Schedule A

(See Clause 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

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

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

1.3 An inventory of the Site including the land, buildings, Structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.1 of this Agreement.

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

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

Annex – I

(Schedule-A)

Site

1. Site

The site of the Two Lane project highway comprises the section of State Highway No 4 commencing from Km 31+700 to Km 59+270 i.e. the Ranikor-Nonghyllam-Maheshkhola-Baghmara road in the state of Meghalaya. The Land, carriageway and structures comprising the site are described below.

2. Land

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

S. No.	Chainage (km)		Existing Row (m)
	From	To	
1	31+000	32+000	9.65
2	32+000	32+470	9.4
3	32+470	33+000	9.6
4	33+000	34+000	9.7
5	34+000	34+960	9.4
6	34+960	35+000	9.75
7	35+000	36+000	9.65
8	36+000	37+000	9.5
9	37+000	37+860	9.3
10	37+860	38+460	9.45
11	38+460	39+000	9.6
12	39+000	40+000	9.4
13	40+000	41+000	9.8
14	41+000	41+320	9.55
15	41+320	41+420	9.55
16	41+420	41+830	9.4
17	41+830	43+000	9.6
18	43+000	43+250	9.4
19	43+250	44+000	9.5
20	44+000	44+180	9.45
21	44+180	45+000	9.3
22	45+000	45+675	9.2

S. No.	Chainage (km)		Existing Row (m)
	From	To	
23	45+675	46+000	9.3
24	46+000	47+000	9.45
25	47+000	48+000	9.55
26	48+000	49+000	9.45
27	49+000	50+000	9.3
28	50+000	51+000	9.55
29	51+000	52+000	9.75
30	52+000	53+000	9.7
31	53+000	53+770	9.1
32	53+770	54+000	9.6
33	54+000	55+000	9.6
34	55+000	55+600	10.35
35	55+600	56+000	9.7
36	56+000	57+000	9.7
37	57+000	58+400	9.55
38	58+400	58+500	9.4
39	58+500	59+000	9.5
40	59+000	59+195	7.6
41	59+195	59+270	7.95

3. Carriageway

The present carriageway of the Project Road is Single lane with average formation width of 6 m and carriageway width of 3.5 - 4.0 m with earthen shoulders of width 1.5 m on either side for the entire stretch. The type of the existing pavement is flexible.

4. Major Bridge

The Site includes the following Major Bridges:

S/no	Location in km	Type of Structures			Length of Bridge/ Span Arrangement (m)	Total width (m)
		Super Structure	Sub Structure	Foundation		
1	59+195	Prestressed Bridge	Cement concrete	Open	72.98m (2 x 38.00)m	4.20

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

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

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

6. Grade separators

The Site includes the following grade separators:

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

7. Railway level crossings

The Site includes the following railway level crossings:

Sl No	Location(km)	Remarks
NIL		

8. Underpasses (vehicular, non vehicular)

The Site includes the following underpasses:

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

9. Truck Lay bays

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

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

10. Road side drains

The details of the roadside drains are as follows:

S/NO	LOCATION IN KM	TYPE	REMARKS
NIL			

11. Minor Bridges

The Site includes the following Minor Bridges:

S. no	Location in km	Type of Structures			Length of Bridge/ Span Arrangement (m)	Total width (m)
		Super Structure	Sub Structure	Foundation		

S. no	Location in km	Type of Structures			Length of Bridge/ Span Arrangement (m)	Total width (m)
		Super Structure	Sub Structure	Foundation		
1	32+140	Timber decking	PCC 1:3:6	Open	1x10.00	3.80
2	40+690	BUG with Timber decking	PCC 1:3:6	Open	1x19.50	3.80
3	44+043	Timber decking	PCC 1:3:6	Open	1x9.40	3.80
4	45+480	Timber decking	PCC 1:3:6	Open	1x9.50	3.80
5	45+670	BUG with Timber decking	Stone masonry in CM	Open	1x13.50	3.80
6	49+820	BUG with Timber decking	RCC 1:3:6	Open	1x25.90	3.80
7	52+085	Timber decking	Stone masonry in cm 1: 6	Open	1x9.50m	3.80
8	52+585	Timber decking	Stone masonry in cm 1: 6	Open	1x7.60m	3.80
9	54+280	Timber decking	RCC 1:3:6	Open	1x9.80m	3.80
10	54+455	Timber decking	Stone masonry in cm 1: 6	Open	1x7.70m	3.80
11	57+915	Timber decking	RCC 1:3:6	Open	1x8.10m	3.80
12	58+175	Timber decking	RCC 1:3:6	Open	1x10.10m	3.80

12. Culvert

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement
				(No x Span/dia)
1	32+460	5.9	Slab	1 x 1.00
2	33+250	5.6	Slab	1 x 0.60
3	34+610	6.2	Slab	1 x 1.00
4	34+740	6.3	Slab	1 x 1.00
5	35+070	7.4	Slab	1 x 2.00
6	35+305	7.5	Slab	1 x 1.00
7	35+410	8.1	Slab	1 x 1.00
8	35+480	8.1	Slab	1 x 1.00
9	35+620	7.2	Slab	1 x 2.00
10	36+215	6.9	Slab	1 x 1.00

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement (No x Span/dia)
11	36+430	7.1	Slab	1 x 1.00
12	36+470	8.2	Slab	1 x 1.00
13	36+610	7.2	Slab	1 x 1.00
14	37+130	6.5	HP	1 x 0.90 dia
15	37+420	6.5	HP	1 x 0.90 dia
16	37+490	7.5	HP	1 x 0.90 dia
17	37+860	6	Slab	1 x 1.00
18	38+010	6	Slab	1 x 1.00
19	38+050	7.5	HP	1 x 0.90 dia
20	38+150	7.5	Slab	1 x 1.00
21	38+240	7.5	HP	1 x 0.90 dia
22	38+410	7	HP	1 x 0.90 dia
23	38+730	6	HP	1 x 0.90 dia
24	38+780	7	HP	1 x 0.90 dia
25	38+880	6.5	HP	1 x 0.90 dia
26	38+930	7.5	HP	1 x 0.90 dia
27	39+020	5.9	HP	1 x 0.90 dia
28	39+110	7.5	HP	1 x 0.90 dia
29	39+350	7.6	Slab	1 x 1.00
30	39+390	7.5	Slab	1 x 1.00
31	39+470	6.7	HP	1 x 0.90 dia
32	39+560	7.3	Slab	1 x 1.00
33	39+680	6.2	Slab	1 x 1.00
34	40+050	6.25	Slab	1 x 1.00
35	40+120	7.5	HP	1 x 0.90 dia
36	40+170	6	HP	1 x 0.90 dia
37	40+470	4.5	HP	1 x 0.90 dia
38	40+520	4.5	HP	1 x 0.90 dia
39	40+570	4.3	Slab	1 x 2.50
40	40+740	7.2	HP	1 x 0.90 dia
41	40+785	7	HP	1 x 0.90 dia
42	40+795	10	Slab+HP	1 x 0.90 dia
43	40+800	7.5	Slab	1 x 0.60
44	40+810	7	HP	1 x 0.90 dia
45	40+900	4.5	Slab	1 x 1.00
46	40+970	6.7	-do-	1 x 1.00
47	41+320	7.20	-do-	1 x 1.00
48	41+830	4.20	-do-	1 x 1.00
49	41+950	5.80	-do-	1 x 1.00
50	41+985	5.90	-do-	1 x 1.00
51	42+045	4.90	Wooden Cul	1 x 5.70
52	42+140	7.90	Slab	1 x 1.00
53	42+200	7.50	-do-	1 x 1.00

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement (No x Span/dia)
54	42+260	7.00	-do-	1 x 1.00
55	42+280	6.50	-do-	1 x 1.00
56	42+340	6.30	Slab	1 x 0.60
57	42+475	5.40	-do-	1 x 1.00
58	42+650	5.20	-do-	1 x 1.00
59	42+835	4.90	-do-	1 x 1.00
60	43+435	5.10	-do-	1 x 1.00
61	43+550	5.80	-do-	1 x 1.00
62	43+640	4.30	-do-	1 x 1.00
63	43+740	4.80	-do-	1 x 1.00
64	43+800	4.70	-do-	1 x 0.60
65	43+970	5.20	-do-	1 x 1.00
66	44+010	6.90	-do-	1 x 1.00
67	44+050	3.60	Wooden cul	1 x 5.80
68	44+210	6.70	Slab	1 x 1.00
69	44+375	6.80	-do-	1 x 1.00
70	44+465	6.20	-do-	1 x 1.00
71	44+670	7.30	-do-	1 x 1.00
72	44+825	6.80	-do-	1 x 1.00
73	44+875	7.00	HP	1 x 0.90 dia
74	44+990	6.40	Slab	1 x 1.00
75	45+075	6.10	-do-	1 x 1.00
76	45+185	6.50	-do-	1 x 1.00
77	45+310	3.60	Wooden cul	1 x 5.50
78	45+385	5.80	Slab	1 x 1.00
79	45+420	4.40	Wooden cul	1 x 3.00
80	45+820	6.40	Slab	1 x 1.00
81	45+900	5.70	-do-	1 x 1.00
82	45+965	4.10	Wooden cul	1 x 2.90
83	46+145	4.50	Slab	1 x 1.00
84	46+240	5.50	Slab	1 x 1.00
85	46+450	5.45	Slab	1 x 1.00
86	46+530	6.80	Slab	1 x 1.00
87	46+580	7.50	HP	1 x 0.90 dia
88	46+790	6.50	Slab	1 x 1.00
89	46+860	7.50	HP	1 x 0.90 dia
90	46+990	6.40	Slab	1 x 1.00
91	47+090	6.50	Slab	1 x 1.00
92	47+820	6.50	Slab	1 x 1.00
93	48+075	5.80	Slab	1 x 1.00

