS-8	230	4 Lane Divided Carriageway with 4m Raised Median- One side Normal Cut/Fill and other side Toe/Retaining wall
TCS-9	1829	4 Lane Divided Carriageway with 1.5m Raised Median- Normal Cut/Fill section in Semi Built up Area
TCS-11	360	4-Lane Divided Carriageway with 1.5m Raised Median & both side Service Road with Footpath cum Drain (with Teo / Retaining wall or Breast wall as per Site Condition)(at Built up Area)
TCS-12	480	4-Lane Divided Carriageway with 1.5m Raised Median & both side Service Road with Footpath cum Drain at Market Area.
TCS-13a	190	4-Lane Divided Carriageway with 1.5m raised median and 2m Earthen Shoulder & Both Side Retaining wall
TCS-13b	810	4-Lane Divided Carriageway with 0.61m Median barrier & Both Side Retaining wall
TCS-13c	830	4-Lane Divided Carriageway with 0.61m Median barrier & One side Retaining wall and another side Open Lined drain
TCS-13d	140	4-Lane Divided Carriageway with 0.61m Median barrier & Both side open Lined drain with 2m Earthen Shoulder
TCS-13e	170	4-Lane Divided Carriageway with 0.61m Median barrier & Both side open Lined drain
Varies	360	
Bridges	45	Bridge Section as per GAD

(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:

S. No.	Type of Utility	Unit	Quantity	Location/Stretch (LHS/RHS)
A	Electrical Utilities			
A1	Electric Poles	Nos.		
A2	Electric Cables	meters		
A3	Transformers	Nos.		
B	Water/Sewage Pipeline			
B1	Sewage	meters		
B2	Water supply	meters		
C	Felling of Trees	Nos.		

Annex – I

SCHEDULE - C

PROJECT FACILITIES

1. Project Facilities

The Contractor shall construct the Project Facilities described in this Annex-I to form part of the Two Lane with Paved Shoulders Project Highway. Such Project Facilities shall include:

(a) Toll Plaza

(b) Roadside furniture;

(c) Pedestrian facilities;

(d) Tree plantation;

(e) Truck lay-byes;

(f) Bus-bays and bus shelters;

(g) Median Opening

(h) Utility duct

(i) Others to be specified

1. Operational and maintenance base camp
2. Utilities

2. Description of Project Facilities

Each of the Project Facilities is described below:

a) Roadside furniture

The roadside furniture shall include the provision of the;

i. Traffic Signs

Traffic signs include roadside signs, overhead signs and curb mounted signs along the entire Project Highway as per manual recommended in Schedule D. locations of the sign boards shall be finalized with the consultation of Authority Engineer.

ii. Pavement Markings

Pavement markings shall cover road marking for the entire Project Highway as per the manual recommended in Schedule D. locations of the sign boards shall be finalized with the consultation of Authority Engineer.

iii. LED Traffic Blinkers

For all **Pedestrian** cross walks along the alignment, at all Major Junction locations and at Curve locations where curve radius not confirming to minimum radius as per design standards and any other locations specified in relevant manual recommended in Schedule D.

iv. Crash barrier

Provide W-beam Steel crash barrier along the Project Highway at the locations as suggested in the manual recommended in Schedule D.

No W-Beam Steel crash barrier is required where already masonry/ concrete parapet wall is provisioned.

v. Delineators

Delineators for the entire project highway at the locations as recommend in relevant IRC Manual (mentioned in Schedule D) or as directed by Authority's Engineer shall be provided.

vi. Boundary stones

For the entire project highway as recommend in relevant IRC Manual (mentioned in Schedule D) shall be provided.

vii. Hectometer/Kilometer stones

For the entire project highway as recommend in relevant IRC Manual (mentioned in Schedule D) shall be provided

b) Pedestrian Facilities

i. Pedestrian Guard Rail: Provide pedestrian guard rail at each bus stop location, shall be provided.

ii. Additional Pedestrian facilities shall be provided at vulnerable locations as per specifications and standards specified in Schedule D.

c) Landscaping and Tree Plantation

Landscaping: At major intersections, interchange etc.

Landscaping within ROW of the project highway shall be done as per specifications and standards specified in Schedule D.

d) Truck Lay-Byes: NIL

e) Bus Bays/Bus Shelters

Bus Bays(15m length and 3.5m width)with ghost island (width=1.5m) and taper of 100m length on bothside as per Figure 12.2 of IRC:SP:84-2014 are proposed at following locations. The design of bus shelters should be aesthetically pleased with surrounding. However, locations shall be decided with Authority & Authority's Engineer at site. The minimum number of bus bays/ shelters is given below.

