Schedules

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1 The Site

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

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

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

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

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

Annex – I

(Schedule-A)

Site

[**Note: Through suitable drawings and description in words, the land, buildings, structures and road works comprising the Site shall be specified briefly but precisely in this Annex-I. All the chainages/ location referred to in Annex-I to Schedule-A shall be existing chainages**.]

1. Site

The Site of the [Intermediate-Lane] Project Highway comprises the section of [National Highway] commencing from km 0.000 to km 53.040 i.e the Tato - Monigong section in the State of Arunachal Pradesh. The land, carriageway and structures comprising the Site are described below.

2. Land

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

S. No.	Chainage (km)		Right of Way (m)	Remarks
	From	To		
1	0+000	0+030	24	
2	0+030	0+132	26	
3	0+132	0+470	34	
4	0+470	0+625	24	
5	0+625	0+795	34	
6	0+795	0+875	31	
7	0+875	0+895	25	
8	0+895	1+300	24	
9	1+300	2+590	33	
10	2+590	2+760	24	
11	2+760	2+780	30	
12	2+780	4+490	33	

13	4+490	5+500	33	
14	5+500	5+600	25	
15	5+600	5+605	27	
16	5+605	5+870	33	
17	5+870	5+895	24	
18	5+895	6+100	24	
19	6+100	6+400	34	
20	6+400	6+703	24	
21	6+703	6+710	28	
22	6+710	10+005	33	
23	10+005	10+610	24	
24	10+610	10+703	26	
25	10+703	11+389	33	
26	11+389	11+500	24	
27	11+500	12+390	32	
28	12+390	12+610	30	
29	12+610	12+990	34	
30	12+990	13+400	26	
31	13+400	13+855	40	
32	13+855	13+880	33	
33	13+880	13+900	24	
34	13+900	14+000	24	
35	14+000	14+700	40	
36	14+700	14+980	33	
37	14+980	15+115	27	

38	15+115	15+125	29	
39	15+125	15+400	34	
40	15+400	15+480	29	
41	15+480	15+610	26	
42	15+610	15+915	34	
43	15+915	15+980	31	
44	15+980	16+100	24	
45	16+100	16+450	34	
46	16+450	16+500	29	
47	16+500	16+600	27	
48	16+600	17+080	34	
49	17+080	17+100	27	
50	17+100	17+200	34	
51	17+200	17+230	28	
52	17+230	17+300	30	
53	17+300	17+340	32	
54	17+340	17+645	30	
55	17+645	17+800	34	
56	17+800	18+240	24	
57	18+240	18+250	31	
58	18+250	19+060	34	
59	19+060	19+480	31	
60	19+480	19+940	33	
61	19+940	20+400	34	
62	20+400	20+600	27	

63	20+600	20+750	34	
64	20+750	20+800	31	
65	20+800	21+260	31	
66	21+260	21+460	34	
67	21+460	21+480	28	
68	21+480	21+610	24	
69	21+610	21+660	33	
70	21+660	21+900	34	
71	21+900	21+940	33	
72	21+940	22+000	25	
73	22+000	22+060	32	
74	22+060	22+400	33	
75	22+400	22+440	33	
76	22+440	22+560	29	
77	22+560	22+900	33	
78	22+900	22+960	31	
79	22+960	23+000	29	
80	23+000	23+040	25	
81	23+040	23+300	33	
82	23+300	23+500	29	
83	23+500	23+540	26	
84	23+540	31+300	24	
85	31+300	32+800	27	
86	32+800	32+850	25	
87	32+850	33+180	27	

88	33+180	33+220	18	
89	33+220	33+500	27	
90	33+500	33+550	30	
91	33+550	40+100	27	
92	40+100	40+660	24	
93	40+660	40+700	25	
94	40+700	41+980	34	
95	41+980	42+260	25	
96	42+260	42+600	24	
97	42+600	42+620	26	
98	42+620	42+780	34	
99	42+780	42+850	30	
100	42+850	42+940	25	
101	42+940	43+000	25	
102	43+000	43+035	24	
103	43+035	43+100	25	
104	43+100	43+150	25	
105	43+150	43+200	24	
106	43+200	44+070	31	
107	44+070	44+130	25	
108	44+130	44+500	24	
109	44+500	45+300	24	
110	45+300	45+400	25	
111	45+400	45+500	24	
112	45+500	46+000	27	

113	46+000	46+100	24	
114	46+100	46+750	37	
115	46+750	46+770	34	
116	46+770	46+940	24	
117	46+940	47+190	32	
118	47+190	47+970	24	
119	47+970	47+990	32	
120	47+990	48+000	24	
121	48+000	48+340	35	
122	48+340	48+395	28	
123	48+395	48+500	24	
124	48+500	48+550	25	
125	48+550	49+000	24	
126	49+000	49+300	31	
127	49+300	50+970	34	
128	50+970	51+200	25	
129	51+200	51+400	33	
130	51+400	51+640	24	
131	51+640	52+000	34	
132	52+000	52+640	33	
133	52+640	53+040	24	

3. Carriageway

The present carriageway of the Project Highway is [Single Lane]. The type of the existing pavement is [flexible].

S. No.	From	To	Carriageway width (m)	Remarks
1	0+000	68+500	3-3.5m	Single lane

4. Major Bridges

The Site includes the following Major Bridges:

S. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Super-structure		
1	9+850	Open Foundation	Wall Type Abutment	DDRBB	105	5.2

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

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

S. No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Superstructure			
Nil						

6. Grade separators

The Site includes the following grade separators:

S. No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)
		Foundation	Superstructure		
Nil					

7. Minor bridges

The Site includes the following minor bridges:

S. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Super-structure		
1.	19+900	Open Foundation	Wall Type Abutment	DDRBB	23	5.2
2.	27+920	Open Foundation	Wall Type Abutment	DDRBB	25	5.2
3.	35+200	Open Foundation	Wall Type Abutment	DDRBB	30	5.2
4.	39+280	Open Foundation	Wall Type Abutment	DDRBB	33	5.2
5.	50+990	Open Foundation	Wall Type Abutment	DDRBB	15.5	5.2
6.	54+100	Open Foundation	Wall Type Abutment	DDRBB	18.5	5.2
7.	55+580	Open Foundation	Wall Type Abutment	DDRBB	20.5	5.2
8.	61+610	Open Foundation	Wall Type Abutment	DDRBB	16	5.2
9.	65+900	Open Foundation	Wall Type Abutment	DDRBB	18.5	5.2

8. Railway Level Crossing:

The Site includes the following railway level crossings:

S. No.	Location (km)	Remarks
Nil		

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

S. No.	Chainage (km)	Type of Structure	No. of Spans with span length (m)	Width (m)
Nil				

10. Culverts

The Site has the following culverts:

S. No.	Ext. Chainage (Km)	Existing Detail		
		Type Existing	No. of Span	Span/Vent(m)
1	0+500	SLAB	1X1X1.2	1
2	1+350	SLAB	1X1.5X1.3	1
3	1+750	SLAB	1X1.5X1	1
4	2+500	SLAB	1X1X1.2	1
5	2+700	SLAB	1X1.5X1.3	1
6	2+900	SLAB	1X1.5X1	1
7	3+100	SLAB	1X1.5X1.3	1
8	3+800	SLAB	1X1.5X1.3	1
9	4+300	SLAB	1X1.5X1	1
10	4+800	SLAB	1X1X1.5	1
11	4+850	SLAB	1X1X1.5	1
12	5+300	SLAB	1X1.5X1	1
13	5+400	SLAB	1X1X1.5	1
14	6+700	SLAB	1X1.5X1	1
15	6+900	SLAB	1X1.5X1	1
16	7+100	SLAB	1X1.5X1.3	1
17	7+300	SLAB	1X1X1.5	1
18	7+400	SLAB	1X1.5X1	1
19	7+900	SLAB	1X1X1.5	1
20	8+200	SLAB	1X1.5X1.3	1
21	8+500	SLAB	1X1.5X1	1
22	8+800	SLAB	1X1X1.2	1
23	9+200	SLAB	1X1.5X1.3	1
24	11+000	SLAB	1X1.5X1	1
25	11+200	SLAB	1X1X1.2	1
26	11+400	SLAB	1X1.5X1.3	1
27	12+500	SLAB	1X1X1.5	1
28	12+800	SLAB	1X1.5X1.3	1
29	13+750	SLAB	1X1.5X1	1
30	14+000	SLAB	1X1.5X1.3	1
31	15+900	SLAB	1X1X1.5	1
32	16+100	SLAB	1X1.5X1	1