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement (No x Span/dia)
94	48+355	7.50	HP	1 x 0.90 dia
95	48+420	8.00	HP	1 x 0.90 dia
96	48+440	4.50	Slab	1 x 1.00
97	48+645	6.60	Slab	1 x 1.00
98	48+855	6.10	Slab	1 x 1.00
99	48+925	4.20	wooden	1 x 6.00
100	48+970	5.50	Slab	1 x 1.00
101	49+025	7.50	HP	1 x 0.90 dia
102	49+070	6.20	Slab	1 x 1.00
103	50+120	7.50	HP	1 x 0.90 dia
104	50+220	4.70	Slab	1 x 1.00
105	50+260	6.20	Slab	1 x 1.00
106	50+275	6.20	Slab	1 x 1.00
107	50+315	7.10	Slab	1 x 1.00
108	50+400	6.70	Slab	1 x 1.00
109	50+580	6.50	Slab	1 x 1.00
110	50+695	4.80	Slab	1 x 1.00
111	50+940	6.10	Slab	1 x 1.00
112	51+380	7.10	Slab	1 x 1.00
113	51+490	6.20	Slab	1 x 1.00
114	51+855	7.50	HP	1 x 0.90 dia
115	51+980	4.80	Slab	1 x 1.00
116	52+015	6.90	Slab	1 x 1.00
117	52+040	5.50	Slab	1 x 1.00
118	52+180	6.80	Slab	1 x 1.00
119	52+315	6.50	Slab	1 x 1.00
120	52+360	7.50	HP	1 x 0.90 dia
121	52+505	5.50	Slab	1 x 1.00
122	52+570	6.10	Slab	1 x 1.00
123	52+730	6.70	Slab	1 x 1.00
124	52+900	6.00	Slab	1 x 1.00
125	53+000	4.20	Wooden Cul	1 x 5.60
126	53+030	8.00	Slab	1 x 1.00
127	53+075	5.70	Slab	1 x 1.00
128	53+230	8.30	Slab	1 x 2.50
129	53+295	7.50	HP	1 x 0.90 dia
130	53+400	7.50	HP	1 x 0.90 dia
131	53+480	10.00	HP	1 x 0.90 dia
132	53+540	9.20	Slab	1 x 1.00
133	53+630	8.50	Slab	1 x 1.00
134	53+860	6.80	Slab	1 x 1.00
135	54+000	6.40	Slab	1 x 1.00
136	54+035	10.60	Slab	1 x 1.00

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement (No x Span/dia)
137	54+160	4.20	Wooden Cul	1 x 5.90
138	54+560	5.00	Slab	1 x 1.00
139	54+630	7.80	Slab	1 x 1.00
140	54+770	5.90	Slab	1 x 1.00
141	54+785	10.00	HP	1 x 0.90 dia
142	54+880	6.00	Slab	1 x 1.00
143	54+900	7.40	Slab	1 x 1.00
144	55+175	6.00	Slab	1 x 0.60
145	55+225	6.50	Slab	1 x 0.60
146	55+390	7.00	Slab	1 x 0.60
147	55+410	6.50	Slab	1 x 0.60
148	55+590	6.30	Slab	1 x 0.60
149	55+618	2.20	Slab	1 x 0.60
150	55+720	6.80	Slab	1 x 0.60
151	55+765	8.80	Slab	1 x 0.60
152	55+788	7.00	Slab	1 x 0.50
153	55+820	8.00	Slab	1 x 0.50
154	55+900	7.50	Slab	1 x 0.50
155	55+990	8.00	Slab	1 x 0.50
156	56+060	9.00	Slab	1 x 0.50
157	56+105	6.50	Slab	1 x 1.00
158	56+135	7.00	Slab	1 x 1.00
159	56+275	4.28	Wooden Cul	1 x 4.30
160	56+330	7.00	Slab	1 x 1.00
161	56+365	10.00	Slab	1 x 1.00
162	56+530	7.00	Slab	1 x 1.00
163	56+570	4.20	Wooden Cul	1 x 4.00
164	56+660	10.00	Slab	1 x 1.00
165	56+810	8.00	Slab	1 x 1.00
166	56+870	7.50	Slab	1 x 1.00
167	56+975	7.50	Slab	1 x 1.00
168	57+060	7.50	Slab	1 x 1.00
169	57+095	7.50	Slab	1 x 1.00
170	57+160	7.50	Slab	1 x 1.00
171	57+335	6.50	Slab	1 x 1.00
172	57+474	7.50	wooden	1 x 6.00
173	57+527	7.00	Slab	1 x 1.00
174	57+640	6.00	Slab	1 x 1.00
175	57+765	5.50	Slab	1 x 1.00
176	57+960	7.50	Slab	1 x 1.00
177	57+995	6.00	Slab	1 x 1.00

S/No.	Existing Chainage (km)	CD Width	Type of Culvert	Span arrangement (No x Span/dia)
178	58+060	5.10	Slab	1 x 1.00
179	58+445	5.50	Slab	1 x 1.00
180	58+545	6.00	Slab	1 x 1.00
181	58+555	7.00	Slab	1 x 1.00
182	58+570	7.50	Slab	1 x 1.00
183	58+765	7.50	Slab	1 x 1.00
184	58+860	6.00	Slab	1 x 1.00

13. Bus bays

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

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

14. Major Intersections along project:

The details of the minor junctions are as follows:

Sn	Location	Name of Road	Type of Junction
NIL			

15. Minor Intersections along project:

The details of the minor intersections are as follows:

S/no	Location in km	Type of Crossing	Link	Remarks
1	40+130	R	For Khonjoy Bazaar	4.50m wide Earthen road
2	40+130	L	For Village	4.50m wide Earthen road

3	40+530	L	For Rangawal Quarry	4.50m wide Earthen road

S/no	Location in km	Type of Crossing	Link	Remarks
4	40+670	L	To River	4.50m wide Earthen road
5	40+800	R	Chibak	BT road 6.00m wide
6	41+175	L	To River for collection of Sand	3.00m Earthen road
7	41+332	L	For Stone Quarry	4.50m wide Earthen road
8	41+880	L	Junction of Bagli	6.00m wide WBM road
9	45+440	R	Boikut Village	4.50 m wide Earthen road
10	57+040	R	To Chima sura Village	5.50m Wide Earthen road
11	58+165	L	Ganga nagar Village	6.00m wide Earthen road
12	59+080	L	IBB Road	3.60m wide BT road
13	59+105	R	To Sohyleng Village	6.00m wide Earthen road

16. Bypass

The details of Bypasses are as follows:

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

17. Other structures

Nil

Annex II

(Schedule-A)

Dates for providing Right of Way

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

Sl.No.	Location stretch		Length(Km)	Width(m)	Date of providing ROW
	From(km)	To(km)			
1) Full ROW	31+700	59+270	Nil	24	90% of the land will be made available on the appointed date and remaining 10% in 90 days from appointed date
2) Part ROW	31+700	59+270	30	8	
3) Balance ROW	31+700	59+270	30	16	

Annex – IIII

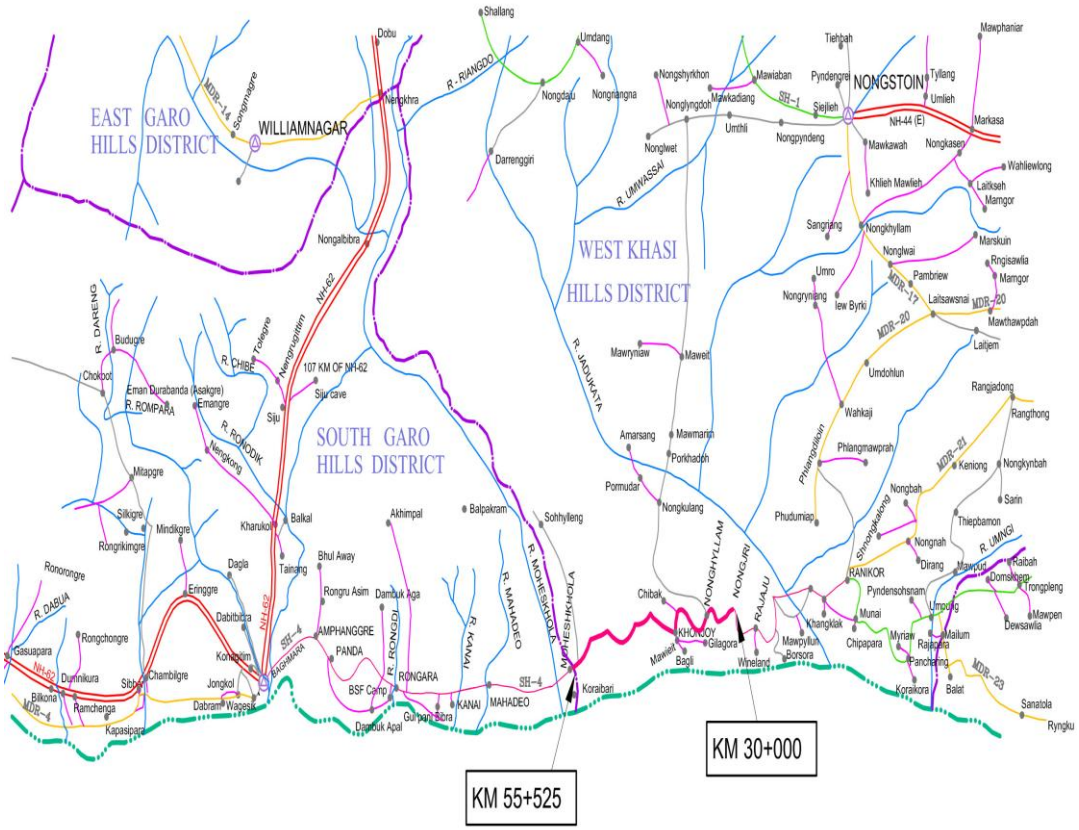
(Schedule-A)

Alignment Plans

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

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

ii) Traffic Signage plan of the Project Highway showing numbers & 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 IRC: SP: 99 & IRC: 67.



