

Dated: 02.01.2020

## Addendum no- 1

**Name of Work:** Widening to 2 (Two) Lane with Hard shoulder of Churachandpur to Tuivai section of NH 102B from Km 48.587 to Km 69.875 (Package-2B) in the State of Manipur on Engineering, Procurement & Construction (EPC) mode.

**Package-2B:** from Km 48.587 to Km 69.875

**Tender ID:** 2019\_NHIDC\_531255\_1

Sr. No	Reference	Addendum
1	Tender ID: 2019_NHIDC_531255_1	Schedules from A to R



(KC Bhatt)  
Dy. General Manager (Tech)

## **Schedule-A**

(See Clauses 2.1 and 8.1)

### Site of the Project

- 1 The Site
    - (i) Site of the [Two-Lane] Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.
    - (ii) The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.
    - (iii) An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2 (i) of this Agreement.
    - (iv) The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be upgraded. The proposed profile of the Project Highways shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The Contractor, however, improve/upgrade the Road Profile as indicated in Annex-III based onsite/design requirement.
    - (v) The status of the environment clearances obtained or awaited is given in Annex-IV.
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## 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 [Two-Lane] Project Highway comprises the section of NH-102B commencing from km 51+147 to km 73+000 i.e. Suangdoh Village to G. Bualjang Village in the state of Manipur.

The land, carriageway and structures comprising the Site are described below.

#### 2. Land

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

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
1	51+100	51+200	9.4	
2	51+200	51+300	8.7	
3	51+300	51+400	8.1	
4	51+400	51+500	7.3	
5	51+500	51+600	7.3	
6	51+600	51+700	8.9	
7	51+700	51+800	8.8	
8	51+800	51+900	7.3	
9	51+900	52+000	8.1	
10	52+000	52+100	8.7	
11	52+100	52+200	9.2	
12	52+200	52+300	7.9	
13	52+300	52+400	7.2	
14	52+400	52+500	8.6	
15	52+500	52+600	11.2	
16	52+600	52+700	8.5	
17	52+700	52+800	7.7	
18	52+800	52+900	8.7	
19	52+900	53+000	7.7	
20	53+000	53+100	6.9	
21	53+100	53+200	7.9	
22	53+200	53+300	9.3	
23	53+300	53+400	9.6	
24	53+400	53+500	8.1	
25	53+500	53+600	9.0	
26	53+600	53+700	10.0	
27	53+700	53+800	8.3	
28	53+800	53+900	8.2	
29	53+900	54+000	5.7	
30	54+000	54+100	9.1	

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
31	54+100	54+200	6.1	
32	54+200	54+300	9.3	
33	54+300	54+400	7.7	
34	54+400	54+500	6.5	
35	54+500	54+600	6.6	
36	54+600	54+700	7.9	
37	54+700	54+800	9.7	
38	54+800	54+900	8.7	
39	54+900	55+000	9.3	
40	55+000	55+100	10.6	
41	55+100	55+200	7.9	
42	55+200	55+300	8.3	
43	55+300	55+400	7.1	
44	55+400	55+500	7.8	
45	55+500	55+600	7.1	
46	55+600	55+700	8.2	
47	55+700	55+800	7.9	
48	55+800	55+900	7.6	
49	55+900	56+000	9.2	
50	56+000	56+100	7.5	
51	56+100	56+200	7.4	
52	56+200	56+300	9.0	
53	56+300	56+400	8.0	
54	56+400	56+500	6.6	
55	56+500	56+600	7.9	
56	56+600	56+700	6.8	
57	56+700	56+800	7.6	
58	56+800	56+900	8.4	
59	56+900	57+000	7.6	
60	57+000	57+100	8.3	
61	57+100	57+200	6.8	
62	57+200	57+300	8.0	
63	57+300	57+400	8.5	
64	57+400	57+500	7.0	
65	57+500	57+600	8.6	
66	57+600	57+700	7.4	
67	57+700	57+800	6.3	
68	57+800	57+900	5.4	
69	57+900	58+000	7.7	
70	58+000	58+100	7.3	
71	58+100	58+200	7.6	
72	58+200	58+300	7.8	
73	58+300	58+400	7.6	
74	58+400	58+500	8.2	
75	58+500	58+600	7.7	
76	58+600	58+700	8.2	
77	58+700	58+800	6.6	
78	58+800	58+900	7.4	
79	58+900	59+000	9.9	
80	59+000	59+100	7.4	
81	59+100	59+200	7.9	
82	59+200	59+300	6.3	
83	59+300	59+400	6.6	

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
84	59+400	59+500	6.2	
85	59+500	59+600	12.2	
86	59+600	59+700	8.7	
87	59+700	59+800	7.2	
88	59+800	59+900	7.8	
89	59+900	60+000	7.6	
90	60+000	60+100	8.7	
91	60+100	60+200	6.3	
92	60+200	60+300	7.4	
93	60+300	60+400	6.2	
94	60+400	60+500	8.9	
95	60+500	60+600	8.4	
96	60+600	60+700	8.9	
97	60+700	60+800	8.8	
98	60+800	60+900	8.9	
99	60+900	61+000	9.1	
100	61+000	61+100	8.4	
101	61+100	61+200	9.9	
102	61+200	61+300	8.2	
103	61+300	61+400	8.3	
104	61+400	61+500	7.8	
105	61+500	61+600	7.4	
106	61+600	61+700	8.2	
107	61+700	61+800	7.6	
108	61+800	61+900	8.1	
109	61+900	62+000	6.7	
110	62+000	62+100	9.8	
111	62+100	62+200	8.1	
112	62+200	62+300	9.5	
113	62+300	62+400	10.5	
114	62+400	62+500	7.1	
115	62+500	62+600	8.3	
116	62+600	62+700	9.3	
117	62+700	62+800	10.0	
118	62+800	62+900	9.3	
119	62+900	63+000	7.5	
120	63+000	63+100	8.4	
121	63+100	63+200	8.1	
122	63+200	63+300	10.9	
123	63+300	63+400	9.0	
124	63+400	63+500	8.9	
125	63+500	63+600	7.6	
126	63+600	63+700	9.5	
127	63+700	63+800	8.6	
128	63+800	63+900	8.2	
129	63+900	64+000	9.2	
130	64+000	64+100	7.8	
131	64+100	64+200	13.0	
132	64+200	64+300	9.2	
133	64+300	64+400	8.8	
134	64+400	64+500	9.3	
135	64+500	64+600	10.9	
136	64+600	64+700	7.1	

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
137	64+700	64+800	9.3	
138	64+800	64+900	9.5	
139	64+900	65+000	8.4	
140	65+000	65+100	7.8	
141	65+100	65+200	8.7	
142	65+200	65+300	8.6	
143	65+300	65+400	12.2	
144	65+400	65+500	7.3	
145	65+500	65+600	8.1	
146	65+600	65+700	9.9	
147	65+700	65+800	10.0	
148	65+800	65+900	7.8	
149	65+900	66+000	8.1	
150	66+000	66+100	7.1	
151	66+100	66+200	9.2	
152	66+200	66+300	8.2	
153	66+300	66+400	8.8	
154	66+400	66+500	10.4	
155	66+500	66+600	8.9	
156	66+600	66+700	7.5	
157	66+700	66+800	8.1	
158	66+800	66+900	8.1	
159	66+900	67+000	9.5	
160	67+000	67+100	8.1	
161	67+100	67+200	7.4	
162	67+200	67+300	10.3	
163	67+300	67+400	8.0	
164	67+400	67+500	8.8	
165	67+500	67+600	8.9	
166	67+600	67+700	8.4	
167	67+700	67+800	6.8	
168	67+800	67+900	7.3	
169	67+900	68+000	8.4	
170	68+000	68+100	8.7	
171	68+100	68+200	7.1	
172	68+200	68+300	7.4	
173	68+300	68+400	10.1	
174	68+400	68+500	8.2	
175	68+500	68+600	8.3	
176	68+600	68+700	9.0	
177	68+700	68+800	7.8	
178	68+800	68+900	11.9	
179	68+900	69+000	5.9	
180	69+000	69+100	8.6	
181	69+100	69+200	6.5	
182	69+200	69+300	7.9	
183	69+300	69+400	7.3	
184	69+400	69+500	6.8	
185	69+500	69+600	8.5	
186	69+600	69+700	8.8	
187	69+700	69+800	7.8	
188	69+800	69+900	9	
189	69+900	70+000	7.3	

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
190	70+000	70+100	7	
191	70+100	70+200	8.1	
192	70+200	70+300	7.9	
193	70+300	70+400	8.3	
194	70+400	70+500	8.4	
195	70+500	70+600	7.2	
196	70+600	70+700	8	
197	70+700	70+800	8.3	
198	70+800	70+900	10.4	
199	70+900	71+000	8.4	
200	71+000	71+100	9	
201	71+100	71+200	9.8	
202	71+200	71+300	7.3	
203	71+300	71+400	6.9	
204	71+400	71+500	5.9	
205	71+500	71+600	7.2	
206	71+600	71+700	14.2	
207	71+700	71+800	7.5	
208	71+800	71+900	7.6	
209	71+900	72+000	8.2	
210	72+000	72+100	10.4	
211	72+100	72+200	6.7	
212	72+200	72+300	8.5	
213	72+300	72+400	6.8	
214	72+400	72+500	7.9	
215	72+500	72+600	6.6	
216	72+600	72+700	6.8	
217	72+700	72+800	6.1	
218	72+800	72+900	6.2	

### 3. Carriageway

The present carriageway of the Project Highway is Two Lane from km 51+147 to km 73+000. The type of the existing pavement is flexible.

### 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		
Nil						

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

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

S. No.	Chainage	Type of Structure	No. of Spans	Width	ROB/

	(km)	Foundation	Superstructure	with span length(m)	(m)	RUB
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	68+650	Open	Wall	Bailey Bridge	1x42.65	3.75
2	71+980	Open	Wall	Bailey Bridge	1x24.40	5

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location(km)	Remarks
Nil		

9. Under passes(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:

Sl. No.	Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
1	51.291	Slab	1X2.767M	3.2
2	51.592	Slab	1X2.398M	2.8
3	51.921	Slab	1X5.934M	3.4
4	52.439	Slab	1X2.534M	3.4
5	52.638	Slab	1X2.778M	3.2
6	52.810	HP	1.2M DIA	3.6
7	53.168	HP	1.2M DIA	3.2
8	53.793	Slab	1X2.374M	3.4
9	54.084	Slab	1X2.768M	2.8
10	54.722	Slab	1X5.726M	3.4
11	54.850	Slab	1X2.520M	3.2

Sl. No.	Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
12	54.945	Slab	1X2.593M	3.6
13	55.128	Slab	1X2.755M	3.4
14	55.442	Slab	1X1.899M	3.2
15	55.733	Slab	1X4.583M	3.1
16	55.841	Slab	1X3.134M	2.8
17	55.957	Slab	1X3.112M	2.9
18	56.068	Slab	1X2.229M	3.4
19	56.639	Slab	1X3.591M	3.2
20	56.769	Slab	1X1.993M	3.6
21	57.006	Slab	1X2.408M	3.1
22	57.211	Slab	1X1.296M	2.8
23	57.359	Slab	1X3.932M	2.9
24	57.575	Slab	1X2.694M	3.6
25	57.654	Slab	1X2.723M	3.4
26	57.948	Slab	1X2.332M	3.1
27	58.298	HP	1.2M DIA	2.9
28	58.574	Slab	1X2.332M	3.4
29	58.644	HP	1.2M DIA	2.9
30	58.900	HP	1.2M DIA	3.6
31	59.324	Slab	1X2.571M	3.2
32	59.490	Slab	1X3.495M	3.5
33	59.765	Slab	1X5.186M	3
34	60.242	HP	1.2M DIA	3.4
35	60.326	HP	1.2M DIA	3.1
36	60.365	Slab	1X2.265M	2.8
37	60.569	HP	1.2M DIA	2.9
38	60.798	HP	1.2M DIA	3.4
39	60.982	HP	1.2M DIA	3.2
40	61.058	Slab	1X2.265M	3.6
41	61.539	HP	1.2M DIA	3.4
42	62.748	Slab	1X2.262M	3.2
43	62.829	Slab	1X2.262M	3.6
44	63.247	Slab	1X2.262M	3.4
45	64.530	HP	1.2M DIA	3.1
46	64.738	HP	1.2M DIA	2.8
47	64.863	HP	1.2M DIA	2.9
48	65.390	Slab	1X1.964M	3.4
49	65.986	HP	1.2M DIA	3.2
50	66.039	HP	1.2M DIA	3.6
51	66.480	Slab	1X1.803M	3.4
52	66.881	Slab	1X2.309M	3.1
53	67.606	Slab	1X2.321M	2.9
54	68.000	Slab	1X6.021M	3.4
55	68.830	HP	1.2M DIA	3.1
56	69.004	Box	1X1.675M	2.8
57	69.189	Box	1x3.410M	2.9
58	69.359	Box	1X2.666M	3.4
59	69.965	Box	1X1.965M	2.9
60	70.506	Box	1X2.930M	3.2
61	70.656	Box	1X2.744M	3.6
62	71.064	Slab	1X2.49M	3.5
63	71.268	Slab	1X1.90M	3.4
64	71.450	Slab	1X2.67M	3.1

Sl. No.	Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
65	71.521	Slab	COVERED BY SOIL	2.8
66	71.600	Slab	1X1.88M	2.9
67	71.856	Slab	1X2.08M	3.2
68	72.434	HP	2X1.2M	3.6

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. Roadside drains

The details of the roadside drains are as follows:

Sl. No.	Location		Type	
	From km	To km	Masonry/cc (Pucca)	Earthen (Kutch)
1	51+147	73+000	Earthen (Hill Side)	

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:

Sl. No.	Location		Type of intersection	
	From Km	To Km	T-Junction	Cross Road
1	60+675		Y	3-Legged
2	61+455		Y	3-Legged
3	61+630		Y	3-Legged

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 km to km	Length(in Km)
Nil			

17. Other structures

[Provide details of other structures, if any.]



## 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:

<b>Sr. No</b>	<b>From (km)</b>	<b>To (Km)</b>	<b>Length (m)</b>	<b>Total RoW Width (m)</b>	<b>Date of providing RoW</b>
1	<b>48.587</b>	<b>69.875</b>	21288	14-24 m	To be filled by NHIDCL

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### **Annex-III**

(Schedule-A)

#### **Alignment Plans**

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

- (i) The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL .In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based onsite/design requirement.
  - (ii) Traffic Signage plan of the Project Highway showing numbers & location of traffic signs is enclosed. The contractor shall, however, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per the relevant specifications/IRC Codes/Manual.
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**Annex – IV**

(Schedule-A)

Environment Clearances

The project highway does not require environment clearance as per MoEF Circular dated 22.08.2013.

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## **Schedule - B**

(See Clause 2.1)

### Development of the Project Highway

**1. Development of the Project Highway**

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

**2. Rehabilitation and augmentation**

Rehabilitation and augmentation shall include Two-Lanning and Strengthening of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

**3. Specifications and Standards**

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

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## Annex – I

(Schedule-B)

### Description of **Widening to 2 (Two) Lane with Hard shoulder of Churachandpur to Tuivai section of NH 102B from Km 48.587 to Km 69.875 (Package-2B) in the State of Manipur on Engineering, Procurement & Construction (EPC) mode**

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 Two Lanning of Highways (IRC: SP: 73-2018) 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 hilly terrain to the extent land is available.

(ii) Width of Carriageway

(a) Two-Lanning with hard shoulders shall be undertaken. The paved carriageway shall be 7(seven) m wide. Provided that in the built-up areas: the width of the carriageway shall be as specified in the following table:

Sl. No.	Built-up stretch (Township)	Location		Width (m)	Typical Cross Section (Refer to Manual)	Remarks
1	Suangdoh	48.587	65.550	7	As per Attached Drawing	7 m Carriageway
2	Lunghul (T)	65.550	68.860	7		7 m Carriageway
3	G. Bualjang	68.860	69.875	7		7 m Carriageway

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

#### 2. **Geometric Design and General Features**

(i) General

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

(ii) Design speed

For Mountainous terrain design speed shall be the minimum design speed of 40-60 km/hr and for sharp curve and hair pin bend locations speed reduces upto 30 kmph & 20 kmph respectively.