33	17+500	SLAB	1X1X1.5	1
34	18+700	SLAB	1X1X1.5	1
35	19+200	SLAB	1X1.5X1	1
36	19+600	SLAB	1X1X1.5	1
37	19+800	SLAB	1X1X1.5	1
38	20+000	SLAB	1X1.5X1	1
39	20+200	SLAB	1X1.5X1.3	1
40	20+400	SLAB	1X1.5X1.3	1
41	20+600	SLAB	1X1.5X1	1
42	20+700	SLAB	1X1.5X1.3	1
43	20+800	SLAB	1X1.5X1	1
44	20+900	SLAB	1X1.5X1	1
45	21+100	SLAB	1X1.5X1.3	1
46	21+500	SLAB	1X1.5X1.3	1
47	21+600	SLAB	1X1.5X1	1
48	23+400	SLAB	1X1.5X1.3	1
49	23+600	SLAB	1X1.5X1.3	1
50	23+700	SLAB	1X1.5X1	1
51	23+800	SLAB	1X1X1.5	1
52	24+100	SLAB	1X1.5X1.3	1
53	24+300	SLAB	1X1.5X1	1
54	24+350	SLAB	1X1X1.5	1
55	24+400	SLAB	1X1.5X1.3	1
56	24+500	SLAB	1X1.5X1	1
57	24+900	SLAB	1X1.5X1.3	1
58	25+300	SLAB	1X1.5X1.3	1
59	26+700	SLAB	1X1.5X1	1
60	27+100	SLAB	1X1.5X1.3	1
61	27+600	SLAB	1X1.5X1.3	1
62	28+100	SLAB	1X1.5X1	1
63	28+800	SLAB	1X1.5X1.3	1
64	29+000	SLAB	1X1X1.5	1
65	29+100	SLAB	1X1.5X1	1
66	29+800	SLAB	1X1.5X1.3	1
67	30+100	SLAB	1X1.5X1	1
68	30+200	SLAB	1X1.5X1	1
69	30+400	SLAB	1X1.5X1.3	1
70	30+600	SLAB	1X1.5X1.3	1
71	30+700	SLAB	1X1.5X1	1
72	30+900	SLAB	1X1X1.5	1
73	31+100	SLAB	1X1.5X1.3	1
74	31+300	SLAB	1X1.5X1	1
75	31+500	SLAB	1X1.5X1.3	1
76	31+900	SLAB	1X1X1.5	1
77	32+600	SLAB	1X1.5X1	1
78	32+700	SLAB	1X1X1.5	1
79	33+200	SLAB	1X1X1.5	1
80	33+300	SLAB	1X1.5X1	1
81	33+400	SLAB	1X1X1.5	1
82	33+800	SLAB	1X1X1.5	1
83	33+900	SLAB	1X1.5X1	1
84	34+000	SLAB	1X1.5X1.3	1
85	34+100	SLAB	1X1.5X1.3	1
86	34+800	SLAB	1X1.5X1	1

87	35+600	SLAB	1X1.5X1.3	1
88	37+800	SLAB	1X1.5X1	1
89	37+900	SLAB	1X1.5X1	1
90	38+000	SLAB	1X1.5X1.3	1
91	38+200	SLAB	1X1.5X1.3	1
92	38+300	SLAB	1X1.5X1	1
93	38+600	SLAB	1X1.5X1.3	1
94	38+700	SLAB	1X1.5X1.3	1
95	38+800	SLAB	1X1.5X1	1
96	38+900	SLAB	1X1X1.5	1
97	39+800	SLAB	1X1.5X1.3	1
98	39+900	SLAB	1X1.5X1	1
99	40+000	SLAB	1X1X1.5	1
100	40+200	SLAB	1X1.5X1.3	1
101	40+300	SLAB	1X1.5X1	1
102	40+900	SLAB	1X1.5X1.3	1
103	41+100	SLAB	1X1.5X1.3	1
104	41+200	SLAB	1X1.5X1	1
105	41+300	SLAB	1X1.5X1.3	1
106	41+500	SLAB	1X1.5X1.3	1
107	41+550	SLAB	1X1.5X1	1
108	41+700	SLAB	1X1.5X1.3	1
109	42+000	SLAB	1X1X1.5	1
110	42+500	SLAB	1X1.5X1	1
111	43+000	SLAB	1X1.5X1.3	1
112	43+200	SLAB	1X1.5X1	1
113	43+300	SLAB	1X1.5X1	1
114	43+600	SLAB	1X1.5X1.3	1
115	44+500	SLAB	1X1.5X1.3	1
116	44+600	SLAB	1X1.5X1	1
117	44+900	SLAB	1X1X1.5	1
118	45+000	SLAB	1X1.5X1.3	1
119	45+300	SLAB	1X1.5X1	1
120	45+400	SLAB	1X1.5X1.3	1
121	45+500	SLAB	1X1X1.5	1
122	45+800	SLAB	1X1.5X1	1
123	46+000	SLAB	1X1X1.5	1
124	46+200	SLAB	1X1X1.5	1
125	46+300	SLAB	1X1.5X1	1
126	46+500	SLAB	1X1X1.5	1
127	46+800	SLAB	1X1X1.5	1
128	47+300	SLAB	1X1.5X1	1
129	47+500	SLAB	1X1.5X1.3	1
130	47+900	SLAB	1X1.5X1.3	1
131	48+000	SLAB	1X1.5X1	1
132	48+700	SLAB	1X1.5X1.3	1
133	48+800	SLAB	1X1.5X1	1
134	48+900	SLAB	1X1.5X1	1
135	49+000	SLAB	1X1.5X1.3	1
136	49+350	SLAB	1X1.5X1.3	1
137	49+500	SLAB	1X1.5X1	1
138	49+600	SLAB	1X1.5X1.3	1
139	49+700	SLAB	1X1.5X1.3	1
140	49+800	SLAB	1X1.5X1	1

141	50+100	SLAB	1X1X1.5	1
142	50+200	SLAB	1X1.5X1.3	1
143	50+400	SLAB	1X1.5X1	1
144	50+500	SLAB	1X1X1.5	1
145	51+300	SLAB	1X1.5X1.3	1
146	51+900	SLAB	1X1.5X1	1
147	52+100	SLAB	1X1.5X1.3	1
148	52+300	SLAB	1X1.5X1.3	1
149	52+700	SLAB	1X1.5X1	1
150	25+800	SLAB	1X1.5X1.3	1
151	53+200	SLAB	1X1.5X1.3	1
152	53+300	SLAB	1X1.5X1	1
153	53+500	SLAB	1X1.5X1.3	1
154	54+900	SLAB	1X1X1.5	1
155	56+500	SLAB	1X1.5X1	1
156	56+800	SLAB	1X1.5X1.3	1
157	56+900	SLAB	1X1.5X1	1
158	57+000	SLAB	1X1.5X1	1
159	57+900	SLAB	1X1.5X1.3	1
160	58+000	SLAB	1X1.5X1.3	1
161	58+300	SLAB	1X1.5X1.3	1
162	58+400	SLAB	1X1X1.5	1
163	58+700	SLAB	1X1X1.5	1
164	59+000	SLAB	1X1.5X1	1
165	59+100	SLAB	1X1X1.5	1
166	59+500	SLAB	1X1X1.5	1
167	59+800	SLAB	1X1.5X1	1
168	60+300	SLAB	1X1X1.5	1
169	60+550	SLAB	1X1X1.5	1
170	60+700	SLAB	1X1.5X1	1
171	61+100	SLAB	1X1.5X1.3	1
172	61+200	SLAB	1X1.5X1	1
173	61+400	SLAB	1X1.5X1	1
174	61+500	SLAB	1X1X1.5	1
175	62+400	SLAB	1X1.5X1.3	1
176	62+500	SLAB	1X1.5X1	1
177	62+660	SLAB	1X1.5X1.3	1
178	62+860	SLAB	1X1X1.5	1
179	63+050	SLAB	1X1.5X1	1
180	63+200	SLAB	1X1X1.5	1
181	63+450	SLAB	1X1X1.5	1
182	63+800	SLAB	1X1.5X1	1
183	64+000	SLAB	1X1X1.5	1
184	64+440	SLAB	1X1X1.5	1
185	64+500	SLAB	1X1.5X1	1
186	64+960	SLAB	1X1.5X1.3	1
187	65+000	SLAB	1X1.5X1.3	1
188	65+200	SLAB	1X1.5X1	1
189	65+300	SLAB	1X1.5X1.3	1
190	66+100	SLAB	1X1.5X1	1
191	66+600	SLAB	1X1.5X1	1
192	66+700	SLAB	1X1.5X1.3	1
193	67+000	SLAB	1X1.5X1.3	1
194	67+200	SLAB	1X1.5X1	1

195	67+300	SLAB	1X1.5X1.3	1
196	67+700	SLAB	1X1X1.5	1
197	68+200	SLAB	1X1X1.5	1
198	68+400	SLAB	1X1.5X1	1
199	68+600	SLAB	1X1X1.5	1
200	68+700	SLAB	1X1X1.5	1

11. Bus bays

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

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

12. Truck Lay byes

The details of truck lay byes are as follows:

S. 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		Type	
	From km	to km	Masonry/cc (Pucca)	Earthen (Kutcha)
Nil				

14. Major junctions

The details of major junctions are as follows:

S. No.	Location		At grade	Separated	Category of Cross Road			
	From km	to km			NH	SH	MDR	Others
Nil								

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

15. Minor junctions

The details of the minor junctions are as follows:

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

Nil

16. Bypasses

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

S. No.	Name of bypass (town)	Chainage (km) From kmto km	Length (in Km)
Nil			

17. Existing Utilities

The existing utilities schedules are as below

(i) Electrical utilities

The site includes the following electrical utilities: -

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

SL.	Chainage		Length (in Km)				Crossings			
	From	To	400KV	220KV	110KV	66KV	400KV	220KV	110KV	66KV
18										

(b) High Tension/Low tension (HT/LT) lines

SL.	Chainage		No of poles affected			Transformers	
	From	To	33KV	11KV	LT	No	Capacity
79							

(ii) Public Health utilities (Water/Sewage Pipelines)

S. No	Chainage		Length (in Km)
	From	To	Water Supply line
18.200			

18. Other structures]

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

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

S. No.	Chainage (km)		Length (km)	EROW (m)	PROW (m)	Date of Providing proposed ROW
	From	To				
(i) Full Right of Way (full width)	0+000	53.040	53.040	3-3.5m	24-40	90% Right of Way of Construction Zone to be handed over on appointed date and balance within 150 days from appointed date as per Concession Agreement.

Annex - III

(Schedule-A)

Alignment Plans

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

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

(ii) Traffic Signage plan of the Project Highway showing numbers & location of traffic signsis enclosed.

(iii) The contractor shall, however, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per the relevant specifications/IRC Codes/Manual.

Annex – IV

(Schedule-A)

Environment Clearances

The proposed project does not require Environmental clearance as per the notification of MoEF&CC Notification No S.O. 3194(E) dated 14th July, 2022 which states that "**All Highway projects are exempted upto 100 km from line of control or border subject to compliance of Standard Operating Procedure notified in this regard from time to time**".