S No	Design Chainage (Km)	Side	Location
1.	299+050	RHS	Sekmai (Urban)
2.	299+100	LHS	Sekmai (Urban)
3.	300+400	RHS	Maharabi
4.	300+500	LHS	Maharabi
5.	302+300	Both	Tendongyan
6.	303+850	Both	Tendongyan
7.	304+810	Both	Khonghampat
8.	305+700	LHS	Khonghampat
9.	305+800	RHS	Khonghampat

f) Median Opening

The median opening of 20m length are proposed at following locations with bothside storage lanes of 3.5m for 55mlength (minimum) where the proposed median width is 4m:

S No	Design Chainage (m)	Median Width (m)	Name of Place
1	298+100	4	Sekmai
2	305+300	1.5	Awang Lekainthambi
3	306+300	1.5	Awang Lekainthambi

g) Utility Duct

A 600mm diameter NP-4 Pipe with inspection box/chamber as per clause 2.16 of IRC:SP:84-2014 are proposed.

Design Chainage (Km)		Length (m)	No. Utility Duct	Built-up Area
From	To			
298+400	299+240	840	2	Sekmai

h) Others: NIL

1. Operational and maintenance base camp- NIL

2. Utilities- NIL

3. Rainwater Harvesting- NIL

SCHEDULE – D

(Refer Clause 2.1)

SPECIFICATIONS AND STANDARDS

1. Construction

The Contractor shall comply with the Specifications and Standards set forth in Annex-I of this 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:

Manual of Specifications and Standards for Four Laning of Highways through Public Private Partnership (IRC: SP: 84-2014), referred to herein as the Manual.

Annex - I

(Schedule-D)

Specifications and Standards for Construction of Project Highway

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Four Laning of Highways through Public Private Partnership (IRC: SP: 84-2014), referred to as the Manual and MoR&TH Specifications for Road and Bridge Work (Fifth Revision 2013). Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. Deviations from the Specifications and Standards

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

2.2 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 Manual shall be deemed to be amended to the extent set forth below:

S. No	Clause No	Description	Deviation to Clause
1	2.2	Design Speed	From Design Chainage Km306+500 to Km308+729

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

					Within 15 days	reconstruct affected.
			5	w > 6 mm, usually associated with spelling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	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 depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		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 IRC:SP: 83-2008)	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	three or four corners broken	Within 15 days	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 2 3	r < 2 % r = 2 - 10 % r = 10 - 20%	Local repair of areas Damaged and liable to be damaged. Within 7days Bonded Inlay within 15 Days	
			4 5	r = 10 - 30% r>30 % and h> 25mm	Reconstruct slab within 30 days	
9	Polished Surface/Glazing	t = texture depth, sand patch test	0 1	 t > 1 mm	No action	

						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	
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m^2		
			4	d = 100 - 300 mm; h > 100	i.e.10 mm more than the depth of the hole.	

				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	0	Nil, not discernible < 3mm	**Short Term** No Action	**Long Term**
			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 colspan="3">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 specifications 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 road structures	15 (fifteen) days
(f) Rest area		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary	24 (twenty four) hours

	installations	
(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 3.1.7(a))

APPLICABLE PERMITS

1 Applicable Permits

(i) 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 Panchayats 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 or clearances required under Applicable Laws.

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

Schedule – G

(See Clauses 7.1 and 19.2)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee
[Performance Security/Additional Performance Security]

To,

Managing Director, NHIDCL,

National Highways & Infrastructure Development Corporation Ltd.

(A) _____[name and address of contractor] (hereinafter called the "**Contractor**") and [name and address of the authority], (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "**Agreement**") for the "**Name of work"** (the "**EPC**") basis, 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 & Infrastructure Development Corporation Ltd. , 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

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

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 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 operatable at our…….. Branch at New Delhi (Complete Address of bank branch is mandatory), 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 there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

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 SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank) transport Bhawan, 1st Parliament Street, New Delhi-110001

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 19.2)

Form for Guarantee for Advance Payment

To,

Managing Director, NHIDCL,

National Highways & Infrastructure Development Corporation Ltd.

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the "**Name of work"** (the "**EPC**") basis, 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 bearing *@Bank Rate + 3%* 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 two 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} 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 instalment 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 the National Highways & Infrastructure Development Corporation Ltd., that the Contractor has committed default in the due and faithful performance of all or any of

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

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

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

[$] Insert a date being 90 (ninety) days after the end of one year from the date of payment of the Advance payment to the Contractor (in accordance with Clause 19.2 of the Agreement).