Annex – IV

(Schedule-A)

Environment Clearances

The following environment clearances have been obtained:

- Environmental clearance is not required as per new notification of MoEF dated 22/08/2013.

- The muck dumping sites shall be identified by the EPC contractor in consultation with the Authority Engineer and forest department for dumping of muck, in addition to the applicable permissions and clearances as stated in Schedule F.

Schedule B

Development of the Project Highway

1 Development of the Project Highway

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

2 Rehabilitation and augmentation

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

3 Specifications and Standards

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

Annex – I

(Schedule-B)

Description of Two-Laning with earthen shoulder

1. **Development of Nongjri- Maheshkhola–Baghmara road from Km 30.00 to Km 55.525 in Meghalaya to 2-Lane Standards.**

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

1.1 Width of carriageway

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

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

S. No	Location (Km to km)		Width (m)	Typical cross section
	From (Km)	To (Km)		
1	37+600	38+000	7+1.5*2	TCS-4
2	55+100	55+200		
3	55+200	55+525		

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

2. Geometric design and general features

2.1 General

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

2.2 Design speed

In general, the Project Highway has been designed for a speed 50 kmph for mountainous terrain but at few locations, 30kmph speed has been provided due to unavoidable circumstances such as steep terrain & sharp curves in accordance with table 6.1 of Hill Road Manual (IRC SP:48-1998)

2.3 Improvement of the existing road geometrics

In the following stretches, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided. The locations where the minimum design speed could not be proposed due to site constraints are as per the table below:

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

2.4 Right of Way

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

2.5 Type of shoulders

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

S. No.	Stretch		Fully paved shoulders/ footpaths	Reference to cross section
	From (Km)	To (Km)		
1	37+600	38+000	Drain cum footpath	TCS-4
2	55+100	55+200		

S. No.	Stretch		Fully paved shoulders/ footpaths	Reference to cross section
	From (Km)	To (Km)		
3	55+200	55+525		

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

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

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

Earthen Shoulder on hill side includes road side drain.

(c) Design and specification of paved shoulders and granular material shall confirm to the requirements specified in paragraphs 5.11 of the Manual.

2.6 Lateral and vertical clearances at underpasses

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

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

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

2.7 Lateral and vertical clearance at overpasses

2.7.1 Lateral and vertical clearances at overpasses shall be as per paragraph 2.11 of the Manual.

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

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

2.8 Service roads/Slip Road

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

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

2.9 Grade separated structures

2.9.1 Grade separated structures shall be provided as per paragraph 2.14.1 of the Manual. The requisite particulars are given below:

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

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

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

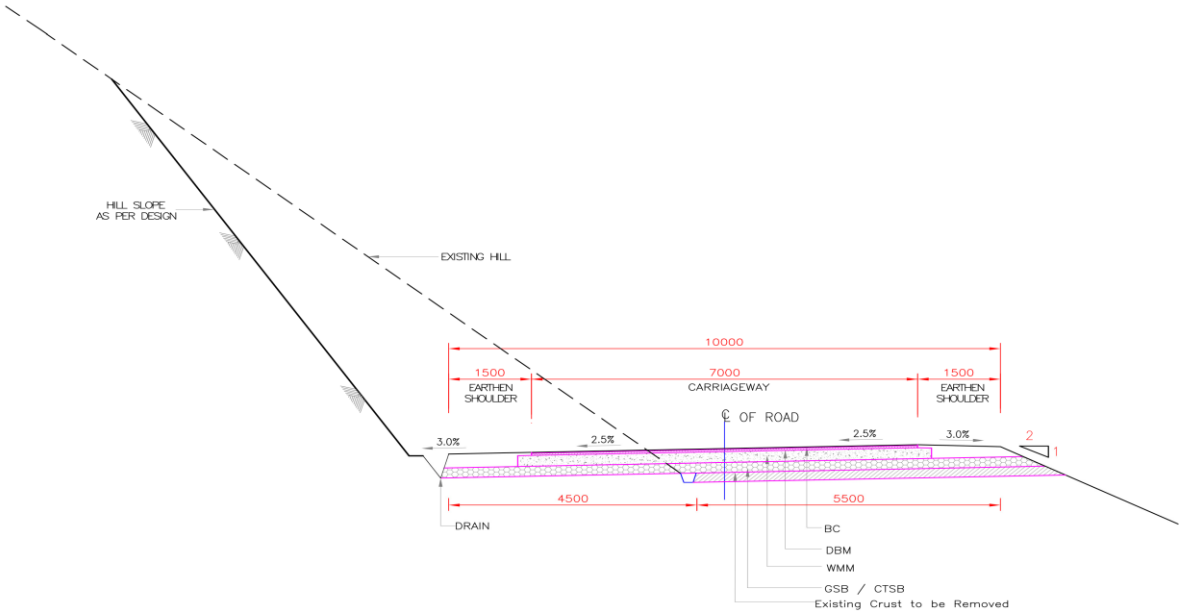
2.10 Cattle and Pedestrian under pass / over pass

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

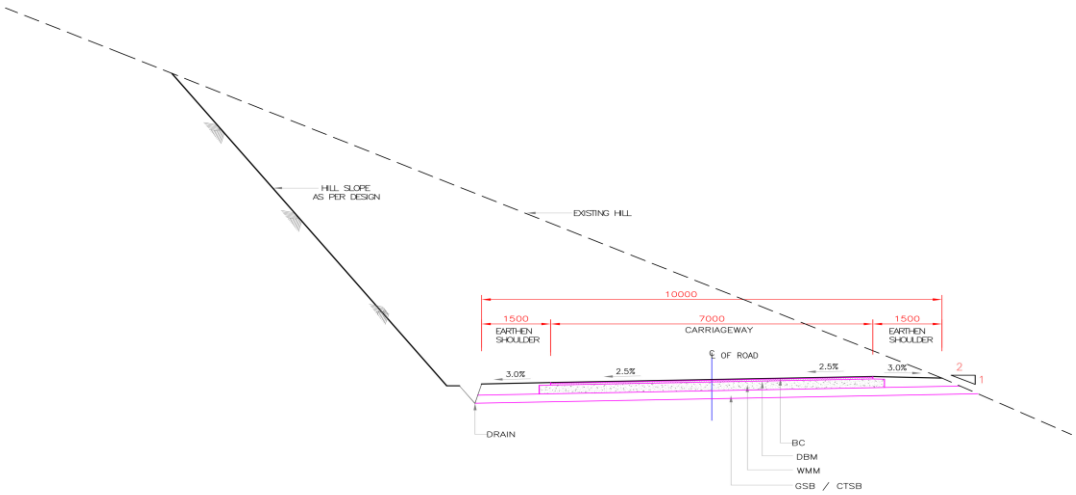
S. No.	Design Chainage (km)	Span	Type of crossing
NIL			

2.11 Typical cross-sections of the Project Highway

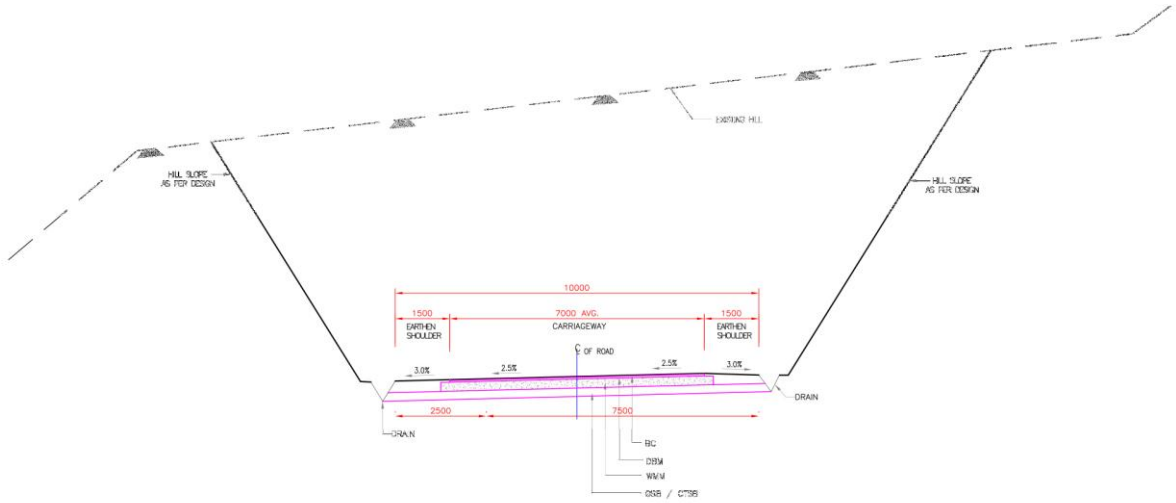
S.No.	Design Length(Km)	TCS Type	Remarks
1	7.10	1	Widening
2	6.22	2	New Construction
3	11.382	3	Box-Cut
4	0.825	4	Built-up