Schedule - B

(See Clause 2.1)

Development of the Project Highway

1. Development of the Project Highway

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

2. Rehabilitation and augmentation

Intermediate laning shall include [constriction of the Intermediate Lane with hard shoulder] 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 Intermediate Laning with Hard shoulder

[**Note:** Description of the Project Highway shall be given by the Authority in detail together with explanatory drawings (where necessary) to explain the Authority's requirements precisely in order to avoid subsequent changes in the Scope of the Project. The particulars that must be specified in this Schedule-B are listed below as per the requirements of the Manual of Specifications and Standards for Geometric Design Standards (Hill roads – IRC: 52-2019 and Hill Road manual IRC: SP 48 - 1998 and IRC SP 73-2018 referred to as the Manual, and MORTH Specifications for Road and Bridge Works 5th Revision 2013 or latest version), referred to as the Manual. If any standards, specifications or details are not given in the Manual, the minimum design/construction requirements shall be specified in this Schedule. In addition to these particulars, all other essential project specific details, as required, should be provided in order to define the Scope of the Project clearly and precisely]

1. Widening of the Existing Highway

(i) The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex-III of Schedule-A. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for [mountainous/hilly] terrain to the extent land is available.

(ii) Width of Carriageway

(a) Intermediate lane with hard Shoulders shall be undertaken. The paved carriageway shall be [5.5 m] wide in accordance with the typical cross sections drawings in the Manual.

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

Sl. No.	Built-up stretch (Township)	Location (km to km)	Width (m) of carriageway	Typical cross section (Ref. to Manual)
Nil				

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

2 GEOMETRIC DESIGN AND GENERAL FEATURES

(i) General

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

(ii) Design speed

The design speed shall be as be the minimum design speed of 40 km per hr. for hilly terrain

(iii) Improvement of the existing road geometrics

[Refer to paragraph 2.1 (v) of the manual and provide details]

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

S. No.	From	To	Type of deficiency	Remarks
1	0+000	36+810	3.5 m	Single lane except newly proposed bypassed

(iv) Right of Way

[Refer to paragraph 2.3 of the Manual]. Details of Right of way are given in Annexure II of Schedule A.

(v) Type of Shoulders

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

Sl. No.	Stretch (from km to km)	Fully paved shoulders/ footpaths	Reference to cross section
1	Km 51.150 to Km 53.040	Paved shoulder	TCS-4

(b) In open country, [Paved shoulders of 1.45 m width shall be provided and balanced width shall be shall be covered with 150 mm thick compacted layer of granular material].

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

(vi) Lateral and vertical clearances at underpasses:

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

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

Sl. No.	Location Chainage (from km to km)	Span/Opening (m)	Remarks
NIL			

(vii) Lateral and vertical clearances at overpasses

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

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

Sl. No.	Location Chainage (from km to km)	Span/Opening (m)	Remarks
NIL			

(viii) Service Roads

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

Sl. No.	Location of service road (from km to km)	Right hand side (RHS)/Left hand side (LHS)/ or Both sides	Length (km) of service road
NiL			

(ix) Grade separated structures

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

Sl. No	Design Chainage	Length (m)	Number and length of spans (m)	Approach Gradient	Remarks, if any
NIL					

(b) In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows:

S. No	Type of structure Length (m)	Cross road at			Remarks, if any
		Existing Level	**Raised Level**	**Lowered Level**	
NIL					

(x) Cattle and pedestrian underpass /overpass

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

S. No.	Location	Type of Crossing
NIL		

(xi) Typical cross-sections of the Project Highway

(a) Cross section schedule along the project highway:

Sr. no.	Chainage		Length in m	Type
	Start	End		
1	0	5+250	5250	**TCS-2**
2	5+250	5+550	300	**TCS-1**
3	5+550	5+800	250	**TCS-2**
4	5+800	6+415	615	**TCS-3**
5	6+415	6+585	170	**BRIDGE**
6	6+585	7+000	415	**TCS-3**
7	7+000	8+850	1850	**TCS-2**
8	8+850	9+900	1050	**TCS-1**
9	9+900	10+943	1043	**TCS-2**
10	10+943	11+300	357	**TCS-1**
11	11+300	13+217.5	1917.5	**TCS-2**
12	13+217.5	13+242.5	25	**BRIDGE**
13	13+242.5	13+550	307.5	**TCS-2**
14	13+550	13+800	250	**TCS-1A**
15	13+800	14+080	280	**TCS-3**
16	14+080	14+800	720	**TCS-1A**
17	14+800	16+100	1300	**TCS-2**
18	16+100	20+737.5	4638	**TCS-3**
19	20+737.5	20+762.5	25	**BRIDGE**
20	20+762.5	21+264	502	**TCS-3**
21	21+264	24+300	3036	**TCS-1A**
22	24+300	24800	500	**TCS-2**

23	24+800	25033	233	**TCS-1**
24	25+033	25068	35	**BRIDGE**
25	25+068	25+350	283	**TCS-2**
26	25+350	25+600	250	**TCS-1A**
27	25+600	25+800	200	**TCS-2**
28	25+800	26+300	500	**TCS-1**
29	26+300	26+500	200	**TCS-2**
30	26+500	28+100	1600	**TCS-1**
31	28+100	28+517.5	417.5	**TCS-3**
32	28+517.5	28+552.5	35	**BRIDGE**
33	28+552.5	30+120	1567.5	**TCS-3**
34	30+120	30+450	330	**TCS-2**
35	30+450	31+050	600	**TCS-1A**
36	31+050	34+600	3550	**TCS-2**
37	34+600	34+900	300	**TCS-1A**
38	34900	36+000	1100	**TCS-2**
39	36000	37+192	1192	**TCS-1A**
40	37192	37+208	16	**BRIDGE**
41	37+208	37+300	92	**TCS-1A**
42	37+300	38+500	1200	**TCS-2**
43	38+500	38+700	200	**TCS-1A**
44	38+700	38+990	290	**TCS-2**
45	38+990	39+010	20	**BRIDGE**
46	39+010	39+470	460	**TCS-2**
47	39+470	40+315	845	**TCS-1A**
48	40+315	40+335	20	**BRIDGE**

49	40+335	40+650	315	**TCS-1A**
50	40+650	41+100	450	**TCS-2**
51	41+100	45+892	4792	**TCS-1A**
52	45+892	45+908	16	**BRIDGE**
53	45+908	49+600	3692	**TCS-1A**
54	49+600	49+915	315	**TCS-1A**
55	49+915	49+935	20	**BRIDGE**
56	49+935	49+950	15	**TCS-1A**
57	49+950	50+350	400	**TCS-2**
58	50+350	51+150	800	**TCS-1A**
59	51+150	53+040	1890	**TCS-4 OR TCS-5**
			53040	

3. INTERSECTIONS AND GRADE SEPARATORS

All intersections and grade separators shall be as per provision of relevant Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

[As per the Section 3 of the Manual]

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

(i) At-grade intersections Major Intersections

Sl. No.	Location of intersection (km)	Type of intersection	Other features
1	**0+000**	**T**	**Right side**

(ii) Grade separated intersection with/without ramps

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

4 ROAD EMBANKMENT AND CUT SECTION

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in IRC: 52-2019 and IRC: SP 48 -1998 and the specified typical cross section. Deficiencies in the plan and profile of the existing road shall be corrected.

(ii) Raising of the existing road

The existing road shall be raised in the following sections:

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

5 PAVEMENT DESIGN

(i) Pavement with following composition shall be adopted for the project road: 20 mm- MSS, 50 mm -DBM, 150 mm- WMM, 100 mm- GSB as drainage layer.

(ii) Type of pavement

Flexible pavement shall be adopted for the project road.

(iii) Design requirements

Deleted.

(a) Design Period and strategy

Deleted.

(b) Design Traffic

Deleted.

(iv) Reconstruction of stretches

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

Sl. No.	Stretch From km to km	Remarks
NIL		

6. ROADSIDE DRAINAGE

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

USHAPE DRAIN			
SR NO	START	END	LENGTH
1	0+000	6+600	6.600
2	6+600	9+000	2.400
3	9+900	10+000	0.100
4	11+500	13+500	2.000
5	13+500	15+700	2.200

6	16+000	17+550	1.550
7	18+250	19+300	1.050
8	19+600	19+750	0.150
9	24+300	25+000	0.700
10	25+200	28+000	2.800
11	29+900	30+550	0.650
12	31+050	31+350	0.300
13	31+500	31+600	0.100
14	31+750	32+150	0.400
15	33+550	34+600	1.050
16	34+900	38+500	3.600
17	38+700	39+500	0.800
18	40+550	40+900	0.350
19	45+900	51+900	6.000
			3.800
FOOTPATH CUM DRAIN			
1	17+600	18+200	0.600
2	32+200	32+800	0.600
3	33+300	33+450	0.150
4	40+200	40+300	0.100
5	52+700	53+050	0.350
			1.800
		Both Side	3.600

7. DESIGN OF STRUCTURES

(i) General

(a) All bridges, culverts and structures shall be designed and constructed in accordance with the provision of relevant Manual and shall conform to the cross- sectional features and other details specified therein.

(b) Width of the carriageway of new bridges and structures shall be as follows:

[Refer to the provision of relevant Manual and specify the width of carriageway of new bridges and structures of more than 60(sixty) meter length, if the carriageway width is different from 7.5(seven point five) meters in the table below.]:

Sl. No.	Bridge at km	Width of carriageway and cross-sectional features*
1	6+500	9 m
2	13+230	9 m
3	20+750	9 m
4	25+050	9 m
5	28+535	9 m
6	37+200	9 m

7	39+000	9 m
8	40+325	9 m
9	45+900	9 m
10	49+925	9 m

- GAD Attached

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

Sl. No.	location at km	Remarks
Nil		

(d) All bridges shall be high-level bridges.

(e) The following structures shall be designed to carry utility services specified in table below:

S. No.	Bridge at km	Utility service to be carried	Remarks
Nil			

(f) Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections given in the provision of relevant Manual.

(ii) Culverts

(a) Overall width of all culverts shall be equal to the roadway width of the approaches.