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 (Complete Address of bank branch is mandatory), 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 there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

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 SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank) transport Bhawan, 1st Parliament Street, New Delhi-110001

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.

SCHEDULE - H

(See Clauses 10.1(iv) and 19.3)

Contract Price Weightages

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

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 of for Payment**	**Percentage Weightage**
1	**2**	**3**	**4**
Road works including New Culverts, Widening and Repair of Culverts	76.492%	**A-Widening and Strengthening of Existing Road**	
		(1) Earthwork up to top of the sub-grade	
		(2) Sub Base Course	
		(3) Non Bituminous Base Course	
		(4) Bituminous Base Course	
		(5) Bituminous Concrete	
		(6) Widening and repair of culverts	2.00%
		B.1- Reconstruction/ New 4 Lane/Realignment/ Bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	9.43%
		(2) Sub Base Course (Granular work sub-base, shoulders)	16.33%
		(3) Non Bituminous Base Course (WMM)	18.28%

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	**2**	**3**	**4**
		(4) Bituminous Base Course (DBM)	19.85%
		(5) Wearing Coat (Bituminous Concrete)	9.25%
		C.1- Reconstruction/ New Service road (Flexible pavement)	
		(1) Earthwork up to top of the sub-grade	0.12%
		(2) Sub Base Course (Granular work sub-base, shoulders)	1.39%
		(3) Non Bituminous Base Course (WMM)	2.01%
		(4) Bituminous Base Course (DBM)	0.59%
		(5) Wearing Coat (Bituminous Concrete)	0.45%
		D-Reconstruction and New Culverts on existing road, realignment and Bypasses,	
		(1) Culverts(length <6m)	20.30%
Minor Bridges/ Underpasses/ Overpasses		**A.1- Widening and Repair of Minor bridges (length>6m and <60m)**	
		Minor Bridges	
		A.2-New Minor bridges (length>6m and <60m)	

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	2	3	4
		1. Foundation + Sub-Structure : On completion of foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap	
		2. Super-structure: On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and markings, tests on completion etc., complete in all respects	
		3. Approaches: On completion of approaches including Retaining walls, stone pitching, protection works, filter media. etc., complete in all respects & fit for use.	
		4. Guide Bunds and river Training Works: On completion of Guide Bund and River Training Works complete in all respects	
		B.2-New Underpass	
		1. Foundation + Sub-Structure: On completion of foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap	

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	**2**	**3**	**4**
		1. **Super-structure:** On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and markings, tests on completion etc., complete in all respects 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	
		2. Approaches: On completion of approaches including Retaining walls/Reinforced Earth walls,, stone pitching, protection works, etc., complete in all respects & fit for use.	
Major Bridge (length>60m) works and ROB/UB/Elevated sections/ Flyovers including viaducts, if	5.027%	**A.1- Widening and Repair of Major Bridges**	
		1. Foundation	
		2. Sub-structure	
		3. Super-structure (including bearings)	

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	**2**	**3**	**4**
any		4. Wearing Coat including expansion joints	
		5. Miscellaneous Items like hand rails, crash barriers, road marking etc.)	
		6. Wing walls/Return walls	
		7. Guide Bunds, River Training works etc.	
		8. Approaches (Including Retaining walls, stone pitching and protection works)	
		A.2- New Major Bridges	
		1. Foundation	11.26%
		2. Sub-structure	37.89%
		3. Super-structure (including bearings)	34.16%
		4. Wearing Coat including expansion joints	5.50%
		5. Miscellaneous Items like hand rails, crash barriers, road marking etc.)	2.29%
		6. Wing walls/Return walls	6.42%
		7. Guide Bunds, River Training works etc.	
		8. Approaches (Including Retaining walls, stone pitching and protection works)	2.48%

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	**2**	**3**	**4**
Other Works	18.481%	(ii) . Road Side Drain	25.94%
		(iii).Road signs, markings, km stones, safety devices… a) W beam crash barrier b) Utility Duct c) Misc	11.48% 18.28%
		(iv).Project Facilities a) Bus Shelter b) Truck lay byes	10.96%
		(v) Road side Plantation	
		(vi) Protection works other than approaches to the bridges, elevated section/flyover/grade separator and ROBs/ RUBs	
		(vii) Protection works a) Retaining/Breast wall b) Surfacial protection and Erosion Control Measures (Cut Height of Side slope >25m)	27.79% 5.55%
		(viii) Safety and Traffic Management during Construction	-

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:

Table 1.3.1

Stage of Payment	Percentage Weightage	Payment Procedure
A-Widening and Strengthening of Existing Road		
(6) Widening and repair of culverts	2.00%	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 5(five) Culverts.
B.1- Reconstruction/ New 4 Lane/Realignment/ Bypass (Flexible Pavement)		
(1) Earthwork up to top of the sub-grade	9.43%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(2) Sub Base Course (Granular work sub-base, shoulders)	16.33%	
(3) Non Bituminous Base Course (WMM)	18.28%	
(4) Bituminous Base Course (DBM)	19.85%	
(5) Wearing Coat (Bituminous Concrete)	9.25%	
C.1- Reconstruction/ New Service road (Flexible pavement)		
(1) Earthwork up to top of the sub-grade	0.12%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(2) Sub Base Course (Granular work sub-base, shoulders)	1.39%	
(3) Non Bituminous Base Course (WMM)	2.01%	
(4) Bituminous Base Course (DBM)	0.59%	

(5) Wearing Coat (Bituminous Concrete)	0.45%	
D-Reconstruction and New Culverts on existing road, realignment and Bypasses,		
(1) Culverts(length <6m)	20.30%	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 5(five) Culverts.

@. 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 due 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 Bridge and Underpasses/Overpasses

Procedure for estimating the value of Minor Bridge and Underpass/overpasses shall be as stated in Table 1.3.2:

Table 1.3.2

Stage of Payment	**Percentage Weightage**	**Payment Procedure**
A.1- Widening and repairs of Minor Bridges (length >6m and <60m)		Cost of each Minor Bridge shall be determined on pro rata basis with respect to the total linear length of the Minor Bridge. Payment shall be made on the completion of widening and repair work of Minor Bridge.
A.2- New Minor Bridges		
1. Foundation +Sub-Structure: On completion of foundation work		**1. Foundation +Sub-Structure:** Cost of each Minor

Stage of Payment	Percentage Weightage	Payment Procedure
including foundations for wing and return walls, abutments, piers up to the abutment/pier cap		Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Minor Bridges. Payment against foundation+ substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation + substructure of each bridge subject to completion of at least two foundations along with sub structure upto abutment/pier cap level of each bridge.
2. Super-structure: On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and markings, tests on completion etc., complete in all respects		**2. 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 respect 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, filter media. etc., complete in all respects & fit for use.		**3. 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 Bunds and River Training Works: On completion of Guide Bunds and River Training Works complete in all respects		**4. Guide Bunds and River Training Works:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training works in all respects as specified.
B.2- New Underpass/Overpasses		

Stage of Payment	Percentage Weightage	Payment Procedure
1. Foundation +Sub-Structure: On completion of foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap		**1. Foundation +Sub-Structure:** Cost of each Underpass shall be determined on pro rata basis with respect to the total linear length (m) of the Underpass. Payment against foundation+ substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation + substructure of each Underpass subject to completion of at least two foundations along with sub-structure upto abutment/pier cap level of each Underpass.
1. **Super-structure:** On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and markings, tests on completion etc., complete in all respects 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.		**2. 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 respect as specified in the column of "Stage of Payment" in this sub-clause.
3. Approaches: On completion of approaches including Retaining walls/Reinforced Earth walls, stone pitching, protection works,.		**3. Approaches** : Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in

Stage of Payment	Percentage Weightage	Payment Procedure
etc., complete in all respects & fit for use.		all respect 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	Percentage Weightage	Payment Procedure
A.2- New Major Bridges		
1. Foundation:	11.26%	**1. Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridges. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of Major bridge subject to completion of atleast two foundations of the Major Bridge. Incase where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.

Stage of Payment	Percentage Weightage	Payment Procedure
2. Sub-Structure	37.89%	**2. 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 abutments/piers upto abutment/pier cap level of the major bridge.
3.Super-structure (including bearings)	34.16%	**3. Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure including bearing of at least one span in all respect as specified.
4.Wearing coat including expansion joints	5.50%	**4. Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
5.Miscellaneous Items like hand rails, crash barriers, road marking etc.	2.29%	**5. Miscellaneous:** Payment shall be made on completion of all miscellaneous works like hand rails, crash barrier, road marking etc. complete in all respect as specified.
6.Wing walls/ Return walls	6.42%	**6. Wing walls/ Return walls:** Payment shall be made on completion of all wing walls/return walls complete in all respect as specified.