(iii) Improvement of the existing road geometrics

The stretches where design speed reduces below 40 kmph are summarized below:

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Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
1	48+883 to 48+896	Sharp Bend	Design Speed = 30 Kmph
2	49+023 to 49+029	Sharp Bend	Design Speed = 20 Kmph
3	49+065 to 49+142	Sharp Bend	Design Speed = 20 Kmph
4	49+210 to 49+252	Sharp Bend	Design Speed = 30 Kmph
5	49+345 to 49+375	Sharp Bend	Design Speed = 20 Kmph
6	49+435 to 49+473	Sharp Bend	Design Speed = 20 Kmph
7	49+500 to 49+536	Sharp Bend	Design Speed = 20 Kmph
8	49+731 to 49+741	Sharp Bend	Design Speed = 20 Kmph
9	49+778 to 49+794	Sharp Bend	Design Speed = 20 Kmph
10	49+849 to 49+881	Sharp Bend	Design Speed = 30 Kmph
11	49+999 to 50+009	Sharp Bend	Design Speed = 30 Kmph
12	50+053 to 50+079	Sharp Bend	Design Speed = 20 Kmph
13	50+126 to 50+156	Sharp Bend	Design Speed = 20 Kmph
14	50+411 to 50+481	Sharp Bend	Design Speed = 30 Kmph
15	50+544 to 50+572	Sharp Bend	Design Speed = 30 Kmph
16	50+628 to 50+701	Sharp Bend	Design Speed = 20 Kmph
17	50+739 to 50+745	Sharp Bend	Design Speed = 20 Kmph
18	50+777 to 50+781	Sharp Bend	Design Speed = 20 Kmph
19	50+886 to 50+917	Sharp Bend	Design Speed = 20 Kmph
20	50+992 to 51+051	Sharp Bend	Design Speed = 20 Kmph
21	51+105 to 51+110	Sharp Bend	Design Speed = 20 Kmph
22	51+182 to 51+199	Sharp Bend	Design Speed = 20 Kmph
23	51+248 to 51+280	Sharp Bend	Design Speed = 20 Kmph
24	51+355 to 51+387	Sharp Bend	Design Speed = 20 Kmph
25	51+418 to 51+423	Sharp Bend	Design Speed = 20 Kmph
26	51+455 to 51+474	Sharp Bend	Design Speed = 20 Kmph
27	51+506 to 51+516	Sharp Bend	Design Speed = 20 Kmph
28	51+555 to 51+570	Sharp Bend	Design Speed = 20 Kmph
29	51+623 to 51+653	Sharp Bend	Design Speed = 20 Kmph
30	51+714 to 51+723	Sharp Bend	Design Speed = 20 Kmph
31	51+844 to 51+868	Sharp Bend	Design Speed = 20 Kmph
32	52+058 to 52+100	Sharp Bend	Design Speed = 20 Kmph
33	52+140 to 52+146	Sharp Bend	Design Speed = 20 Kmph
34	52+206 to 52+212	Sharp Bend	Design Speed = 20 Kmph
35	52+248 to 52+255	Sharp Bend	Design Speed = 20 Kmph
36	52+302 to 52+309	Sharp Bend	Design Speed = 20 Kmph
37	52+399 to 52+407	Sharp Bend	Design Speed = 20 Kmph
38	52+496 to 52+511	Sharp Bend	Design Speed = 20 Kmph
39	52+604 to 52+609	Sharp Bend	Design Speed = 20 Kmph
40	52+646 to 52+668	Sharp Bend	Design Speed = 20 Kmph
41	52+790 to 52+796	Sharp Bend	Design Speed = 20 Kmph
42	52+857 to 52+877	Sharp Bend	Design Speed = 20 Kmph
43	52+908 to 52+956	Sharp Bend	Design Speed = 20 Kmph
44	53+071 to 53+082	Sharp Bend	Design Speed = 20 Kmph
45	53+200 to 53+327	Sharp Bend	Design Speed = 20 Kmph
46	53+445 to 53+457	Sharp Bend	Design Speed = 20 Kmph
47	53+528 to 53+536	Sharp Bend	Design Speed = 20 Kmph
48	53+568 to 53+631	Sharp Bend	Design Speed = 20 Kmph
49	53+759 to 53+79	Sharp Bend	Design Speed = 20 Kmph
50	53+842 to 53+902	Sharp Bend	Design Speed = 20 Kmph
51	53+933 to 53+946	Sharp Bend	Design Speed = 20 Kmph
52	54+014 to 54+038	Sharp Bend	Design Speed = 20 Kmph
53	54+076 to 54+094	Sharp Bend	Design Speed = 20 Kmph
54	54+145 to 54+151	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
55	54+190 to 54+212	Sharp Bend	Design Speed = 20 Kmph
56	54+279 to 54+329	Sharp Bend	Design Speed = 20 Kmph
57	54+383 to 54+429	Sharp Bend	Design Speed = 20 Kmph
58	54+461 to 54+466	Sharp Bend	Design Speed = 20 Kmph
59	54+553 to 54+571	Sharp Bend	Design Speed = 20 Kmph
60	54+608 to 54+611	Sharp Bend	Design Speed = 20 Kmph
61	54+766 to 54+786	Sharp Bend	Design Speed = 20 Kmph
62	54+856 to 54+861	Sharp Bend	Design Speed = 20 Kmph
63	54+893 to 54+921	Sharp Bend	Design Speed = 20 Kmph
64	54+994 to 55+010	Sharp Bend	Design Speed = 20 Kmph
65	55+067 to 55+080	Sharp Bend	Design Speed = 20 Kmph
66	55+111 to 55+116	Sharp Bend	Design Speed = 20 Kmph
67	55+147 to 55+151	Sharp Bend	Design Speed = 20 Kmph
68	55+194 to 55+199	Sharp Bend	Design Speed = 20 Kmph
69	55+294 to 55+312	Sharp Bend	Design Speed = 20 Kmph
70	55+355 to 55+366	Sharp Bend	Design Speed = 20 Kmph
71	55+397 to 55+542	Sharp Bend	Design Speed = 20 Kmph
72	55+658 to 55+678	Sharp Bend	Design Speed = 20 Kmph
73	55+819 to 55+843	Sharp Bend	Design Speed = 20 Kmph
74	55+945 to 55+981	Sharp Bend	Design Speed = 20 Kmph
75	56+055 to 56+079	Sharp Bend	Design Speed = 20 Kmph
76	56+270 to 56+318	Sharp Bend	Design Speed = 20 Kmph
77	56+405 to 56+418	Sharp Bend	Design Speed = 20 Kmph
78	56+472 to 56+514	Sharp Bend	Design Speed = 20 Kmph
79	56+530 to 56+540	Sharp Bend	Design Speed = 20 Kmph
80	56+616 to 56+668	Sharp Bend	Design Speed = 20 Kmph
81	56+739 to 56+750	Sharp Bend	Design Speed = 20 Kmph
82	56+888 to 56+929	Sharp Bend	Design Speed = 20 Kmph
83	57+098 to 57+118	Sharp Bend	Design Speed = 20 Kmph
84	57+183 to 57+190	Sharp Bend	Design Speed = 20 Kmph
85	57+225 to 57+249	Sharp Bend	Design Speed = 20 Kmph
86	57+280 to 57+290	Sharp Bend	Design Speed = 20 Kmph
87	57+344 to 57+390	Sharp Bend	Design Speed = 30 Kmph
88	57+457 to 57+465	Sharp Bend	Design Speed = 20 Kmph
89	57+503 to 57+577	Sharp Bend	Design Speed = 30 Kmph
90	57+647 to 57+659	Sharp Bend	Design Speed = 20 Kmph
91	57+692 to 57+699	Sharp Bend	Design Speed = 20 Kmph
92	57+732 to 57+748	Sharp Bend	Design Speed = 20 Kmph
93	57+787 to 57+808	Sharp Bend	Design Speed = 30 Kmph
94	57+890 to 57+936	Sharp Bend	Design Speed = 30 Kmph
95	58+032 to 58+051	Sharp Bend	Design Speed = 20 Kmph
96	58+110 to 58+192	Sharp Bend	Design Speed = 20 Kmph
97	58+214 to 58+23	Sharp Bend	Design Speed = 20 Kmph
98	58+315 to 58+339	Sharp Bend	Design Speed = 20 Kmph
99	58+414 to 58+453	Sharp Bend	Design Speed = 30 Kmph
100	58+480 to 58+528	Sharp Bend	Design Speed = 20 Kmph
101	58+628 to 58+670	Sharp Bend	Design Speed = 20 Kmph
102	58+701 to 58+711	Sharp Bend	Design Speed = 20 Kmph
103	58+761 to 58+787	Sharp Bend	Design Speed = 20 Kmph
104	58+903 to 59+015	Sharp Bend	Design Speed = 20 Kmph
105	59+190 to 59+231	Sharp Bend	Design Speed = 20 Kmph
106	59+267 to 59+313	Sharp Bend	Design Speed = 20 Kmph
107	59+343 to 59+375	Sharp Bend	Design Speed = 20 Kmph
108	59+420 to 59+449	Sharp Bend	Design Speed = 30 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
109	59+549 to 59+558	Sharp Bend	Design Speed = 20 Kmph
110	59+592 to 59+615	Sharp Bend	Design Speed = 20 Kmph
111	59+646 to 59+665	Sharp Bend	Design Speed = 20 Kmph
112	59+687 to 59+769	Sharp Bend	Design Speed = 20 Kmph
113	59+796 to 59+815	Sharp Bend	Design Speed = 20 Kmph
114	59+855 to 59+867	Sharp Bend	Design Speed = 20 Kmph
115	59+911 to 59+939	Sharp Bend	Design Speed = 20 Kmph
116	60+116 to 60+195	Sharp Bend	Design Speed = 20 Kmph
117	60+276 to 60+317	Sharp Bend	Design Speed = 20 Kmph
118	60+374 to 60+431	Sharp Bend	Design Speed = 20 Kmph
119	60+524 to 60+540	Sharp Bend	Design Speed = 20 Kmph
120	60+596 to 60+728	Sharp Bend	Design Speed = 30 Kmph
121	60+744 to 60+772	Sharp Bend	Design Speed = 30 Kmph
122	60+809 to 60+877	Sharp Bend	Design Speed = 20 Kmph
123	60+935 to 60+942	Sharp Bend	Design Speed = 20 Kmph
124	60+996 to 61+036	Sharp Bend	Design Speed = 20 Kmph
125	61+074 to 61+088	Sharp Bend	Design Speed = 20 Kmph
126	61+286 to 61+383	Sharp Bend	Design Speed = 30 Kmph
127	61+448 to 61+461	Sharp Bend	Design Speed = 20 Kmph
128	61+616 to 61+640	Sharp Bend	Design Speed = 20 Kmph
129	61+695 to 61+702	Sharp Bend	Design Speed = 20 Kmph
130	61+760 to 61+773	Sharp Bend	Design Speed = 20 Kmph
131	61+805 to 61+818	Sharp Bend	Design Speed = 20 Kmph
132	61+880 to 61+890	Sharp Bend	Design Speed = 30 Kmph
133	61+934 to 61+945	Sharp Bend	Design Speed = 30 Kmph
134	62+030 to 62+043	Sharp Bend	Design Speed = 20 Kmph
135	62+080 to 62+092	Sharp Bend	Design Speed = 20 Kmph
136	62+123 to 62+139	Sharp Bend	Design Speed = 20 Kmph
137	62+185 to 62+191	Sharp Bend	Design Speed = 20 Kmph
138	62+224 to 62+239	Sharp Bend	Design Speed = 20 Kmph
139	62+302 to 62+356	Sharp Bend	Design Speed = 20 Kmph
140	62+401 to 62+424	Sharp Bend	Design Speed = 30 Kmph
141	62+463 to 62+473	Sharp Bend	Design Speed = 20 Kmph
142	62+515 to 62+534	Sharp Bend	Design Speed = 20 Kmph
143	62+576 to 62+587	Sharp Bend	Design Speed = 20 Kmph
144	62+625 to 62+635	Sharp Bend	Design Speed = 20 Kmph
145	62+719 to 62+741	Sharp Bend	Design Speed = 20 Kmph
146	62+774 to 62+781	Sharp Bend	Design Speed = 20 Kmph
147	62+870 to 62+884	Sharp Bend	Design Speed = 20 Kmph
148	62+921 to 62+940	Sharp Bend	Design Speed = 20 Kmph
149	62+981 to 62+986	Sharp Bend	Design Speed = 20 Kmph
150	63+099 to 63+123	Sharp Bend	Design Speed = 20 Kmph
151	63+144 to 63+164	Sharp Bend	Design Speed = 20 Kmph
152	63+196 to 63+212	Sharp Bend	Design Speed = 20 Kmph
153	63+250 to 63+258	Sharp Bend	Design Speed = 20 Kmph
154	63+317 to 63+334	Sharp Bend	Design Speed = 20 Kmph
155	63+390 to 63+413	Sharp Bend	Design Speed = 20 Kmph
156	63+544 to 63+643	Sharp Bend	Design Speed = 30 Kmph
157	63+664 to 63+683	Sharp Bend	Design Speed = 20 Kmph
158	63+720 to 63+747	Sharp Bend	Design Speed = 20 Kmph
159	63+780 to 63+795	Sharp Bend	Design Speed = 20 Kmph
160	63+833 to 63+842	Sharp Bend	Design Speed = 20 Kmph
161	63+876 to 63+898	Sharp Bend	Design Speed = 20 Kmph
162	63+974 to 63+983	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
163	64+014 to 64+032	Sharp Bend	Design Speed = 20 Kmph
164	64+072 to 64+089	Sharp Bend	Design Speed = 20 Kmph
165	64+808 to 64+846	Sharp Bend	Design Speed = 20 Kmph
166	64+878 to 64+924	Sharp Bend	Design Speed = 20 Kmph
167	64+984 to 64+994	Sharp Bend	Design Speed = 20 Kmph
168	65+033 to 65+086	Sharp Bend	Design Speed = 20 Kmph
169	65+119 to 65+140	Sharp Bend	Design Speed = 20 Kmph
170	65+243 to 65+254	Sharp Bend	Design Speed = 20 Kmph
171	65+289 to 65+314	Sharp Bend	Design Speed = 20 Kmph
172	65+408 to 65+467	Sharp Bend	Design Speed = 30 Kmph
173	65+611 to 65+666	Sharp Bend	Design Speed = 30 Kmph
174	65+714 to 65+748	Sharp Bend	Design Speed = 30 Kmph
175	65+797 to 65+815	Sharp Bend	Design Speed = 30 Kmph
176	65+848 to 65+901	Sharp Bend	Design Speed = 20 Kmph
177	65+903 to 65+942	Sharp Bend	Design Speed = 20 Kmph
178	66+056 to 66+068	Sharp Bend	Design Speed = 20 Kmph
179	66+097 to 66+111	Sharp Bend	Design Speed = 20 Kmph
180	66+157 to 66+164	Sharp Bend	Design Speed = 20 Kmph
181	66+260 to 66+278	Sharp Bend	Design Speed = 20 Kmph
182	66+308 to 66+331	Sharp Bend	Design Speed = 20 Kmph
183	66+376 to 66+402	Sharp Bend	Design Speed = 20 Kmph
184	66+452 to 66+498	Sharp Bend	Design Speed = 20 Kmph
185	66+513 to 66+567	Sharp Bend	Design Speed = 20 Kmph
186	66+636 to 66+653	Sharp Bend	Design Speed = 20 Kmph
187	66+689 to 66+721	Sharp Bend	Design Speed = 20 Kmph
188	66+741 to 66+776	Sharp Bend	Design Speed = 20 Kmph
189	66+862 to 66+885	Sharp Bend	Design Speed = 20 Kmph
190	66+924 to 66+932	Sharp Bend	Design Speed = 30 Kmph
191	66+999 to 67+009	Sharp Bend	Design Speed = 20 Kmph
192	67+042 to 67+073	Sharp Bend	Design Speed = 20 Kmph
193	67+095 to 67+154	Sharp Bend	Design Speed = 30 Kmph
194	67+200 to 67+239	Sharp Bend	Design Speed = 30 Kmph
195	67+281 to 67+293	Sharp Bend	Design Speed = 20 Kmph
196	67+402 to 67+432	Sharp Bend	Design Speed = 20 Kmph
197	67+516 to 67+526	Sharp Bend	Design Speed = 20 Kmph
198	67+563 to 67+574	Sharp Bend	Design Speed = 20 Kmph
199	67+676 to 67+692	Sharp Bend	Design Speed = 20 Kmph
200	67+765 to 67+795	Sharp Bend	Design Speed = 30 Kmph
201	67+855 to 67+873	Sharp Bend	Design Speed = 20 Kmph
202	67+897 to 67+944	Sharp Bend	Design Speed = 20 Kmph
203	67+969 to 68+017	Sharp Bend	Design Speed = 20 Kmph
204	68+097 to 68+118	Sharp Bend	Design Speed = 20 Kmph
205	68+143 to 68+166	Sharp Bend	Design Speed = 20 Kmph
206	68+199 to 68+208	Sharp Bend	Design Speed = 20 Kmph
207	68+264 to 68+283	Sharp Bend	Design Speed = 20 Kmph
208	68+330 to 68+340	Sharp Bend	Design Speed = 20 Kmph
209	68+406 to 68+413	Sharp Bend	Design Speed = 20 Kmph
210	68+473 to 68+479	Sharp Bend	Design Speed = 20 Kmph
211	68+512 to 68+519	Sharp Bend	Design Speed = 20 Kmph
212	68+604 to 68+677	Sharp Bend	Design Speed = 20 Kmph
213	68+807 to 68+839	Sharp Bend	Design Speed = 20 Kmph
214	68+897 to 68+921	Sharp Bend	Design Speed = 20 Kmph
215	68+968 to 69+084	Sharp Bend	Design Speed = 30 Kmph
216	69+111 to 69+137	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
217	69+182 to 69+266	Sharp Bend	Design Speed = 20 Kmph
218	69+300 to 69+424	Sharp Bend	Design Speed = 20 Kmph
219	69+460 to 69+475	Sharp Bend	Design Speed = 20 Kmph
220	69+522 to 69+599	Sharp Bend	Design Speed = 30 Kmph
221	69+698 to 69+707	Sharp Bend	Design Speed = 20 Kmph
222	69+805 to 69+839	Sharp Bend	Design Speed = 20 Kmph

