Schedules

Schedule A

(See Clause 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

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

1.2 The dates of handing over the Right of Way 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 8.2.1 of this Agreement.

1.4 The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be modified.

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

Annex – I

(Schedule-A)

Site

1. Site

The site of the Two Lane project highway comprises the section of State Highway No 4 commencing from Km 59+270 to Km Km 85+970 i.e. the Ranikor-Nonghyllam-Maheshkhola- Baghmara road in the state of Meghalaya. The Land, carriageway and structures comprising the site are described below.

2. Land

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

S. No.	Chainage (km)		Existing Row (m)	Land use
	From	To		
1	59.27	59.35	5.8	Barren
2	59.35	60.05	6.1	Built up
3	60.05	60.96	7.5	Agriculture
4	60.96	61.57	7.5	Agriculture
5	61.57	62.97	7.3	Agriculture
6	62.97	63.235	10.5	Agriculture
7	63.235	63.27	7.3	Agriculture
8	63.27	64.33	7.3	Agriculture
9	64.33	64.345	9.8	Agriculture
10	64.345	65.82	9.8	Agriculture
11	65.82	66.77	9.2	Agriculture
12	66.77	67.74	9.9	Agriculture
13	67.74	68.04	10	Agriculture
14	68.04	68.76	9.7	Agriculture
15	68.76	69.69	12	Agriculture
16	69.69	70.69	9.2	Agriculture
17	70.69	71.735	10.5	Agriculture
18	71.735	72.7	9.6	Agriculture
19	72.7	73.71	10.2	Agriculture
20	73.71	74.585	13	Agriculture
21	74.585	74.99	6.6	Agriculture
22	74.99	75.13	9.7	Agriculture
23	75.13	75.63	9.7	Agriculture
24	75.63	76.53	10.3	Agriculture
25	76.53	77.49	11	Agriculture

S. No.	Chainage (km)		Existing Row (m)	Land use
	From	To		
26	77.49	78.515	8.2	Agriculture
27	78.515	79.345	10.5	Agriculture
28	79.345	80.44	9.8	Agriculture
29	80.44	81.35	9.9	Agriculture
30	81.35	82.32	9.1	Agriculture
31	82.32	83.035	9.55	Agriculture
32	83.035	83.29	10	Agriculture
33	83.29	83.42	10.3	Agriculture
34	83.42	84.27	8.6	Agriculture
35	84.27	85.970	12.2	Agriculture

3. Carriageway

The present carriageway of the project highway is a single lane carriageway. Existing pavement and shoulder are in bad condition.

4. Major Bridge

The Site includes the following Major Bridges:

S/no	Location in km	Type of Structures			Length of Bridge/ Span Arrangement (m)	Total width (m)
		Super Structure	Sub Structure	Foundation		
1	75.150	Steel Truss with Timber decking	Cement concrete	Well Foundation	146.55, 4 Span of different length	4.20

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

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

Sl No	Chainage(km)	Type of structure		No of Span with Span length(m)	width (m)	ROB/RUB
		Foundation	Superstructure			
NIL						

6. Grade separators

The Site includes the following grade separators:

Sl No	Chainage(km)	Type of structure		No of Span with Span length(m)	width (m)
		Foundation	Superstructure		
NIL					

7. Minor Bridges

The Site includes the following Minor Bridges:

S. no	Location in km	Type of Structures			Length of Bridge/ Span Arrangement (m)	Total width (m)
		Super Structure	Sub Structure	Foundation		
1.	60.18	Timber decking (over RSJ RCC slab)	Cement concrete	Open	1x16.00	4
2.	69.39	Steel Truss with Timber Decking	Cement concrete	Open	1x12.90	4.00
3.	77.64	Steel Truss with Timber Decking	Cement concrete	Open	1x32.00	4.00
4	85.460	Steel Truss with Timber Decking	Cement concrete	Open	1x37.80	4
5	85.92	Steel Truss with Timber Decking	Cement concrete	Open	1x19.10	4

8. Railway level crossings

The Site includes the following railway level crossings:

Sl No	Location(km)	Remarks
NIL		

9. Underpasses (vehicular, non vehicular)

The Site includes the following underpasses:

Sl No	Chainage(km)	Type of structure	No of Span with Span length(m)	width (m)
NIL				

10. Culvert

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement
				(No x Span/dia)
1	59.411	6.3	Slab	1 x 5.40
2	59.461	10	HP	1 x 1.20 dia
3	59.490	5.50	Slab	1 x 1.00
4	59.590	7.20	Slab	1 x 1.00
5	59.670	7.10	Slab	1 x 1.00
6	59.720	6.20	Slab	1 x 1.00
7	59.881	7.20	Slab	1 x 1.00
8	59.964	6.00	Slab	1 x 1.00
9	60.020	10.00	HP	1 x 1.20 dia
10	60.050	7.20	Slab	1 x 1.00
11	60.150	7.10	Slab	1 x 6.00
12	60.215	7.00	Slab	1 x 1.00
13	60.315	6.00	Slab	1 x 2.00
14	60.385	10.00	HP	1 x 1.20 dia
15	60.550	10.00	HP	1 x 1.20 dia
16	60.615	7.00	Slab	1 x 1.00
17	60.710	10.00	HP	1 x 1.20 dia
18	60.800	5.90	Slab	1 x 1.00
19	60.835	7.00	Slab	1 x 1.00
20	60.940	7.00	Slab	1 x 1.00
21	61.030	7.50	Slab	1 x 1.00
22	61.280	7.00	Slab	1 x 1.00
23	61.330	10.00	HP	1 x 1.20 dia
24	61.510	10.00	HP	1 x 1.20 dia
25	61.570	6.20	Slab	1 x 1.00
26	61.610	10.00	HP	1 x 1.20 dia
27	61.715	6.20	Slab	1 x 1.00
28	61.840	6.00	Slab	1 x 1.00
29	62.050	6.00	Slab	1 x 1.00
30	62.130	7.00	Slab	1 x 1.00
31	62.290	6.00	Slab	1 x 1.00
32	62.390	6.00	Slab	1 x 1.00
33	62.570	6.00	Slab	1 x 1.00
34	62.725	6.00	Slab	1 x 1.00
35	62.900	6.00	Slab	1 x 1.00
36	63.090	10.00	HP	1 x 1.20 dia
37	63.230	6.00	Slab	1 x 1.00
38	63.406	6.00	Slab	1 x 1.00

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement
				(No x Span/dia)
39	63.480	6.00	Slab	1 x 1.00
40	63.585	6.00	Slab	1 x 1.00
41	63.630	6.00	Slab	1 x 1.00
42	63.772	10.00	HP	1 x 1.20 dia
43	63.916	10.00	HP	1 x 1.20 dia
44	63.985	7.00	Slab	1 x 1.00
45	64.115	7.00	Slab	1 x 1.00
46	64.380	6.00	Slab	1 x 1.00
47	64.530	10.00	HP	1 x 1.20 dia
48	64.665	10.00	HP	1 x 1.20 dia
49	64.713	7.00	Slab	1 x 1.00
50	64.826	7.00	Slab	1 x 1.00
51	64.889	6.00	Slab	1 x 1.00
52	65.013	6.00	Slab	1 x 1.00
53	65.110	7.00	Slab	1 x 1.00
54	65.175	7.00	Slab	1 x 1.00
55	65.529	7.00	Slab	1 x 1.00
56	65.630	7.00	Slab	1 x 1.00
57	65.815	7.00	Slab	1 x 1.00
58	66.066	7.00	Slab	1 x 1.00
59	66.220	7.00	Slab	1 x 1.00
60	66.500	6.00	Slab	1 x 1.00
61	66.620	6.00	Slab	1 x 1.00
62	67.118	6.00	Slab	1 x 1.00
63	67.185	6.00	Slab	1 x 1.00
64	67.230	6.00	Slab	1 x 1.00
65	67.600	7.00	Slab	1 x 1.00
66	67.695	6.00	Slab	1 x 1.00
67	67.778	6.00	Slab	1 x 1.00
68	67.865	7.00	Slab	1 x 1.00
69	67.980	7.00	Slab	1 x 1.00
70	68.289	7.00	Slab	1 x 1.00
71	68.394	7.00	Slab	1 x 1.00
72	68.505	7.50	Slab	1 x 1.00
73	68.624	7.00	Slab	1 x 1.00
74	68.647	6.00	Slab	1 x 1.00
75	68.710	6.00	Slab	1 x 1.00
76	68.990	6.20	Slab	1 x 1.00
77	69.030	6.00	Slab	1 x 1.00
78	69.150	6.00	Slab	1 x 1.00
79	69.320	7.00	Slab	1 x 1.00
80	69.425	6.00	Slab	1 x 1.00
81	69.630	6.00	Slab	1 x 1.00
82	69.730	6.00	Slab	1 x 1.00
83	69.790	6.00	Slab	1 x 1.50
84	69.940	6.25	HP	1 x0.90 dia
85	69.980	6.50	Slab	1 x 1.00