Stage of Payment	Percentage Weightage	Payment Procedure
7.Guide bunds, River Training works etc.		**7. Guide bunds, River Training works:** Payment shall be made on completion of all Guide bunds/ River Training works etc. complete in all respect as specified
8.Approaches (including Retaining walls, stone pitching and protection works)	2.48%	**8. Approaches:** Payment shall be made on completion of both approaches including stone pitching, protection works etc. complete in all respect as specified

1.3.4 Other works.

Procedure for estimating the value of other works done shall be as stated in Table 1.3.4:

Table 1.3.4

Stage of Payment	Percentage Weightage	Payment Procedure
(ii) Road side drains	25.94%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(iii)Road signs, markings, km stones, safety devices… d) W beam crash barrier e) Utility Duct f) Misc.	 11.48% 18.28%	
(iv) Project facilities		
a) Bus Shelter	10.96%	Payment shall be made on pro rata

Stage of Payment	Percentage Weightage	Payment Procedure
b) Truck lay-byes		basis for completed facilities.
(v) Roadside plantation		Unit of measurement is linear length.
(vii) Protection works other than approaches to the bridges, elevated section/flyover/grade separator and ROBs/ RUBs		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 10 (ten) percent of the total length.
(viii) Protection works a) Retaining/Breast wall b) Surfacial protection and Erosion Control Measures (Cut Height of Side slope >25m)	 27.79% 5.55%	
(ix) Safety and traffic management during construction		Payment shall be made on pro rata basis every six months.

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 10.2 (iv))

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

1. A minimum list of the drawings of the various components/elements of the project highway and project facility required to be submitted by the Contractor is given below:

(a) Drawing of horizontal alignment, vertical profile and detailed cross sections
(b) Drawings of cross drainage works i.e. Bridges/Culverts/Flyovers and Other Structures.
(c) Drawings for River Training works
(d) Drawings of interchanges, major intersections and underpasses
(e) Drawing of control centre
(f) Drawings of road furniture items including traffic signage, marking, safety barriers, etc.
(g) Drawings of traffic diversions plans and traffic control measures
(h) Drawings of road drainage measures
(i) Drawings of typical details slope protection measures
(j) Drawings of landscaping and horticulture
(k) Drawings of pedestrian crossing
(k) Drawings of street lighting
(l) Any other drawings as per instruction of Authority Engineer
(m) General Arrangement showing Base Camp and Administrative Block

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 192nd 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 329th 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 five 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 466th 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% (seventy 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 548th 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 (ii))

Tests on Completion

1 Schedule for Tests

(i) The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority's Engineer and the Authority of its intent 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.

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

2 Tests

(i) 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 [***].

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

(iii) Tests for bridges: All major and minor bridges shall be subjected to the rebound hammer and ultrasonic pulse velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway Research Board on Nondestructive 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) metres or more shall also be subjected to load testing.

(iv) 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, except tests as specified in clause 5,but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.

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

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

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

S.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)

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 **"Name of work"** (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

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

(ii) 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.

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

2. Percentage reductions in lump sum payments

- 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 crossfall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
S. No.	**Item/Defect/Deficiency**	**Percentage**
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented 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%

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

$$R=P/100 \times (M_1 \text{ or } M_2) \times L1/L$$

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

(i) 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 NHIDCL(the "Authority") and ..... (the "Contractor")# **"Name of Work** and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

- In case the bid of Authority's Engineer is invited simultaneously with the bid of EPC project, then the status of bidding of EPC project only to be indicated

(ii) The TOR shall apply to construction and maintenance of the Project Highway.

2 Definitions and interpretation

(i) 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.

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

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

3. General

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

(ii) The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority 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).

(iii) The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports

shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.

(iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, 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.

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

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

4 **Construction Period**

(i) During the Construction Period, the Authority's Engineer shall review and approve the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1 (vi). The Authority's Engineer shall complete such review and approval and send its 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 upto 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.

(ii) 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.

(iii) 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.

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

(v) 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.

(vi) 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.

(vii) The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In

particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.

(viii) 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.

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For 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.

(x) 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.

(xi) 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.

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

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

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

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

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

(xvii) 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.

(xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate 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

(i) 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.

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

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

(iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule-E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the 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.

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

6 Determination of costs and time

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

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

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

7. Payments

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

(ii) 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.

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

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

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

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

(iii) 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.

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

(v) 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(i) 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(iii) (a);
(e) total of (a), (b), (c) and (d) above;
(f) Deductions:
  (i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
  (ii) Any amount towards deduction of taxes; and
  (iii) Total of (i) and (ii) above.
(g) Net claim: (e) – (f) (iii);
(h) The amounts received by the Contractor 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

(i) The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the 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.

(ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under 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 of not less than 15% of the Contract Price 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

(i) 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: Rs. [*****]

(ii) The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this Agreement excluding:

(a) 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 **"Name of work"** (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 *****