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 existing right of way and proper road signs and safety Measures shall be provided.

(iv) Right of Way

Refer to provision of relevant Manual Details of the Right of Way are given in Annex-II of Schedule-A.

(v) Type of shoulders

[Refer to provision of relevant Manual and specify]

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

Sl. No.	Stretch (from Km to Km)	Fully Paved shoulders/footpaths	Reference to cross section
1	60+600 to 61+270	2 X 1.0 m width Footpath	TCS-1
2	65+580 to 65+760	2 X 1.0 m width Footpath	TCS-1

(b) Hard shoulders of 1.5 m width shall be provided with selected earth wherever applicable as per TCS drawing.

(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 requirements specified in the relevant Manual.

(b) Lateral clearance: The width of the opening at the under passes 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 over passes shall be as per requirements specified in the 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:

[Refer requirements specified in the relevant Manual]

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 provision of the Manual. The requisite particulars are given below:

[Refer to requirements specified in the relevant Manual]

Sl. No.	Location of Structure (VUP)	Length (m)	Number and length of spans	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:[Refer to provision of the Manual and specify the type of vehicular underpass/ overpass structure and whether the cross road is to be carried at the existing Level. Raised or lowered]

Sl. No.	Location	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: [Refer to provision of the relevant Manual and specify the requirements of cattle and pedestrian underpass/overpass]

Sl. No.	Location	Type of crossing
Nil		

(xi) Typical cross-sections of the Project Highway

[Give typical cross-sections of the Project Highway by reference to the Manual]

As per attached Drawings

TCS TYPE	DESCRIPTION	Length (m)
TCS 1	Two-Lane carriageway with hard shoulder in built up area with both side footpath cum RCC covered drain (existing pavement)	850
TCS 2	Two-Lane carriageway with hard shoulder and one side toe wall & one side ret wall (existing pavement)	0
TCS 3	Two-Lane carriageway with hard shoulder and one side toe wall (existing pavement)	0
TCS 4	Two-Lane carriageway with hard shoulder in rural area (existing pavement)	0

TCS 4A	Two-Lane carriageway with hard shoulder in rural area (realignment stretch)	0
TCS 5	Two-Lane carriageway with hard shoulder and one side toe wall & one side trapezoidal drain (existing pavement)	400
TCS 6	Two-Lane carriageway with hard shoulder and both side trapezoidal drain (existing pavement)	1410
TCS 6A	Two-Lane carriageway with hard shoulder and both side trapezoidal drain (realignment stretch)	0
TCS 7	Two-Lane carriageway with hard shoulder and one side trapezoidal drain (existing pavement)	3313
TCS 8	Two-Lane carriageway with hard shoulder and one side breast wall (existing pavement)	7155
TCS 9	Two-Lane carriageway with hard shoulder and one side breast wall & one side drain (existing pavement)	5500
TCS 10	Two-Lane carriageway with hard shoulder and one side ret wall (existing pavement)	0
TCS 10A	Two-Lane carriageway with hard shoulder and one side ret wall (realignment stretch)	0
TCS 11	Two-Lane carriageway with hard shoulder and one side ret wall & one side drain (existing pavement)	0
TCS 12	Two-Lane carriageway with hard shoulder and one side ret wall & one breast wall (existing pavement)	1350
TCS 13	Two-Lane carriageway with hard shoulder and both sides retaining wall (existing pavement)	0
TCS-14	Two Lane carriageway with hard shoulder and one side toe wall & one side breast wall (existing pavement)	1310

Chainage (m)		Length of CD	Net Length (m)	TCS No.
From	To			
48587	48720	7.8	125	TCS-7
48720	49070	13	337	TCS-8
49070	49520	18.2	432	TCS-7
49520	49670	2.6	147	TCS-5
49670	49820	5.2	145	TCS-14
49820	49970	2.6	147	TCS-8
49970	50270		300	TCS-9
50270	50420		150	TCS-14
50420	51220	7.8	792	TCS-9
51220	51670	7.8	442	TCS-8
51670	51720		50	TCS-12
51720	51820		100	TCS-7
51820	52220		400	TCS-9
52220	52520	2.6	297	TCS-6
52520	52920	5.2	395	TCS-8
52920	52970	2.6	47	TCS-12
52970	53620	5.2	645	TCS-8
53620	53820	2.6	197	TCS-12
53820	53920	2.6	97	TCS-8
53920	54070	2.6	147	TCS-5
54070	54220	2.6	147	TCS-8
54220	54320	2.6	97	TCS-7
54320	55970	26	1624	TCS-9
55970	56020	2.6	47	TCS-5
56020	56120		100	TCS-8
56120	56220		100	TCS-7
56220	57470	15.6	1234	TCS-9
57470	57720	5.2	245	TCS-7
57720	58220	7.8	492	TCS-8
58220	58370		150	TCS-14
58370	58670	7.8	292	TCS-6
58670	59070		400	TCS-9
59070	59420	5.2	345	TCS-6
59420	59620		200	TCS-8
59620	59820	2.6	197	TCS-7

Chainage (m)		Length of CD	Net Length (m)	TCS No.
From	To			
59820	59920		100	TCS-8
59920	60600	5.2	675	TCS-7
60600	61270	7.8	662	TCS-1
61270	61670	5.2	395	TCS-7
61670	62170	5.2	495	TCS-8
62170	62370	2.6	197	TCS-7
62370	63020		650	TCS-8
63020	63420	2.6	397	TCS-7
63420	64770	7.8	1342	TCS-8
64770	64820		50	TCS-5
64820	64920	2.6	97	TCS-6
64920	65120		200	TCS-9
65120	65370		250	TCS-6
65370	65470		100	TCS-9
65470	65580		110	TCS-6
65580	65760	50.48	130	TCS-1
65760	66220	5.2	455	TCS-14
66220	66420	2.6	197	TCS-7
66420	66870	2.6	447	TCS-8
66870	67270	2.6	397	TCS-14
67270	67520	2.6	247	TCS-8
67520	68120	5.2	595	TCS-12
68120	68220	2.6	97	TCS-8
68220	68570	7.8	342	TCS-12
68570	68720	2.6	147	TCS-8
68720	68820		100	TCS-9
68820	68920	52.96	47	TCS-7
68920	69020		100	TCS-8
69020	69070		50	TCS-12
69070	69370	2.6	297	TCS-9
69370	69420		50	TCS-12
69420	69875	2.6	452	TCS-8
<b>Total Length</b>		<b>348</b>	<b>20940</b>	

### 3. Intersections and Grade Separators

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

[Refer to provision of the relevant Manual and specify the requirements. Explain where necessary with drawings/sketches/general arrangement]

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	Remarks
Nil				

Minor Intersections

Sl. No.	Location of intersection (Km)	Type of intersection	Other features
1	60+675	Y	3-Legged
2	61+455	Y	3-Legged
3	61+630	Y	3-Legged

- (ii) Grade separated inter section with/without ramps

Sl. 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 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in Section 4 of the Manual and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.
- (ii) Raising of the existing road [Refer to provision of the relevant Manual and specify sections to be raised.

The existing road shall be raised in the following sections:

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

**5. Pavement Design**

- (i) Pavement design shall be carried out in accordance with provision of the relevant manual.
- (ii) Type of pavement  
Flexible Pavement
- (iii) Design requirements  
[Refer to provision of the relevant Manual and specify design requirements and strategy]
- (a) Design Period and strategy  
Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.
- (b) Design Traffic  
Notwithstanding anything to the contrary contained in this Agreement or the Manual. The Contractor shall design the pavement for design traffic of 20 msa.
- (iv) Re-construction of stretches

[Refer to provision of the relevant Manual and specify the stretches if any to be

reconstructed.]

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	TCS Type
1	32+835 to 48+720	Reconstruction	TCS-7
2	48+720 to 49+070	Reconstruction	TCS-8
3	49+070 to 49+520	Reconstruction	TCS-7
4	49+520 to 49+670	Reconstruction	TCS-5
5	49+670 to 49+820	Reconstruction	TCS-14
6	49+820 to 49+970	Reconstruction	TCS-8
7	49+970 to 50+270	Reconstruction	TCS-9
8	50+270 to 50+420	Reconstruction	TCS-14
9	50+420 to 51+220	Reconstruction	TCS-9
10	51+220 to 51+670	Reconstruction	TCS-8
11	51+670 to 51+720	Reconstruction	TCS-12
12	51+720 to 51+820	Reconstruction	TCS-7
13	51+820 to 52+220	Reconstruction	TCS-9
14	52+220 to 52+520	Reconstruction	TCS-6
15	52+520 to 52+920	Reconstruction	TCS-8
16	52+920 to 52+970	Reconstruction	TCS-12
17	52+970 to 53+620	Reconstruction	TCS-8
18	53+620 to 53+820	Reconstruction	TCS-12
19	53+820 to 53+920	Reconstruction	TCS-8
20	53+920 to 54+070	Reconstruction	TCS-5
21	54+070 to 54+220	Reconstruction	TCS-8
22	54+220 to 54+320	Reconstruction	TCS-7
23	54+320 to 55+970	Reconstruction	TCS-9
24	55+970 to 56+020	Reconstruction	TCS-5
25	56+020 to 56+120	Reconstruction	TCS-8
26	56+120 to 56+220	Reconstruction	TCS-7
27	56+220 to 57+470	Reconstruction	TCS-9
28	57+470 to 57+720	Reconstruction	TCS-7
29	57+720 to 58+220	Reconstruction	TCS-8
30	58+220 to 58+370	Reconstruction	TCS-14
31	58+370 to 58+670	Reconstruction	TCS-6
32	58+670 to 59+070	Reconstruction	TCS-9
33	59+070 to 59+420	Reconstruction	TCS-6
34	59+420 to 59+620	Reconstruction	TCS-8
35	59+620 to 59+820	Reconstruction	TCS-7
36	59+820 to 59+920	Reconstruction	TCS-8
37	59+920 to 60+60	Reconstruction	TCS-7
38	60+600 to 61+270	Reconstruction	TCS-1
39	61+270 to 61+670	Reconstruction	TCS-7
40	61+670 to 62+170	Reconstruction	TCS-8
41	62+170 to 62+370	Reconstruction	TCS-7
42	62+370 to 63+020	Reconstruction	TCS-8
43	63+020 to 63+420	Reconstruction	TCS-7
44	63+420 to 64+770	Reconstruction	TCS-8
45	64+770 to 64+820	Reconstruction	TCS-5
46	64+820 to 64+920	Reconstruction	TCS-6
47	64+920 to 65+120	Reconstruction	TCS-9
48	65+120 to 65+370	Reconstruction	TCS-6
49	65+370 to 65+470	Reconstruction	TCS-9

SL NO.	Stretch from Km to Km	Remarks	TCS Type
50	65+470 to 65+580	Reconstruction	TCS-6
51	65+580 to 65+760	Reconstruction	TCS-1
52	65+760 to 66+220	Reconstruction	TCS-14
53	66+220 to 66+420	Reconstruction	TCS-7
54	66+420 to 66+870	Reconstruction	TCS-8
55	66+870 to 67+270	Reconstruction	TCS-14
56	67+270 to 67+520	Reconstruction	TCS-8
57	67+520 to 68+120	Reconstruction	TCS-12
58	68+120 to 68+220	Reconstruction	TCS-8
59	68+220 to 68+570	Reconstruction	TCS-12
60	68+570 to 68+720	Reconstruction	TCS-8
61	68+720 to 68+820	Reconstruction	TCS-9
62	68+820 to 68+920	Reconstruction	TCS-7
63	68+920 to 69+020	Reconstruction	TCS-8
64	69+020 to 69+070	Reconstruction	TCS-12
65	69+070 to 69+370	Reconstruction	TCS-9
66	69+370 to 69+420	Reconstruction	TCS-12
67	69+420 to 69+8750	Reconstruction	TCS-8

## 6. Road side Drainage

Drainage system including surface and sub surfaced rains for the Project Highway has been provided in the table given below:

### RCC Covered Drain

Chainage		Side	Net Length (m)
From (m)	To (m)		
60600	61270	Both	1324
65580	65760	Both	259
<b>Total Length =</b>			<b>1583</b>

### RR Masonry Trapezoidal Drain

Chainage		Side	Net Length (m)
From (m)	To (m)		
48587	48720	One Side	125
49070	49520	One Side	432
49520	49670	One Side	147
49970	50270	One Side	300
50420	51220	One Side	792
51720	51820	One Side	100
51820	52220	One Side	400
52220	52520	One Side	595
53920	54070	One Side	147
54220	54320	One Side	97
54320	55970	One Side	1624
55970	56020	One Side	47
56120	56220	One Side	100
56220	57470	One Side	1234
57470	57720	One Side	245
58370	58670	One Side	584
58670	59070	One Side	400
59070	59420	One Side	690
59620	59820	One Side	197
59920	60600	One Side	675
61270	61670	One Side	395

Chainage		Side	Net Length (m)
From (m)	To (m)		
62170	62370	One Side	197
63020	63420	One Side	397
64770	64820	One Side	50
64820	64920	One Side	195
64920	65120	One Side	200
65120	65370	One Side	500
65370	65470	One Side	100
65470	65580	One Side	220
66220	66420	One Side	197
68720	68820	One Side	100
68820	68920	One Side	47
69070	69370	One Side	297
<b>Total Length =</b>			<b>11829</b>

## 7. Design of Structures

### (i) General

(a) All bridges culverts, structures shall be designed and constructed in accordance with provision of the 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 provision of the relevant Manual and specify the width of carriageway of new bridges and structures of more than 60 (sixty) metre length. If the carriageway width is different from 7.5 (seven point five) metres in the table below.]