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement
				(No x Span/dia)
86	70.020	6.20	Slab	1 x 1.00
87	70.080	6.00	Slab	1 x 1.00
88	70.415	6.00	Slab	1 x 1.00
89	70.460	6.25	HP	1 x0.90 dia
90	70.540	6.00	Slab	1 x 1.00
91	70.580	7.00	Slab	1 x 1.00
92	70.645	7.00	Slab	1 x 1.00
93	70.765	6.00	Slab	1 x 1.00
94	70.890	7.00	Slab	1 x 1.00
95	71.015	6.00	Slab	1 x 1.00
96	71.105	6.00	Slab	1 x 1.00
97	71.185	7.40	Slab	1 x 5.60
98	71.360	6.00	Slab	1 x 1.00
99	71.385	6.25	HP	1 x0.90 dia
100	71.450	6.00	Slab	1 x 1.00
101	71.700	6.50	Slab	1 x 1.00
102	71.730	6.50	Slab	1 x 1.00
103	71.825	6.50	Slab	1 x 1.00
104	71.920	7.00	Slab	1 x 1.00
105	71.975	7.00	Slab	1 x 1.00
106	72.065	7.00	Slab	1 x 1.00
107	72.180	7.00	Slab	1 x 1.00
108	72.285	7.00	Slab	1 x 1.00
109	72.455	7.00	Slab	1 x 1.00
110	72.560	6.20	Slab	1 x 1.00
111	72.930	7.00	Slab	1 x 1.00
112	73.210	6.00	Slab	1 x 1.00
113	73.338	6.00	Slab	1 x 1.00
114	73.470	7.00	Slab	1 x 1.00
115	73.520	7.00	Slab	1 x 2.50
116	73.590	7.00	Slab	1 x 1.00
117	73.630	7.00	Slab	1 x 1.00
118	73.690	7.00	Slab	1 x 1.50
119	73.790	7.50	Slab	1 x 1.00
120	73.860	7.00	Slab	1 x 6.00
121	73.990	7.00	Slab	1 x 1.50
122	74.185	6.00	Slab	1 x 1.00
123	74.420	7.50	Slab	1 x 1.50
124	74.460	7.20	Slab	1 x 1.00
125	74.480	7.20	Slab	1 x 4.70
126	74.550	7.20	Slab	1 x 1.00
127	74.680	7.20	Slab	1 x 1.00
128	74.930	7.20	Slab	1 x 3.00
129	75.050	7.20	Slab	1 x 1.00
130	75.338	6.20	Slab	1 x 1.00
131	75.409	6.00	Slab	1 x 3.00
132	75.430	6.00	Slab	1 x 4.80

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement
				(No x Span/dia)
133	75.500	7.20	Slab	1 x 1.00
134	75.680	6.20	Slab	1 x 1.00
135	75.835	7.20	Slab	1 x 4.30
136	76.028	7.00	Slab	1 x 4.50
137	76.140	7.20	Slab	1 x 1.00
138	76.380	7.20	Slab	1 x 1.50
139	76.530	7.00	Slab	1 x 1.00
140	76.570	7.00	Slab	1 x 3.50
141	76.622	6.00	Slab	1 x 1.00
142	76.670	6.00	Slab	1 x 1.00
143	76.705	7.00	Slab	1 x 4.50
144	76.729	7.00	Slab	1 x 1.00
145	76.805	7.00	Slab	1 x 1.00
146	76.830	7.00	Slab	1 x 4.50
147	76.855	7.00	Slab	1 x 1.00
148	76.885	7.20	Slab	1 x 1.00
149	76.889	7.20	Slab	1 x 1.00
150	76.990	7.00	Slab	1 x 1.00
151	77.071	7.00	Slab	1 x 1.00
152	77.170	7.00	Slab	1 x 1.00
153	77.270	7.00	Slab	1 x 1.00
154	77.445	6.20	Slab	1 x 1.00
155	77.710	7.00	Slab	1 x 1.00
156	77.771	6.20	Slab	1 x 1.00
157	77.870	7.30	Slab	1 x 6.00
158	77.975	7.00	Slab	1 x 1.00
159	78.115	7.20	Slab	1 x 1.00
160	78.270	7.20	Slab	1 x 1.00
161	78.340	7.20	Slab	1 x 1.00
162	78.470	7.00	Slab	1 x 1.00
163	78.560	7.00	Slab	1 x 1.00
164	78.625	7.00	Slab	1 x 1.00
165	78.680	7.00	Slab	1 x 1.00
166	78.860	7.00	Slab	1 x 1.00
167	79.025	7.20	Slab	1 x 1.00
168	79.125	7.20	Slab	1 x 1.00
169	79.180	7.20	Slab	1 x 1.00
170	79.605	6.80	Slab	1 x 1.00
171	79.725	7.50	HP	1 x0.90 dia
172	79.860	6.20	Slab	1 x 1.00
173	79.890	6.20	Slab	1 x 1.00
174	80.085	7.20	Slab	1 x 1.00
175	80.130	7.20	Slab	1 x 1.00
176	80.225	7.20	Slab	1 x 1.00
177	80.380	7.20	Slab	1 x 1.00
178	80.550	7.20	Slab	1 x 1.00
179	80.685	7.20	Slab	1 x 1.00

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement (No x Span/dia)
180	80.870	7.20	Slab	1 x 1.00
181	80.920	7.20	Slab	1 x 1.00
182	80.965	7.20	Slab	1 x 1.00
183	81.010	6.20	Slab	1 x 1.00
184	81.025	6.20	Slab	1 x 1.00
185	81.200	7.20	Slab	1 x 1.00
186	81.315	7.20	Slab	1 x 1.00
187	81.345	6.20	Slab	1 x 1.00
188	81.425	6.20	Slab	1 x 1.00
189	81.770	7.20	Slab	1 x 1.00
190	81.860	7.40	Slab	1 x 3.00
191	81.980	7.20	Slab	1 x 1.00
192	82.080	6.20	Slab	1 x 1.00
193	82.185	6.20	Slab	1 x 1.00
194	82.310	7.20	Slab	1 x 1.00
195	82.375	7.20	Slab	1 x 3.00
196	82.510	7.20	Slab	1 x 1.00
197	82.575	7.20	Slab	1 x 1.00
198	82.720	7.20	Slab	1 x 1.00
199	82.755	7.20	Slab	1 x 1.00
200	82.940	7.20	Slab	1 x 1.00
201	83.040	7.20	Slab	1 x 1.00
202	83.135	6.20	Slab	1 x 1.00
203	83.330	6.20	Slab	1 x 1.00
204	83.410	6.20	Slab	1 x 1.00
205	83.550	6.80	Slab	1 x 1.00
206	83.600	7.20	Slab	1 x 3.00
207	83.740	7.20	Slab	1 x 1.00
208	83.835	7.20	Slab	1 x 1.00
209	83.990	7.20	Slab	1 x 1.00
210	84.125	7.20	Slab	1 x 1.00
211	84.205	6.20	Slab	1 x 1.00
212	84.340	6.20	Slab	1 x 1.00
213	84.500	7.20	Slab	1 x 1.00
214	84.585	6.40	Slab	1 x 3.00
215	84.635	6.20	Slab	1 x 1.00
216	84.765	6.20	Slab	1 x 1.00
217	84.865	6.20	Slab	1 x 1.00
218	84.970	6.20	Slab	1 x 1.00
219	85.200	7.00	Slab	1 x 1.00
220	85.255	7.00	Slab	1 x 1.00
221	85.310	7.00	Slab	1 x 1.00
222	85.580	7.00	Slab	1 x 1.00
223	85.700	7.00	Slab	1 x 1.00
224	85.755	7.00	Slab	1 x 1.00

11. Bus bays

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

Sl No	Chainage(km)	Length(m)	Left Hand side	Right Hand side
NIL				

12. Truck Lay bays

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

Sl No	Chainage(km)	Length(m)	Left Hand side	Right Hand side
NIL				

13. Road side drains

The details of the roadside drains are as follows:

S/NO	LOCATION IN KM	TYPE	REMARKS
NIL			

14. Major Intersections along project:

The details of the minor junctions are as follows:

Sn	Location	Name of Road	Type of Junction
NIL			

15. Minor Intersections along project:

The details of the minor intersections are as follows:

S/no	Location in km	Type of Crossing	Link	Specification	Remarks
1	59.293	L	BOP Maheshkhola	VR	4.50m wide BT Road
2	59.352	R	Village	VR	3.50m wide BT Road
3	59.63	R	Houses	VR	4.50m wide Earthen road
4	60.015	R	PWD IB	VR	3.50m wide BT Road
5	60.618	L	Bandar Sura village	VR	3.50 m wide Earthen road
6	60.69	R	Custom Department Quarters	VR	3.50m BT road (Old GREF)
7	61.81	R	Maheshkhola Check post	VR	3.50m wide Earthen road
8	62.944	L	Paunch Gaon village	VR	3.50m wide Earthen road
9	66.522	R	For Ratangiri village	VR	3.50m wide Earthen road
10	69.45	R	For Ratangiri village	VR	3.50m wide Earthen road
11	69.73	R	For Ratangiri village	VR	3.50m wide Earthen road
12	69.79	R	For Ratangiri village	VR	3.50m wide Earthen road
13	71.66	R	For Ratangiri village	VR	3.50m wide Earthen road
14	71.745	R	For Ratangiri village	VR	3.50m wide Earthen road
15	72.378	L	For Ratangiri village	VR	3.50m wide Earthen road
16	72.556	L	For Ratangiri village	VR	3.50m wide Earthen road
17	72.602	L	For Ratangiri village	VR	3.50m wide Earthen road
18	74.211	L	For Ratangiri village	VR	3.50m wide Earthen road
19	74.631	L	For Ratangiri village	VR	3.50m wide Earthen road
20	74.704	R	For Ratangiri village	VR	3.50m wide Earthen road
21	74.77	L	For Ratangiri village	VR	3.50m wide Earthen road

S/no	Location in km	Type of Crossing	Link	Specification	Remarks
22	74.915	R	For Ratangiri village	VR	3.50m wide Earthen road
23	74.98	L	BOP of BSF	VR	3.60m wide BT road
24	74.987	R	Asan Chuning Village	VR	3.50m wide Earthen road
25	75.245	R	Mahadeo PWD IB	VR	3.00m wide Earthen road
26	79.024	R	Forest IB Champa	VR	3.50m wide Earthen road
27	79.815	R	BALPAKRAM National Park	VR	3.60m wide BT Road
28	80.499	L	Village	VR	3.60m wide Earthen road
29	81.236	L	New Bonbera	VR	3.60m wide Earthen road

16. Bypass

The details of Bypasses are as follows:

	Name of bypass (town)	Chainage(km)		Length(in km)	Carriageway	
		Fom(km)	To (km)		width(m)	Type
NIL						

17. Other structures

Nil

Annex II

(Schedule-A)

Dates for providing Right of Way

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

Sl.No.	Location stretch		Length(Km)	Width(m)	Date of providing ROW
	From(km)	To(km)			
1) Full ROW	55+525	79+680	24.155	24	90% of the land will be made available on the appointed date and remaining 10% in 90 days from appointed date
2) Part ROW	55+525	79+680	24.155	7.5	
3) Balance ROW	55+525	79+680	24.155	16.5	

Annex – IIII

(Schedule-A)

Alignment Plans

The existing alignment of the Project Highway shall be modified in the following sections as per the alignment plan and profile enclosed.