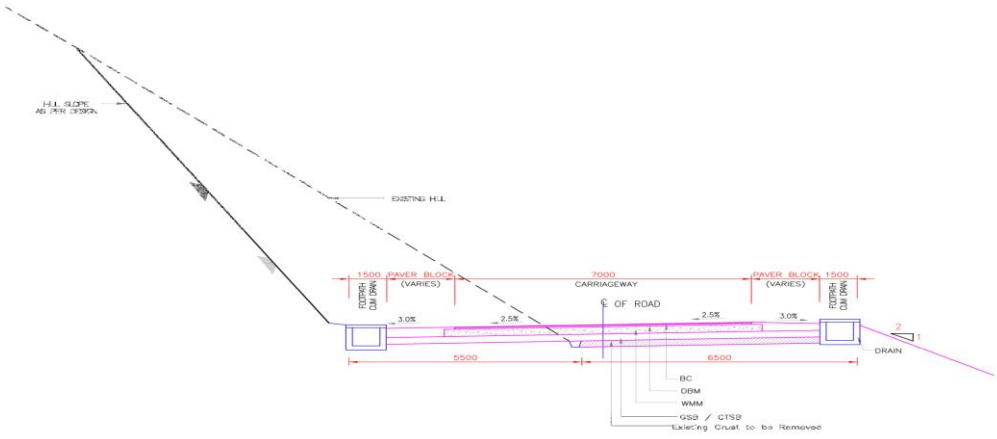
TCS–1 :– 2 LANE WITH EARTHEN SHOULDER FOR WIDENING



TCS–2 :– 2 LANE WITH EARTHEN SHOULDER FOR NEW CONSTRUCTION



TCS-3 :- 2 LANE WITH EARTHEN SHOULDER FOR BOX CUT SECTION



TCS -4 : 2 LANE WITH EARTHEN SHOULDER FOR BUILT-UP SECTION

3. Intersections and grade separators

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

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

(a) At-grade intersections

Major Intersection

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

Minor Intersection

S. No	Location of Intersections	Type of Intersection	Other Features
1	37+996	Y	market road
2	38+395	T	ODR.
3	38+545	T	To River
4	38+700	Y	Chibak Village
5	39+010	Y	To River
6	39+158	Y	ODR.
7	39+705	Y	Baghi Road
8	43+117	T	Bolkut Village
9	54+490	Y	Ganganagar
10	55+265	T	Soling Village

S. No	Location of Intersections	Type of Intersection	Other Features
11	55+337	Y	IBB Road

Note: All other junctions, if any, identified during the execution of the work shall be developed as per the extant guidelines and shall not be treated as change in scope of work.

At the locations of geometric improvements, the connectivity of built-up area, along existing road, with the proposed highway shall be provided. All such locations shall be finalized as per site requirement in consultation with Authority Engineer and it will not be treated as change in scope of work.

(b) Grade separated intersection with/without ramps

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

4. Road embankment and cut section

4.1 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment / cuttings shall conform to the standards and specifications given in Section 4 of the Manual and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

4.2 Box cut section

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

Sr. No.	Chainage		Total Length	Soil & Soft Rock	Hard Rock
	From	To			
1	30+170	30+190	20		20
2	30+220	30+360	140	140	
3	30+980	31+060	80	80	
4	31+290	31+310	20	20	

Sr. No.	Chainage		Total Length	Soil & Soft Rock	Hard Rock
	From	To			
5	31+360	31+560	200	200	
6	31+630	31+650	20	20	
7	32+300	32+620	320	320	
8	32+820	32+840	20	20	
9	33+040	33+120	80	80	
10	33+180	33+900	720	720	
11	33+940	33+960	20	20	
12	34+240	34+300	60		60
13	34+360	34+400	40		40
14	34+460	34+920	460		460
15	35+420	35+500	80		80
16	35+540	35+560	20		20
17	35+720	35+880	160		160
18	35+920	35+940	20		20
19	36+260	37+520	1260	280	980
20	38+140	38+520	380		380
21	38+640	38+660	20	20	
22	38+780	38+900	120	120	
23	39+060	39+140	80	80	
24	39+210	39+230	20	10	10
25	39+400	39+560	160		160
26	39+580	39+600	20		20
27	39+700	39+760	60	60	
28	39+850	39+870	20	20	
29	39+930	39+950	20	20	
30	40+010	40+030	20	20	
31	40+300	40+320	20	20	
32	40+490	40+510	20	20	
33	40+780	40+820	40	40	
34	40+940	40+980	40		40
35	41+780	42+120	340	120	220
36	42+220	42+640	420	420	
37	42+710	42+730	20	20	
38	42+880	43+000	120	120	
39	43+360	43+440	80	80	
40	43+660	43+780	120	120	
41	44+040	44+060	20	20	
42	44+150	44+170	20	20	
43	44+200	44+220	20	20	
44	44+400	44+460	60	60	

Sr. No.	Chainage		Total Length	Soil & Soft Rock	Hard Rock
	From	To			
45	44+520	44+600	80	80	
46	44+840	45+180	340	340	
47	45+280	45+500	220	220	
48	45+720	46+160	440	440	
49	46+190	46+210	20	20	
50	46+320	46+420	100	100	
51	47+060	47+140	80	80	
52	47+220	47+340	120	120	
53	47+480	47+620	140	140	
54	47+740	48+860	1120	1120	
55	48+970	48+990	20	20	
56	49+030	49+050	20	20	
57	49+130	49+150	20	20	
58	49+240	49+260	20	20	
59	49+290	49+310	20	20	
60	49+395	49+415	20	20	
61	49+440	49+480	40	40	
62	49+520	49+720	200	200	
63	49+860	50+260	400	400	
64	50+450	50+470	20	20	
65	50+560	50+660	100	100	
66	50+720	50+740	20	20	
67	50+880	50+920	40	40	
68	51+140	51+380	240	240	
69	51+420	51+460	40	40	
70	51+600	51+640	40	40	
71	51+700	51+740	40	40	
72	51+840	51+880	40	40	
73	51+940	51+980	40	40	
74	52+060	52+120	60	60	
75	52+180	52+220	40	40	
76	52+260	52+300	40	40	
77	52+380	52+420	40	40	
78	52+500	52+560	60	60	
79	52+640	52+720	80	80	
80	52+800	52+820	20	20	
81	53+080	53+220	140	140	
82	53+260	53+400	140	140	
83	53+540	53+660	120	120	
84	53+720	53+760	40	40	

Sr. No.	Chainage		Total Length	Soil & Soft Rock	Hard Rock
	From	To			
85	53+800	53+840	40	40	
86	53+940	54+000	60	60	
87	54+040	54+200	160	160	
88	54+280	54+360	80	80	
89	54+420	54+480	60	60	
90	54+520	54+560	40	40	
91	54+860	54+880	20	20	
92	54+960	55+060	100	100	

Note: i)Type of soil of existing cutting section shall be verified as per actual site conditions. Any variations in the type of soil specified in the table shall not constitute a Change of Scope or any deviation thereof.

ii) Contractor shall identify the locations and construct a boundary for proper disposal of cut material in consultation with Authority Engineer.

5. Pavement design

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

5.2 Type of pavement

Type of pavement shall be flexible.

5.3 Design requirements

Pavement design shall be as per Section 5 of IRC: SP 73-2018. Design of flexible pavement applies to the new carriageway and widening of existing carriageway. The methodologies recommended in IRC: 37-2018 shall be adopted.

5.3.1 Design Period and strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for minimum design period of 15 years. Stage construction shall not be permitted.

5.3.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of 10 million standard axles or as per actual traffic survey, whichever is higher.