Sl. No.	Bridge/Structure at km	Width of carriageway and cross-sectional features
1	65+550	Carriageway Width = 11.0 m Overall width = 16.0 m
2	68+866	

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

[Refer to provision of the relevant Manual and provide details of new Structures with footpath]

Sl. No.	Bridge/Structure at km	Width of carriageway and cross-sectional features
1	65+550	Carriageway Width = 11.0 m Width of Footpath = 2 X 1.5m Overall width = 16.0 m
2	68+866	

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

[Refer to provision of the relevant Manual and state if there is any exception])

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

[Refer to provision of the relevant Manual and provide details]

Sl.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 Highways shall conform to the typical cross-sections given in provision of the 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:

[Refer to provision of the relevant Manual and provide details]

Sl. No.	Culvert Location	Span /Opening (m)	Remarks*
1	48.730	2.0 X 2.0	Single Span
2	49.034	2.0 X 2.0	Single Span
3	49.362	2.0 X 2.0	Single Span
4	49.872	2.0 X 2.0	Single Span
5	51.185	2.0 X 2.0	Single Span
6	51.466	2.0 X 2.0	Single Span
7	52.594	2.0 X 2.0	Single Span
8	52.794	2.0 X 2.0	Single Span
9	53.413	2.0 X 2.0	Single Span
10	53.901	2.0 X 2.0	Single Span
11	54.029	2.0 X 2.0	Single Span
12	54.250	2.0 X 2.0	Single Span
13	54.430	2.0 X 2.0	Single Span
14	54.575	2.0 X 2.0	Single Span
15	54.785	2.0 X 2.0	Single Span
16	54.862	2.0 X 2.0	Single Span
17	55.147	2.0 X 2.0	Single Span
18	55.495	2.0 X 2.0	Single Span
19	55.758	2.0 X 2.0	Single Span
20	56.907	2.0 X 2.0	Single Span
21	57.373	2.0 X 2.0	Single Span
22	57.457	2.0 X 2.0	Single Span
23	57.493	2.0 X 2.0	Single Span
24	57.702	2.0 X 2.0	Single Span
25	57.930	2.0 X 2.0	Single Span
26	58.114	2.0 X 2.0	Single Span
27	58.191	2.0 X 2.0	Single Span
28	58.669	2.0 X 2.0	Single Span
29	60.227	2.0 X 2.0	Single Span
30	61.492	2.0 X 2.0	Single Span
31	61.694	2.0 X 2.0	Single Span
32	61.813	2.0 X 2.0	Single Span
33	62.341	2.0 X 2.0	Single Span
34	63.406	2.0 X 2.0	Single Span
35	63.791	2.0 X 2.0	Single Span
36	65.743	2.0 X 2.0	Single Span
37	65.913	2.0 X 2.0	Single Span
38	66.098	2.0 X 2.0	Single Span
39	66.265	2.0 X 2.0	Single Span
40	66.869	2.0 X 2.0	Single Span
41	67.404	2.0 X 2.0	Single Span
42	68.160	2.0 X 2.0	Single Span
43	68.344	2.0 X 2.0	Single Span

Sl. No.	Culvert Location	Span /Opening (m)	Remarks*
44	68.403	2.0 X 2.0	Single Span
45	68.487	2.0 X 2.0	Single Span
46	69.319	2.0 X 2.0	Single Span

\*[Specify modifications, if any, required in the road level, etc.]

(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 as per the typical cross section given in provision of the 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:

Sl. No.	Culvert Location	Span /Opening (m)	Remarks*
1	48.617	2.0 X 2.0	Single Span
2	48.653	2.0 X 2.0	Single Span
3	48.83	2.0 X 2.0	Single Span
4	48.932	2.0 X 2.0	Single Span
5	48.97	2.0 X 2.0	Single Span
6	49.079	2.0 X 2.0	Single Span
7	49.17	2.0 X 2.0	Single Span
8	49.291	2.0 X 2.0	Single Span
9	49.408	2.0 X 2.0	Single Span
10	49.423	2.0 X 2.0	Single Span
11	49.486	2.0 X 2.0	Single Span
12	49.587	2.0 X 2.0	Single Span
13	49.702	2.0 X 2.0	Single Span
14	49.787	2.0 X 2.0	Single Span
15	50.968	2.0 X 2.0	Single Span
16	51.094	2.0 X 2.0	Single Span
17	51.354	2.0 X 2.0	Single Span
18	51.615	2.0 X 2.0	Single Span
19	52.417	2.0 X 2.0	Single Span
20	52.927	2.0 X 2.0	Single Span
21	53.011	2.0 X 2.0	Single Span
22	53.668	2.0 X 2.0	Single Span
23	54.102	2.0 X 2.0	Single Span
24	54.699	2.0 X 2.0	Single Span
25	55.277	2.0 X 2.0	Single Span
26	55.911	2.0 X 2.0	Single Span
27	55.978	2.0 X 2.0	Single Span
28	56.291	2.0 X 2.0	Single Span
29	56.745	2.0 X 2.0	Single Span
30	57.184	2.0 X 2.0	Single Span
31	58.411	2.0 X 2.0	Single Span
32	58.569	2.0 X 2.0	Single Span
33	59.145	2.0 X 2.0	Single Span
34	59.375	2.0 X 2.0	Single Span
35	59.646	2.0 X 2.0	Single Span
36	60.014	2.0 X 2.0	Single Span
37	60.844	2.0 X 2.0	Single Span

Sl. No.	Culvert Location	Span /Opening (m)	Remarks*
38	60.902	2.0 X 2.0	Single Span
39	61.088	2.0 X 2.0	Single Span
40	61.282	2.0 X 2.0	Single Span
41	64.267	2.0 X 2.0	Single Span
42	64.671	2.0 X 2.0	Single Span
43	64.828	2.0 X 2.0	Single Span
44	67.142	2.0 X 2.0	Single Span
45	67.934	2.0 X 2.0	Single Span
46	68.068	2.0 X 2.0	Single Span
47	68.603	2.0 X 2.0	Single Span
48	69.723	2.0 X 2.0	Single Span

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

[Refer provision of the relevant Manual and provide details]

Sl.No.	Location at km	Type of repair required
Nil		

- (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

[Refer provision of the relevant Manual and provide details]

Sl. No.	Bridge location	Salient details of existing bridge		Adequacy or otherwise of the existing waterway, vertical clearance etc.*	Remarks
	(km)	Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)		
1	65+550	Bailey Bridge	1x42.65	Insufficient width and not conform to IRC Loading	
2	68+866	Bailey Bridge	1x24.40	Insufficient width and not conform to IRC Loading	

- (ii) The following narrow bridges shall be widened:

Sl. No.	Location (km)	Existing width(m)	Extent of widening(m)	Cross-section at deck level for widening@
Nil				

- (b) Additional new bridges

[Specify additional new bridges if required. And attach GAD]

New bridges at the following locations on the Project Highway shall be constructed. GADs for the new bridges are attached in the drawings folder.

Sl. No.	Location (km)	Total Length (m)	Remarks. If any
Nil			

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

[Refer provision of the relevant Manual and provide details:]

Sl.No.	Location at km	Remarks
Nil		

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

[Refer to provision of the relevant Manual and provide details]

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 provision of the relevant Manual

(f) Structures in marine environment

[Refer to provision of the 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 provision of the relevant Manual [Refer to provision of the 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 bridge (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 provision of the 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.

- (vi) Repairs and strengthening of bridges and structures  
[Refer to provision of the relevant Manual and provide details]

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

- (a) Bridges

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

- (b) ROB / RUB

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

- (c) Overpasses/Underpasses and other structures

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

- (vii) List of Major Bridges and Structures

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

Sl. No.	Location (Km)
Nil	

## 8. Traffic Control Devices and Road Safety Works

- (i) Traffic control devices and road safety works shall be provided in accordance with provisions of relevant Manual.

Sl. No	Traffic Signages, Road Marking and other appurtenances	unit	Quantity
1	Total No of Street Light=	Nos	71
2	Kilometer stones=	Nos	17
3	5th Kilometer stones=	Nos	4
4	Boundary Stones=	Nos	215
5	Delineators (100 cm long and circular shaped) +Hazard marker =	Nos	2920
6	Road Stud=	Nos	11892
7	900 mm Octagonal	Nos	2
8	600 mm circular	Nos	4
9	900 mm Triangular	Nos	494
10	800 mm x 600 mm rectangular	Nos	2
11	Direction Sign < 0.9 sqm	sqm	3.4
12	Direction Sign > 0.9 sqm	sqm	4
13	Convex Mirror for Blind Curve	Nos	36
14	Rumble Strip	Nos	6

- (i) Specifications of the reflective sheeting. [Refer to provision of relevant Manual and specify]

## 9. Roadside Furniture

- (i) Road side furniture shall be provided in accordance with article 8(i) of this schedule.
- (ii) Overhead traffic signs: location and size

Sl. No.	Location (Km)	Size
1	At G. Bualjang Village (Ch. 69+875 km)	16 m X 1.2 m (Double Pole)

## 10. Compulsory Afforestation

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

## 11. Hazardous Locations

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

### a) Breast Wall

Chainage		Side	Net Length (m)
From (m)	To (m)		
48720	49070	One	337
49670	49820	One	145
49820	49970	One	147
49970	50270	One	300
50270	50420	One	150
50420	51220	One	792
51220	51670	One	442
51670	51720	One	50
51820	52220	One	400
52520	52920	One	395
52920	52970	One	47
52970	53620	One	645
53620	53820	One	197
53820	53920	One	97
54070	54220	One	147
54320	55970	One	1624
56020	56120	One	100
56220	57470	One	1234
57720	58220	One	492
58220	58370	One	150
58670	59070	One	400
59420	59620	One	200
59820	59920	One	100
61670	62170	One	495
62370	63020	One	650
63420	64770	One	1342
64920	65120	One	200
65370	65470	One	100
65760	66220	One	455
66420	66870	One	447
66870	67270	One	397
67270	67520	One	247
67520	68120	One	595
68120	68220	One	97
68220	68570	One	342
68570	68720	One	147
68720	68820	One	100

Chainage		Side	Net Length (m)
From (m)	To (m)		
68920	69020	One	100
69020	69070	One	50
69070	69370	One	297
69370	69420	One	50
69420	69875	One	452
<b>Total Length =</b>			<b>15159</b>

b) Retaining Wall

Chainage		Side	Net Length (m)
From (m)	To (m)		
51670	51720	One	50
52920	52970	One	47
53620	53820	One	197
67520	68120	One	595
68220	68570	One	342
69020	69070	One	50
69370	69420	One	50
<b>Total Length =</b>			<b>1332</b>

c) Toe wall

Chainage		Side	Net Length (m)
From (m)	To (m)		
49520	49670	One	147
49670	49820	One	145
50270	50420	One	150
53920	54070	One	147
55970	56020	One	47
58220	58370	One	150
64770	64820	One	50
65760	66220	One	455
66870	67270	One	397
<b>Total Length =</b>			<b>1689</b>

a) Metal Beam Crash Barrier

Chainage		Side	Net Length (m)
From (m)	To (m)		
49520	49670	One	147
49670	49820	One	145
50270	50420	One	150
51670	51720	One	50
52920	52970	One	47
53620	53820	One	197
53920	54070	One	147
55970	56020	One	47
58220	58370	One	150
64770	64820	One	50
65760	66220	One	455
66870	67270	One	397
67520	68120	One	595
68220	68570	One	342
69020	69070	One	50
69370	69420	One	50

<b>Total Length =</b>	<b>3021</b>
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**For Bridge Approaches =120 m**  
(Taking 30 m each Approach)

**Total length of crash barrier =3141m**

**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

**(Schedule-B1)**

1. The shifting of utilities and felling of trees shall be carried out by the concerned department.  
The cost of the same shall be borne by the concerned Authority.

## 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 plaza[s]
- (b) Roadside furniture;
- (c) Pedestrian facilities;
- (d) Truck Lay byes;
- (e) Bus-bays and passenger shelters;
- (f) Rest areas; and
- (g) Others to be specified

#### 2. Description of Project Facilities

Each of the Project Facilities is described below:

##### a) Toll Plaza: -

Sl. No.	Design Chainage(km)	Name of the Place
Nil		

##### b) Road side furniture: -

Sl. No.	Description	Location	Design Standard
1	Traffic sign & pavement marking	Entire Length (As per Schedule B)	As per Manual
2	Km Stone, 5th kilometre stone	Entire Length	As per Manual
3	Boundary Stone	Entire Length	As per Manual
4	Roadside Delineator, marker & Road Stud	As per Schedule B	As per Manual
5	Metal beam crash barrier	As per Schedule B	As per Manual

##### c) Pedestrian Facility: -

Pedestrian facilities in the form of foot path shall be provided in the built-up area (refer typical cross – section drawing). Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with NHIDCL.

##### d) Truck Lay bye: -

Sl. No.	Truck lay bye Chainage (Both Side)	Name of the Place
Nil		

---

**e) Bus Bay & Passenger shelter: -**

<b>Sl. No.</b>	<b>Project Facility</b>	<b>Location (km)</b>	<b>Design Requirements</b>	<b>Other Essential Details</b>
1	Bus Bay & Passenger shelter	66+200 (Both Side)	Bus Bays & Passenger shelter have been placed on both side of proposed roadway	Dimension of Bus Bay (L X B = 59.0 m X 3.0 m) Dimension of Passenger Shelter (L X B = 6.0 m X 2.0 m) (Refer Passenger Shelter Drawing)

**f) Rest Areas**

<b>Sl. No.</b>	<b>Rest Area Chainage</b>	<b>Name of the Place</b>
	Nil	

**g) Others to be specified**

**Street Lighting:**

Total 71 Nos. Street lighting shall be provided in junction, passenger shelters & bridge locations.

Note: Provide adequate details of each Project Facility to ensure their design and completion in accordance with the project-specific requirements and the provisions of the Manual.

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## **Schedule - D**

(See Clause 2.1)

### Specifications and Standards

#### 1. Construction

The Contractor shall comply with the Specifications and Standards set forth in Annex- I of this Schedule-D for construction of the Project Highway.

#### 2. Design Standards

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

[Manual of Specifications and Standards for Two Lanning of Highways (IRC: SP: 73-2015), referred to herein as the Manual]

[Note: Specify the relevant Manual, Specifications and Standards]

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## Annex – I

(Schedule-D)

### Specifications and Standards for Construction

#### 1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for [Two-Lanning of Highways (IRC:SP:73-2018)], referred to as the Manual, and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority’s Engineer.