Annex – IV

(Schedule-A)

Environment Clearances

Environmental clearance not required for project road as per guidelines of MOEF.

Schedule B Development of

the Project Highway

1 Development of the Project Highway

Development of the Project Highway shall include design and construction of the Project Highway as described in this Schedule-B and in Schedule-C.

2 Rehabilitation and augmentation

Rehabilitation and augmentation shall include Two-Laning with earthen shoulder and strengthening of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3 Specifications and Standards

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

Annex – I

(Schedule-B)

Description of Two-Laning with earthen shoulder

1. **Development of Ranikor – Nonghyllam – Maheshkhola – Baghmara road from Km 55.525 to Km 79.680 in Meghalaya to 2-Lane Standards.**

The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex III of Schedule-A. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for Hills/rolling terrain to the extent land is available. Chainage Equation has been applied on the stretch as per the table given in Appendix B1.

1.1 Width of carriageway

Two-Laning with earthen shoulder shall be undertaken. The paved carriageway shall be 7 (Seven) m wide in accordance with the typical cross sections drawings in the Manual.

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

S. No	Location (Km to Km)		Width (m)	Typical cross section
	From (Km)	To (Km)		
1	55+600	56+200	7	TCS-5
2	60+100	60+720	7	TCS-5
3	71+150	71+750	7	TCS-5

The area between paved carriageway and drain in built-up area will be covered with paver block as per TCS-5.

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

2. Geometric design and general features

2.1 General

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

2.2 Design speed

The design speed shall be the minimum design speed of 30 km per hr for hill terrain.

2.3 Improvement of the existing road geometrics

In the following stretches, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided:

Sl. No.	HIP CH:	Type of Deficiency	Remarks
NIL			

2.4 Right of Way

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

2.5 Type of shoulders

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

S. No	Location (Km to Km)		Width (m)	Reference to cross section
	From (Km)	To (Km)		
1	55+600	56+200	7	TCS-5
2	60+100	60+720	7	TCS-5
3	71+150	71+750	7	TCS-5

The area between paved carriageway and drain in built-up area will be covered with paver block as per TCS-5.

(b) In open country section the earthen shoulders shall be covered with 150 mm thick compacted layer of granular material. The width of shoulder is 1.5 m on both sides.

Earthen Shoulder on Valley side includes crash barrier, parapet wall, etc. Earthen Shoulder on hill side includes road side drain.

(c) Design and specification of paved shoulders and granular material shall confirm to the

requirements specified in paragraphs 5.9.9 and 5.9.10 of the Manual.

2.6 Lateral and vertical clearances at underpasses

2.6.1 Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per the paragraph 2.11 of the Manual.

2.6.2 Lateral clearance: The size of the opening at the underpasses shall be as follows:

S. No.	Description	Design Chainage (km)	Span length	Remarks
NIL				

2.7 Lateral and vertical clearance at overpasses

2.7.1 Lateral and vertical clearances at overpasses shall be as per paragraph 2.12 of the Manual.

2.7.2 Lateral clearance: The size of the opening at the overpasses shall be as follows:

S. No.	Location (Chainage) From km to km	Number and length of spans	Remarks
NIL			

2.8 Service roads/Slip Road

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

S. No.	Length of Service road		Right hand side (RHS)/ Left hand side (LHS)/ or Both sides	Length (km) of service road
	(From	To		
NIL				

2.9 Grade separated structures

2.9.1 Grade separated structures shall be provided as per paragraph 2.14 of the Manual. The requisite particulars are given below:

S. No.	Location of structure	Length (m)	Number and length of spans	Approach gradient
NIL				

2.9.2 In the case of grade separated structures, the type of structure and the level of the Project

Highway and the cross roads shall be as follows:

S. No.	Location	Type of structure Length (m)	Cross road at		
			Existing level	Raised Level	Lowered Level
NIL					

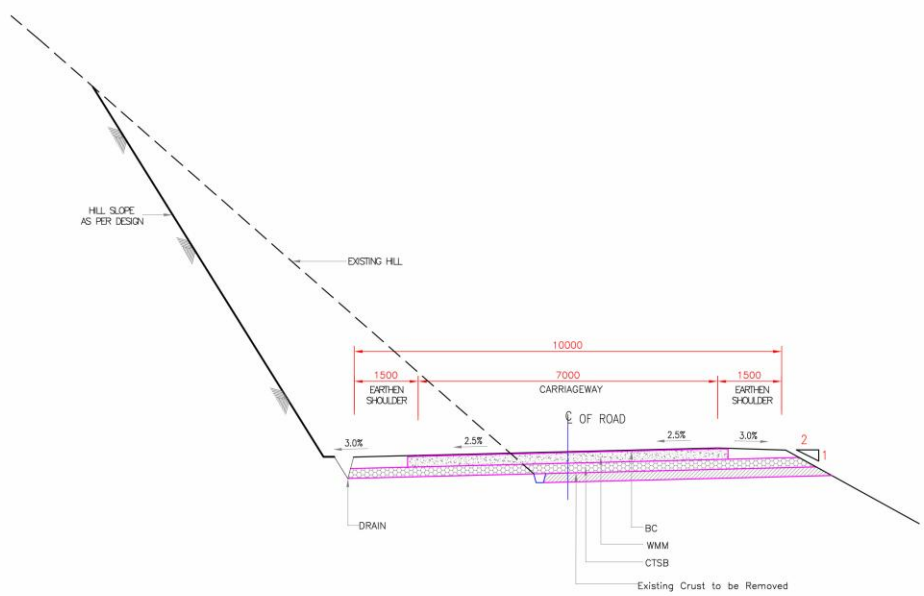
2.10 Cattle and Pedestrian under pass / over pass

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

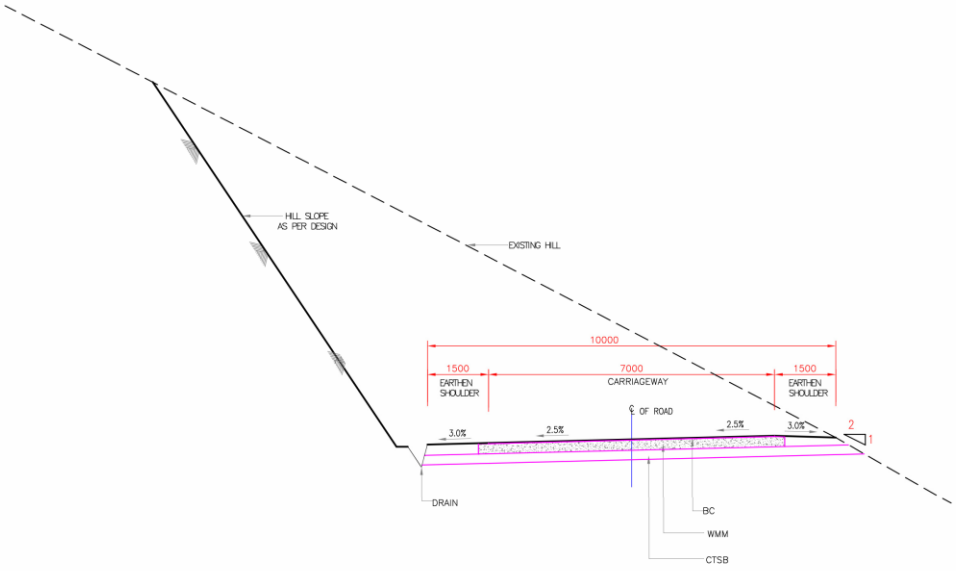
S. No.	Design Chainage (km)	Span	Type of crossing
1	63+780	1x12x4.5	Cattle Underpass
2	64+220	1x12x4.5	Cattle Underpass

2.11 Typical cross-sections of the Project Highway

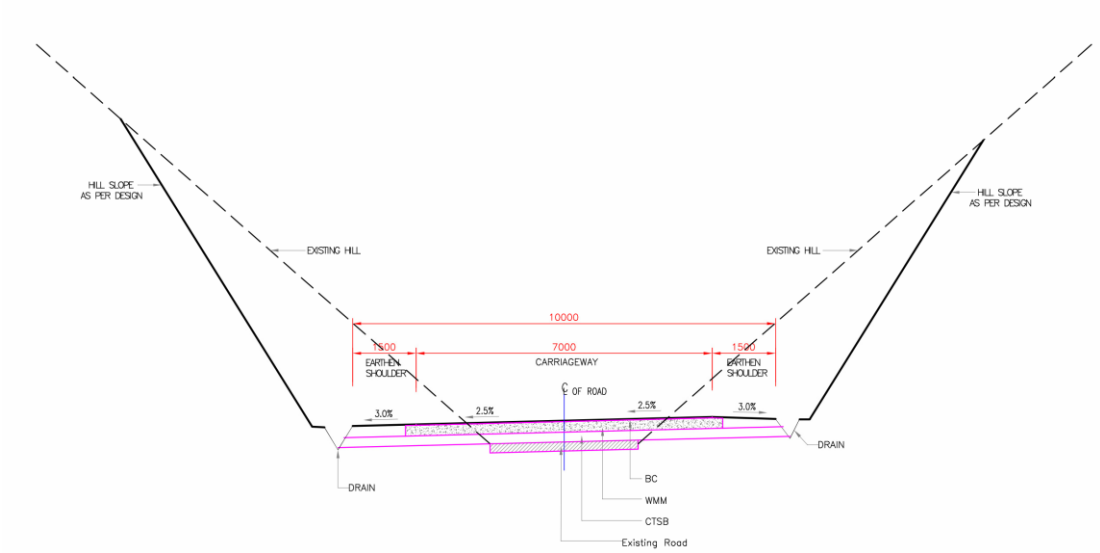
S.No.	Design Length(Km)	TCS Type	Remarks
1	9.785	1	Widening (One Side Hill)
2	4.630	2	New Construction (One Side Hill)
3	5.955	4	Widening (Box-Cut)
4	1.965	3	New Construction (Box-Cut)
5	1.820	5	Built-up