(b) Reconstruction of existing culverts:

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

Sr. No.	Culvert Location	SPAN / Opening (m)	Remarks, If any
1	10+992	1X1X1.2	9 m width
2	14+245	1X1.5X1.3	9 m width
3	16+428	1X1.5X1	9 m width
4	17+145	1X1X1.2	9 m width
5	17+332	1X1.5X1.3	9 m width
6	21+678	1X1.5X1	9 m width
7	23+712	1X1.5X1.3	9 m width
8	27+545	1X1.5X1.3	9 m width
9	27+925	1X1.5X1	9 m width
10	29+392	1X1X1.5	9 m width

11	30+340	1X1X1.5	9 m width
12	30+511	1X1.5X1	9 m width
13	30+680	1X1X1.5	9 m width
14	31+400	1X1.5X1	9 m width
15	41+900	1X1.5X1	9 m width
16	42+165	1X1.5X1.3	9 m width
17	42+308	1X1X1.5	9 m width
18	42+501	1X1.5X1	9 m width
19	43+300	1X1X1.5	9 m width
20	43+691	1X1.5X1.3	9 m width
21	44+730	1X1.5X1	9 m width
22	45+300	1X1X1.5	9 m width
23	45+501	1X1X1.5	9 m width
24	45+610	1X1.5X1.3	9 m width
25	45+845	1X1X1.5	9 m width
26	45+950	1X1X1.5	9 m width
27	46+805	1X1.5X1.3	9 m width
28	46+857	1X1.5X1.3	9 m width
29	47+013	1X1.5X1.3	9 m width
30	47+460	1X1X1.5	9 m width
31	48+090	1X1.5X1	9 m width
32	49+095	1X1X1.5	9 m width
33	49+645	1X1.5X1	9 m width
34	51+045	1X1.5X1.3	9 m width
35	51+485	1X1X1.5	9 m width
36	51+578	1X1.5X1	9 m width
37	52+352	1X2X1.5	9 m width
38	52+685	1X1.5X1.3	9 m width
39	52+848	1X1.5X1	9 m width

(c) Widening of existing culverts:

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway. All existing culverts which are not to be reconstructed shall be widened tothe roadway width of the Project Highway as per the typical cross section given in the provision of relevant Manual. Repairs and strengthening of existing structures where required shall be carried out.

Sl. No.	Culvert location	Type, span, height and width of existing culvert (m)	Repairs to be carried out [specify]
Nil			

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

Sr. No.	Culvert Location	SPAN / Opening (m)
1	0+167	1X1.5
2	0+334	1X1.5
3	0+501	1X2.5
4	0+668	1X1.5
5	0+835	1X1.5
6	1+002	1X2.5
7	1+169	1X1.5
8	1+336	1X1.5
9	1+503	1X2.5
10	1+670	1X1.5
11	1+837	1X1.5
12	2+004	1X2.5
13	2+171	1X1.5
14	2+338	1X2.5
15	2+505	1X2.5
16	2+740	1X1.5
17	2+889	1X1.5
18	3+006	1X2.5
19	3+173	1X1.5
20	3+340	1X1.5
21	3+507	1X2.5
22	3+674	1X1.5
23	3+841	1X1.5
24	4+060	1X2.5
25	4+230	1X1.5
26	4+342	1X1.5
27	4+509	1X2.5
28	4+705	1X1.5
29	4+780	1X1.5
30	5+010	1X2.5
31	5+177	1X1.5
32	5+344	1X1.5
33	5+511	1X2.5
34	5+678	1X1.5
35	5+845	1X1.5
36	6+012	1X2.5
37	6+179	1X1.5
38	6+346	1X1.5
39	6+613	1X2.5
40	6+680	1X1.5
41	6+847	1X2.5
42	7+014	1X2.5
43	7+181	1X1.5
44	7+348	1X1.5
45	7+515	1X2.5
46	7+682	1X1.5

47	7+849	1X1.5
48	8+016	1X2.5
49	8+183	1X1.5
50	8+350	1X1.5
51	8+570	1X2.5
52	8+684	1X1.5
53	8+808	1X1.5
54	9+018	1X2.5
55	9+185	1X1.5
56	9+352	1X1.5
57	9+519	1X2.5
58	9+686	1X1.5
59	9+853	1X1.5
60	10+022	1X1.5
61	10+187	1X1.5
62	10+354	1X1.5
63	10+521	1X2.5
64	10+688	1X1.5
65	10+855	1X2.5
66	11+175	1X1.5
67	11+356	1X1.5
68	11+523	1X2.5
69	11+690	1X1.5
70	11+857	1X1.5
71	12+024	1X2.5
72	12+191	1X1.5
73	12+358	1X1.5
74	12+525	1X2.5
75	12+692	1X1.5
76	12+859	1X1.5
77	13+026	1X2.5
78	13+193	1X1.5
79	13+360	1X1.5
80	13+527	1X2.5
81	13+732	1X1.5
82	13+795	1X2.5
83	14+002	1X2.5
84	14+362	1X1.5
85	14+560	1X2.5
86	14+650	1X1.5
87	14+863	1X1.5
88	15+030	1X2.5
89	15+197	1X1.5
90	15+364	1X1.5
91	15+531	1X2.5
92	15+698	1X1.5
93	15+865	1X1.5
94	16+032	1X2.5
95	16+205	1X1.5
96	16+533	1X2.5
97	16+718	1X1.5

98	16+860	1X1.5
99	17+034	1X2.5
100	17+395	1X2.5
101	17+520	1X1.5
102	17+800	1X2.5
103	18+036	1X2.5
104	18+280	1X1.5
105	18+370	1X1.5
106	18+520	1X2.5
107	18+704	1X1.5
108	18+871	1X1.5
109	19+038	1X2.5
110	19+140	1X1.5
111	19+372	1X1.5
112	19+539	1X2.5
113	19+706	1X1.5
114	19+873	1X1.5
115	20+040	1X2.5
116	20+207	1X1.5
117	20+374	1X1.5
118	20+541	1X2.5
119	20+708	1X2.5
120	20+875	1X1.5
121	21+042	1X2.5
122	21+209	1X1.5
123	21+376	1X1.5
124	21+543	1X2.5
125	21+782	1X1.5
126	21+955	1X2.5
127	22+211	1X1.5
128	22+378	1X1.5
129	22+635	1X2.5
130	22+712	1X1.5
131	22+890	1X1.5
132	232+978	1X2.5
133	23+155	1X1.5
134	23+367	1X1.5
135	23+547	1X2.5
136	23+825	1X1.5
137	24+090	1X2.5
138	24+250	1X1.5
139	24+382	1X1.5
140	24+622	1X2.5
141	24+716	1X1.5
142	24+883	1X1.5
143	25+140	1X2.5
144	25+217	1X2.5
145	25+384	1X1.5
146	25+551	1X2.5
147	25+718	1X1.5
148	25+885	1X1.5

149	26+052	1X2.5
150	26+219	1X1.5
151	26+386	1X1.5
152	26+553	1X2.5
153	26+720	1X1.5
154	26+887	1X1.5
155	27+054	1X2.5
156	27+221	1X1.5
157	27+402	1X1.5
158	27+650	1X1.5
159	28+000	1X2.5
160	28+105	1X1.5
161	28+198	1X1.5
162	28+557	1X2.5
163	28+724	1X1.5
164	28+891	1X1.5
165	29+105	1X2.5
166	29+225	1X1.5
167	29+501	1X2.5
168	29+726	1X1.5
169	29+893	1X1.5
170	30+060	1X2.5
171	30+227	1X1.5
172	30+895	1X2.5
173	31+062	1X2.5
174	31+229	1X1.5
175	31+563	1X2.5
176	31+730	1X1.5
177	31+897	1X1.5
178	32+064	1X2.5
179	32+231	1X1.5
180	32+398	1X1.5
181	32+565	1X2.5
182	32+732	1X1.5
183	32+899	1X1.5
184	33+990	1X2.5
185	33+233	1X1.5
186	33+400	1X1.5
187	33+530	1X2.5
188	33+734	1X1.5
189	33+965	1X1.5
190	34+050	1X2.5
191	34+115	1X1.5
192	34+160	1X1.5
193	34+330	1X2.5
194	34+435	1X1.5
195	34+840	1X1.5
196	35+070	1X2.5
197	35+290	1X1.5
198	35+480	1X1.5
199	35+570	1X2.5

200	35+800	1X1.5
201	35+945	1X2.5
202	36+072	1X2.5
203	36+239	1X1.5
204	36+406	1X1.5
205	36+573	1X2.5
206	36+740	1X1.5
207	36+907	1X1.5
208	37+074	1X2.5
209	37+241	1X1.5
210	37+408	1X1.5
211	37+575	1X2.5
212	37+742	1X1.5
213	37+909	1X1.5
214	38+076	1X2.5
215	38+243	1X1.5
216	38+410	1X1.5
217	38+577	1X2.5
218	38+700	1X1.5
219	38+911	1X1.5
220	39+078	1X2.5
221	39+245	1X1.5
222	39+412	1X1.5
223	39+579	1X2.5
224	39+725	1X1.5
225	39+913	1X1.5
226	40+080	1X2.5
227	40+247	1X1.5
228	40+414	1X1.5
229	40+581	1X2.5
230	40+748	1X1.5
231	40+915	1X2.5
232	41+082	1X2.5
233	41+249	1X1.5
234	42+530	1X1.5
235	41+620	1X2.5
236	41+750	1X1.5
237	42+084	1X1.5
238	42+752	1X1.5
239	42+931	1X1.5
240	43+020	1X2.5
241	43+420	1X1.5
242	43+587	1X2.5
243	44+000	1X1.5
244	44+088	1X2.5
245	44+255	1X1.5
246	44+422	1X1.5
247	44+589	1X2.5
248	44+952	1X1.5
249	45+090	1X2.5
250	45+375	1X2.5