#### 2. Deviations from the Specifications and Standards

(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:]

Item	Manual Clause Reference	Provision as per Manual					Modified Provision				
Shoulder	2.6	<b><u>Mountainous Terrain</u></b>					<b><u>Mountainous Terrain</u></b>				
		Type of Section		Width of Shoulder (m)			Type of Section		Width of Shoulder (m)		
				Paved	Earthen	Total			Paved	Earthen	Total
		Open Country with Isolated Built-up Area	Hill Side	1.5	-	1.5	Open Country with Isolated Built-up Area	Hill Side	-	-	-
			Valley Side	1.5	1	2.5		Valley Side	-	Up to 1.0 m	1
		Built-up Area and Approaches to grade separated structures/ bridges	Hill Side	0.25 m + 1.5 m (Raised)	-	1.75	Built-up Area and Approaches to grade separated structures/ bridges	Hill Side	-	-	-
Valley Side	0.25 m + 1.5 m (Raised)		-	1.75	Valley Side	-		-	-		
Design Speed	2.2	<b><u>Mountainous Terrain:</u></b> Ruling : 60 Kmph  Minimum : 40 Kmph					<b><u>Mountainous Terrain:</u></b> Design Speed followed 40-60 kmph in general. However design speed has been reduced to 20 kmph due to site constraints and to accommodate the proposal within EROW. (Refer Horizontal Alignment Drawing and Table 1.1 below)				
Extra Widening	2.7	Extra Widening has been proposed as per IRC: SP: 73-2015					Extra Widening has been proposed as per IRC: SP: 48-1998 (Table 6.9) of Hill Road Manual.				
		Radius		Extra Widening			Radius		Extra Widening		
		75-100 m		0.9 m			21-40 m		1.5 m		
		101-300 m		0.6 m			41-60 m		1.2 m		
							61-100 m		0.9 m		
					75-100 m		0.9 m				

Item	Manual Clause Reference	Provision as per Manual	Modified Provision	
			101-300 m	0.6 m
			Above 300 m	NIL
Radii Of Horizontal Curve	2.9.4	<b>Mountainous Terrain:</b> Desirable Minimum Radius: 150 m Absolute Minimum Radius: 75 m	Radius below 75 m has been provided in the location listed in table 1.	

**Table 1.1: Locations where Design Speed is less than 40 kmph**

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
1	48+883 to 48+896	Sharp Bend	Design Speed = 30 Kmph
2	49+023 to 49+029	Sharp Bend	Design Speed = 20 Kmph
3	49+065 to 49+142	Sharp Bend	Design Speed = 20 Kmph
4	49+210 to 49+252	Sharp Bend	Design Speed = 30 Kmph
5	49+345 to 49+375	Sharp Bend	Design Speed = 20 Kmph
6	49+435 to 49+473	Sharp Bend	Design Speed = 20 Kmph
7	49+500 to 49+536	Sharp Bend	Design Speed = 20 Kmph
8	49+731 to 49+741	Sharp Bend	Design Speed = 20 Kmph
9	49+778 to 49+794	Sharp Bend	Design Speed = 20 Kmph
10	49+849 to 49+881	Sharp Bend	Design Speed = 30 Kmph
11	49+999 to 50+009	Sharp Bend	Design Speed = 30 Kmph
12	50+053 to 50+079	Sharp Bend	Design Speed = 20 Kmph
13	50+126 to 50+156	Sharp Bend	Design Speed = 20 Kmph
14	50+411 to 50+481	Sharp Bend	Design Speed = 30 Kmph
15	50+544 to 50+572	Sharp Bend	Design Speed = 30 Kmph
16	50+628 to 50+701	Sharp Bend	Design Speed = 20 Kmph
17	50+739 to 50+745	Sharp Bend	Design Speed = 20 Kmph
18	50+777 to 50+781	Sharp Bend	Design Speed = 20 Kmph
19	50+886 to 50+917	Sharp Bend	Design Speed = 20 Kmph
20	50+992 to 51+051	Sharp Bend	Design Speed = 20 Kmph
21	51+105 to 51+110	Sharp Bend	Design Speed = 20 Kmph
22	51+182 to 51+199	Sharp Bend	Design Speed = 20 Kmph
23	51+248 to 51+280	Sharp Bend	Design Speed = 20 Kmph
24	51+355 to 51+387	Sharp Bend	Design Speed = 20 Kmph
25	51+418 to 51+423	Sharp Bend	Design Speed = 20 Kmph
26	51+455 to 51+474	Sharp Bend	Design Speed = 20 Kmph
27	51+506 to 51+516	Sharp Bend	Design Speed = 20 Kmph
28	51+555 to 51+570	Sharp Bend	Design Speed = 20 Kmph
29	51+623 to 51+653	Sharp Bend	Design Speed = 20 Kmph
30	51+714 to 51+723	Sharp Bend	Design Speed = 20 Kmph
31	51+844 to 51+868	Sharp Bend	Design Speed = 20 Kmph
32	52+058 to 52+100	Sharp Bend	Design Speed = 20 Kmph
33	52+140 to 52+146	Sharp Bend	Design Speed = 20 Kmph
34	52+206 to 52+212	Sharp Bend	Design Speed = 20 Kmph
35	52+248 to 52+255	Sharp Bend	Design Speed = 20 Kmph
36	52+302 to 52+309	Sharp Bend	Design Speed = 20 Kmph
37	52+399 to 52+407	Sharp Bend	Design Speed = 20 Kmph
38	52+496 to 52+511	Sharp Bend	Design Speed = 20 Kmph
39	52+604 to 52+609	Sharp Bend	Design Speed = 20 Kmph
40	52+646 to 52+668	Sharp Bend	Design Speed = 20 Kmph
41	52+790 to 52+796	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
42	52+857 to 52+877	Sharp Bend	Design Speed = 20 Kmph
43	52+908 to 52+956	Sharp Bend	Design Speed = 20 Kmph
44	53+071 to 53+082	Sharp Bend	Design Speed = 20 Kmph
45	53+200 to 53+327	Sharp Bend	Design Speed = 20 Kmph
46	53+445 to 53+457	Sharp Bend	Design Speed = 20 Kmph
47	53+528 to 53+536	Sharp Bend	Design Speed = 20 Kmph
48	53+568 to 53+631	Sharp Bend	Design Speed = 20 Kmph
49	53+759 to 53+79	Sharp Bend	Design Speed = 20 Kmph
50	53+842 to 53+902	Sharp Bend	Design Speed = 20 Kmph
51	53+933 to 53+946	Sharp Bend	Design Speed = 20 Kmph
52	54+014 to 54+038	Sharp Bend	Design Speed = 20 Kmph
53	54+076 to 54+094	Sharp Bend	Design Speed = 20 Kmph
54	54+145 to 54+151	Sharp Bend	Design Speed = 20 Kmph
55	54+190 to 54+212	Sharp Bend	Design Speed = 20 Kmph
56	54+279 to 54+329	Sharp Bend	Design Speed = 20 Kmph
57	54+383 to 54+429	Sharp Bend	Design Speed = 20 Kmph
58	54+461 to 54+466	Sharp Bend	Design Speed = 20 Kmph
59	54+553 to 54+571	Sharp Bend	Design Speed = 20 Kmph
60	54+608 to 54+611	Sharp Bend	Design Speed = 20 Kmph
61	54+766 to 54+786	Sharp Bend	Design Speed = 20 Kmph
62	54+856 to 54+861	Sharp Bend	Design Speed = 20 Kmph
63	54+893 to 54+921	Sharp Bend	Design Speed = 20 Kmph
64	54+994 to 55+010	Sharp Bend	Design Speed = 20 Kmph
65	55+067 to 55+080	Sharp Bend	Design Speed = 20 Kmph
66	55+111 to 55+116	Sharp Bend	Design Speed = 20 Kmph
67	55+147 to 55+151	Sharp Bend	Design Speed = 20 Kmph
68	55+194 to 55+199	Sharp Bend	Design Speed = 20 Kmph
69	55+294 to 55+312	Sharp Bend	Design Speed = 20 Kmph
70	55+355 to 55+366	Sharp Bend	Design Speed = 20 Kmph
71	55+397 to 55+542	Sharp Bend	Design Speed = 20 Kmph
72	55+658 to 55+678	Sharp Bend	Design Speed = 20 Kmph
73	55+819 to 55+843	Sharp Bend	Design Speed = 20 Kmph
74	55+945 to 55+981	Sharp Bend	Design Speed = 20 Kmph
75	56+055 to 56+079	Sharp Bend	Design Speed = 20 Kmph
76	56+270 to 56+318	Sharp Bend	Design Speed = 20 Kmph
77	56+405 to 56+418	Sharp Bend	Design Speed = 20 Kmph
78	56+472 to 56+514	Sharp Bend	Design Speed = 20 Kmph
79	56+530 to 56+540	Sharp Bend	Design Speed = 20 Kmph
80	56+616 to 56+668	Sharp Bend	Design Speed = 20 Kmph
81	56+739 to 56+750	Sharp Bend	Design Speed = 20 Kmph
82	56+888 to 56+929	Sharp Bend	Design Speed = 20 Kmph
83	57+098 to 57+118	Sharp Bend	Design Speed = 20 Kmph
84	57+183 to 57+190	Sharp Bend	Design Speed = 20 Kmph
85	57+225 to 57+249	Sharp Bend	Design Speed = 20 Kmph
86	57+280 to 57+290	Sharp Bend	Design Speed = 20 Kmph
87	57+344 to 57+390	Sharp Bend	Design Speed = 30 Kmph
88	57+457 to 57+465	Sharp Bend	Design Speed = 20 Kmph
89	57+503 to 57+577	Sharp Bend	Design Speed = 30 Kmph
90	57+647 to 57+659	Sharp Bend	Design Speed = 20 Kmph
91	57+692 to 57+699	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
92	57+732 to 57+748	Sharp Bend	Design Speed = 20 Kmph
93	57+787 to 57+808	Sharp Bend	Design Speed = 30 Kmph
94	57+890 to 57+936	Sharp Bend	Design Speed = 30 Kmph
95	58+032 to 58+051	Sharp Bend	Design Speed = 20 Kmph
96	58+110 to 58+192	Sharp Bend	Design Speed = 20 Kmph
97	58+214 to 58+23	Sharp Bend	Design Speed = 20 Kmph
98	58+315 to 58+339	Sharp Bend	Design Speed = 20 Kmph
99	58+414 to 58+453	Sharp Bend	Design Speed = 30 Kmph
100	58+480 to 58+528	Sharp Bend	Design Speed = 20 Kmph
101	58+628 to 58+670	Sharp Bend	Design Speed = 20 Kmph
102	58+701 to 58+711	Sharp Bend	Design Speed = 20 Kmph
103	58+761 to 58+787	Sharp Bend	Design Speed = 20 Kmph
104	58+903 to 59+015	Sharp Bend	Design Speed = 20 Kmph
105	59+190 to 59+231	Sharp Bend	Design Speed = 20 Kmph
106	59+267 to 59+313	Sharp Bend	Design Speed = 20 Kmph
107	59+343 to 59+375	Sharp Bend	Design Speed = 20 Kmph
108	59+420 to 59+449	Sharp Bend	Design Speed = 30 Kmph
109	59+549 to 59+558	Sharp Bend	Design Speed = 20 Kmph
110	59+592 to 59+615	Sharp Bend	Design Speed = 20 Kmph
111	59+646 to 59+665	Sharp Bend	Design Speed = 20 Kmph
112	59+687 to 59+769	Sharp Bend	Design Speed = 20 Kmph
113	59+796 to 59+815	Sharp Bend	Design Speed = 20 Kmph
114	59+855 to 59+867	Sharp Bend	Design Speed = 20 Kmph
115	59+911 to 59+939	Sharp Bend	Design Speed = 20 Kmph
116	60+116 to 60+195	Sharp Bend	Design Speed = 20 Kmph
117	60+276 to 60+317	Sharp Bend	Design Speed = 20 Kmph
118	60+374 to 60+431	Sharp Bend	Design Speed = 20 Kmph
119	60+524 to 60+540	Sharp Bend	Design Speed = 20 Kmph
120	60+596 to 60+728	Sharp Bend	Design Speed = 30 Kmph
121	60+744 to 60+772	Sharp Bend	Design Speed = 30 Kmph
122	60+809 to 60+877	Sharp Bend	Design Speed = 20 Kmph
123	60+935 to 60+942	Sharp Bend	Design Speed = 20 Kmph
124	60+996 to 61+036	Sharp Bend	Design Speed = 20 Kmph
125	61+074 to 61+088	Sharp Bend	Design Speed = 20 Kmph
126	61+286 to 61+383	Sharp Bend	Design Speed = 30 Kmph
127	61+448 to 61+461	Sharp Bend	Design Speed = 20 Kmph
128	61+616 to 61+640	Sharp Bend	Design Speed = 20 Kmph
129	61+695 to 61+702	Sharp Bend	Design Speed = 20 Kmph
130	61+760 to 61+773	Sharp Bend	Design Speed = 20 Kmph
131	61+805 to 61+818	Sharp Bend	Design Speed = 20 Kmph
132	61+880 to 61+890	Sharp Bend	Design Speed = 30 Kmph
133	61+934 to 61+945	Sharp Bend	Design Speed = 30 Kmph
134	62+030 to 62+043	Sharp Bend	Design Speed = 20 Kmph
135	62+080 to 62+092	Sharp Bend	Design Speed = 20 Kmph
136	62+123 to 62+139	Sharp Bend	Design Speed = 20 Kmph
137	62+185 to 62+191	Sharp Bend	Design Speed = 20 Kmph
138	62+224 to 62+239	Sharp Bend	Design Speed = 20 Kmph
139	62+302 to 62+356	Sharp Bend	Design Speed = 20 Kmph
140	62+401 to 62+424	Sharp Bend	Design Speed = 30 Kmph
141	62+463 to 62+473	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
142	62+515 to 62+534	Sharp Bend	Design Speed = 20 Kmph
143	62+576 to 62+587	Sharp Bend	Design Speed = 20 Kmph
144	62+625 to 62+635	Sharp Bend	Design Speed = 20 Kmph
145	62+719 to 62+741	Sharp Bend	Design Speed = 20 Kmph
146	62+774 to 62+781	Sharp Bend	Design Speed = 20 Kmph
147	62+870 to 62+884	Sharp Bend	Design Speed = 20 Kmph
148	62+921 to 62+940	Sharp Bend	Design Speed = 20 Kmph
149	62+981 to 62+986	Sharp Bend	Design Speed = 20 Kmph
150	63+099 to 63+123	Sharp Bend	Design Speed = 20 Kmph
151	63+144 to 63+164	Sharp Bend	Design Speed = 20 Kmph
152	63+196 to 63+212	Sharp Bend	Design Speed = 20 Kmph
153	63+250 to 63+258	Sharp Bend	Design Speed = 20 Kmph
154	63+317 to 63+334	Sharp Bend	Design Speed = 20 Kmph
155	63+390 to 63+413	Sharp Bend	Design Speed = 20 Kmph
156	63+544 to 63+643	Sharp Bend	Design Speed = 30 Kmph
157	63+664 to 63+683	Sharp Bend	Design Speed = 20 Kmph
158	63+720 to 63+747	Sharp Bend	Design Speed = 20 Kmph
159	63+780 to 63+795	Sharp Bend	Design Speed = 20 Kmph
160	63+833 to 63+842	Sharp Bend	Design Speed = 20 Kmph
161	63+876 to 63+898	Sharp Bend	Design Speed = 20 Kmph
162	63+974 to 63+983	Sharp Bend	Design Speed = 20 Kmph
163	64+014 to 64+032	Sharp Bend	Design Speed = 20 Kmph
164	64+072 to 64+089	Sharp Bend	Design Speed = 20 Kmph
165	64+808 to 64+846	Sharp Bend	Design Speed = 20 Kmph
166	64+878 to 64+924	Sharp Bend	Design Speed = 20 Kmph
167	64+984 to 64+994	Sharp Bend	Design Speed = 20 Kmph
168	65+033 to 65+086	Sharp Bend	Design Speed = 20 Kmph
169	65+119 to 65+140	Sharp Bend	Design Speed = 20 Kmph
170	65+243 to 65+254	Sharp Bend	Design Speed = 20 Kmph
171	65+289 to 65+314	Sharp Bend	Design Speed = 20 Kmph
172	65+408 to 65+467	Sharp Bend	Design Speed = 30 Kmph
173	65+611 to 65+666	Sharp Bend	Design Speed = 30 Kmph
174	65+714 to 65+748	Sharp Bend	Design Speed = 30 Kmph
175	65+797 to 65+815	Sharp Bend	Design Speed = 30 Kmph
176	65+848 to 65+901	Sharp Bend	Design Speed = 20 Kmph
177	65+903 to 65+942	Sharp Bend	Design Speed = 20 Kmph
178	66+056 to 66+068	Sharp Bend	Design Speed = 20 Kmph
179	66+097 to 66+111	Sharp Bend	Design Speed = 20 Kmph
180	66+157 to 66+164	Sharp Bend	Design Speed = 20 Kmph
181	66+260 to 66+278	Sharp Bend	Design Speed = 20 Kmph
182	66+308 to 66+331	Sharp Bend	Design Speed = 20 Kmph
183	66+376 to 66+402	Sharp Bend	Design Speed = 20 Kmph
184	66+452 to 66+498	Sharp Bend	Design Speed = 20 Kmph
185	66+513 to 66+567	Sharp Bend	Design Speed = 20 Kmph
186	66+636 to 66+653	Sharp Bend	Design Speed = 20 Kmph
187	66+689 to 66+721	Sharp Bend	Design Speed = 20 Kmph
188	66+741 to 66+776	Sharp Bend	Design Speed = 20 Kmph
189	66+862 to 66+885	Sharp Bend	Design Speed = 20 Kmph
190	66+924 to 66+932	Sharp Bend	Design Speed = 30 Kmph
191	66+999 to 67+009	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
192	67+042 to 67+073	Sharp Bend	Design Speed = 20 Kmph
193	67+095 to 67+154	Sharp Bend	Design Speed = 30 Kmph
194	67+200 to 67+239	Sharp Bend	Design Speed = 30 Kmph
195	67+281 to 67+293	Sharp Bend	Design Speed = 20 Kmph
196	67+402 to 67+432	Sharp Bend	Design Speed = 20 Kmph
197	67+516 to 67+526	Sharp Bend	Design Speed = 20 Kmph
198	67+563 to 67+574	Sharp Bend	Design Speed = 20 Kmph
199	67+676 to 67+692	Sharp Bend	Design Speed = 20 Kmph
200	67+765 to 67+795	Sharp Bend	Design Speed = 30 Kmph
201	67+855 to 67+873	Sharp Bend	Design Speed = 20 Kmph
202	67+897 to 67+944	Sharp Bend	Design Speed = 20 Kmph
203	67+969 to 68+017	Sharp Bend	Design Speed = 20 Kmph
204	68+097 to 68+118	Sharp Bend	Design Speed = 20 Kmph
205	68+143 to 68+166	Sharp Bend	Design Speed = 20 Kmph
206	68+199 to 68+208	Sharp Bend	Design Speed = 20 Kmph
207	68+264 to 68+283	Sharp Bend	Design Speed = 20 Kmph
208	68+330 to 68+340	Sharp Bend	Design Speed = 20 Kmph
209	68+406 to 68+413	Sharp Bend	Design Speed = 20 Kmph
210	68+473 to 68+479	Sharp Bend	Design Speed = 20 Kmph
211	68+512 to 68+519	Sharp Bend	Design Speed = 20 Kmph
212	68+604 to 68+677	Sharp Bend	Design Speed = 20 Kmph
213	68+807 to 68+839	Sharp Bend	Design Speed = 20 Kmph
214	68+897 to 68+921	Sharp Bend	Design Speed = 20 Kmph
215	68+968 to 69+084	Sharp Bend	Design Speed = 30 Kmph
216	69+111 to 69+137	Sharp Bend	Design Speed = 20 Kmph
217	69+182 to 69+266	Sharp Bend	Design Speed = 20 Kmph
218	69+300 to 69+424	Sharp Bend	Design Speed = 20 Kmph
219	69+460 to 69+475	Sharp Bend	Design Speed = 20 Kmph
220	69+522 to 69+599	Sharp Bend	Design Speed = 30 Kmph
221	69+698 to 69+707	Sharp Bend	Design Speed = 20 Kmph
222	69+805 to 69+839	Sharp Bend	Design Speed = 20 Kmph