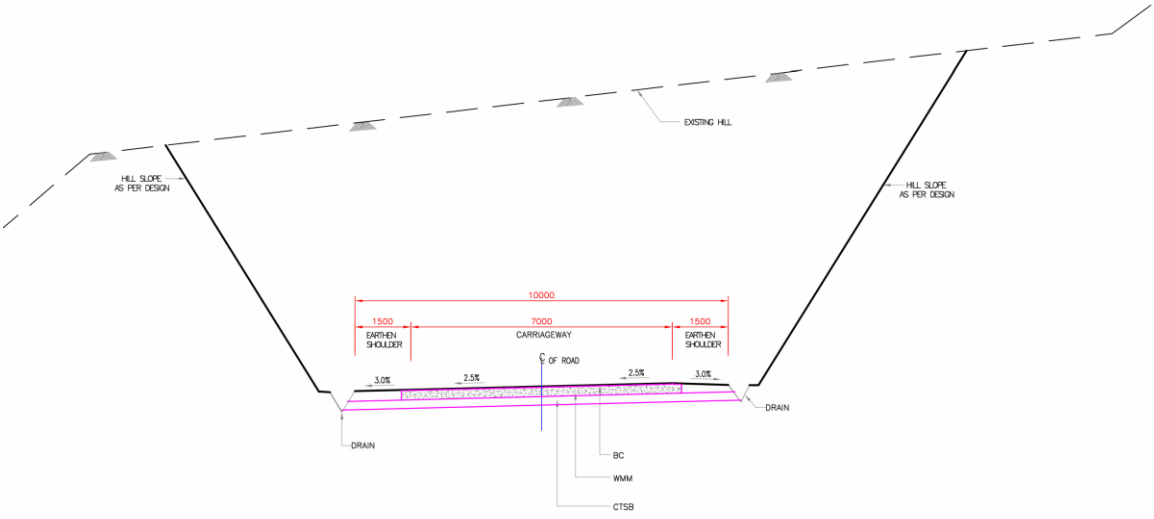
TCS–1 :– 2 LANE WITH EARTHEN SHOULDER FOR WIDENING (ONE SIDE HILL)



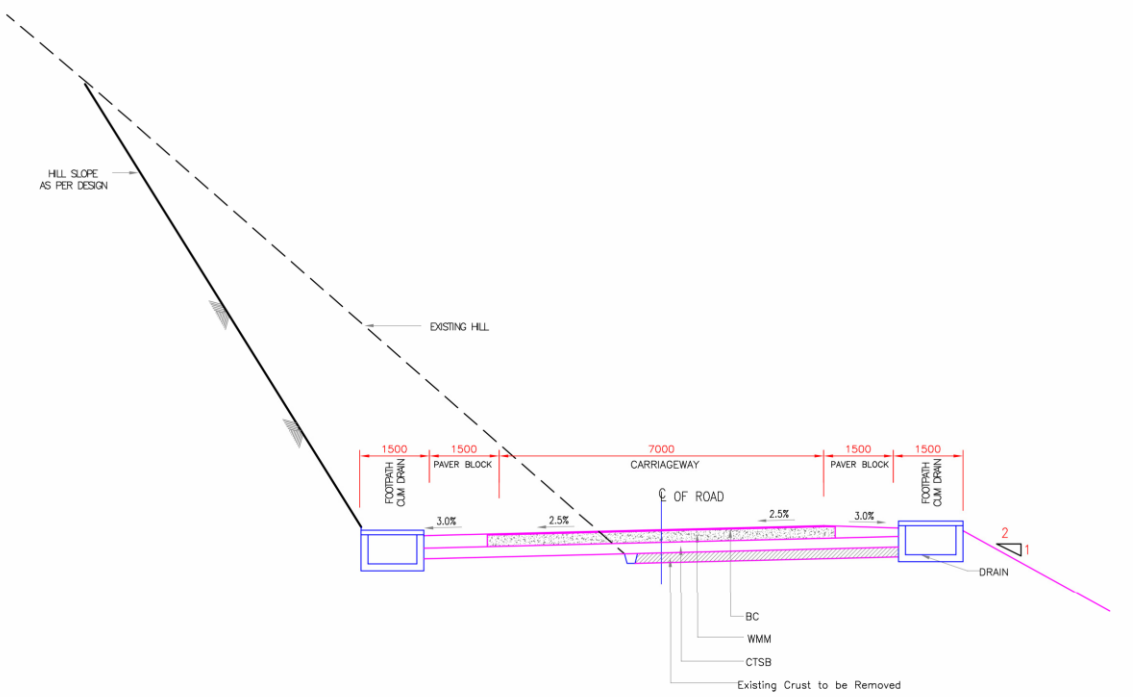
TCS–2 :– 2 LANE WITH EARTHEN SHOULDER
FOR NEW CONSTRUCTION (ONE SIDE HILL)



TCS–3 :– 2 LANE WITH EARTHEN SHOULDER FOR WIDENING (BOTH SIDE HILL)



TCS–4 :– 2 LANE WITH EARTHEN SHOULDER FOR NEW CONSTRUCTION (BOX CUT SECTION)



TCS–5 :– 2 LANE FOR BUILT–UP SECTION

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 types and features given in the tables below:

(a) At-grade intersections

Major Intersection

S. No.	Location of intersection (km)	Type of intersection	Other features
NIL			

Minor Intersection

S. No	Location of Intersections	Type of Intersection	Other Features
1	55.610	Y	ODR.
2	57.700	Y	ODR.
3	60.085	Y	ODR.
4	61.940	T	ODR.
5	65.020	Y	ODR.
6	67.540	Y	ODR.
7	69.450	Y	ODR.
8	70.170	X	ODR.
9	75.420	Y	ODR.

(b) Grade separated intersection with/without ramps

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

4. Road embankment and cut section

4.1 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment / cuttings shall conform to the standards and specifications 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 Box cut section

The existing road shall be box cutting in the following sections.

S.No.	From(Km)	To (Km)	Length	Remarks
1	56+200	56+250	50	Widening
2	57+050	57+100	50	New Construction
3	57+100	57+220	120	Widening

4	57+220	57+335	115	New Construction

S.No.	From(Km)	To (Km)	Length	Remarks
5	57+335	57+610	275	Widening
6	57+610	57+700	90	New Construction
7	57+700	57+950	250	Widening
8	58+350	58+500	150	Widening
9	59+100	59+160	60	New Construction
10	59+160	59+500	340	Widening
11	61+150	61+600	450	New Construction
12	62+050	62+700	650	Widening
13	63+100	63+130	30	New Construction
14	63+130	63+240	110	Widening
15	63+240	63+320	80	New Construction
16	63+320	63+550	230	Widening
17	65+150	65+450	300	Widening
18	65+950	66+050	100	Widening
19	66+350	66+600	250	Widening
20	66+800	68+050	1250	Widening
21	68+050	68+200	150	New Construction
22	68+500	68+580	80	Widening
23	68+580	68+650	70	New Construction
24	68+650	68+700	50	Widening
25	68+700	68+750	50	New Construction
26	71+000	71+150	150	Widening
27	72+100	72+150	50	New Construction
28	72+750	73+130	380	Widening
29	73+130	73+300	170	New Construction
30	73+300	73+620	320	Widening
31	73+620	73+860	240	New Construction
32	73+860	74+560	700	Widening
33	74+680	74+800	120	Widening
34	74+800	75+160	360	New Construction
35	79+320	79+400	80	Widening
Total(m)			**7920**	

5. Pavement design

5.1 Pavement design shall be carried out in accordance with Section 5 of the Manual.

5.2 Type of pavement

Flexible pavement shall be constructed.

5.3 Design requirements

Design of pavement shall be as per paragraph 5.4, 5.9 and 5.10 of the Manual.

5.3.1 Design Period and strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for minimum design period of 20 years. Stage construction shall not be permitted.

5.3.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of minimum 10 Million standard axles and 8% CBR. In case the MSA is more than specified above at the time of traffic survey done by EPC Contractor at the time of design of project highway, then the higher traffic will be adopted for design.

5.3 Reconstruction of stretches

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

S.No.	From(Km)	To (Km)	Length
1	55+525	55+600	75
2	56+200	56+275	75
3	56+380	56+525	145
4	56+650	56+790	140
5	56+940	56+980	40
6	57+100	57+220	120
7	57+335	57+610	275
8	57+700	57+950	250
9	58+040	59+100	1060
10	59+160	60+100	940
11	60+775	60+830	55
12	60+910	61+020	110
13	61+750	61+770	20
14	61+880	61+990	110
15	62+050	63+100	1050
16	63+130	63+240	110
17	63+320	63+550	230

18	63+550	63+720	170
19	64+000	64+050	50
20	64+350	65+735	1385

S.No.	From(Km)	To (Km)	Length
21	65+950	66+090	140
22	66+165	68+050	1885
23	68+200	68+580	380
24	68+650	68+700	50
25	68+800	68+880	80
26	69+070	69+600	530
27	69+685	69+910	225
28	70+050	70+250	200
29	70+315	70+435	120
30	70+520	70+620	100
31	70+750	70+890	140
32	70+950	71+150	200
33	71+750	72+070	320
34	72+200	72+350	150
35	72+445	72+600	155
36	72+700	73+130	430
37	73+300	73+620	320
38	73+860	74+800	940
39	75+160	75+290	130
40	75+450	75+840	390
41	76+000	76+100	100
42	76+355	76+430	75
43	76+750	76+830	80
44	77+000	77+050	50
45	77+170	77+445	275
46	77+570	77+655	85
47	77+720	78+360	640
48	78+540	79+680	1140
Total (m)			**15740**

6. Roadside drainage

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

Drain shall be provided in following stretches but not limited to:

S. No	Type of Drain	Length (Km
1	Rectangular RCC Covered Drain	3.64 (1.82*2)
2	V-Shaped Lined Drain	30.255

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 carriage way of New/Reconstruction bridge and structures shall be follows:

S No	Bridge at Km		Deck Width	Carriageway Width	Span Arrangement
	Existing Chainage	Design Chainage			
1	69.390	64.630	12.9	10.5	1x16
2	75.150	69.800	12.9	10.5	4x38.5
3	85.920	79.640	12.9	10.5	1x22

7.1.2 The following structures shall be provided with footpaths:

S. No.	Location at km	Remarks
NIL		

7.1.3 All bridges shall be high-level bridges This

shall be as per site condition

7.1.4 The following structures shall be designed to carry utility services specified in the table below:

S. No.	Bridge at km	Utility service to be carried	Remarks
All Bridges shall have provisions for utility services to be carried over			

7.1.5 Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections given in section 7 of the Manual and as specified in 7.1.2 & 7.3.