5.4 Reconstruction of stretches

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

Sl No.	Chainage		Length
	From	To	
1	30+000	30+350	350
2	30+500	31+400	900
3	31+670	32+400	730
4	32+500	32+550	50
5	32+600	32+800	200
6	32+880	33+000	120
7	33+100	33+180	80
8	33+520	33+820	300
9	33+910	34+260	350
10	34+700	34+850	150
11	35+100	35+450	350
12	35+600	35+730	130
13	35+900	37+200	1300
14	37+350	37+610	260
15	37+900	38+400	500
16	39+250	39+600	350
17	39+800	39+920	120
18	40+130	41+700	1570
19	43+750	44+110	360
20	44+200	44+390	190
21	44+610	45+500	890
22	45+520	46+110	590
23	46+450	46+590	140
24	46+680	46+960	280
25	47+600	47+700	100
26	48+110	48+250	140
27	49+650	49+800	150

Sl No.	Chainage		Length
	From	To	
28	50+500	50+610	110
29	52+820	53+050	230
30	53+410	53+510	100
31	53+900	54+190	290
32	55+100	55+525	425
			11805

6. Roadside drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per stipulations of IRC SP: 42-2014.

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

S. No	Type of Drain	Length (Km	Remarks
1	Rectangular RCC Covered Drain	0.725	Provided in Built-up town areas
2	V-Shaped Lined Drain	30.600	Provided in soils & soft rock portions
3	V-Shaped Unlined drain	16.835	Provided in Hard rock Stretches

Lined Drain shall be provided in Soil & Soft Rock Areas and in hard rock stretches Unlined Drain shall be provided.

The EPC Contractor shall ensure proper functioning of the roadside drains by designing them as per site conditions and considering the outfall locations.

7. Design of structures

7.1 General

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

7.1.2 Width of the carriage way of new/Reconstruction bridge and structures shall be follows:

S No	Bridge at Km	Deck Width	Carriageway Width	Span Arrangement
1	30+425	12.9	10.5	1x12
2	38+562	12.9	10.5	1x24
3	41+825	12.9	10.5	1x12
4	43+155	12.9	10.5	1x10
5	43+325	12.9	10.5	1x16
6	47+185	12.9	10.5	1x30
7	49+080	12.9	10.5	1x10

S No	Bridge at Km	Deck Width	Carriageway Width	Span Arrangement
8	49+496	12.9	10.5	1x10
9	51+085	12.9	10.5	1x12
10	51+250	12.9	10.5	1x10
11	54+236	12.9	10.5	1x10
12	54+500	12.9	10.5	1x12
13	55+485	12.9	10.5	2x38.5

7.1.2 The following structures shall be provided with footpaths:

S. No.	Location at km	Remarks
NIL		

7.1.3 All bridges shall be high-level bridges

This shall be as per site condition

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

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

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

7.2 Culverts

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

7.2.2 Reconstruction of existing culverts:

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

S.No	Existing Chainage	Proposed Chainage	No of Span/Row	Length of Span/Dia	Proposed Type of Culvert
1	32+460	30+760	1	1	HPC
2	33+250	31+545	1	1	HPC
3	34+740	32+920	1	1	HPC
4	35+305	33+340	1	1	HPC
5	35+410	33+445	1	1	HPC
6	35+480	33+525	1	1	HPC
7	36+215	34+220	1	1	HPC
8	36+430	34+420	1	1	HPC
9	36+470	34+470	1	1	HPC
10	36+610	34+580	1	1	HPC
11	37+130	35+100	1	1	HPC
12	37+420	35+380	1	1	HPC
13	37+490	35+450	1	1	HPC
14	37+860	35+830	1	1	HPC
15	38+010	35+970	1	1	HPC
16	38+050	36+010	1	1	HPC
17	38+150	36+100	1	1	HPC
18	38+240	36+195	1	1	HPC
19	38+410	36+365	1	1	HPC
20	38+730	36+675	1	1	HPC
21	38+780	36+730	1	1	HPC
22	38+880	36+825	1	1	HPC
23	38+930	36+882	1	1	HPC
24	39+020	36+965	1	1	HPC
25	39+110	37+050	1	1	HPC
26	39+350	37+250	1	1	HPC
27	39+470	37+340	1	1	HPC
28	39+560	37+425	1	1	HPC
29	39+680	37+540	1	1	HPC

S.No	Existing Chainage	Proposed Chainage	No of Span/Row	Length of Span/Dia	Proposed Type of Culvert
30	40+050	37+920	1	1	HPC
31	40+120	37+985	1	1	HPC
32	40+170	38+035	1	1	HPC
33	40+470	38+332	1	1	HPC
34	40+520	38+375	1	1	HPC
35	40+795	38+688	1	1	HPC
36	40+810	38+700	1	1	HPC
37	40+970	38+855	1	1	HPC
38	41+320	39+150	1	1	HPC
39	41+830	39+662	1	1	HPC
40	41+985	39+815	1	1	HPC
41	42+045	39+880	1	6	Box
42	42+140	39+970	1	1	HPC
43	42+260	40+065	1	1	HPC
44	42+280	40+080	1	1	HPC
45	42+340	40+135	1	1	HPC
46	42+475	40+265	1	1.2	HPC
47	42+650	40+440	1	1.2	HPC
48	42+835	40+625	1	1.2	HPC
49	43+435	41+210	1	1.2	HPC
50	43+550	41+330	1	1.2	HPC
51	43+640	41+415	1	1.2	HPC
52	43+740	41+520	1	1.2	HPC
53	43+800	41+580	1	1.2	HPC
54	43+970	41+755	1	1.2	HPC
55	44+210	42+000	1	1.2	HPC
56	44+375	42+130	1	1.2	HPC
57	44+670	42+370	1	1.2	HPC
58	45+075	42+745	1	1.2	HPC
59	45+185	42+855	1	1.2	HPC
60	45+310	42+970	1	6	Box
61	45+820	43+500	1	1	HPC
62	45+900	43+585	1	1	HPC
63	45+965	43+645	1	3	Box
64	46+145	43+820	1	1.2	HPC

S.No	Existing Chainage	Proposed Chainage	No of Span/Row	Length of Span/Dia	Proposed Type of Culvert
65	46+240	43+910	1	1.2	HPC
66	46+450	44+120	1	1.2	HPC
67	46+530	44+185	1	1.2	HPC
68	46+580	44+230	1	1	HPC
69	46+860	44+485	1	1	HPC
70	46+990	44+630	1	1.2	HPC
71	47+090	44+720	1	1.2	HPC
72	47+820	45+280	1	1.2	HPC
73	48+075	45+510	1	1.2	HPC
74	48+440	45+882	1	1.2	HPC
75	48+645	46+115	1	1.2	HPC
76	48+855	46+220	1	1.2	HPC
77	48+925	46+295	1	6	Box
78	49+070	46+475	1	1.2	HPC
79	50+120	47+450	1	1	HPC
80	50+260	47+580	1	1.2	HPC
81	50+275	47+595	1	1.2	HPC
82	50+315	47+645	1	1.2	HPC
83	50+580	47+798	1	1.2	HPC
84	50+695	47+915	1	1.2	HPC
85	50+940	48+125	1	1.2	HPC
86	51+380	48+450	1	1.2	HPC
87	51+490	48+535	1	1.2	HPC
88	51+855	48+830	1	1	HPC
89	52+360	49+280	1	1	HPC
90	52+730	49+670	1	1.2	HPC
91	52+900	49+830	1	1.2	HPC
92	53+000	49+935	1	6	Box
93	53+230	50+150	1	3	Box
94	53+295	50+218	1	1	HPC
95	53+400	50+290	1	1	HPC
96	53+540	50+418	1	1.2	HPC
97	53+630	50+475	1	1.2	HPC
98	53+860	50+695	1	1.2	HPC
99	54+000	50+830	1	1.2	HPC

S.No	Existing Chainage	Proposed Chainage	No of Span/Row	Length of Span/Dia	Proposed Type of Culvert
100	54+160	50+950	1	6	Box
101	54+770	51+545	1	1.2	HPC
102	54+880	51+660	1	1.2	HPC
103	54+900	51+677	1	1.2	HPC
104	55+175	51+805	1	1	HPC
105	55+390	52+005	1	1	HPC
106	55+410	52+020	1	1	HPC
107	55+590	52+135	1	1	HPC
108	55+618	52+160	1	1	HPC
109	55+720	52+252	1	1	HPC
110	55+788	52+320	1	1	HPC
111	55+820	52+355	1	1	HPC
112	55+990	52+518	1	1	HPC
113	56+105	52+618	1	1.2	HPC
114	56+135	52+655	1	1.2	HPC
115	56+275	52+760	1	6	Box
116	56+330	52+830	1	1.2	HPC
117	56+365	52+855	1	1.2	HPC
118	56+530	53+020	1	1.2	HPC
119	56+570	53+060	1	4	Box
120	56+810	53+238	1	1.2	HPC
121	56+870	53+290	1	1.2	HPC
122	57+060	53+420	1	1.2	HPC
123	57+095	53+460	1	1.2	HPC
124	57+160	53+515	1	1.2	HPC
125	57+335	53+685	1	1.2	HPC
126	57+640	53+980	1	1.2	HPC
127	57+765	54+108	1	1.2	HPC
128	58+060	54+395	1	1.2	HPC
129	58+445	54+745	1	1.2	HPC
130	58+555	54+830	1	1.2	HPC
131	58+570	54+850	1	1.2	HPC
132	58+765	55+020	1	1.2	HPC
133	58+860	55+125	1	1.2	HPC

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

7.2.3 Widening of existing culverts

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

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

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

S.No	Proposed Chainage	No of Span/Row	Length of Span/Dia	Proposed Type of Culvert
1	32+810	1	1	HPC
2	33+175	2	1	HPC
3	33+655	2	1	HPC
4	37+290	1	1	HPC
5	38+415	1	3	Box
6	38+640	1	1	HPC
7	38+795	1	1	HPC
8	39+790	1	1	HPC
9	40+020	1	1	HPC
10	41+790	1	1.2	HPC
11	42+225	1	1.2	HPC
12	42+560	1	1.2	HPC
13	42+595	1	1	HPC