**Table 1.2: Locations where Radii of Horizontal Curve is less than 75 m**

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS
		From	To	
1	358	49.023	49.029	25
2	359	49.065	49.142	60
3	360	49.210	49.252	50
4	361	49.345	49.375	20
5	363	49.500	49.536	30
6	365	49.731	49.741	40
7	366	49.778	49.794	30
8	369	50.053	50.079	20
9	370	50.126	50.156	50
10	373	50.411	50.481	40
11	374	50.544	50.572	40
12	375	50.628	50.701	40
13	376	50.739	50.745	20
14	377	50.777	50.781	40
15	378	50.886	50.917	20

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS
		From	To	
16	379	50.992	51.051	35
17	380	51.105	51.110	40
18	381	51.182	51.199	20
19	382	51.248	51.280	25
20	383	51.355	51.387	35
21	384	51.418	51.423	25
22	385	51.455	51.474	20
23	386	51.506	51.516	20
24	387	51.555	51.570	40
25	389	51.714	51.723	40
26	390	51.844	51.868	30
27	391	52.058	52.100	22
28	392	52.140	52.146	20
29	393	52.206	52.212	20
30	394	52.248	52.255	40
31	395	52.302	52.309	30
32	396	52.399	52.407	40
33	397	52.496	52.511	30
34	398	52.604	52.609	20
35	399	52.646	52.668	20
36	400	52.790	52.796	60
37	401	52.857	52.877	50
38	402	52.908	52.956	40
39	403	53.071	53.082	30
40	405	53.445	53.457	20
41	406	53.528	53.536	60
42	409	53.842	53.902	60
43	410	53.933	53.946	50
44	411	54.014	54.038	30
45	412	54.076	54.094	20
46	413	54.145	54.151	30
47	414	54.190	54.212	30
48	415	54.279	54.329	30
49	416	54.383	54.429	40
50	417	54.461	54.466	20
51	418	54.553	54.571	20
52	419	54.608	54.611	20
53	420	54.766	54.786	40
54	421	54.856	54.861	40
55	422	54.893	54.921	20
56	423	54.994	55.010	40
57	424	55.067	55.080	30
58	425	55.111	55.116	30
59	426	55.147	55.151	20
60	427	55.194	55.199	50
61	429	55.355	55.366	50
62	431	55.658	55.678	50
63	432	55.819	55.843	20
64	433	55.945	55.981	20
65	434	56.055	56.079	30

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS
		From	To	
66	435	56.270	56.318	50
67	438	56.530	56.540	25
68	439	56.616	56.668	22
69	440	56.739	56.750	20
70	441	56.888	56.929	22
71	442	57.098	57.118	20
72	443	57.183	57.190	40
73	444	57.225	57.249	30
74	445	57.280	57.290	30
75	447	57.457	57.465	30
76	449	57.647	57.659	30
77	450	57.692	57.699	30
78	451	57.732	57.748	40
79	455	58.032	58.051	30
80	457	58.214	58.230	20
81	458	58.315	58.339	20
82	460	58.480	58.528	20
83	461	58.628	58.670	55
84	462	58.701	58.711	30
85	463	58.761	58.787	20
86	465	59.190	59.231	50
87	466	59.267	59.313	55
88	467	59.343	59.375	30
89	469	59.549	59.558	30
90	470	59.592	59.615	50
91	471	59.646	59.665	45
92	473	59.796	59.815	30
93	474	59.855	59.867	50
94	475	59.911	59.939	50
95	477	60.116	60.195	50
96	478	60.276	60.317	50
97	480	60.524	60.540	50
98	483	60.809	60.877	35
99	484	60.935	60.942	20
100	485	60.996	61.036	35
101	486	61.074	61.088	30
102	489	61.448	61.461	20
103	490	61.616	61.640	20
104	491	61.695	61.702	40
105	492	61.760	61.773	40
106	493	61.805	61.818	30
107	494	61.880	61.890	60
108	495	61.934	61.945	60
109	496	62.030	62.043	40
110	497	62.080	62.092	30
111	498	62.123	62.139	30
112	499	62.185	62.191	35
113	500	62.224	62.239	20
114	501	62.302	62.356	37
115	502	62.401	62.424	60

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS
		From	To	
116	503	62.463	62.473	30
117	504	62.515	62.534	30
118	505	62.576	62.587	30
119	507	62.719	62.741	25
120	508	62.774	62.781	25
121	509	62.870	62.884	30
122	510	62.921	62.940	25
123	511	62.981	62.986	45
124	514	63.144	63.164	20
125	515	63.196	63.212	20
126	516	63.250	63.258	20
127	517	63.317	63.334	30
128	518	63.390	63.413	20
129	521	63.720	63.747	40
130	522	63.780	63.795	20
131	523	63.833	63.842	20
132	524	63.876	63.898	35
133	525	63.974	63.983	20
134	526	64.014	64.032	20
135	527	64.072	64.089	40
136	535	64.808	64.846	20
137	536	64.878	64.924	20
138	537	64.984	64.994	50
139	538	65.033	65.086	35
140	539	65.119	65.140	40
141	540	65.243	65.254	40
142	542	65.408	65.467	60
143	543	65.611	65.666	50
144	544	65.714	65.748	50
145	545	65.797	65.815	40
146	549	66.097	66.111	20
147	550	66.157	66.164	30
148	551	66.260	66.278	20
149	552	66.308	66.331	40
150	553	66.376	66.402	35
151	554	66.452	66.498	30
152	556	66.636	66.653	30
153	557	66.689	66.721	30
154	561	66.999	67.009	40
155	562	67.042	67.073	35
156	565	67.281	67.293	20
157	566	67.402	67.432	20
158	567	67.516	67.526	35
159	568	67.563	67.574	35
160	569	67.676	67.692	30
161	571	67.855	67.873	20
162	573	67.969	68.017	35
163	574	68.097	68.118	40
164	576	68.199	68.208	30
165	577	68.264	68.283	30

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS
		From	To	
166	578	68.330	68.340	20
167	579	68.406	68.413	30
168	580	68.473	68.479	35
169	581	68.512	68.519	40
170	583	68.807	68.839	30
171	584	68.897	68.921	30
172	586	69.111	69.137	40
173	589	69.460	69.475	30
174	591	69.698	69.707	30
175	592	69.805	69.839	30

(iii) Note1: 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.

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## **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.

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**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.

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**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 for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					

<p><b>Flexible Pavement</b></p> <p><b>(Pavement of MCW, Service Road, approach)</b></p>	<p>Potholes</p>	<p>Nil</p>	<p>&lt; 0.1 % of area and subject to limit of 10 mm in depth</p>	<p>Daily</p>	<p>Length Measurement Unit like Scale, Tape, odometer etc.</p>	<p>IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (<a href="http://www.tfhrc.com/pavement/ltp/reports/03031/">http://www.tfhrc.com/pavement/ltp/reports/03031/</a>)</p>	<p>24-48 hours</p>	<p>MORT&amp;H Specification 3004.2</p>
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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					
sofGrade structure, approaches of connecting roads, slip roads, lay byes etc. as	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3

applicable )	Rutting	Nil	< 5 mm	Daily	Straight Edge	15 -30 days	MORT&H Specification n 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 /			< 1 % of area				7-15 days	IRC:82-2015 read with IRC SP 81

Stripping	Nil		Daily		
Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width  0.1 m at any location, restricted	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					
			nd to 30 cm from the edge					
Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference	180 days	IRC:82-2015	
Skid			Bi-Annually	SCRIM (Sideway-		180		

Number	60SN	50SN		force Coefficient Routine Investigation Machine or equivalent)	ASTME1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	days	BS: 7941-1: 2006
Pavement Condition Index	3	2.1	Bi- Annuall y			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

<b>Rigid Pavement</b>  <b>(Pavement of MCW)</b>	Roughness BI	2200m m/km	2400mm /km	Bi- Annuall y	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83- 2008
<b>Service Road, Grade structure,</b>	Skid	Skid Resistance no. at different speed of vehicles		Bi- Annuall y	SCRIM  (Sideway- force	IRC:SP:83-2008	180 days	IRC:SP:83- 2008

	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					
Asset Type  approaches of connecting		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					
	Edge drop at shoulders	Nil	40m m	Daily			7-15 days	MORT&H Specification 408.4

<b>Embankment/ Slope</b>	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	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	N A		7-15 days	MORT&H Specification

	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Speciall y During Rainy Season	N A		7-15 days	MORT&H Specification
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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 $d > D/2$
<b>CRACKING</b>						
			0	Nil, not discernible	No Action	Not applicable
			1	$w < 0.2$ mm. hair cracks		
	<b>Single Discrete</b>	$w$ = width of crack $L$ = length of crack $d$ =	2	$w = 0.2 - 0.5$ mm, discernible from slow-moving car		

1	Cracks intersecting with any joint	Not any depth of crack D = depth of slab	3	w = 0.5 - 1.5 mm, discernible from fast-moving car	Seal without delay	lm. Within 7days
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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	$w = 1.5 - 3.0 \text{ mm}$	Seal, and stitch if $L > 1 \text{ m}$ . Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion.  Within 15days
			5	$w > 3 \text{ mm}$ .		
			0	Nil, not discernible	No Action	
			1	$w < 0.2 \text{ mm}$ , hair cracks	Route and seal with epoxy.  Within 7 days	Staple or Dowel Bar Retrofit.  Within 15days
			2	$w = 0.2 - 0.5 \text{ mm}$ , discernible from slow vehicle		
	<b>Single Transverse (or</b>	$w = \text{width of crack}$ L				

2	<b>Diagonal) Crack intersecting with one or more joints</b>	= length of crack d = depth of crack D = depth of slab	3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m.  Within 7 days	
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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.
			5	$w > 6$ mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Portion with norms and specifications - See Para 5.5 & 9.2  Within 15days
			0	Nil, not discernible	No Action	

3	<b>Single Crack with one or more joints</b>	<b>Longitudinal intersecting</b> w = width of crack L = length of crack d = depth of crack D = depth of slab	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
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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 > 1 m.  Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m.  Within 15 days	
			4	w = 6.0 - 12.0 mm, usually associated with spalling		Partial Depth Repair with stapling.  Within 15 days

			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications -
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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
			0	Nil, not discernible	No Action	
			1	$w < 0.2$ mm, hair cracks	Seal, and stitch if $L > 1$ m.	
			2	$w = 0.2 - 0.5$ mm. discernible from slow vehicle	Within 15 days	-
			3	$w = 0.5 - 3.0$ mm, discernible from fast vehicle		

4	Multiple Cracks intersecting with one or more joints	w=width of crack	4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces	Full depth repair within 15 days	Dismantle, Reinstall subbase, Reconstruct
			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		
			0	Nil, not discernible	No Action	-
			1	$w < 0.5$ mm; only 1 corner broken	Seal with low viscosity epoxy to	Seal with epoxy seal with epoxy
			2	$w < 1.5$ mm; $L < 0.6$ m, only one corner broken	secure broken parts Within 7 days	Within 7days
			3	$w < 1.5$ mm; $L < 0.6$ m, two corners broken		

5	<b>Corner Break</b>	w = width of crack L = length of crack	4	w > 1.5 mm; L > 0.6 m or three corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008)  Within 15 days	Full depth repair
			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
	<b>Punchout (Applicable to Continuous Reinforced Concrete Pavement)</b>		0	Nil, not discernible		No Action
			1	$w < 0.5 \text{ mm}; L < 3 \text{ m/m}^2$		Seal with low viscosity epoxy to secure broken parts.  Within 15days
			2	either $w > 0.5 \text{ mm}$ or $L < 3 \text{ m/m}^2$		
			3	$w > 1.5 \text{ mm}$ and $L < 3 \text{ m/m}^2$		

6	only)	(CRCP)	w = width of crack L = length (m/m <sup>2</sup> )	4	w > 3 mm, L < 3 m/m <sup>2</sup> and deformation	Not Applicable, as it may be full depth	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 <sup>2</sup> 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 $d > D/2$
<b>Surface Defects</b>						
					<b>Short Term</b>	<b>Long Term</b>
			0	Nil, not discernible	No action.	
			1	$r < 2\%$	Local repair of areas damaged	
	Ravelling	$r = \frac{\text{area damaged surface}}{\text{total surface of slab}} \times 100\%$	2	$r = 2 - 10\%$	and liable to be damaged.	