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:

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

S.No.	Existing Chainage	Design Chainage	Span
1	59.411	55.660	1x6x3
2	59.461	55.710	1x1.5x1.5
3	59.490	55.740	1x1.5x1.5
4	59.590	55.840	1x1.5x1.5
5	59.670	55.915	1x1.5x1.5
6	59.720	55.970	1x1.5x1.5
7	60.050	56.215	1x1.5x1.5
8	60.150	56.315	1x6x6.0
9	60.315	56.460	1x1.5x1.5
10	60.385	56.530	1x1.5x1.5
11	60.550	56.645	1x1.5x1.5
12	60.615	56.700	1x1.5x1.5
13	60.710	56.790	1x1.5x1.5
14	60.800	56.850	1x1.5x1.5
15	60.835	56.880	1x1.5x1.5
16	60.940	56.940	1x1.5x1.5
17	61.030	57.025	1x1.5x1.5
18	61.280	57.250	1x1.5x1.5
19	61.510	57.445	1x1.5x1.5
20	61.570	57.505	1x1.5x1.5
21	61.610	57.550	1x1.5x1.5
22	61.840	57.725	1x1.5x1.5
23	62.050	57.915	1x1.5x1.5
24	62.290	58.135	1x1.5x1.5
25	62.390	58.235	1x1.5x1.5
26	62.570	58.410	1x1.5x1.5
27	62.725	58.565	1x1.5x1.5
28	62.900	58.740	1x1.5x1.5
29	63.090	58.930	1x1.5x1.5
30	63.230	59.070	1x1.5x1.5
31	63.406	59.230	1x1.5x1.5
32	63.480	59.305	1x1.5x1.5
33	63.585	59.410	1x1.5x1.5
34	63.630	59.455	1x1.5x1.5
35	63.772	59.600	1x1.5x1.5

36	63.916	59.740	1x1.5x1.5
37	63.985	59.810	1x1.5x1.5

S.No.	Existing Chainage	Design Chainage	Span
38	64.115	59.935	1x1.5x1.5
39	64.380	60.190	1x1.5x1.5
40	64.665	60.445	1x1.5x1.5
41	64.713	60.495	1x1.5x1.5
42	64.826	60.610	1x1.5x1.5
43	64.889	60.660	1x1.5x1.5
44	65.110	60.835	1x1.5x1.5
45	65.529	61.190	1x1.5x1.5
46	66.500	61.965	1x1.5x1.5
47	66.620	62.075	1x1.5x1.5
48	67.118	62.575	1x1.5x1.5
49	67.175	62.630	1x1.5x1.5
50	67.230	62.685	1x1.5x1.5
51	67.600	63.055	1x1.5x1.5
52	67.778	63.220	1x1.5x1.5
53	67.980	63.400	1x1.5x1.5
54	68.289	63.705	1x1.5x1.5
55	68.624	63.995	1x1.5x1.5
56	68.647	64.015	1x1.5x1.5
57	69.030	64.285	1x1.5x1.5
58	69.150	64.395	1x1.5x1.5
59	69.320	64.565	1x1.5x1.5
60	69.425	64.670	1x1.5x1.5
61	69.730	64.970	1x1.5x1.5
62	69.790	65.025	1x1.5x1.5
63	69.940	65.175	1x1.5x1.5
64	69.980	65.220	1x1.5x1.5
65	70.020	65.260	1x1.5x1.5
66	70.080	65.320	1x1.5x1.5
67	70.415	65.650	1x1.5x1.5
68	70.460	65.695	1x1.5x1.5
69	70.580	65.810	1x1.5x1.5
70	71.015	66.215	1x1.5x1.5
71	71.105	66.305	1x1.5x1.5
72	71.185	66.380	1x1.5x1.5
73	71.360	66.555	1x1.5x1.5
74	71.385	66.575	1x1.5x1.5
75	71.450	66.645	1x1.5x1.5
76	71.700	66.880	1x1.5x1.5
77	71.730	66.910	1x1.5x1.5
78	71.825	67.000	1x1.5x1.5
79	71.920	67.090	1x1.5x1.5
80	71.975	67.145	1x1.5x1.5
81	72.065	67.235	1x1.5x1.5
82	72.180	67.350	1x1.5x1.5
83	72.285	67.450	1x1.5x1.5
84	72.455	67.615	1x1.5x1.5
85	72.560	67.720	1x1.5x1.5
86	72.930	68.080	1x1.5x1.5

S.No.	Existing Chainage	Design Chainage	Span
87	73.210	68.180	1x1.5x1.5
88	73.338	68.305	1x1.5x1.5
89	73.470	68.435	1x1.5x1.5
90	73.520	68.485	1x1.5x1.5
91	73.590	68.555	1x1.5x1.5
92	73.990	68.880	1x1.5x1.5
93	74.420	69.100	1x1.5x1.5
94	74.460	69.140	1x1.5x1.5
95	74.480	69.190	1x1.5x1.5
96	74.550	69.230	1x1.5x1.5
97	74.680	69.355	1x1.5x1.5
98	74.930	69.605	1x1.5x1.5
99	75.050	69.700	1x1.5x1.5
100	75.409	70.060	1x1.5x1.5
101	75.500	71.150	1x1.5x1.5
102	75.580	70.230	1x1.5x1.5
103	75.730	70.360	1x1.5x1.5
104	76.425	71.030	1x1.5x1.5
105	76.475	71.080	1x1.5x1.5
106	76.530	71.135	1x1.5x1.5
107	76.570	71.175	1x1.5x1.5
108	76.600	71.205	1x1.5x1.5
109	76.625	71.230	1x1.5x1.5
110	76.705	71.305	1x1.5x1.5
111	76.730	71.335	1x1.5x1.5
112	76.755	71.360	1x1.5x1.5
113	76.785	71.385	1x1.5x1.5
114	76.990	71.590	1x1.5x1.5
115	77.071	71.670	1x1.5x1.5
116	77.170	71.770	1x1.5x1.5
117	77.330	71.925	1x1.5x1.5
118	77.470	72.065	1x1.5x1.5
119	77.710	72.325	1x1.5x1.5
120	77.885	72.490	1x1.5x1.5
121	77.975	72.575	1x1.5x1.5
122	77.710	72.725	1x1.5x1.5
123	78.340	72.865	1x1.5x1.5
124	78.560	73.080	1x1.5x1.5
125	79.125	73.490	1x1.5x1.5
126	79.605	73.910	1x1.5x1.5
127	79.725	74.025	1x1.5x1.5
128	79.860	74.160	1x1.5x1.5
129	79.890	74.190	1x1.5x1.5
130	80.085	74.375	1x1.5x1.5
131	80.130	74.420	1x1.5x1.5
132	80.225	74.515	1x1.5x1.5
133	80.380	74.665	1x1.5x1.5
134	80.685	74.920	1x1.5x1.5
135	80.870	75.085	1x1.5x1.5

S.No.	Existing Chainage	Design Chainage	Span
136	80.965	75.175	1x1.5x1.5
137	81.010	75.225	1x1.5x1.5
138	81.025	75.240	1x1.5x1.5
139	81.315	75.505	1x1.5x1.5
140	81.345	75.535	1x1.5x1.5
141	81.425	75.595	1x1.5x1.5
142	81.860	75.985	1x1.5x1.5
143	81.980	76.100	1x1.5x1.5
144	82.310	76.385	1x1.5x1.5
145	82.375	76.425	1x1.5x1.5
146	82.510	76.520	1x1.5x1.5
147	82.720	76.645	1x1.5x1.5
148	82.940	76.815	1x1.5x1.5
149	83.040	76.900	1x1.5x1.5
150	83.135	76.985	1x1.5x1.5
151	83.410	77.215	1x1.5x1.5
152	83.550	77.350	1x1.5x1.5
153	83.600	77.395	1x1.5x1.5
154	83.835	77.595	1x1.5x1.5
155	83.990	77.740	1x1.5x1.5
156	84.125	77.870	1x1.5x1.5
157	84.205	77.945	1x1.5x1.5
158	84.340	78.075	1x1.5x1.5
159	84.500	78.235	1x1.5x1.5
160	84.585	78.315	1x1.5x1.5
161	84.635	78.365	1x1.5x1.5
162	84.865	78.590	1x1.5x1.5
163	84.970	78.700	1x1.5x1.5
164	85.200	78.930	1x1.5x1.5
165	85.255	78.970	1x1.5x1.5
166	85.580	79.290	1x1.5x1.5
167	85.700	79.415	1x1.5x1.5
168	85.755	79.470	1x1.5x1.5

Note: The culvert shall be measured in square direction only. The locations, orientation of the above mentioned structures are tentative and shall vary as per the actual site condition. For skew nallah locations the structure shall be provided in skew only. The height of the culvert is minimum clear height only above the invert level. The length and height proposed above is tentative and shall be reconfirmed based on the actual hydrologic calculation. Increase of total length & formation level based on hydrological calculation shall NOT be considered as CHANGE OF SCOPE

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 section 7 of the

Manual. Repairs and strengthening of existing structures where required shall be carried out.