251	46+120	1X1.5
252	46+426	1X1.5
253	46+593	1X2.5
254	47+125	1X1.5
255	47+428	1X1.5
256	47+860	1X1.5
257	47+929	1X1.5
258	48+263	1X1.5
259	48+355	1X1.5
260	48+597	1X2.5
261	48+764	1X1.5
262	48+931	1X2.5
263	49+245	1X1.5
264	49+325	1X1.5
265	49+440	1X2.5
266	49+530	1X1.5
267	50+100	1X2.5
268	50+267	1X1.5
269	50+460	1X1.5
270	50+601	1X2.5
271	50+768	1X1.5
272	50+940	1X1.5
273	51+269	1X1.5
274	51+357	1X1.5
275	52+005	1X1.5
276	52+104	1X2.5
277	52+271	1X1.5
278	52+605	1X2.5
279	53+040	1X2.5
253	46+593	1X2.5
254	47+125	1X1.5
255	47+428	1X1.5
256	47+860	1X1.5
257	47+929	1X1.5
258	48+263	1X1.5
259	48+355	1X1.5
260	48+597	1X2.5
261	48+764	1X1.5
262	48+931	1X2.5
263	49+245	1X1.5
264	49+325	1X1.5
265	49+440	1X2.5
266	49+530	1X1.5
267	50+100	1X2.5
268	50+267	1X1.5
269	50+460	1X1.5
270	50+601	1X2.5
271	50+768	1X1.5
272	50+940	1X1.5
273	51+269	1X1.5
274	51+357	1X1.5

275	52+005	1X1.5
276	52+104	1X2.5
277	52+271	1X1.5
278	52+605	1X2.5
279	53+040	1X2.5

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

Sl. No.	Location at km	Type of repair required

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

(iii) Bridges

(a) Existing bridges to be re-constructed/widened

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

Sl. No	Bridge Location	Salient details of existing bridge	Adequacy or otherwise of the existing waterway, vertical clearance, etc*
	NIL		

(ii) The following narrow bridges shall be widened:

Sl. No.	Location	Existing width (m)	Existing Width of Culvert	Cross-section at deck level for widening @
	NIL			

(b) Additional New bridges

(i) New Major Bridges: New Major Bridges at the following locations on the Project Highway shall be constructed. GADs for the new bridges are attached in the drawings folder.

S. No.	Location (km)	Total length (m)	Remarks if any
1	6+500	170 (1x40+1x50+2x40)	**9 m width**

2	13+230	25 (1x25)	**9 m width**
3	20+750	25 (1x25)	**9 m width**
4	25+050	35 (1x35)	**9 m width**
5	28+535	35 (1x35)	**9 m width**
6	37+200	16 (1x16)	**9 m width**
7	39+000	20 (1x20)	**9 m width**
8	40+325	20 (1x20)	**9 m width**
9	45+900	16 (1x16)	**9 m width**
10	49+925	20 (1x20)	**9 m width**

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

Sl. No	Location at km	Remarks
NIL		

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

Sl. No.	Location at (km)	Remarks
NIL		

(e) Drainage system for bridge decks

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

(f) Structures in marine environment

[Refer to the provision of relevant Manual and specify the necessary measures/ treatments for protecting structures in marine environment, where applicable]

(iv) Rail-road bridges

(a) Design, construction and detailing of ROB/RUB shall be as specified in the provision of relevant Manual. [Refer to the provision of relevant Manual and specify modification, if any].

(b) Road over-bridges

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

Sl. No.	Location of Level crossing (Chainage km)	Length of span (m)
NIL		

(c) Road under-bridges

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

Sl. No.	Location of Level crossing (Chainage km)	Number and length of span (m)
NIL		

(v) Grade separated structures

[Refer to the provision of relevant Manual]

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2 (ix) and 3 of this Annex-I of schedule B.

(vi) Repairs and strengthening of bridges and structures

[Refer to the provision of relevant Manual]

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

(a) Bridges

Sl. No.	Location of the Bridge (km)	Nature and extent of repairs / strengthening to be carried out
Nil		

(b) ROB / RUB

Sl. No.	Location of the Bridge (km)	Nature and extent of repairs / strengthening to be carried out
Nil		

(c) Overpasses/Underpasses and other structures

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

(vii) **List of Major Bridges and Structures**

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

Major Bridge

S. No.	Location
1	6+500

8 TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

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

(ii) Specifications of the reflective sheeting shall be as per Section 9 of the Manual.

9 ROADSIDE FURNITURE

(i) Roadside furniture shall be provided in accordance with the provisions of the Manual.

(ii) Overhead traffic signs: 2 nos.

Sr. No.	Design Chainage
1	Km 0+000
2	Km 53+040

(iii) Cantilever Overhead traffic signs: 4 nos.
Locations as per site requirement in consultation with the Authority's Engineer.

10 COMPULSORY AFFORESTATION

[Refer to the provision of relevant Manual and specify the number of trees which are required to be planted by the Contractor as compensatory afforestation.]

11 HAZARDOUS LOCATIONS

W-Beam crash barrier , Retaining wall, miled steel railing, and Breast wall should be provided as per manual at the following location.

W-BEAM CRASH BARRIER			
SR NO	START	END	LENGTH
1	0+640	0+860	0.220
2	1+400	1+600	0.200
3	1+950	2+080	0.130
4	3+220	3+350	0.130
5	9+600	9+700	0.000
6	10+800	10+880	0.080
7	12+100	12+230	0.130
8	12+670	12+750	0.080

9	13+100	13+300	0.200
10	14+780	14+850	0.070
11	15+880	16+000	0.120
12	18+440	18+500	0.060
13	19+080	19+200	0.120
14	21+170	21+230	0.060
15	21+390	21+420	0.030
16	21+530	21+580	0.050
17	22+490	22+540	0.050
18	23+928	24+000	0.072
19	26+700	26+800	0.100
20	27+280	27+300	0.020
21	27+730	27+770	0.040
22	30+680	30+720	0040
23	35+740	35+780	0.040
24	43+730	43+760	0.030
25	43+950	44+010	0.060
26	44+600	44+700	0.100

Increase in length if any as per site requirement will not constitute change of scope.

RETAINING WALL-3,5					
SR NO	**START**	**END**	**SIDE**	**LENGTH**	**LENGTH**
1	5+250	5+550	LEFT	3	0.300
2	5+800	5+863	LEFT	5	0.063
3	5+800	6+737	LEFT	3	0.937
4	13+550	14+109	LEFT	5	0.559
5	20+750	21+300	LEFT	3	0.550
6	25+350	25+600	LEFT	5	0.250
7	28+100	28+500	LEFT	5	0.400
8	38+500	38+700	LEFT	3	0.200
9	49650	49950	LEFT	5	0.300
10	50350	50900	LEFT	3	0.550

Increase in length if any as per site requirement will not constitute change of scope.

	MILD STEEL RAILING IN BUILTUP SECTION			
SR NO	**START**	**END**	**SIDE**	**LENGTH**
1	17+500	18+300	Both	0.800
2	31+600	33+600	Both	2.000
3	40+100	40+400	Both	0.300
4	40+500	40+680	Both	0.180
5	42+200	42+400	Both	0.000
6	45+100	45+900	Both	0.800
7	48+800	49+000	Both	0.200
8	52+100	53+040	Both	0.940

Increase in length if any as per site requirement will not constitute change of scope.

BREAST WALL -1.5,3 Breast wall					
SR NO	**START**	**END**	**SIDE**	**HEIGHT**	**LENGTH**
1	0	5+810	RIGHT	3	5.810
2	5+810	6+362	RIGHT	4	0.552

3	6+362	6+585	RIGHT	5	0.223
4	6+585	7+000	RIGHT	4	0.415
5	9+300	11+187	RIGHT	3	1.887
6	11+300	13+214	RIGHT	3	1.914
7	13+214	13+243	RIGHT	4	0.029
8	13+243	13+800	RIGHT	5	0.557
9	14+800	15+780	RIGHT	1.5	0.980
10	16+100	17+300	RIGHT	1.5	1.200
11	17+907	18+514	RIGHT	1.5	0.607
12	18+900	19+724	RIGHT	6	0.824
13	24+300	24+800	RIGHT	1.5	0.500
14	25+068	25+800	RIGHT	1.5	0.732
15	26+300	26+553	RIGHT	3	0.253
16	30+000	30+550	RIGHT	1.5	0.550
17	31+050	33+437	RIGHT	1.5	2.387
18	34+900	36+100	RIGHT	3	1.200
19	37+300	38+500	RIGHT	3	1.200
20	38+700	39+470	RIGHT	1.5	0.770
21	40+650	41+100	RIGHT	1.5	0.450
22	49+600	51+100	RIGHT	3	1.500

Increase in length if any as per site requirement will not constitute change of scope.

12 SPECIAL REQUIREMENT FOR HILL ROADS

Refer to the provision of relevant manual and provide details where relevant and required.

13 CHANGE OF SCOPE

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

14. Utility Shifting

Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and specification of concerned Utility Owning Department is part of the scope of work of the Contractor/Concessionaire. The bidders may visit the site and assess the quantum of shifting of utilities for the projects before submission of their bid. Copy of utility relocation plan is enclosed. The specification of concerned Utility Owning Department shall be applicable and followed.

Notes:

a) The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work shall be as per the guidelines of utility owning department and it is to be agreed solely between the contractor/Concessionaire and the utility owning department. No change of scope

shall be admissible and no cost shall be paid for using different type/spacing/size/specifications in shifted work in comparison to those in the existing work or for making any overhead crossing to underground as per requirement of utility owning department and/or construction of project highway. The contractor/concessionaire shall carry out joint inspection with utility owning department and get the estimates from the utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of contractor/concessionaire to utility owning department whenever asked by the contractor/concessionaire. The decision/ approval of utility owning department shall be on the contractor/concessionaire.

b) The supervision charges at the rates/charges applicable of the utility owning department shall be paid directly by the Authority to the utility Owning department as and when contractor/concessionaire furnishes demand of utility Owning Department along with a copy of estimated cost given by later.

c) The dismantled material/scrap of existing Utility to be shifted/Dismantled shall belong to the contractor/concessionaire who would be free to dispose-off the dismantled material as deemed fit by them unless the contractor/concessionaire is required to deposit the dismantled material may be availed by the contractor/concessionaire as per estimate agreed between them.

d) The utilities shall be handed over after shifting work is completed to utility Owning Department to their entire satisfaction. The maintenance liability shall rest with the Utility Owning Department after Handing over Process is complete as far as utility shifting works are concerned.