7	Honeycomb surface	type	maximum depth of damage			Within 15 days	Not Applicable
				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	
					<b>Short Term</b>	<b>Long Term</b>
			0	Nil, not discernible	No action.	
		$r =$ damaged				

8	Scaling	surface/total surface of slab (%) h = maximum depth of damage	1	$r < 2 \%$	Local repair of areas damaged	Not Applicable
			2	$r = 2 - 10 \%$	and liable to be damaged.  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 $d > D/2$
			3	$r = 10 - 20\%$	Bonded Inlay within 15 days	
			4	$r = 20 - 30 \%$		
			5	$r > 30 \%$ and $h > 25 \text{ mm}$		
			0		No action.	
			1	$t > 1 \text{ mm}$		

9	Polished Surface/Glazing	t = texture depth, sand patch test	2'	t = 1 - 0.6 mm	Monitor rate of deterioration	Not Applicable
			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	$t < 0.1 \text{ mm}$	Diamond Grinding if affecting  50% or more slabs in a  continuous stretch of minimum  5 km.  Within 30 days	

10	<b>Popout (Small Hole)</b> <b>Pothole Refer Para 8.4</b>	$n = \text{number/m}^2$ $d = \text{diameter}$ $h = \text{maximum depth}$	0	$d < 50 \text{ mm}; h < 25 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	No action.	Not Applicable
			1	$d = 50 - 100 \text{ mm}; h < 50 \text{ mm}; n < 1$ per 5 m <sup>2</sup>	Partial depth repair 65 mm deep.	
			2	$d = 50 - 100 \text{ mm}; h > 50 \text{ mm}; n < 1$ per 5 m <sup>2</sup>	Within 15 days	

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

**Joint Defects**

Joint Defects							
		loss or damage L = Length as % total	0	Difficult to discern.	Short Term	Long Term	
						No action.	
					1	Discernible, L < 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.
	Notable. L > 25% insufficient protection against ingress of water and trapping	Clean and reapply sealant in selected locations.					

11	Joint Seal Defects	joint length	3	incompressible material.	Within 7 days	Not Applicable
			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	
					50 - 100 mm deep repair. H = w + 20% of w.	

			5	w > 80 mm, and L > 25%	Within 30 days	
13	<b>Faulting (or Stepping)</b>	f = difference of level	0	not discernible, < 1 mm	No action.	No action.

	<b>in Cracks or Joints</b>	1	$f < 3 \text{ mm}$		
		2	$f = 3 - 6 \text{ mm}$	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate.  Within 30days
		3	$f = 6 - 12 \text{ mm}$	Diamond Grinding	
		4	$f = 12 - 18 \text{ mm}$	Raise sunken slab.	Replace the slab as appropriate.  Within 30days
		5	$f > 18 \text{ mm}$	Strengthen subgrade and sub-base by grouting and raising sunken slab	
		0	Nil, not discernible		

14	<b>Blowup or Buckling</b>	h = vertical displacement from normal profile	1	$h < 6 \text{ mm}$	No Action
			2	$h = 6 - 12 \text{ mm}$	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	
		h = negative vertical displacement from	0	Not discernible, h < 5 mm	No action.	
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic	

15	<b>Depression</b>	normal profile L =length	3	h = 30 - 50 mm	within 7 days	Not Applicable
			4	h > 50 mm or > 20% joints	Strengthen subgrade.  Reinstate pavement at normal level	

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

			5	$h > 100 \text{ mm}$	pavement at normal level if length < 20 m. Within 30 days	
17	<b>Bump</b>	$h =$ vertical	0	$h < 4 \text{ mm}$	No action	

		displacement from normal profile	1	$h = 4 - 7 \text{ mm}$	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	$h = 7 - 15 \text{ mm}$	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	$h > 15 \text{ mm}$	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
			0	Nil, not discernible	<b>Short Term</b>	<b>Long Term</b>
				$< 3\text{mm}$	No action.	
				1	$f = 3 - 10 \text{ mm}$	

18	Lane Shoulder Dropoff	to f = difference of level	2	f = 10 - 25 mm	Spot repair of shoulder within 7 days	
			3	f = 25 - 50 mm	Fill up shoulder	

			4	f = 50 - 75 mm	within 7 days	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch.
			5	f > 75 mm		
<b>Drainage</b>						
		quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	slight/ occasional 10%	Nos < Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressed sections and upstream.
			3 to 4	appreciable/ 10 - 25%	Frequent Lift or jack slab within 30 days.	

19	<b>Pumping</b>	Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab.  Within 30 days	
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20	<b>Ponding</b>	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	Action required to stop water damaging foundation within 30 days.
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	
			5	Ponding, accumulation of water observed	-do-	

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

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.			Monthly	Manual Measurements  Odometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.  In case of permanent structure or design deficiency:  Removal of  obstruction/improvement of deficiency at the earliest  Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP 84-2014
		Design Speed, kmph	Desirable Minimum Sight Distance (m)	Safe Stopping Sight Distance (m)					
		100	360	18					



Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m <sup>2</sup> /lux  Bituminous Road - 100mcd/m <sup>2</sup> /lux	Monthly	As per Annexure-D of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015
		<u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>  D (RL) Retro  e s i g n  S Reflectivity  p e e d  (mcd/m <sup>2</sup> /lux)		As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015

Night Time  
Visibility

	Initial (7 days)	Minimum Threshold level (TL) & warranty period required up to 2 years
U p t o 6 5	200	80
6 5 - 1 0 0	250	120
A b o v e  1 0	350	150

Bi-Annually

0

Initial and Minimum Performance for

Night Visibility under wet condition  
(Retro reflectivity):

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/m <sup>2</sup> /lux  Minimum Threshold Level: 50 mcd/m <sup>2</sup> /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	change of signboard	48 hours in case of Mandatory	IRC: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		Signs, Cautionary  1 Month in case of Gantry/Cantilever Sign boards	
<b>Kerb</b>	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	<u>Functionality:</u> Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
	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	<u>Functionality:</u> Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014

<b>Other Road Furniture</b>	Traffic Safety Barriers	<u>Functionality:</u> 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	<u>Functionality:</u> 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
		<p>Illumination:</p> <p>Minimum 40 Lux illumination on the road surface</p>	Daily	The illumination level shall be measured with luxmeter	Improvement in	24 hours	IRC:SP:84-2014

<b>Highway Lighting System</b>	Highway Lights	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
	Cleaning of toilets	-	Daily	-	-	Every 4 hours	

<b>Rest Areas</b>	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
<b>Other</b>  <b>Project Facilities and Approach roads</b>	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	Free waterway/unobstructed section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35- 1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
		Spalling of concrete not more than 0.25 sqm  Delamination of concrete not more than 0.25 sq.m.		Detailed inspection			

culverts	Structurally sound	Cracks wider than 0.3 mm not more than 1m aggregate length	Bi-Annually	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
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	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid	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.
<b>Bridges including ROBs Flyover etc. as applicable</b>	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
	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.

<b>Bridge -Super Structure</b>	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	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.
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Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
Spalling of concrete	Not more than 0.50 sq.m					
Delamination	Not more than 0.50 sq.m					
Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to	1 months	MORTH specifications 2600 & 2700.

				drainage spouts		
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	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 to 30 m	Laser displacement sensors or laser vibrometers	Strengthening of structure	4 months	AASHTO LRFD specifications
Leakage in Expansion	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		Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge	Replace of seal		MORTH specifications

joints	copper strip joint.	Bi-Annually	Inspection Unit	expansion joint	15 days	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, chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
<b>Bridge-substructure</b>	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 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 n 2810 and IRC SP: 40-199.
<b>Bridge Foundations</b>	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit.  In case of doubt, use Underwater camera Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification n 2500

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a (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.
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		sq.m, damage to solid apron (concrete apron)				weeks before onset of rainy season whichever is earlier.	
<p><b>Note:</b> 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.</p>							

**Table 4: Maintenance Criteria for Structures and Culverts:**

**Table 5: Maintenance Criteria for Hill Roads**

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

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

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

**A. Flexible Pavement**

<b>Nature of Defect or deficiency</b>		<b>Time limit for repair/rectification</b>
<b>(b) Granular earth shoulders, side slopes, drains and culverts</b>		
(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)
<b>(c) Road side furniture including road sign and pavement marking</b>		
(i)	Damage to shape or position, poor visibility or loss of retro- reflectivity	48 (forty eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
<b>(d) Road lighting</b>		
(i)	Any major failure of the system	24 (twenty four) hours

(ii)	Faults and minor failures	8 (eight) hours
<b>(e) Trees and plantation</b>		
<b>Nature of Defect or deficiency</b>		<b>Time limit for repair/rectification</b>
(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 road structures	15 (fifteen) days
<b>(f) Rest area</b>		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
<b>(g) [Toll Plaza]</b>		
<b>(h)</b>	<b>Other Project Facilities and Approach roads</b>	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts]and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
<b>Bridges</b>		

<b>(a) Superstructure</b>		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty eight) hours  within 15 (fifteen) days or as specified by the Authority's Engineer
<b>(b) Foundations</b>		
<b>Nature of Defect or deficiency</b>		<b>Time limit for repair/ rectification</b>
(i)	Scouring and/or cavitation	15 (fifteen) days
<b>(c) Piers, abutments, return walls and wing walls</b>		
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
<b>(d) Bearings (metallic) of bridges</b>		
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
<b>(e) Joints</b>		
(i)	Malfunctioning of joints	15 (fifteen) days
<b>(f) Other items</b>		
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days

(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or 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
<b>(g) Hill Roads</b>		
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
<b>Nature of Defect or deficiency</b>		<b>Time limit for repair/ rectification</b>
(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) Licence for use of explosives;
  - (d) Permission of the State Government for drawing water from river/reservoir;
  - (e) Licence from inspector of factories or other competent Authority for setting up batching plant;
  - (f) Clearance of Pollution Control Board for setting up batching plant;
  - (g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;
  - (h) Permission of Village Panchayats and State Government for borrow earth; and
  - (i) Any other permits or clearances required under Applicable Laws.
- (ii) Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.

## Schedule – G

(See Clauses 7.1 and 19.2)

### Annex-I

(See Clause 7.1)

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

To,  
Managing Director, NHIDCL,  
National Highways & Infrastructure Development Corporation Ltd.

- (A) \_\_\_\_\_ [name and address of contractor] (hereinafter called the “**Contractor**”) and [name and address of the authority], (hereinafter called the “**Authority**”) have entered into an agreement (hereinafter called the “**Agreement**”) for the **Widening to 2 (Two) Lane with Hard shoulder of Churachandpur to Tuivai section of NH 102B from Km 48.587 to Km 69.875 (Package-2B) in the State of Manipur on Engineering, Procurement & Construction (EPC) mode** (the “**EPC**”) basis, subject to and in accordance with the provisions of the Agreement
- (B) The Agreement requires the Contractor to furnish a Performance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the {Construction Period/ Defects Liability Period and Maintenance Period} (as defined in the Agreement) in a sum of Rs..... cr. (Rupees ..... crore) (the “**Guarantee Amount**”).
- (C) We, ..... through our branch at ..... (the “**Bank**”) have agreed to furnish this bank guarantee (*hereinafter called the “**Guarantee**”*) by way of Performance Security.

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor’s obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the National Highways & Infrastructure Development Corporation Ltd. , that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any

reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
8. The Guarantee shall cease to be in force and effect on \*\*\*\*<sup>§</sup>. 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

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<sup>§</sup> Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement).

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

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
12. This guarantee shall also be operatable at our..... Branch at New Delhi (Complete Address of bank branch is mandatory), from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

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

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

..... SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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



## Annex – II

(Schedule - G)

(See Clause 19.2)

### Form for Guarantee for Advance Payment

To,  
Managing Director, NHIDCL,  
National Highways & Infrastructure Development Corporation Ltd.  
WHEREAS:

- (A) [name and address of contractor] (hereinafter called the “**Contractor**”) has executed an agreement (hereinafter called the “**Agreement**”) with the [name and address of the authority], (hereinafter called the “**Authority**”) for the **Widening to 2 (Two) Lane with Hard shoulder of Churachandpur to Tuivai section of NH 102B from Km 48.587 to Km 69.875 (Package-2B) in the State of Manipur on Engineering, Procurement & Construction (EPC) mode.** (the “**EPC**”) basis, subject to and in accordance with the provisions of the Agreement
- (B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing @*Bank Rate* + 3% advance payment (herein after called “**Advance Payment**”) equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs. ----- cr. (Rupees ----- crore) and the amount of this Guarantee is Rs. ----- cr. (Rupees ----- crore) (the “**Guarantee Amount**”)<sup>§</sup>.
- (C) We, ..... through our branch at ..... (the “**Bank**”) have agreed to furnish this bank guarantee (*hereinafter called the “Guarantee*”) for the Guarantee Amount.

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid instalment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

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

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<sup>§</sup> The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment.

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

2. 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 \*\*\*\*.\*<sup>§</sup> 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.

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<sup>§</sup> 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).

8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
10. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
11. This guarantee shall also be operatable at our..... Branch at New Delhi (Complete Address of bank branch is mandatory), from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
12. 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:

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

Signed and sealed this ..... day of ....., 20..... at  
 ..... SIGNED, SEALED AND DELIVERED  
 For and on behalf of the Bank by:  
 (Signature)  
 (Name)  
 (Designation)  
 (Code Number)

(Address)

NOTES:

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

## Schedule - H

(See Clauses 10.1 (iv) and 19.3)

### Contract Price Weightages

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

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

Item	Weightage in % of CP	Stage for Payment	Percentage
1	2	3	4
Road Works including Culverts, widening and repair of culverts	64.52 %	<b>A- Widening and strengthening of existing road</b>	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Non bituminous Base course	[Nil]
		(4) Bituminous Basecourse	[Nil]
		(5) Wearing Coat	[Nil]
		(6) Widening and repair of culverts	[Nil]
		<b>B.1-Reconstruction/New 2-Lane Realignment /Bypass(Flexible Pavement)</b>	
		(1) Earthwork up to top of the sub- grade	34.28%
		(2) Sub-base Course	23.04%
		(3) Non bituminous Base course	14.7%
		(4) Bituminous Basecourse	11.08%
		(5) Wearing Coat	6.36%
		<b>B.2-Reconstruction/New 8-Lane Realignment/ Bypass(Rigid Pavement)</b>	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Dry Lean Concrete (DLC) Course	[Nil]
		(4) Pavement Quality Control (PQC) Course	[Nil]
		<b>C.1-Reconstruction/ New Service Road (Flexible Pavement)</b>	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Non bituminous Base course	[Nil]
		(4) Bituminous Basecourse	[Nil]
(5) Wearing Coat	[Nil]		
<b>C.2- Reconstruction/New Service road (Rigid Pavement)</b>			
(1) Earthwork up to top of the sub- grade	[Nil]		
(2) Sub-base Course	[Nil]		
(3) Dry Lean Concrete (DLC) Course	[Nil]		
(4) Pavement Quality Control (PQC) Course	[Nil]		
<b>D- Reconstruction &amp; New Culverts on existing road, realignments, bypasses Culverts (length &lt;6m)</b>	10.53%		
Minor bridge/ Underpasses/ Overpasses	2.14 %	<b>A.1-widening and repairing of Minor Bridges (length &gt;6 m&lt;60m)</b>	
		Minor Bridges	[Nil]
		<b>A.2- New Minor bridges (length &gt;6 mand&lt;60m)</b>	