S. No	Existing Chainage	Proposed Chainage	No of Span/ Row	Span Length/Dia	Type of Culvert
		Nil			

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

S.No.	Existing Chainage	Design Chainage	Span
1	59.881	56.120	1x1.5x1.5
2	59.964	56.155	1x1.5x1.5
3	60.020	56.185	1x1.5x1.5
4	60.215	56.365	1x1.5x1.5
5		57.180	1x1.5x1.5
6	61.330	57.305	1x1.5x1.5
7	61.715	57.635	1x1.5x1.5
8	62.130	57.985	1x1.5x1.5
9		58.060	1x1.5x1.5
10	64.530	60.330	1x1.5x1.5
11	65.013	60.775	1x1.5x1.5
12	65.175	60.910	1x1.5x1.5
13		61.050	1x1.5x1.5
14	65.630	61.235	1x1.5x1.5
15	65.815	61.365	1x1.5x1.5
16	66.066	61.550	1x1.5x1.5
17	66.220	61.685	1x1.5x1.5
18	67.695	63.145	1x1.5x1.5
19	67.865	63.295	1x1.5x1.5
20	68.505	63.880	1x1.5x1.5
21	68.710	64.070	1x1.5x1.5
22	68.990	64.250	1x1.5x1.5
23	69.630	64.870	1x1.5x1.5
24		65.370	1x1.5x1.5
25	70.540	65.775	1x1.5x1.5
26	70.645	65.865	1x1.5x1.5
27	70.765	65.990	1x1.5x1.5
28	70.890	66.110	1x1.5x1.5
29		66.700	1x1.5x1.5
30		67.270	1x1.5x1.5
31		67.480	1x1.5x1.5
32		67.795	1x1.5x1.5
33	73.630	68.590	1x1.5x1.5
34	73.690	68.640	1x1.5x1.5
35	73.790	68.720	1x1.5x1.5
36	73.860	68.755	1x1.5x1.5
37	74.185	69.000	1x1.5x1.5
38		69.270	1x1.5x1.5
39		69.390	1x1.5x1.5

S.No.	Existing Chainage	Design Chainage	Span
40	75.338	69.990	1x1.5x1.5
41	75.835	70.475	1x1.5x1.5
42		70.565	1x6x6.0
43	76.020	70.650	1x6x6.0
44	76.040	70.675	1x1.5x1.5
45	76.280	70.895	1x1.5x1.5
46		72.190	1x1.5x1.5
47	78.115	72.685	1x1.5x1.5
48	78.270	72.815	1x1.5x1.5
49	78.470	72.990	1x1.5x1.5
50	78.625	73.140	1x1.5x1.5
51	78.680	73.150	1x1.5x1.5
52	78.860	73.245	1x1.5x1.5
53	79.025	73.460	1x1.5x1.5
54	79.180	73.535	1x1.5x1.5
55		74.540	1x1.5x1.5
56	80.920	75.135	1x1.5x1.5
57		75.270	1x1.5x1.5
58	81.200	75.405	1x1.5x1.5
59	81.770	75.905	1x1.5x1.5
60	82.080	76.200	1x1.5x1.5
61	82.185	76.285	1x1.5x1.5
62	82.575	76.560	1x1.5x1.5
63	82.755	76.675	1x1.5x1.5
64	83.330	77.145	1x1.5x1.5
65		77.300	1x1.5x1.5
66	83.740	77.525	1x1.5x1.5
67		77.990	1x1.5x1.5
68		78.120	1x1.5x1.5
69	84.765	78.500	1x1.5x1.5

Note: The culvert shall be measured in square direction only. The locations, orientation of the above mentioned structures are tentative and shall vary as per the actual site condition. For skew nallah locations the structure shall be provided in skew only. The height of the culvert is minimum clear height only above the invert level. The length and height proposed above is tentative and shall be reconfirmed based on the actual hydrologic calculation. Increase of total length & formation level based on hydrological calculation shall NOT be considered as CHANGE OF SCOPE.

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

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/widened

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

S No	Bridge at Km		Deck Width	Carriageway Width	Proposed Span Arrangement
	Existing Chainage	Design Chainage			
1	69.39	64.630	12.9	10.5	1x16
2	75.150	69.800	12.9	10.5	4x38.5
3	85.920	79.640	12.9	10.5	1x22

Note: The span mentioned above is centre to centre of expansion joints measured in square direction only. The locations, orientation of the above mentioned structures are tentative and shall vary as per the actual site condition. The span proposed above is tentative and shall be reconfirmed based on the actual hydrologic calculation. Increase of total length & formation level of the bridge based on hydrological calculation shall NOT be considered as CHANGE OF SCOPE.

(ii) The following narrow bridges shall be widened:

S. No	Location (km)	Proposed Deck Width	Span Arrangement
NIL			

7.3.2 Additional new bridges

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

S No	Proposed Chainages	Span arrangement
NIL		

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

Sl No	Location at Km	Type of bridge

NIL

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

Sl No	Location at Km	Remarks
NIL		

7.3.5 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.21 of the Manual

7.3.6 Structures in marine environment

Nil

7.4 Rail-road bridges

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 (road over rail) shall be provided at the following level crossing

Sl No	Location at Km	Length of Bridge
Nil		

7.4.3 Road under bridges (road under railway line) shall be provided at the following level crossings:

S. No.	Location of level crossing	Number and length of span
NIL		

7.5 Grade separated structures

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2.9 & 3 of this Annex-I

7.6 Repairs and strengthening of structures

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

A – Bridges

S. No.	Design Chainage (km)	Existing Span	Existing Width(m)	Nature and extent of repairs / strengthening to be carried out
1	72.255	1x32	4	Strengthening of super structure by providing additional steel bracing and replacing the timber planks by precast RCC slab.
2	79.170	1x37.8	4.1	

B – ROB / RUB

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

C – Overpasses/Underpasses and other structures

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

7.7 List of Major Bridges and Structures

The following is the list of the Major Bridges and structures.

Sl No	Existing Location (Km)	Design Location (Km)	Remarks
1	60.180	56.340	Retained

2	69.390	64.630	Reconstruction
3	75.150	69.800	Reconstruction

Sl No	Existing Location (Km)	Design Location (Km)	Remarks
4	77.640	72.255	Strengthening
5	85.460	79.170	Strengthening
6	85.920	79.640	Reconstruction

8. Traffic control devices and road safety works

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

8.2 Specifications of the reflecting sheeting shall be provided as per Manual.

Note: For safe crossing of animals at 6 locations (both sides) in the project stretch the contractor shall provide adequate number of cautionary traffic signs and construct stone paved rough surface to reduce the speed of the vehicles.

9. Roadside furniture

Roadside furniture shall be provided in accordance with the provisions of section 11 of the Manual.

9.1 Overhead traffic signs: location and size

Sl No.	Design Chainage (km)	Remarks
NIL		

10. Compulsory afforestation

Total of 1145 trees are identified to be affected in the proposed ROW. As per guideline, new trees to be planted by the concessionaire

11. Hazardous locations

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

S. No.	Location stretch from (km) to (km)	LHS/RHS

This shall be Provided as per manual.

Minimum Length of Crash Barrier and parapet wall is 600m and 12988m respectively.

12. Special requirements for hill roads

The Breast wall shall be constructed as per table given below but not limited to.

Height (m)	Length (m)
3	0
4	0
5	0
6	900
Total	**900**

The retaining wall shall be constructed as per table given below but not limited to

Height (m)	Length (m)
1.5	1000
2.5	1763
3	720
4	540
6	360
Total	**4383**

13. Change of Scope

The length of structures and bridges specified hereinabove shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule-B shall not constitute a Change of Scope or any deviation thereof.

Appendix B1

Chainage Equation	
79+680	81+100

Schedule – C

(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

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

a) toll plazas;

b) roadside furniture;

c) pedestrian facilities;

d) tree plantation;

e) truck lay-bys;

f) bus-bays and bus shelters;

g) rest areas; and

h) Others to be specified

1 Description of Project Facilities

Each of the Project Facilities is described below:

S. No.	Project Facility	Location design ch. (km)	Design Requirements	Other essential details
1.	Toll Plazas	N.A.	As per section 10 of manual	
2.	Road side furniture	Along project stretch	As per section 11 of manual	
3.	Pedestrian facility	Along project stretch	As per section 13.2 of manual	
4.	Tree Plantation	Along project stretch	As per section 12 of manual	
5.	Truck lay bye	Km 71.700	As per section 13.4 of the manual	
6	Bus bays & bus shelter	3 Nos	As per section of 13.5 of the manual	
7.	Rest area	Nil	Nil	
8.	Special Requirement for Hill Road	Along project stretch	As per section of manual	

Schedule – D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1. Construction

The Contractor shall comply with the Specifications and Standards set forth in Annex-I of 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 Standards and Specifications for Two Laning of State Highways published by the Indian Roads Congress – IRC: SP: 73-2007.

Annex – I

(Schedule-D)

Specifications and Standards for Construction

1 Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Two-Lane Highways published by IRC (referred to as "Manual" in this Schedule) and MORTH Specifications for Road and Bridge Works. 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

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

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

Sl No.	Clause referred in Manual	Item	Provisions as per Manual	Modified Provisions
1	2.15	Typical cross section	Typical cross sections of project highway are given in fig. 2.1 to 2.5 for various locations.	Modified TCS are as per Clause 2.11 of Schedule B

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	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken	IRC:SP: 83-2008) Within 15 days	
			5	three or four corners broken		Reinstate sub-base, and reconstruct the

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

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

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

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

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

			4 5	f= 12 - 18 mm f> 18 mm	Raise sunken slab. Strengthen sub-grade and sub-base by grouting and raising sunken slab	Replace the slab as appropriate. Within 30days
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	No Action	
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic	
			3	h = 12 - 25 mm	within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	Depression	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	
			1	h = 5 - 15 mm		

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

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

			3	f = 25 - 50 mm	Fill up shoulder within 7 dayss	For any 100 m Stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			4	f = 50 - 75 mm		
			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	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressed sections and upstream.
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	
			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

				of IRC:35-2015		within 2 months	
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m2/lux Bituminous Road - 100mcd/m2/lux	Monthly	As per Annexure-D of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015
	Night Time Visibility	Initial and Minimum Performance for Dry Retro reflectivity during night time:	Bi-Annually	As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015
		Design Speed / (RL) Retro Reflectivity (mcd/m2/lux)					
		Up to 65 / 200 / 80					
		65-100 / 250 / 120					
		Above 100 / 350 / 150					
		Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):					
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as Per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of	IRC:67-2012