S.No	Proposed Chainage	No of Span/Row	Length of Span/Dia	Proposed Type of Culvert
14	42+690	1	1.2	HPC
15	43+045	1	1	HPC
16	43+070	1	3	Box
17	44+430	1	1.2	HPC
18	45+800	1	1	HPC
19	45+855	1	1	HPC
20	46+380	1	1.2	HPC
21	46+435	1	1	HPC
22	47+550	1	1.2	HPC
23	47+750	1	1.2	HPC
24	48+920	1	1.2	HPC
25	48+990	1	1.2	HPC
26	49+052	1	1.2	HPC
27	49+165	1	1.2	HPC
28	49+225	1	1.2	HPC
29	49+390	1	1.2	HPC
30	49+480	1	1.2	HPC
31	49+965	1	1.2	HPC
32	50+020	1	1.2	HPC
33	50+355	1	1	HPC
34	50+870	1	1.2	HPC
35	51+360	1	1.2	HPC
36	51+445	1	1.2	HPC
37	51+573	1	1	HPC
38	51+860	1	1	HPC
39	52+290	1	1	HPC
40	52+430	1	1	HPC
41	52+575	1	1	HPC
42	53+145	1	1.2	HPC
43	53+340	1	1.2	HPC
44	53+820	1	6	Box
45	53+875	1	1.2	HPC
46	54+265	1	1.2	HPC
47	54+330	1	1.2	HPC
48	54+815	1	1.2	HPC

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

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

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

7.3 Bridges

7.3.1 Existing bridges to be re-constructed/widened

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

S. No	Location (km)	Proposed Deck Width	Span Arrangement
1	55+485	12.90	2x38.5

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

(ii) The following narrow bridges shall be widened:

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

7.3.2 Additional new bridges

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

S No	Proposed Chainages	Span arrangement
1	30+425	1x12
2	38+562	1x24
3	41+825	1x12
4	43+155	1x10
5	43+325	1x16
6	47+185	1x30
7	49+080	1x10
8	49+496	1x10
9	51+085	1x12
10	51+250	1x10
11	54+236	1x10
12	54+500	1x12

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

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

Sl No	Location at Km	Type of bridge
NIL		

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

Sl No	Location at Km	Remarks
NIL		

7.3.5 Drainage system for bridge decks

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

7.3.6 Structures in marine environment

Nil

7.4 Rail-road bridges

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

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

Sl No	Location at Km	Length of Bridge
Nil		

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

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

7.5 Grade separated structures

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

7.6 Repairs and strengthening of structures

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

A – Bridges

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

B – ROB / RUB

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

C – Overpasses/Underpasses and other structures

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

7.7 List of Major Bridges and Structures

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

Sl No	Location at Km	Remarks
1	55+485	New Construction

8. Traffic control devices and road safety works

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

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

9. Roadside furniture

Roadside furniture shall be provided in accordance with the provisions of section 12 of the Manual.

9.1 Overhead traffic signs: location and size

S.No.	Design Chainage (km)	Remarks
NIL		

10. Compulsory afforestation

Total of 977 trees are identified to be affected in the proposed ROW. As per guideline, new trees to be planted by the concessionaire

11. Hazardous locations

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

S. No.	Location stretch from (km) to (km)	LHS/RHS
This shall be Provided as per manual. Minimum Length of Crash Barrier and parapet wall is 2670m and 11316m respectively.		

12. Special requirements for hill roads

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

Height (m)	Length (m)
3	200
4	400
5	500
6	600
Total	**1700**

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

Height (m)	Length (m)
1.5	740
2.5	340
3	140
4	300
6	720
Total	**2240**

13. Change of Scope

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

(Schedule B-1)

Improvement/Widening to 2-lane with Earthen Shoulders from Nongjri to Maheshkhola Package-2 (Design Chainage from km 30+000 to km 55+525)

Sr. No	Type of Utility	Unit	Quantity	Location/Stretch LHS/RHS
A	Electrical Utilities			
A1	**Shifting of 11KV lines from Nongjri to Maheshkhola**			
(i)	GI Pole 14.5 m (HD) long	Nos.	17.00	The details of items/quantities/works to be executed for shifting of utilities is tentative. All works/quantities/all miscellaneous items including necessary accessories, fittings, lead & lifts & manpower etc to be executed at site as per detailed estimate of utility owning department, without any additional claim/CoS.
(ii)	GI Pole 9.5 m long	Nos.	25.00	
(iii)	ACSR Weasel Conductor	kms	5.52	
(iv)	GI Wire 8 SWG (for cradle guard)	kg	765.00	
(v)	GI Stay wire 7/14 SWG	Nos.	120.00	
A2	**Shifting of LT lines from Nongjri to Maheshkhola**			
(i)	GI Pole 9.5 m long	Nos.	8.00	
(ii)	GI Pole 8.0 m long	Nos.	15.00	
(iii)	ACSR Squirel Conductor	kms	2.76	
(iv)	GI Wire 8 SWG (for cradle guard)	kg	770.00	
(v)	GI Stay wire 7/10 SWG	kg	360.00	
B	**Water/Sewage pipeline**			
B1	**Water supply pipeline (Public Health Engineering Dept., PHED)**			
a	**Labour charge for taking out GI pipe including fitting fixing GI specials complete as per specificaiton and as per directed**			The details of items/quantities/works to be executed for shifting of utilities is tentative. All works/quantities/all miscellaneous items including necessary accessories, fittings, lead & lifts & manpower etc to be executed at site as per detailed estimate of utility owning department, without any additional claim/CoS.
(i)	Khonjoy-A WSS: 40 mm Dia	meters	245.00	
(ii)	Rangdongai WSS; 40 mm Dia	meters	180.00	
(iii)	Rangdongai WSS; 15 mm Dia	meters	200.00	
(iv)	Chimasora-Maheshkhola comb. WSS: 25 mm Dia	meters	215.00	
(v)	Chimasora-Maheshkhola comb. WSS: 25 mm Dia	meters	190.00	
b	**Demolishing RCC works incuding stacking of steel bars and disposing of non-serviceable materials within 50m lead**	m3	98.81	

c	**Supplying including carriage within 8 km and laying in trenches including fitting fixing GI pipes complete with all GI fitting socket threaded nipple, reducing socket reducing trees including cutting, threading etc, with all jointing materials complete as directed excluding trenches & refilling of earth which will be paid extra as applicable as per current SoR. The fiitings will be paid extra except socket joints**			
(i)	Khonjoy-A WSS: 40 mm Dia	meters	245.00	
(ii)	Rangdongai WSS; 40 mm Dia	meters	180.00	
(iii)	Rangdongai WSS; 15 mm Dia	meters	200.00	
(iv)	Chimasora-Maheshkhola comb. WSS: 25 mm Dia	meters	215.00	
(v)	Chimasora-Maheshkhola comb. WSS: 25 mm Dia	meters	190.00	
d	**Re-construction of sedimentation tank**	L*B*H	2.6 x 1.6 x 1.5	
e	**Re-construction of slow sand filter**	L*B*H	3.8 x 3.8 x 1.5	
f	**Re-construction of clear water reservoir**	L*D	1.40 x 2.40	
g	**Re-construction of Intake structures (02 Nos)**	L*B*D	1.8 x 1.6 x 0.80	

Schedule – C

(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

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

a) toll plazas;

b) roadside furniture;

c) pedestrian facilities;

d) tree plantation;

e) truck lay-bys;

f) bus-bays and bus shelters;

g) rest areas;

2 Description of Project Facilities

Each of the Project Facilities is described below:

a) Toll Plaza:

Toll Plaza shall be designed as per the guidelines prescribed on following locations:-

Sr No	Project Facility	Toll Location (Design Ch.)	Design Requirements	Other Essential Details
NIL				

b) Roadside Furniture

The roadside furniture shall include the provision of the;

i. Traffic Signs

Traffic signs include roadside signs, overhead signs and curb mounted signs along the entire Project

Highway as per Section 9.2 of the Manual.

ii. Pavement Markings

Pavement markings shall cover road marking for the entire Project Highway as per Section 9.3 of the Manual.

iii. LED Traffic Blinkers

LED traffic blinker signal shall be provided on entire project length.

iv. Crash barrier

W-beam crash barrier shall be provided along the project highway at the locations as suggested in Manual.

v. Delineators

Delineators for the entire Project Highway at the locations as suggested in relevant IRC Manual shall be provided

vi. Boundary stones

For the entire Project Highway as suggested in Manual.

vii. Hectometer / Kilometer stones

For the entire Project Highway as suggested in Manual.

c) Pedestrian Facilities

The pedestrian facilities shall be provided as per Manual.

d) Tree Plantation

The landscaping and tree plantation shall be provided as per IRC:SP:21-2009.

e) **Truck Lay byes**:

Truck lay byes shall be provided at the following locations:-

S. No.	Design Chainage	Location
NIL		

f) Bus Stops

2 nos bus bays/stops shall be provided. The location of bus bays shall be finalized in consultation with Authority Engineer.

g) **Rest Areas :**NIL

Schedule – D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1. Construction

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

2. Design Standards

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

Manual of Standards and Specifications for Two Laning of State Highways published by the Indian Roads Congress – IRC: SP: 73-2018.