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-byes;
f) Bus-bays and bus shelters;
g) Rest areas; and
h) Others to be specified

2. Description of Project Facilities

Each of the Project Facilities is described below:

a) Toll plaza

Sl. No	Existing Location (km)	Design Chainage (km)
NIL		

b) Roadside Furniture

The roadside furniture shall include the provision of:

i. Traffic Signs

Traffic signs include roadside signs, overhead signs and kerb-mounted signs along the entire Project Highway as per the manual of specifications.

ii. Pavement Markings

Pavement markings shall cover road marking as per the manual of specifications.

iii. LED Traffic Blinkers

LED Traffic Blinkers for the entire project highway at the locations as suggested in Manual.

iv. Parapet wall

The parapet wall shall be provided along the project highway of minimum length of 19290 m

v. **Delineators**

Delineators for the entire Project Highway at the locations as suggested in Manual.

vi. **Kilometre stones**

Kilometer Stones for the entire Project Highway at the locations as suggested in Manual.

vii. **Solar studs**

The Solar Studs shall be provided throughout the project highway in accordance with table 5.2 of IRC: 35 and clause 9.5 of IRC: SP:73. Color of road studs shall be provided as per clause 5.4 of IRC 35.

c) Tree Plantation

Landscaping & Tree Plantation shall be as per the Manual of Specifications & IRC Standards.

d) Truck Lay-byes

Sl. No.	Design Chainage (km)	Side
1	17+900	RHS
2	45+300	LHS

e) Bus Byes/ Shelters

18 Nos shelter shall be provided. (09 Nos. each side)

Sl. No.	Chainage(Km)	Sides
1	0+500	BOTH
2	4+100	BOTH
3	12+400	BOTH
4	18+250	BOTH
5	32+650	BOTH
6	36+000	BOTH
7	40+100	BOTH
8	48+800	BOTH
9	52+650	BOTH

f) Others

Lighting shall be provided at the following locations:

a. Lighting shall be provided at all Major/Minor Junctions & Lighting on Bridges shall be provided at approach to bridges, built up areas, bus stops and truck Lay-byes as per manual recommended in Schedule D.

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 Manual of Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill Road manual IRC: SP 48 - 1998 and IRC SP 73-2018 referred to as the Manual, and MORTH Specifications for Road and Bridge Works 5th Revision 2013 or latest version. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

Annex - I
(Schedule-D)

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Guidelines for the Alignment Survey and Geometric Design of Hill Roads (IRC:52-2019) and Manual of Specifications and Standards for Intermediate Lane with hard Shoulder, referred to as the Manual or all other latest IRC Codes and Indian Road Congress (IRC) Codes and Standards and MORTH Specifications for Road and Bridge Works. Where the aforesaid Manuals, guidelines, codes, standards and specifications are silent on any aspect, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2 Deviations from the Specifications and Standards

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

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

Sl. No.	Item	Clause referred in Manual	Provision as per Manual	Modified Provision
1	Typical Cross section	IRC : SP : 73: 2018- 2.16	Typical Cross Sections	Typical Cross – Section shall be as specified at cl. 2(xi) of schedule B
2	Width of structures	IRC SP 73 2018 – 7.3	Width of structures	Width of structures shall be as specified in Annexure-I of Schedule B

(iii) [Note 1: Deviations from the aforesaid Specifications and Standards shall be listed out here. Such deviations shall be specified only if they are considered essential in view of project-specific requirements.]

CODE FOLLOWS:

1. IRC: SP: 73-2018
2. IRC: 37- 2018
3. IRC: 6-2017
4. IRC:52-2019
5. IRC: 78-2014
6. IRC: 112-2011
7. IRC: 64-1990
8. IRC: 35-2015
10. IRC: 67-2012
11. IRC: 79-1981
12. Specifications for Road and Bridge Works (5th Revision)
13. IS: 456

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-fulfilment 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 wilful default or neglect of the Authority shall be undertaken by the Authority at its own cost. The Authority may instruct the Contractor to undertake the repairs at the rates agreed between the Parties.

Annex – I

(Schedule-E)

Repair/rectification of Defects and deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit set forth in the table below.

Table -1: Maintenance Criteria for Pavements:

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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
s of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	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

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

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**					
			d to 30 cm from the edge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015

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**					
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure,	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	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	IRC:SP:83-2008	180 days	IRC:SP:83-2008

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**					
approaches of connecting roads, slip roads, lay byes etc. as applicable)		**Minimum SN**	**Traffic Speed (Km/h)**		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

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

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**					
			side slope					
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

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	**For the case d > D/2**
CRACKING						
1	**Single Discrete Cracks Not intersecting with any joint**	w = width of crack L = length of crackd = 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 without delay	Seal, and stitch if L > lm.
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		Within 7days

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse(or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crackd = 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. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected. Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	
3	**Single Longitudinal Crack intersecting with one or more joints**	w = width of crack L = length of crackd = depth of crackD = 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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, 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 15 days
			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 -

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
						See Para 5.6.4 Within 15 days
4	**Multiple Cracks intersecting 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. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken		

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

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

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
					Within 30 days	
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs 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**	**Long Term**
					No action.	Not Applicable
			1	r < **2 %**	Local repair of areas damaged and liable to be damaged. Within 7days	
			2	r = 2 - 10 %		

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	**Popout (Small Hole) Pothole Refer Para 8.4**	n = number/m^2 d = diameterh = 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		

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

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

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

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

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

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

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

			4	f = 50 - 75 mm	within 7 dayss	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			5	f > 75 mm		
Drainage						
19	**Pumping**	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	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.	
		Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	

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

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="4">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="5">Highway</td><td rowspan="5">Availability of Safe Sight Distance</td><td colspan="4">As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.</td><td rowspan="5">Monthly</td><td rowspan="5">Manual Measurements with Odometer along with video/ image backup</td><td colspan="2" rowspan="5">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.</td><td rowspan="5">IRC:SP 84-2014</td></tr>
<tr><td>Design Speed, kmph</td><td>Desirable Minimum Sight Distance (m)</td><td>Safe Stopping Sight Distance (m)</td></tr>
<tr><td>100</td><td>360</td><td>180</td></tr>
<tr><td>80</td><td>260</td><td>130</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td colspan="4"><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
</table>

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td></td><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m²/lux
Bituminous Road - 100mcd/m²/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td>Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>
<table>
<tr><th>Design Speed</th><th colspan="2">(RL) Retro Reflectivity (mcd/m²/lux)</th></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<tr><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td>65 - 100</td><td>250</td><td>120</td></tr>
<tr><td>Above 100</td><td>350</td><td>150</td></tr>
</table>
<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u></td><td>Bi-Annually</td><td>As per Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Initial 7 days Retro reflectivity: 100 mcd/m²/lux Minimum Threshold Level: 50 mcd/m²/lux					
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. 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 Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	hange of ignboard	48 hours in case of Mandatory	RC:67-2012

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
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	

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

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 barrelafter 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 aggregate length					

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged 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	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

	Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRCSP: 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 IRCSP: 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 IRCSP: 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	Within design limits.	Once in every 10 years for spans more	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.

	live loads		than 40 m				
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for 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	No dust or debris in expansion joint	Monthly	Detailed condition survey as per IRC SP:35-1990 using	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and

	expansion joint	gap.		Mobile Bridge Inspection Unit			IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainagespouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
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	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	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 load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt,use Underwatercamera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times ina 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	IRC: SP 40-1993 and IRC:SP:13-2004.

		sq.m, damage to solid apron (concrete apron) not more than 1 sq.m				weeks before onset of rainy season whichever is earlier.	
Note: 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

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

A. 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 lossof retro-reflectivity	48 (forty eight) hours
(ii)	Painting of km stone, railing, parapets, crashbarriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road lighting**	
(i)	Any major failure of the system	24 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e)	**Trees and plantation**	

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and roadstructures	15 (fifteen) days
(f)	**Rest area**	
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g)	**[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] andservice 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'sEngineer
(b)	**Foundations**	

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement andtilting, 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 cloggingof spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or 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

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

[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

Schedule - F *(See Clause*

4.1 (vii)(a)) **Applicable**

Permits

1. Applicable Permits

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

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

(b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;

(c) License for use of explosives;

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

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

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

(g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;

(h) Permission of Village Panchayats and State Government for borrow earth; and

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

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

Schedule – G

(See Clauses 7.1 and 19.2)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

The Managing Director,
National Highways & Infrastructural Development Corporation Ltd.
PTI Building, 3rd Floor,
4, Parliament Street
New Delhi - 110001

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 Intermediate Lane Road with Hard Shoulder from Design Ch. 0+000 to Ch. 53+040 (Total Design Length = 53.04 Km) of Tato to Manigong Section of NH-913 (Frontier Highway) in the State of Arunachal Pradesh" on EPC mode**" 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 MaintenancePeriod}(asdefinedintheAgreement)inasumofRs…..cr.(Rupees …….…... crore) (the "**Guarantee Amount**").

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

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

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

2. A letter from the Authority, under the hand of an officer not below the rank of

[General Manager in the National Highways Infrastructure Development Corporation Limited], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the 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, orany 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 andthe 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 so posted shall be conclusive.

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

12. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

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

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

(Insert date at least 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 2.21of the RFP). The Contractors can submit the BG for periods of two years at one time and keep on renewing the same till the DLP is over if they have problems in getting the BG in one go for the entire DLP.)