						Gantry/Cantilever Sign boards	
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of Each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/ Cantilever Sign boards	IRC:67-2012
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	IRC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	IRC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84-2014,

				backup			IRC:119- 2015
	End Treatment of Traffic Safety Barriers	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119- 2015
	Attenuators	Functionality: Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119- 2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014

Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, busshelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

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

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

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

					capacity		
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specification s 2600 and IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes	3 days	MORTH specification 2700.

		silt, debris, clogging of drainage spout collection chamber.		Mobile Bridge Inspection Unit	with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed		
Bridge-substructure	Cracks/ spalling of concrete/ Rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
	Bearings	Delaminating of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/ abutment shall be replaced, in order to get uniform	3 months	MORTH specification 2810 and IRC SP: 40-199.

		side, no rupture of reinforcement or rubber			load transfer on to bearings.		
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual Inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of oubt, use Underwater camera for inspection of deep wells in major Rivers.	suitable protection works around pier/abutment	1 months	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days After defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

Hill Roads		
(i)	Damage to Retaining wall/ Breast wall	7 (Seven) days
(ii)	Landslides requiring clearance	12 (Twelve) hours
(iii)	Snow requiring clearance	24 (Twenty Four) hours

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

A. Flexible Pavement

Nature of Defect or deficiency		**Time limit for repair/ rectification**
(b) Granular earth shoulders, side slopes, drains and culverts		
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban areas	24 (twenty four) hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c) Road side furniture including road sign and pavement marking		
(i)	Damage to shape or position, poor visibility or loss of retro- reflectivity	48 (forty eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(vi)	Damage to road mark ups	7 (seven) days
(d) Road lighting		
(i)	Any major failure of the system	24 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e) Trees and plantation		
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(vi)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and 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)

FORM OF BANK GUARANTEE

Annex-I

(See Clause 7.1)

[Performance Security/Additional Performance Security]

[DG(RD)&SS,

Ministry of Road Transport & Highways Transport Bhawan, New Delhi]

WHEREAS:

(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 construction of the **"Improvement/widening to two-lanning of stretch from km 55.525 to km 79.680 of Ranikhor- Baghmara Project in the state of Meghalaya under "SARDP-NE" Phase-A on EPC mode (Package-III)"**, subject to and in accordance with the provisions of the Agreement

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

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be

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

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

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

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

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

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

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

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

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized 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 posted shall be conclusive.

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

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

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

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi

5	Beneficiary Bank Address	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) (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 Withdrawal of Retention Money

[DG(RD)&SS,

Ministry of Road Transport & Highways Transport Bhawan, New Delhi]

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "Agreement") with the NHIDCL, (hereinafter called the "**Authority**") for the construction of the **"Improvement/widening to two-lanning of stretch from km 55.525 to km 79.680 of Ranikhor- Baghmara Project in the state of Meghalaya under "SARDP-NE" Phase-A on EPC mode (Package-III)** 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.

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

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

2. 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.

3. 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.

4. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any 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.

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

6. 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.

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

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

9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, 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.

10. 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.

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

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

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	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)

(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 Clauses10.1 (iv) and 19.3)
Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs ----------

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road works including culverts, widening and repair of culverts.	68.21%	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of the sub-grade	25.78%
		(2) Sub-base Course	6.71%
		(3) Non Bituminous Base Course	5.57%
		(4) Bituminous Base Course	0.59%
		(5) Wearing Coat	4.82%
		(6) Widening and repair of culvert	0.00%
		B1- Reconstruction/ New 2-Lane realignment/bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	25.78%
		(2) Sub-base Course	4.47%
		(3) Non Bituminous Base Course	3.71%
		(4) Bituminous Base Course	0.39%
		(5) Wearing Coat	3.21%
		B2- Reconstruction/ New 2-Lane realignment/bypass (Rigid Pavement)	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) Course	0.00%
		C1- Reconstruction/ New Service Road (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-base Course	0.00%
		(3) Non Bituminous Base Course	0.00%
		(4) Bituminous Base Course	0.00%
		(5) Wearing Coat	0.00%
		C2- Reconstruction/ New Service Road (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) Course	0.00%
		D - Re-Construction and new culverts on existing road, realignments on existing road, realignments,bypasses:	
		Culverts(Length<6m)	18.97%
Minor Bridges/Underpasses/Overpasses	4.01%	**A1-<u>Widening and Repairs of Minor Bridges (Length>6m</u>**	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
		and <60m)	
		Minor bridges	4.51%
		A2-New Minor Bridges (Length>6m and <60m)	
		(1) Foundation+Sub Structure: On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap	40.54%
		(2) Super Structure: On completion of the super structure in all respect includong wearing coat, bearings, expansion joints, hand rails, crash barriers,road sign & markings, tests on completion etc. complete in all respect,	21.58%
		(3) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use	3.27%
		(4) Guide Bund and River Training Works: On completion of Guide Bund and River Training Works complete in all respect.	0.00%
		B.1- Widening and repair of Underpasses/overpasses	
		Underpasses/Overpasses	0.00%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
		B.2- New Underpasses/overpasses **(1) Foundation+Sub Structure:** On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap **(2) Super Structure:** On completion of the super structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers,road sign & markings, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass- wearing coat including expansion joint complete in all respect as specified and (b) in case of underpass rigid pavement including drainage facility complete in all respects as specified. **(3) Approaches:** On completion of approaches including Retaining Walls, stone pitching, protection works complete in all respect and fit for use	16.55% 12.04% 1.50%
Major Bridge (length>60m) works and RUB/ROB/elevated sections/flyovers including viaducts, if any	5.36%	**A.1 -<u>Widening and repairs of Major Bridges</u>** (1) Foundation (2) Sub-structure (3) Super-structure (including bearings)	 0.00% 0.00% 0.00%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
		(4) Wearing coat including expansion joints	0.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Guide bunds, River Training Works etc	0.00%
		(8) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		A.2 -New <u>Major Bridges</u>	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
			0.00%
		(4) Wearing Coat including expansion joints	0.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Guide bunds, River Training Works etc	0.00%
		(8) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		B.1-<u>Widening and repair of</u>	
		(a) ROB	
		(b) RUB	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of	0.00%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
		RUB rigid pavement under RUB including drainage facility complete in all respects as specified.	
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		B.2-<u>New ROB/RUB</u>	
		(a) ROB	
		(b) RUB	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respects as specified.	0.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		C.1- Widening and repair of Elevated Sections/Flyovers/Grade Separators	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints.	0.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		C.2- New Elevated Sections/Flyovers/Grade Separators	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints.	0.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Approaches (including retaining walls, stone pitching and protection works)	0.00%
Other works	22.42%	(i) Toll Plaza	0.00%
		(ii)Road side drains	11.87%
		(iii)Road signs, markings, km stones, safety devices, …	12.68%
		(iv)Project facilities	0.00%
		a) Bus bays	1.47%
		b) Truck lay bye	2.12%
		c) Rest Areas	0.00%
		d) Others(Miscellaneous items and Site Clearance)	9.36%
		(v)Road side plantation	0.00%
		(vi) Repair of protection works other than approaches	0.00%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
		to the bridges, elevated sections/ flyovers/grade separators and ROBs/RUBs	
		(vii)Safety and traffic management during construction	0.00%
		(viii)Protection works	62.50%

Table 1.3.1

Stage of Payment	Percentage - weightage	Payment Procedure
A- Widening and strengthening of existing road		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length for equivalent 2 laning of not less than 5 (five) percent for equivalent 2 -laning length..
(1) Earthwork up to top of the sub-grade	25.78%	
(2) Sub-base Course	6.71%	
(3) Non Bituminous Base Course	5.57%	
(4) Bituminous Base Course	0.59%	
(5) Wearing Coat	4.82%	
(6) Widening and repair of culvert	0.00%	Cost of completed culverts shall be determined pro rate with respect to the total number of culverts. Payment shall be made on the completion of atleast one culverts.
B1- Reconstruction/ New 2-Lane realignment/bypass (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 0.5 (Zero Point five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	25.78%	

Stage of Payment	Percentage - weightage	Payment Procedure
(2) Sub-base Course	4.47%	
(3) Non Bituminous Base Course	3.71%	
(4) Bituminous Base Course	0.39%	
(5) Wearing Coat	3.21%	
B2- Reconstruction/ New 2-Lane realignment/bypass (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 0.5 (Zero point five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	
C1- Reconstruction/ New Service Road (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 0.5 (Zero point five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-base Course	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing Coat	0.00%	
C2- Reconstruction/ New Service Road (Rigid Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 0.5 (Zero point five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	

Stage of Payment	Percentage - weightage	Payment Procedure
D - Re-Construction and new culverts on existing road, realignments on existing road, realignments,bypasses:		Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of one no. Culvert corresponding to equivalent Two laning.
Culverts(Length<6m)	18.97%	

@ For calculation of payment stage for main carriageway the project length shall be converted into equivalent 2 lane length . For example, if the total length of 4 lane main carriageway is 100km , then the equivalent length for calculation of payment stage will be 2x100km. Now, if the total length of bituminous work to be done is 100km, 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 equivalent 2-Lane length in km as defined above.

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 including the length not handed over to contractor under clause 8.3 of this Contract Agreement due to which the contractor is unable to execute the work, may be deducted from the total project length for payment purpose. The total length calculated here is only for payment purpose and will not affect and referred in other clauses of the contract agreement.

1.2.1 Minor Bridge and Underpasses/Overpasses

Procedure for estimating the value of Minor Bridge works and Underpasses/Overpasses shall be stated in table 1.3.2

Table 1.3.2

Stage of Payment	Percentage - weightage	Payment Procedure
1	**2**	**3**
A1-<u>Widening and Repairs of Minor Bridges (Length>6m and <60m)</u>	4.51%	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of widening and repair works of a

		minor bridge.
A2-New <u>Minor Bridges</u> **(i) Foundation+Sub**		**(i) Foundation+Sub Structure:** Cost of each

Stage of Payment	**Percentage - weightage**	**Payment Procedure**
Structure: On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap	40.54%	minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation+sub structure shall be made on pro rata basis on completion of a stage i.e. not less than 25% of the scope of foundation+ sub structure of each bridge subject to completion of atleast two foundations along with sub structure upto abutment/pier cap level of each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Super Structure: On completion of the super structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers,road sign & markings, tests on completion etc. complete in all respect,	21.58%	**(ii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure of atleast one span in all respect as specified in the column of " Stage of Payment" in this sub clause.
(iii) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use	3.27%	**(iii) 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.
(iv) Guide Bund and River Training Works: On completion of Guide Bund and River Training Works complete in all respect.	0.00%	**(iv) Guide Bund 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 respect as specified.
B.1- Widening and repair of Underpasses/overpasses		Cost of each overpass/underpass shall be determined on pro rata basis with respect to the total linear length of the underpass/overpass.