Annex – I

(Schedule-D)

Specifications and Standards for Construction

1 Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Two-Lane Highways published by IRC (referred to as "Manual" in this Schedule) and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2 Deviations from the Specifications and Standards

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

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

S. No.	Item	Description of deviation	Clause reference of IRC SP 73:2018
1	Minimum Desirable Radius	Details of curves with radius less than 150 are given in Appendix 1	Clause 2.9.4 Minimum desirable radius of horizontal curves is 150 m in mountaneous and steep terrain.
2	Width of carriageway	Roadway(Carriageway + Earthen Shoulders) width is 10m (7+1.5*2)	Fig. 2.8, 2.9 and 2.10. Roadway width shall be 11m,11m and 10.5m respectively.

S. No.	Item	Description of deviation	Clause reference of IRC SP 73:2018
3	Deck width of bridges	Deck width of bridges is 12m	Fig. 7.6 , deck width of bridges shall be 18m

Appendix 1

Sl. No.	HIPCH: (m)	Easting (m)	Northing (m)	Radius
1	30+118.291	49676.814	45330.516	70
2	30+198.648	49625.723	45268.797	70
3	30+452.188	49561.168	45025.531	150
4	30+871.825	49427.051	44631.72	60
5	31+017.017	49284.141	44707.258	50
6	31+128.972	49176.166	44691.029	35
7	31+246.133	49301.624	44602.205	40
8	31+357.914	49245.263	44498.434	70
9	31+451.574	49266.074	44406.601	100
10	31+535.155	49277.495	44324.507	40
11	31+635.878	49384.376	44337.37	40
12	31+763.959	49455.013	44229.795	50
13	31+845.291	49527.518	44193.254	50
14	31+918.529	49523.138	44115.591	50
15	31+999.699	49567.313	44047.63	80
16	32+137.619	49667.926	43955.251	40
17	32+244.041	49543.674	43909.114	40
18	32+332.123	49564.905	43819.026	100
19	32+453.227	49633.003	43719.366	50
20	32+527.380	49581.257	43658.449	70
21	32+617.823	49540.946	43577.636	60
22	32+777.737	49375.396	43606.975	50
23	32+862.356	49358.675	43509.915	80
24	32+995.475	49299.02	43391.18	50
25	33+064.236	49303.709	43322.727	50
26	33+169.172	49227.594	43248.307	100
27	33+238.147	49192.186	43189.159	150
28	33+291.341	49169.490	43141.214	50
29	33+346.584	49121.063	43114.461	70
30	33+475.789	49041.788	43013.201	50
31	33+621.399	49155.613	42908.965	50
32	33+793.245	49142.852	42738.596	50
33	33+853.414	49174.716	42687.464	70
34	33+919.412	49185.959	42622.342	130

Sl. No.	HIPCH: (m)	Easting (m)	Northing (m)	Radius
35	33+989.059	49205.982	42555.696	70
36	34+075.655	49160.743	42479.166	150
37	34+151.817	49148.545	42403.349	50
38	34+213.560	49106.269	42358.375	130
39	34+268.033	49073.564	42314.950	50
40	34+446.748	48908.848	42247.285	50
41	34+527.627	48955.796	42160.815	50
42	34+588.640	48951.676	42099.888	150
43	34+733.437	48957.758	41955.344	100
44	34+959.127	48771.463	41818.326	100
45	35+096.524	48775.683	41675.867	150
46	35+332.813	48823.891	41446.603	55
47	35+475.430	48673.258	41427.221	55
48	35+587.026	48661.842	41311.645	50
49	35+742.470	48542.877	41210.975	60
50	35+886.738	48690.164	41126.139	100
51	35+960.277	48742.963	41074.831	100
52	36+051.080	48825.983	41038.179	50
53	36+108.465	48852.038	40986.837	50
54	36+192.702	48917.908	40934.655	70
55	36+243.758	48967.549	40922.487	130
56	36+302.900	49021.204	40897.762	70
57	36+352.872	49055.906	40861.825	50
58	36+418.932	49115.525	40833.862	50
59	36+497.197	49133.429	40756.273	50
60	36+982.650	49530.481	40477.549	50
61	37+042.978	49590.700	40475.946	50
62	37+182.652	49702.340	40392.322	60
63	37+257.885	49775.851	40418.316	50
64	37+349.993	49863.903	40392.749	50
65	37+482.187	49923.347	40274.482	100
66	37+559.290	49980.157	40222.222	70
67	37+624.760	49989.146	40156.070	50
68	37+674.418	50013.233	40112.743	70
69	37+776.971	50024.276	40011.079	50
70	37+851.905	49979.158	39950.979	50
71	37+911.826	49988.067	39890.989	70
72	37+968.131	49981.152	39835.115	70
73	38+095.048	50028.921	39717.333	150
74	38+423.632	50245.777	39472.838	150
75	38+504.980	50307.009	39420.399	40
76	38+612.908	50240.226	39329.501	50
77	38+723.649	50273.876	39223.813	55
78	38+864.610	50419.837	39249.290	100
79	38+918.724	50466.801	39276.144	70

Sl. No.	HIPCH: (m)	Easting (m)	Northing (m)	Radius
80	39+021.940	50568.914	39280.851	40
81	39+102.669	50586.919	39198.777	50
82	39+155.586	50628.508	39165.313	70
83	39+223.193	50674.951	39116.268	100
84	39+299.321	50746.221	39088.716	100
85	39+383.312	50805.984	39030.144	70
86	39+453.280	50818.052	38961.286	150
87	39+539.140	50840.954	38878.656	70
88	39+633.377	50832.517	38784.609	50
89	39+719.402	50891.301	38720.615	50
90	39+929.591	50779.281	38537.617	100
91	40+191.049	50685.368	38294.209	100
92	40+270.212	50622.504	38245.844	130
93	40+327.171	50570.400	38222.829	100
94	40+424.739	50498.675	38156.701	70
95	40+494.604	50435.145	38127.687	100
96	40+579.316	50385.092	38058.615	100
97	40+865.781	50132.529	37924.751	150
98	40+938.824	50062.015	37905.896	100
99	41+797.608	49343.684	37437.351	70
100	41+874.258	49312.603	37368.169	40
101	41+965.362	49377.987	37302.453	40
102	42+057.651	49320.771	37226.335	50
103	42+140.053	49238.358	37219.216	50
104	42+269.609	49183.942	37098.366	30
105	42+403.573	49135.729	37254.245	30
106	42+539.142	49058.602	37120.472	50
107	42+605.626	48995.921	37096.708	50
108	42+728.550	48902.516	37018.175	40
109	42+834.714	48905.718	37173.280	50
110	42+971.572	48798.730	37257.195	50
111	43+117.484	48682.970	37170.544	40
112	43+223.000	48678.992	37065.799	40
113	43+290.589	48623.234	37027.455	40
114	43+384.931	48601.999	36937.156	40
115	43+454.234	48670.449	36911.790	50
116	43+503.428	48709.566	36882.098	70
117	43+558.269	48761.103	36863.331	70
118	43+652.254	48821.303	36790.780	50
119	43+745.498	48906.282	36752.731	150
120	43+812.951	48971.603	36736.057	100
121	43+943.727	49068.524	36647.761	130
122	44+019.801	49141.505	36624.264	50
123	44+071.384	49175.425	36585.439	70
124	44+144.653	49234.688	36543.241	50

Sl. No.	HIPCH: (m)	Easting (m)	Northing (m)	Radius
125	44+265.077	49254.851	36425.197	100
126	44+405.594	49351.003	36321.419	50
127	44+510.370	49289.738	36227.844	50
128	44+632.723	49392.223	36144.735	70
129	44+694.989	49452.361	36128.673	70
130	44+747.320	49493.343	36095.934	70
131	44+940.206	49681.502	36055.158	130
132	45+175.934	49911.112	36100.335	40
133	45+267.484	49840.760	35987.651	50
134	45+344.422	49835.971	35911.087	80
135	45+444.594	49870.345	35817.169	100
136	45+506.317	49908.366	35768.568	100
137	45+666.792	49969.913	35621.530	50
138	45+756.732	50058.026	35606.709	100
139	45+821.370	50118.616	35584.251	100
140	45+905.707	50202.651	35579.067	50
141	46+010.185	50234.563	35476.698	70
142	46+190.924	50156.644	35316.978	35
143	46+391.994	50068.386	35526.230	40
144	46+450.680	50042.405	35341.744	50
145	46+619.188	49967.508	35191.300	50
146	46+688.545	49900.306	35170.857	50
147	46+802.003	49826.450	35084.838	100
148	46+878.456	49757.822	35050.848	50
149	47+008.116	49714.472	34921.664	40
150	47+120.809	49605.405	34987.630	40
151	47+249.007	49573.790	34851.156	40
152	47+359.409	49682.819	34817.754	40
153	47+454.738	49630.773	34719.415	40
154	47+598.179	49733.574	34618.938	50
155	47+740.573	49873.841	34632.305	50
156	47+830.761	49931.142	34563.319	50
157	47+972.419	50067.636	34525.481	100
158	48+050.780	50125.375	34472.961	50
159	48+131.890	50118.048	34391.029	50
160	48+312.865	50257.937	34275.591	50
161	48+443.890	50170.854	34172.003	50
162	48+544.922	50184.676	34073.004	80
163	48+690.417	50265.004	33952.318	50
164	48+779.550	50181.304	33899.297	50
165	48+845.934	50122.371	33933.655	50
166	48+902.380	50066.238	33938.517	50
167	48+959.228	50020.898	33972.846	100
168	49+040.970	49945.091	34001.936	40
169	49+111.171	49885.215	33966.488	50