S. No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank)transport Bhawan, 1st Parliament Street, New Delhi-110001

Signed and sealed this ……. day of ……..., 20…… at ……..
SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:
(Signature) (Name)

(Designation) (Code Number)

(Address)

NOTES:

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

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

Annex – II *(Schedule - G)*

(See Clause 19.2)

Form for Guarantee for Advance Payment

The Managing Director,
National Highways & Infrastructural Development Corporation Ltd.
PTI Building, 3rd Floor,
4, Parliament Street
New Delhi – 110001

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the "**Construction of Intermediate Lane Road with Hard Shoulder from Design Ch. 0+000 to Ch. 53+040 (Total Design Length = 53.04 Km) of Tato to Manigong Section of NH-913 (Frontier Highway) in the State of Arunachal Pradesh" on EPC mode**", 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"AdvancePayment")equalto10%(tenpercent)oftheContractPrice;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 installment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to then 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 orany of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the ContractorisindefaultshallbefinalandbindingontheBank,notwithstandingany 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 Advance Payment.

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 inforce 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 is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

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

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

S. No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank)transport Bhawan, 1st Parliament Street, New Delhi-110001

Signed and sealed this ……. day of ……..., 20…… at ……..
SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:
(Signature) (Name) (Designation)
(Code Number) (Address)
NOTES:

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

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

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

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 ofthe 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	**55.27%**	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of thesub-grade	0.00%
		(2) Sub-base Course	0.00%
		(3) Non bituminous Base course	0.00%
		(4) Bituminous Base course	0.00%
		(5) Mixed Seal Surfacing (MSS)	0.00%
		(6) Widening and repair of culverts	0.00%
		B.1-Reconstruction/New Intermediate Lane Realignment /Bypass	-
		(1) Earthwork up to top of the sub- grade	57.64%
		(2) Sub-base Course	7.86%
		(3) Non bituminous Base course	6.77%
		(4) Bituminous Base course	15.39%
		(5) Mixed Seal Surfacing (MSS)	0.21%
		B.2-Reconstruction/New Intermediate Lane Realignment/Bypass (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	-
		C.1- Reconstruction/ New Service Road/ Slip Road (FlexiblePavement)	0.00%

		(1) Earthwork up to top of thesub-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%
		C.2- Reconstruction/New ServiceRoad (Rigid Pavement)	
		(1) Earthwork up to top of thesub-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- Reconstruction & New Culverts on existing road, realignments, bypasses	-
		Culverts(length <6m)	12.13%
Minor bridge/ Underpasses/ Overpasses	4.3%	**A.1- Widening and repairs ofMinor**	-
		Bridges (length>6m & <60m)	
		Minor Bridges	0.00%
		A.2- New Minor bridges (length >6 m and < 60 m)	
		(1) **Foundation + Sub-structure**: On completion of the foundation work including foundations for wing and return walls, abutments, piers uptothe abutment/ pier cap	48.35%
		(2) **Super-structure**: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion in all respect.	44.32%
		(3) **Approaches** : On completion of approaches including retaining walls, stone pitching, protection works complete in all respect, tests on completion in all respect and fit for use.	7.33%

		(4) Guide bunds and River Training Works. On Completion of Guide Bunds and River Training Works complete in all respect.	0.00%
		B.1- Widening and repairs of underpasses/overpasses	
		Underpasses/ Overpasses	0.00%
		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.	0.00%
		(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass-rigid pavement including drainage facility complete in all respects as specified.	0.00%
		((3). **Approaches** : On completion of Retaining / Reinforced earth walls, RE/Embankment earth filling ,stone pitching, protection works, completion in all respect and fit for use.	
Major bridge(length>60 m) works and ROB/RUB/elevat ed sections/flyovers including viaducts, if any	3.51%	**A.1- Widening and repairs of Major Bridges**	
		(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 barrier, road markings etc.	0.00%
		(6) Wing walls/return walls upto top	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 Major Bridges	-
		(1) Foundation:	12.21%
		(2) Sub-structure:	15.05%
		(3) Super-structure: includingbearings.	60.01%
		(4) Wearing Coat includingexpansion joints	-
		(5) Miscellaneous Items like hand rails, crash barrier, road markingsetc.	4.23%
		(6) Wing walls/return walls uptotop	0.00%
		(7) Guide bunds, River Trainingworks etc.	0.00%
		(8) Approaches (including Retaining walls, stone pitching and protection works)	8.50%
		B.1- Widening and repairs of (a) ROB (b) RUB	
		(1) Foundations	0.00%
		(2) Sub-Structure	0.00%
		(3) Super-Structure (Includingbearings)	0.00%
		(4) Wearing Coat (a) in case of ROB-wearing coat including expansionjoints complete in all respects as specified and	0.00%
		(b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	0.00%
		(5) Miscellaneous Items like handrails, crash barrier, road markingsetc.	0.00%
		(6) Wing walls/Return walls	0.00%
		(7) Approaches (including Retaining walls, stone pitching, protection works etc.)	0.00%
		B.2- New ROB/RUB	-
		(1) Foundations	0.00%
		(2) Sub-Structure	0.00%
		(3) Super-Structure (Includingbearings)	0.00%
		(4) Wearing Coat (a) in case of ROB-wearing coat including expansionjoints complete in all respects as specified and	0.00%
		(b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as	0.00%

		specified	
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%
		(6) Wing walls/Return walls	0.00%
		(7) Approaches (including Retaining/ Reinforced earth walls, stone pitching, protection works etc.)	0.00%
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	
		(1) Foundations	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 barrier, road markings etc.	0.00%
		(6) Wing walls/Return walls	0.00%
		(7) Approaches (including Retaining/ Reinforced earth walls, stone pitching, protection works etc.)	0.00%
		C.2- New Elevated	
		Section/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 barrier, road markings etc.	0.00%
		(6) Wing walls/Return walls	0.00%
		(7) Approaches (including Retaining/ Reinforced earth walls, stone pitching, protection works etc.)	0.00%
Other Works	30.13	(i) Toll Plaza	0.00%
		(ii) Road side drains	
		Lined Drain	12.19%
		Unlined Drain	0.00%
		(iii) Road signs markings, Km stones, safety Devices, Pavement marking, LED traffic Blinkers, Delineators, Solar Studs etc..	2.57%
		(iv) Metal Crash Barrier	0.65%

		(v) Gabion Wall	18.29%
		(vi) Retaining wall	7.67%
		(vii) Parapet	5.29%
		(viii) Breast wall	40.04%
		(viii) Steel railing	8.90%
		a) Bus Byes/ Shelter	1.51%
		b) Truck lay byes	0.62%
		c) Check Post	0.00%
		d) Street Lighting	1.04 %
		d) Other miscellaneous works including Connecting Road & Junction under Grade separator	0.87%
		(ix) Site clearance	0.4%
		(x) Repair of Protection Worksother than approaches to the bridges, elevated sections/ flyover/ grade separators andROBs/ RUBs	0.00%
		(xi) Safety & Traffic Management during const.	0.51%
Electrical utilities and Public Health Utilities (Water pipe lines and Sewage lines)	6.79%	(i) EHT line	100%
		(ii) EHT Crossings	
		(iii) HT/LT line	
		(iv) HT/LT crossings	
		(v)Water Pipeline	
		(vi)Water Pipeline crossing	
		(vii) Sewage lines	
		(viii) Sewage lines crossing	

1.3

Procedure of estimating the value of work done

1.3.1 Road works.

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

Table 1.3.1

Stage for payment	**Percentage weightage**	**Payment Procedure**
A- Widening & 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 of not less than 10 (ten) percent of the total length.
(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) Mixed Seal Surfacing (MSS)	0.00%	
(6) Widening and repair of culverts	0.00%	Cost of completed culverts shall be determined pro rata basis with respect to the total no. of culverts.

		The payment shall be made on the completion of atleast five culverts
B.1- 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 5(five) km. length, whichever is less.
(1) Earthwork up to top of the sub-grade	57.64%	
(2) Sub-base Course with GSB	7.86%	
(3) Non Bituminous Base Course	6.77%	
(4) Bituminous Base Course	15.39%	
(5) Mixed Seal Surfacing (MSS)	0.21%	
B.2- Reconstruction/New Intermediate Lane realignment / bypass (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 5(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%	
C.1- Reconstruction/ New service r o a d (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 5(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%	
C.2- Reconstruction/ New service road (Rigid pavement)		
(1) Earthwork up to top of the sub- grade	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5(five) km. length, whichever is less.
(2) Sub Base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	
D- Reconstruction and New Culverts 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 at least five culverts.
(1) Culverts (length <6m)	12.13%	

@. For example, if the total length of bituminous work to be done is 100 km, the cost per km of bituminous work shall be determined as follows:

Cost per km= P x weightage for road work x weightage for bituminous work x (1/L)
Where,
P= Contract Price
L = Total length in km
Similarly, the rates per km for other stages shall be worked out accordingly

Note: The length affected due to law-and-order problems or litigation during execution due to which the Contractor is unable to execute the work, may be deducted from the total project length for payment purposes. The total length calculated here is only for payment purposes and will not affect and referred in other clauses of the Contract Agreement.