Item	Weightage in % of CP	Stage for Payment	Percentage
		(1)Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	50.25%
		(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.	49.75%
		(3)Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	[Nil]
		(4) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	[Nil]
		<b>B.1- Widening and repairs of underpasses/overpasses</b>	
		Underpasses/ Overpasses	[Nil]
		<b>B.2-New Underpasses/Overpasses</b>	
		(1)Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	[Nil]
		(2)Super-structure:On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.  Wearing Coat (a) in case of Overpass-wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass- rigid pavement including drainage facility complete in all respects as specified.	[Nil]
		(3) Approaches: On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]
<b>Major bridge(length&gt;60 m)worksand ROB/RUB/elevatedsections/flyovers including viaducts,ifany</b>	0.000 %	<b>A.1- Wideningand repairs of Major Bridges</b>	
		(1)Foundation	[Nil]
		(2)Sub-structure	[Nil]
		(3)Super-structure(including bearings)	[Nil]
		(4)Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7)Guidebunds,RiverTrainingworks etc.	[Nil]
		(8)Approaches(including Retaining walls, stone pitchingandprotection works)	[Nil]

Item	Weightage in % of CP	Stage for Payment	Percentage
		<b>A.2-NewMajorBridges</b>	
		(1)Foundation	[Nil]
		(2)Sub-structure	[Nil]
		(3)Super-structure(including bearings)	[Nil]
		(4)WearingCoatincludingexpansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7)Guidebunds,RiverTrainingworks etc.	[Nil]
		(8)Approaches(including Retaining walls, stone pitchingand protection works)	[Nil]
		<b>B.1-Wideningandrepairsof (a) ROB (b) RUB</b>	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-Structure (Including bearings)	[Nil]
		(4)Wearing Coat(a)in case of ROB- wearing coat including expansion joints complete in all respectsas specified and (b) incase of RUB-rigid pavement under RUB including drainagefacility completein all respects as specified	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7) Approaches (Including Retaining walls,Stone Pitching and protection works)	[Nil]
		<b>B.2-NewROB/RUB</b>	
		(1)Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-Structure (Including bearings)	[Nil]
		(4)Wearing Coat (a) in case of ROB- wearing coat including expansion joints complete in all respectsas specified and (b) incase of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7)Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		<b>C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators</b>	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3)Super-Structure(Including bearings)	[Nil]
		(4)WearingCoatincludingexpansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7)Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		<b>C.2- New Elevated</b>	

Item	Weightage in % of CP	Stage for Payment	Percentage
		<b>Section/Flyovers/GradeSeparators</b>	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-Structure(Including bearings)	[Nil]
		(4) Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
<b>Other Works</b>	33.34 %	(i) Toll Plaza	[Nil]
		(ii) Road side drains	10.53%
		(iii) Road signs, markings, km stones, safety devices etc	4.97%
		(iv) Project facilities	
		a) Bus Bays	0.44%
		b) Truck Lay-byes	[Nil]
		c) Passenger Shelter	0.05%
		d) Rest Area	[Nil]
		(v) Road side Plantation	[Nil]
		(vi) Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/RUBs	[Nil]
		(vii) Safety & Traffic Management during const.	[Nil]
		(viii) Breast Wall	69.7%
		(ix) Toe Wall	2.26%
		(x) Retaining Wall	5.96%
		(xi) Boundary wall	[Nil]
		(xii) Site Clearance & Dismantling	1.09%
		(xiii) Protection Works	5%

1.3 Procedure of estimating the value of work done

1.3.1 Road works

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

Table 1.3.1

Stage of Payment	Percentage weightage	Payment Procedure
<b>A- Widening &amp; Strengthening of road</b>		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10(ten) percent of the total length.
(2) Sub-base Course	[Nil]	
(3) Non bituminous Base course	[Nil]	
(4) Bituminous Base course	[Nil]	
(5) Wearing Coat	[Nil]	
(6) Widening and repair of culverts	[Nil]	
<b>B.1- Reconstruction/New 2-Lane Realignment/Bypass (Flexible Pavement)</b>		
(1) Earthwork up to top of the sub-grade	34.28%	Unit of measurement is linear length. Payment of each stage shall be made on prorata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(3) Sub-base Course	23.04%	
(4) Non bituminous Base course	14.7%	
(5) Bituminous Base course	11.08%	
(6) Wearing Coat	6.36%	
(7) Widening and repair of culverts		
<b>B.2- Reconstruction/New 8-Lane Realignment/Bypass (Rigid Pavement)</b>		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(2) Sub-base Course	[Nil]	
(3) DryLean Concrete (DLC) Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
<b>C.1- Reconstruction/New Service Road/ Slip Road (Flexible Pavement)</b>		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(2) Sub-base Course	[Nil]	
(3) Non bituminous Base course	[Nil]	
(4) Bituminous Basecourse	[Nil]	
(5) Wearing Coat	[Nil]	
<b>C.2- Reconstruction/New Service road (Rigid Pavement)</b>		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(2) Sub-base Course	[Nil]	
(3) Dry Lean Concrete (DLC) Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
<b>D- Reconstruction &amp; New Culverts on existing road, realignments, bypasses</b>		
Culverts (length <6m)	10.53%	Cost of each culverts shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least five culverts

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

Cost per km = P x weightage for road work x weightage for bituminous work x (1/L)

Where,

P = Contract Price

L = Total length in km

Similarly, the rates per km for other stages shall be worked out accordingly.

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

### 1.3.2 Minor Bridges and Underpasses/Overpasses.

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

Table 1.3.2

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
<b>A.1-Widening and repairs of Minor Bridges (length &gt; 6 m &amp; &lt; 60 m)</b>	[Nil]	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
<b>A.2- New Minor Bridges (length &gt; 6 m &amp; &lt; 60 m)</b>		
(1)Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	50.25%	Foundation: Cost of each minor bridge shall be determined on pro-rata basis with respect to the total linear length (m)of the minor bridges. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of each bridge.  Incase where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2)Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road, signs & markings, tests on completion etc. complete in all respect.	49.75%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(3)Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	[Nil]	Approaches: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause.
(4) Guide Bund sand River Training Works:On completion of	[Nil]	Guide Bunds and River Training Works:

Stage of Payment	Percentage weightage	Payment Procedure
Guide Bunds and river training works complete in all respects		Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bund sand River training Works in all respects as specified
<b>B.1- Widening and repairs of under passes/overpasses</b>	[Nil]	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/ overpasses. Payment shall be made on the completion of widening & repair works of a underpass/overpass.
<b>B.2- New Underpasses/Overpasses</b>		
(1)Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	[Nil]	Foundation:Cost of each Underpass/ Overpass shall be determined on pro- rata basis with respect to the total linear length (m) of the Underpasses/Overpasses. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of each Underpasses/ Overpasses.  In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2)Super-structure:On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails,crash barriers, road signs & markings, tests on completion etc. complete in all respect.  Wearing Coat (a) in case of Overpass-wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass- rigid pavement including drainage facility complete in all respects as specified.	[Nil]	Super-structure:Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause. In case of structures where pre-cast girders have been proposed by the Contractor,50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(3) Approaches: On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified

1.3.3 Major Bridge works, ROB/RUB and Structures.

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

Table 1.3.3

Stage of Payment	Percentage weightage	Payment Procedure
<b>A.1- Widening and repairs of Major Bridges</b>		
<b>(1)Foundation</b>	[Nil]	Foundation: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against 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. Incase where load testing is required for foundation,the trigger of first payment shall include load testing also where specified.
<b>(2)Sub-structure</b>	[Nil]	Sub-structure:Payment against sub- structure shall be made on pro-rata basis on completion of a stagei.e. not less than 25% of the scope of sub- structure of majorbridge.
<b>(3)Super-structure(including bearings)</b>	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e.completion of super-structure including bearings of atleast one span inall respects asspecified.In case of structures where pre-cast girders have been proposed by the Contractor,50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
<b>(4)Wearing Coat including expansion joints</b>	[Nil]	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
<b>(5) Miscellaneous Items like handrails, crash barrier, road markings etc.</b>	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers,road markings etc. complete in all respects as specified.
<b>(6) Wing walls/return walls</b>	[Nil]	Wingwalls/return walls : Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
<b>(7)Guide bunds, River Training works etc.</b>	[Nil]	Guide Bunds, River Trainingworks: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
<b>(8)Approaches(including Retaining walls, stone pitchingandprotection works)</b>	[Nil]	Approaches: Payments shallbe made on pro rata basis on completion of 10% of the scope of each stage.
<b>A.2-NewMajorBridges</b>		
<b>(1)Foundation</b>	[Nil]	Foundation:Cost of each Major Bridge shall be determined on pro ratabasis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-ratabasison completion of a stage i.e. not lessthan 25% of the

		scope of foundation of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
<b>(2) Sub-structure</b>	[Nil]	Sub-structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of major bridge.
<b>(3) Super-structure (including bearings)</b>	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
<b>(4) Wearing Coat including expansion joints</b>	[Nil]	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
<b>(5) Miscellaneous Items like handrails, crash barrier, road markings etc.</b>	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
<b>(6) Wing walls/return walls</b>	[Nil]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
<b>(7) Guide bunds, River Training works etc.</b>	[Nil]	Guide Bunds, River Training works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
<b>(8) Approaches (including Retaining walls, stone pitching and protection works)</b>	[Nil]	Approaches: Payments shall be made on pro-rata basis on completion of 10% of the scope of each stage.
<b>B.1- Widening and repairs of (a) ROB (b) RUB</b>		
<b>(1) Foundations</b>	[Nil]	Foundation: Cost of each ROB/RUB shall be determined on pro-rata basis with respect to the total linear length (m) of the ROB/RUB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB.  In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
<b>(2) Sub-Structure</b>	[Nil]	Sub-structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of ROB/RUB.
<b>(3) Super-Structure (Including bearings)</b>	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor,

		50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above.
<b>(4) Wearing Coat (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified</b>	[Nil]	Wearing Coat: Payment shall be made on completion  (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified  and  (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
<b>(5) Miscellaneous Items like handrails, crash barrier, road markings etc.</b>	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road marking etc. complete in all respects as specified.
<b>(6) Wing walls/Return walls</b>	[Nil]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
<b>(7) Approaches (Including Retaining walls, Stone Pitching and protection works)</b>	[Nil]	Payments shall be made on prorata basis on completion of 20% of the total area.
<b>B.2-New ROB/RUB</b>		
<b>(1) Foundation</b>	[Nil]	Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB.
<b>(2) Sub-structure</b>	[Nil]	Sub-structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of sub-structure of ROB/RUB.
<b>(3) Super-structure (including bearing)</b>	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. Completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
<b>(4) Wearing Coat (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified</b>	[Nil]	Wearing Coat: Payment shall be made on completion  (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified  and  (b) In case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
<b>(5) Miscellaneous Items like handrails, crash barrier, road</b>	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails,

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

		In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
<b>(2) Sub-Structure</b>	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure.
<b>(3) Super-Structure (Including bearings)</b>	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
<b>(4) Wearing Coat including expansion joints</b>	[Nil]	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
<b>(5) Miscellaneous Items like handrails, crash barrier, road markings etc.</b>	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
<b>(6) Wing walls/Return walls</b>	[Nil]	Wingwalls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
<b>(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)</b>	[Nil]	Payments shall be made on pro rata basis on completion of 20% of the total area.

- Note:
- (1) In case of innovate Major Bridge projects like cable suspension/cable stayed/ Extra Dozed and exceptionally long span bridges, the schedule may be modified as per site requirements before bidding with due approval of Competent Authority.
  - (2) The Schedule for exclusive tunnel projects may be prepared as per site requirements before bidding with due approval of Competent Authority.

#### 1.3.4 Other works.

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

Table 1.3.4

<b>Stage of Payment</b>	<b>Percentage weightage</b>	<b>Payment Procedure</b>
1	2	3
(1) Toll Plaza	[Nil]	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plaza.
(2) Road side drains	10.53%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than <b>5% (five percent)</b> of the total
(3) Road signs, markings, km stones, safety devices etc	4.97%	

Stage of Payment	Percentage weightage	Payment Procedure
(4) Project Facilities		length.
a) Bus Bays	0.44%	Payment shall be made on pro rata basis for completed facilities.
b) Truck Lay-byes	[Nil]	
c) Passenger Shelter	0.05%	
d) Rest Area	[Nil]	
(5) Road side Plantation including Horticulture in Wayside Amenities	[Nil]	Unit of measurement is linear length
(6) Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten percent) of the total length.
(7) Safety and traffic management during construction	[Nil]	Payment shall be made on pro rata basis every six months.
(8) Protection Works		Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.
a) Retaining Wall	5.96%	
b) Breast Wall	69.7%	
c) Toe Wall	2.26%	
(9) Site Clearance & Dismantling	1.09%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.
(10) Other Works (Turfing & Hydro-Seeding)	5%	Unit of measurement is square metre.

## 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**

[Note: The Contractor is required to furnish drawing as per standard Manual and specifications 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 or such other agency or person as it may specify in consultation with the Authority.

**4. Completion Certificate**

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

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

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

The first testing with the help of NSV shall be conducted at the time of issue of Completion Certificate.

**Schedule - L**  
(See Clause 12.2)

**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 the \*\*\*\*section (km \*\* to km \*\*) of National Highway No. \*\*\*] (the “**Project Highway**”) on Engineering, Procurement and Construction (EPC) basis through ..... (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.
- 2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the ..... day of ..... 20..... , 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:

<b>S. No.</b>	<b>Item/Defect/Deficiency</b>	<b>Percentage</b>
<b>(a) Carriageway/Pavement</b>		
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
<b>(b) Road, Embankment, Cuttings, Shoulders</b>		
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
<b>(c) Bridges and Culverts</b>		
(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%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
<b>(d) Roadside Drains</b>		
(i)	Cleaning and repair of drains	5%
<b>(e) Road Furniture</b>		

<b>S. No.</b>	<b>Item/Defect/Deficiency</b>	<b>Percentage</b>
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5 <sup>th</sup> km stones	5%
<b>(f)</b>	<b>Miscellaneous Items</b>	
(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%
<b>(g)</b>	<b>Defects in Other Project Facilities</b>	5%

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

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

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 such items/Defects/deficiency or non-compliance.

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

**Schedule - N**  
*(See Clause 18.1 (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 entered into between the [name and address of the Authority] (the “**Authority**”) and ..... (the “**Contractor**”)# for [Two-Laning] of the \*\*\*\* section (km \*\* to km \*\*) of National Highway No. \*\* in the State of \*\*\* 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 of the proposed methodology from the Contractor.
- (v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.
- (vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.

- (vii) The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.
- (viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.
- (ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (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 accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.
- (xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.
- (xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.
- (xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.
- (xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor'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 by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.
- (ii) The Authority's Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.
- (iii) Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.
- (iv) The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.

- (v) The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

## **Schedule - O**

*(See Clauses 19.4 (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 Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.
- (ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

**2. Insurance for Contractor's Defects Liability**

The Contractor shall effect and maintain insurance cover of not less than 15% of the Contract Price for the Works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and which arises from a cause occurring prior to the issue of the Completion Certificate. The Contractor shall also maintain other insurances for maximum sums as may be required under the Applicable Laws and in accordance with Good Industry Practice.

**3. Insurance against injury to persons and damage to property**

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

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

- (ii) The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this Agreement excluding:
- (a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and
  - (b) damage which is an unavoidable result of the Contractor's obligations to execute the Works.

**4. Insurance to be in joint names**

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

## **Schedule-Q**

*(See Clause 14.10)*

### **Tests on Completion of Maintenance Period**

**1. Riding Quality test:**

Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be [2,200 (two thousand and two hundred only)] mm for each kilometre.

**2. Visual and physical test:**

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

**Schedule-R**

*(See Clause 14.10)*

**Taking Over Certificate**

I, ..... (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated ..... (the "**Agreement**"), for [construction of the \*\*\*\*section (km \*\* to km \*\*) of

\*\*\*\*] (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through ..... (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)