	0.00%	Payment shall be made on the completion of wiening & repair works of a underpass/overpass.
B.2- New Underpasses/overpasses **(i) Foundation+Sub Structure:**		**(i) Foundation+Sub Structure:** Cost of each Underpass/Overpass shall be determined on pro

Stage of Payment	Percentage - weightage	Payment Procedure
On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap	16.55%	rata basis with respect to the total linear length (m) of the Underpass/Overpass. Payment against foundation+sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation+ sub structure of each Underpass/Overpass subject to completion of atleast two foundations along with sub structure upto abutment/pier cap level of each Underpass/Overpass. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Super Structure: On completion of the super structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers,road sign & markings, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass- wearing coat including expansion joint complete in all respect as specified and (b) in case of underpass rigid pavement including drainage facility complete in all respects as specified.	12.04%	**(ii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure of atleast one span in all respect as specified in the column of " Stage of Payment" in this sub clause.
(iii) Approaches: On completion of approaches including Retaining Walls, stone pitching, protection works complete in all respect and fit for use	1.50%	**(iii) 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.

1.2.2 Major Bridge Works, ROB/RUB and Structures.

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

Table 1.3.3

Stage of Payment	Percentage - weightage	Payment Procedure
1	2	3
A1-Widening and Repairs of Major Bridges		
(i) Foundation:	0.00%	**(i) 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 copletion of a stage i.e. not less than 25% of the scope of foundation of Major Bridge subject to completion of atleast two foundationsof the Major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:	0.00%	**(ii) Sub Structure:** Payment against sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of sub structure of Major Bridge subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the major bridge.
(iii) Super Structure (including bearings)	0.00%	**(iii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respect as specified.
(iv) Wearing Coat including expansion joints.	0.00%	**Wearing Coat** Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
(v) Miscellaneous items like hand rails,		**(v) Miscellaneous**

crash barriers, road markings etc.		

Stage of Payment	Percentage - weightage	Payment Procedure
	0.00%	Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.
(vi) Wing walls/Return Walls	0.00%	**(vi) Wing walls/Return Walls** Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Guide bunds, River Training Works etc	0.00%	**(vii) Guide bunds, River Training Works etc** Payment shall be made on completion of all Guide bunds/River Training Works etc. complete in all respect as specified.
(viii) Approaches (including retaining walls, stone pitching and protection works)	0.00%	**(viii) Approaches:** Payment shall be made on completion of both approaches including stone pitching, protection works,etc. complete in all respects as specified.
A2-New Major Bridges		
(i) Foundation:	0.00%	**(i) 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 copletion of a stage i.e. not less than 25% of the scope of foundation of Major Bridge subject to completion of atleast two foundationsof the Major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:		**(ii) Sub Structure:**

	0.00%	Payment against sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of sub structure of Major Bridge subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the major bridge.

Stage of Payment	Percentage - weightage	Payment Procedure
(iii) Super Structure (including bearings)	0.00%	**(iii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respect as specified.
(iv) Wearing Coat including expansion joints.	0.00%	**Wearing Coat** Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous** Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.
(vi) Wing walls/Return Walls	0.00%	**(vi) Wing walls/Return Walls** Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Guide bunds, River Training Works etc	0.00%	**(vii) Guide bunds, River Training Works etc** Payment shall be made on completion of all Guide bunds/River Training Works etc. complete in all respect as specified.
(viii) Approaches (including retaining walls, stone pitching and protection works)		**(viii) Approaches:** Payment shall be made on completion of both

	0.00%	approaches including stone pitching, protection works,etc. complete in all respects as specified.
B1 - Widening and repairs of **(a) ROB** **(b) RUB**		

Stage of Payment	**Percentage - weightage**	**Payment Procedure**
(i) Foundation:	0.00%	**(i) Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB. Payment against foundation shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation of ROB/RUB subject to completion of atleast two foundations of the ROB/RUB.** In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:	0.00%	**(ii) Sub Structure:** Payment against sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of sub structure of ROB/RUB subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the ROB/RUB.
(iii) Super Structure (including bearings)	**including**	**expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified.**
(iv) Wearing Coat		

	(iii) **Superstructure:**	**ade on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respect as specified.**
0.00%	**(iv) Wearing Coat:**	Payment shall be made on completion of (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respects as specified.
0.00%		

Payment shall be

(v) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous** **Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.**

Stage of Payment	Percentage - weightage	Payment Procedure
(vi) Wing walls/Return Walls	0.00%	**(vi) Wing walls/Return Walls** Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Approaches (including retaining walls, stone pitching and protection works)	0.00%	**(viii) Approaches:** Payment shall be made on completion of both approaches including stone pitching, protection works,etc. complete in all respects as specified.
B2 - New **(a) ROB** **(b) RUB**		
(i) Foundation:	0.00%	**(i) Foundation:** Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB. Payment against foundation shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation of ROB/RUB subject to completion of atleast two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:	0.00%	**(ii) Sub Structure:** Payment against sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of sub structure of ROB/RUB subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the ROB/RUB.
(iii) Super Structure (including bearings)	0.00%	**(iii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respect as specified.

Stage of Payment	Percentage - weightage	Payment Procedure
(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified.	0.00%	**(iv) Wearing Coat:** Payment shall be made on completion of (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respects as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous** Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.
(vi) Wing walls/Return Walls	0.00%	**(vi) Wing walls/Return Walls** Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Approaches (including retaining walls, stone pitching and protection works)	0.00%	**(viii) Approaches:** Payment shall be made on completion of both approaches including stone pitching, protection works,etc. complete in all respects as specified.
C1 - Widening and repairs of Elevated Section/Flyovers/ Grade Separators		
(i) Foundation:	0.00%	**(i) Foundation:** Cost of each Structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation of structures subject to completion of

Stage of Payment	Percentage - weightage	Payment Procedure
		atleast two foundations of the structures. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:	0.00%	**(ii) Sub Structure:** Payment against sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of sub structure of structures subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the structures.
(iii) Super Structure (including bearings)	0.00%	**(iii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respect as specified.
(iv) Wearing Coat including expansion joints.	0.00%	**Wearing Coat** Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous** Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.
(vi) Wing walls/Return Walls	0.00%	**(vi) Wing walls/Return Walls** Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Approaches (including retaining walls, stone pitching and protection works)		**(viii) Approaches:**

Stage of Payment	Percentage - weightage	Payment Procedure
	0.00%	Payment shall be made on completion of both approaches including stone pitching, protection works,etc. complete in all respects as specified.
C2 - New Elevated Section/Flyovers/ Grade Separators		
(i) Foundation:	0.00%	**(i) Foundation:** Cost of each Structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation of structures subject to completion of atleast two foundations of the structures. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:	0.00%	**(ii) Sub Structure:** Payment against sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of sub structure of structures subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the structures.
(iii) Super Structure (including bearings)	0.00%	**(iii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respect as specified.
(iv) Wearing Coat including expansion joints.	0.00%	**Wearing Coat** Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.		**(v) Miscellaneous**

Stage of Payment	Percentage - weightage	Payment Procedure
	0.00%	Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.
(vi) Wing walls/Return Walls	0.00%	**(vi) Wing walls/Return Walls** Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Approaches (including retaining walls, stone pitching and protection works)	0.00%	**(viii) Approaches:** Payment shall be made on completion of both approaches including stone pitching, protection works,etc. complete in all respects as specified.

Note: (1) In case of innovative major bridge projects like cable suspension/cable stayed/Extra dozed and exceptionally long span bridges , the schedule may be modified as per site requirement before bidding with due approval of DG(RD)&SS ,MoRT&H.

(2)The Schedule for exclusive tunnel projects may be prepared as per site requirement before bidding with due approval of DG(RD)&SS ,MoRT&H.

1.2.3 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	Weightage	Payment Procedure
(i) Toll Plaza	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(ii)Road side drains	11.87%	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 per cent) of the total length.
(iii)Road signs, markings, km stones, safety devices, etc.	12.68%	
(iv)Project facilities	0.00%	Payment shall be made on pro rata basis for

a) Bus Bays	1.47%	completed facilities.
b) Truck Lay Bye	2.12%	
c) Rest Areas	0.00%	

Stage of Payment	Weightage	Payment Procedure
d) Others	9.36%	
(v)Road side plantation	0.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(vi) Repair of Protection works other than approaches to the bridges, elevated sections/ flyovers/ grade separators and ROBs/RUBs.	0.00%	
(vii) Safety and traffic management during construction	0.00%	Payment shall be made on prorate basis every six month.
(viii)Protection works	62.50%	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 per cent) of the total length.

2. Procedure for payment for Maintenance

2.1 The cost for maintenance shall be as stated in Clause 14.1(v).

2.2 Payment for Maintenance shall be made in Monthly basis in accordance with the provisions of Clause 19.6 & 19.7 of the Contract Agreement.

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 55th day from then 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 192nd 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 384th 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 **"Improvement/widening to two-lanning of stretch from km 55.525 to km 79.680 of Ranikhor- Baghmara Project in the state of Meghalaya under "SARDP-NE" Phase-A on EPC mode (Package-III)"** (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")# **"Improvement/widening to two-lanning of stretch from km 55.525 to km 79.680 of Ranikhor- Baghmara Project in the state of Meghalaya under "SARDP-NE" Phase-A on EPC mode (Package-III)"** 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 **"Improvement/widening to two-lanning of stretch from km 55.525 to km 79.680 of Ranikhor-Baghmara Project in the state of Meghalaya under "SARDP-NE" Phase-A on EPC mode (Package-III)"** (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 *****