1.3.2 Minor Bridges and Underpasses/Overpasses.

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

Table 1.3.2		
Stage for payment	**Percentage weightage**	**Payment Procedure**
A.1-Widening and repair of minor bridges **(length > 6m and < 60m)**	**0.00%**	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of widening & repair works of a minor bridge
A.2- New Minor Bridges		
i) Foundation +Sub- Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	48.35%	(i) Foundation +Sub- Structure: Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. Payment against 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 respects including wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion in all respect.	44.32%	(ii) Super Structure: Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of at least one span in all respects as specified in the column of "Stage of Payment" In this sub-clause.
(iii) Approaches : On completion of approaches including retaining walls, stone pitching, protection works complete in all respect, tests on completion in all respect and fit for use.	7.33%	(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 bunds and River Training Works. On Completion of Guide Bunds and River Training Works complete in all respect.	0.00%	(v) Guide Bunds and River Training Works: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training Works in all respects as specified.
B.1-Widening and repair of underpasses/overpasses	0.00%	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/overpasses. Payment shall be made on the completion of widening & repair works of a underpass/ overpass.
B.2-New underpasses/overpasses/EUP/Eco Duct		(i) **Foundation +Sub- Structure:** Cost of each Underpass/Overpass shall be determined

(i) Foundation +Sub- Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	0.00%	on pro rata basis with respect to the total linear length (m) of the Underpasses/Overpasses. 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 Underpasses/Overpasses subject to completion of atleast two foundations along with sub-structure upto abutment/ pier cap level 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 respects including wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion in all respect. Wearing Coat (a) in case of overpasses - Wearing Coat including expansion joints complete in all respects as specified and (b) in case of underpasses - rigid pavement including drainage facility complete in all respects as specified.	0.00%	**(ii) Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(iii). Approaches: On completion of Retaining / Reinforced earth walls, RE/Embankment earth filling ,stone pitching, protection works, completion in all respect and fit for use.	0.00%	**(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.

1.3.3 Major Bridge Works, ROB/RUB and Structures.

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

Table 1.3.3		
Stage for payment	**Percentage weightage**	**Payment Procedure**
A.1- 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 Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25 of the scope of foundation of the major Bridge subject to completion of atleast two foundations of the major Bridge . In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	0.00%	**(ii) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25 of

		the scope of sub- structure of the major bridge subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(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 respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc	0.00%	**(v) Miscellaneous**: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Guide Bunds, River Training works etc.	0.00%	**(vii) Guide Bunds, River Training works:** Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(viii) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	**(viii) Approaches:** Payments 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:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on prorate basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of at least two foundations of the major Bridge . In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(1) Foundation: On Completion of the Foundation work Including Foundation for return walls, abutments, piers.	13.17%	
(2) Sub-structure: On completion of abutments, piers upto the abutment/ pier cap	15.05%	**(ii) Sub-Structure:**. Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of substructure of the major bridge subject to completion of at least two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings.	60.01%	**(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 respects as specified.
(4) Wearing Coat including expansion joints	2.04%	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barriers, road marking etc.)	4.23%	**(v) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.

(6) Wing wall / Return Wall upto top	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide Bunds, river Training Works etc.	0.00%	**(vii) Guide Bunds, River Training works**: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, Stone Pitching and Protection Work).	5.50%	**(viii) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B.1 -Widening and repairs of **(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 ROBs/RUBs. Payment against foundation shall be made on pro- rata basis on completion of a stage i.e. not less than 25 of the scope of foundation of the ROB/RUB 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 completion of a stage i.e. not less than 25 of the scope of sub- structure of the ROB/RUB subject to completion of atleast two sub-structures of abutments/piers 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 at-least one span in all respects as specified.
(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 joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	**(vii) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.

B.2 -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 ROBs/RUBs. Payment against foundation shall be made on pro- rata basis on completion of a stage i.e. not less than 25 of the scope of foundation of the ROB/RUB 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 completion of a stage i.e. not less than 25 of the scope of sub- structure of the ROB/RUB subject to completion of atleast two sub-structures of abutments/piers 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 respects as specified.
(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 joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	**(vii) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C.1- 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 completion of a stage i.e. not less than 25 of the scope of foundation of the structure subject to completion of atleast two foundations of the structure. 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 completion of a stage i.e. not less than 25 of the scope of sub- structure of the structure subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the structure.
(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 respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	**(vii) Approaches**: Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C.2- 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 completion of a stage i.e. not less than 25 of the scope of foundation of the structure subject to completion of atleast two foundations of the structure . 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 completion of a stage i.e. not less than 25 of the scope of sub- structure of the structure subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the structure.
(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 respects as specified.

(iv) Wearing Coat including expansion joints	0.00%	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	**(vii) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.

1.3.4 Other works.

Procedure for estimating the value of Other Works shall be as stated in Table 1.3.4.

Table 1.3.4		
Stage for payment	**Percentage weightage**	**Payment Procedure**
(i) Toll Plaza	0.00%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (ten per cent) of the total length.
(ii) Road side drains	0.00%	
Lined Drain	12.19%	
Unlined Drain	0.00%	
(iii) Road signs markings, Km stones, safety Devices, Pavement marking, LED traffic Blinkers, Delineators, Solar Studs etc.	2.57%	
(iv) Metal Crash Barrier	0.65%	Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m of length.
(v) Gabion Wall	18.29%	
(vi) Retaining wall	7.67%	
(vii) Parapet Wall	5.29%	
(viii) Breast wall	40.04%	
(viii) Steel railing	8.90%	
a) Bus Byes/ Shelter	1.51%	
b) Truck lay byes	0.62%	
c) Check Post	0.00%	
d) Street Lighting	1.04%	
e) Other miscellaneous works including Connecting Road & Junction under Grade separator	0.87%	Payment shall be made on pro rata basis for completed facilities.
(ix) Site clearance, Landscaping & Tree Plantation,	0.4%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (ten per cent) of the total length.
(x) Repair of Protection Works other than approaches to the bridges, elevated sections/ flyover/ grade separators andROBs/	0.00%	Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m of length.

RUBs	
(xi) Safety & Traffic Management during const.	0.51%

1.3.5 Utility

Procedure for estimating the value of utilities shifting done shall be as stated in Table 1.3.5

Table 1.3.5

Stage for payment	Percentage weightage	Payment Procedure
Electrical utilities and public health utilities (water pipe line and sewage lines)		
(i) EHT line	100%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage. With reference to total cost of EHT line. Payment shall be made for completed activity .(The average weightage of major activities(only for payment purpose) in shifting work is (i) Erection of Poles-20%,(ii) Conductor stringing including laying of cable-30%,(iii) DTR erection (if involved) -15% and (iv) Charging of line including dismantling and site clearance-35% (with DTR) and 50% without DTR)
(ii) EHT Crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossing. payment shall be made for not less than 25% of the crossing subject to a minimum of 4 crossing.
(iii) HT/LT line (including Transformers if any)		Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage. With reference to total cost of LT/HT line. Payment shall be made for completed activity .(The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of Poles-20%,(ii) Conductor stringing including laying of cable-30%,(iii) DTR erection (if involved) - 10% and (iv) Charging of line including dismantling and site clearance-40% (with DTR) and 50% without DTR)
(iv) HT/LT crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossing payment shall be made for not less than 25% of the crossing subject to a minimum of 10 crossing.
(v) Water pipeline		Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and

		dismantling and site clearance-50%)
(vi) Water pipeline crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25 of the crossings subject to a minimum of 8 crossings.
(vii) Sewage lines		Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)
(vii) Sewage lines crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for completed activity. (The average weightage pf major activities in shifting work is laying pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)

2. Procedure for payment for Maintenance

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

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

Schedule - I

(See Clause 10.2 (iv))

Drawings

1. Drawings

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

2. Additional Drawings

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

Annex – I

(Schedule - I)

List of

Drawings

The list of required drawings is as under:

1. Survey Drawing.
2. Plan and Profile Drawing.
3. Cross Section and Typical Cross Section Drawing.
4. Cross Drainage Drawing.
5. GAD.
6. Structural Component Drawing of Structure.
7. Miscellaneous Drawing.
8. Any other Drawing related to or found essential of the Project.

[**Note**: The Authority shall describe in this Annex-I, all the Drawings that the Contractor is required to furnish under Clause 10.2.]

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 **[35% of the Scheduled Construction Period]** day from the Appointed Date (the "**Project Milestone- I**").

(ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

3. Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the **[60% of the Scheduled Construction Period]** 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 **[85% of the Scheduled Construction Period]** 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 [Scheduled Construction Period] 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 kilometre.

(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 orsuch 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.

Sr. No.	Key metrics of Asset	Equipment to be used	Frequency of condition survey
1	Surface defects of pavement	Network Vehicle Survey (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
2	Roughness of pavement	Network Vehicle Survey (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 ofCompletion 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 **Construction of Intermediate Lane Road with Hard Shoulder from Design Ch. 0+000 to Ch. 53+040 (Total Design Length = 53.04 Km) of Tato to Manigong Section of NH-913 (Frontier Highway) in the State of Arunachal Pradesh" on EPC mode** of National Highway-913] (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 entryinto operation on this the …… day of 20… , Scheduled Completed Date for which was 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 on monthly basis

(i) The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate cross fall, undulations, settlement,potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetationgrowth, 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, roadmarkings, 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 ofparticular item shall be calculated as under:

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

Where,

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

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

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

L1= Non-complying length L = Total length of the road,

R= Reduction (the amount to be deducted for non-compliance for a particular item/Defect/deficiency

The total amount of reduction shall be arrived at by summation of reductions for suchitems/Defects/deficiency or non-compliance.

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

(ii) 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 enteredinto between the [name and address of the Authority] (the "**Authority**") and ..... (the "**Contractor**") # for [Intermediate-Laning] of the **Intermediate-Lane of Proposed Frontier Highway from Nafra to Vijaynagar in State of Arunachal Pradesh (Frontier Highway, NH-913) (Package-5: Tato to Monigong Designed length 53.040 Km)"** section (km 0.000 to km 53.040) of National Highway No. ** in the State of **Arunachal Pradesh** on Engineering, Procurement, Construction(EPC) basis, 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) issuance of Completion Certificate or

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

(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 and approve 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 and approve 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 ofthe 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 Agreementand in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), 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 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

(xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordancewith 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's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.

(xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority 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, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 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 (iv) (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 bythe 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 thebuildings and structures forming part of Project Facilities; and shall hand them over tothe 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 (i), 19.6 (i), and 19.8 (i))

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 Siteby 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 mayarise 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 [construction of the **Construction of Intermediate Lane Road with Hard Shoulder from Design Ch. 0+000 to Ch. 53+040 (Total Design Length = 53.04 Km) of Tato to Manigong Section of NH-913 (Frontier Highway) in the State of Arunachal Pradesh" on EPC mode"** (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 *****