Sl. No.	HIPCH: (m)	Easting (m)	Northing (m)	Radius
170	49+187.379	49848.241	33900.408	40
171	49+273.655	49761.902	33926.689	50
172	49+361.366	49685.373	33880.911	40
173	49+448.177	49620.193	33943.093	40
174	49+554.959	49522.362	33903.781	40
175	49+656.918	49567.717	33806.495	50
176	49+790.747	49514.166	33686.301	50
177	49+995.996	49326.881	33782.872	50
178	50+092.774	49389.451	33589.212	50
179	50+175.094	49344.778	33518.331	50
180	50+287.870	49387.565	33412.944	80
181	50+385.167	49459.266	33347.416	50
182	50+514.533	49470.686	33218.702	100
183	50+625.012	49409.403	33126.580	50
184	50+696.325	49336.367	33133.262	50
185	50+758.223	49276.255	33119.329	50
186	50+830.311	49215.800	33160.334	50
187	50+890.763	49155.304	33153.210	50
188	50+944.060	49103.997	33167.133	50
189	51+029.802	49024.346	33137.422	50
190	51+124.499	49044.657	33036.318	30
191	51+204.163	48987.127	32983.095	30
192	51+308.219	49051.713	32903.654	50
193	51+461.003	49191.864	32978.769	40
194	51+527.482	49162.851	32860.772	50
195	51+584.973	49169.305	32803.736	50
196	51+663.129	49138.211	32732.123	50
197	51+744.101	49193.782	32667.738	50
198	51+832.569	49185.350	32578.714	50
199	51+958.166	49295.301	32512.074	50
200	52+022.087	49327.139	32456.800	50
201	52+109.268	49403.938	32415.664	50
202	52+301.723	49354.435	32222.943	60
203	52+512.001	49572.528	32194.062	50
204	52+586.659	49636.513	32156.741	50
205	52+663.447	49709.642	32178.221	100
206	52+787.701	49832.016	32172.963	50
207	52+885.129	49847.443	32075.474	100
208	52+990.253	49886.252	31978.273	70
209	53+097.299	49981.255	31929.561	50
210	53+177.820	49997.982	31851.335	50
211	53+246.695	50038.757	31795.998	50
212	53+336.630	50016.531	31707.636	50
213	53+530.839	50141.939	31558.167	50
214	53+616.202	50127.413	31473.415	50

Sl. No.	HIPCH: (m)	Easting (m)	Northing (m)	Radius
215	53+777.316	50214.321	31340.217	50
216	53+919.428	50103.573	31247.804	50
217	54+021.346	50107.116	31147.990	50
218	54+096.264	50164.918	31101.136	100
219	54+188.914	50220.505	31027.040	70
220	54+293.848	50323.610	31002.714	40
221	54+380.549	50311.527	30911.816	50
222	54+455.171	50352.268	30848.620	40
223	54+535.661	50315.505	30776.908	70
224	54+653.599	50220.871	30707.053	50
225	54+737.896	50250.013	30622.301	50
226	54+837.688	50207.405	30532.238	50
227	54+947.844	50101.499	30501.250	50
228	55+029.717	50060.060	30430.107	50
229	55+147.210	49940.567	30427.677	50
230	55+268.555	49887.721	30320.272	40
231	55+359.083	49926.217	30238.642	70

SCHEDULE - E
(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

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

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

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

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

shall be determined by the Authority's Engineer and conveyed to the Contractor and the Authority with reasons thereof.

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm indepth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82- 2015
	Bleeding	Nil	< 0.1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Raveling / Stripping	Nil	< 0.1 % of area	Daily			7-15 days	IRC:82- 2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily	Scale, Tape, odometer etc.			IRC:82- 2015
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-			180 days	BS: 7941-1: 2006

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

Embankment/ Slope	Edge drop at shoulders	Nil	40 mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe side slope	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

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

Table -2: Maintenance Criteria for Rigid Pavements:

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

			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected. Portion with norms and specifications - See Para 5.5 & 9.2
			5	w > 6 mm, usually associated with spelling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Within 15days
3	Single Longitudinal Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > l m. Within 15 days	
			3	w = 3.0 – 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4

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

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

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

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

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

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

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

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

			5	h > 100 mm	Reinstate pavement at normal level if length < 20 m. Within 30 days	
17	Bump	h = vertical displacement from normal profile	0	h < 4 mm	No action	
			1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			4	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level			**Short Term**	**Long Term**
			0	Nil, not discernible < 3mm	No Action	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		

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

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

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

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.			Monthly	Manual Measurements with O dometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments. In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP 84-2014
		Design Speed, kmph	**Desirable Minimum Sight Distance (m)**	**Safe Stopping Sight Distance (m)**					
		100	360	180					
		80	260	130					

<table>
<tr><td>Pavement Marking</td><td>Wear</td><td><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m2/lux
Bituminous Road - 100mcd/m2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td rowspan="6">Night Time Visibility</td><td colspan="3"><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u></td><td rowspan="6">Bi-Annually</td><td rowspan="6">As per Annexure-E of IRC:35-2015</td><td rowspan="6">Re - painting</td><td rowspan="6">Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months</td><td rowspan="6">IRC:35-2015</td></tr>
<tr><td></td><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m2/lux)</td></tr>
<tr><td></td><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td></td><td>65-100</td><td>250</td><td>120</td></tr>
<tr><td></td><td>Above 100</td><td>350</td><td>150</td></tr>
<tr><td></td><td colspan="3">Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</td></tr>
<tr><td>Road Signs</td><td>Shape and Position</td><td>Shape and Position as per IRC:67-2012.
Signboard should be clearly visible for
the design speed of the section.</td><td>Daily</td><td>Visual with video/image backup</td><td>Improvement of shape, in case if shape is damaged.

Relocation as Per</td><td>48 hours in case of Mandatory Signs, Cautionary and Informatory</td><td>IRC:67-2012</td></tr>
</table>

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

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

				with luxmeter			
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, busshelters, cattle crossings, Traffic Aid Posts,		Daily	-	Rectification	15 days	IRC:SP 84-2014

and Approach roads	Medical Aid Posts and other works					

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

		sq.m. Cracks wider than 0.3 mm not more than 1m aggregatelength		the defects			
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concreteapron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge -Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-	Repairs and replacement of safety barriers as the case may be	**3** days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

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

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

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

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

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g) [Toll Plaza]		
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a) Superstructure		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b) Foundations		
(i)	Scouring and/or cavitation	15 (fifteen) days
(c) Piers, abutments, return walls and wing walls		
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d) Bearings (metallic) of bridges		
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e) Joints		
(i)	Malfunctioning of joints	15 (fifteen) days
(f) Other items		
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(vi)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g) Hill Roads		
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(iii)	Snow requiring clearance	24 (twenty four) hours
[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]		

SCHEDULE - F
(See Clause 3.1.7(a))

APPLICABLE PERMITS

1 Applicable Permits

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

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

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

(c) License for use of explosives;

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

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

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

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

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

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

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

SCHEDULE – G

(See Clauses 7.1 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

(See Clause 7.1)

[Performance Security/Additional Performance Security]

[DG(RD)&SS,

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

WHEREAS:

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

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

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

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

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

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

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

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

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

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

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for

the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

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

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

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

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

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

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

S. No	**Particulars**	**Details**

.		
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Syndicate Bank transport Bhawan, 1st Parliament Street, New Delhi-110001

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

SIGNED, SEALED AND DELIVERED

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

NOTES:

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

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

Annex – II
(Schedule - G)
(See Clause 19.2)

Form for Guarantee for Withdrawal of Retention Money

[DG(RD)&SS,

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

WHEREAS:

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

(B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing *@Bank Rate + 3%* advance payment (herein after called "Advance Payment") equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs. ------ cr. (Rupees ------ crore) and the amount of this Guarantee is Rs. ------- cr. (Rupees ------ crore) (the "Guarantee Amount")$.

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid instalment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
   A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed

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

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

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

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

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

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

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

8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the

power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

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

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

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

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

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

5	Beneficiary Bank Address	Syndicate Bank transport Bhawan, 1st Parliament Street, New Delhi-110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(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 percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road works including culverts, widening and repair of culverts.	59.55%	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of the sub-grade	18.14%
		(2) Sub-base Course	6.41%
		(3) Non Bituminous Base Course	3.94%
		(4) Bituminous Base Course	0.83%
		(5) Wearing Coat	3.41%
		(6) Widening and repair of culvert	0.00%
		B1- Reconstruction/ New 2-Lane realignment/bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	33.69%
		(2) Sub-base Course	9.61%
		(3) Non Bituminous Base Course	5.91%
		(4) Bituminous Base Course	1.01%
		(5) Wearing Coat	4.17%
		B2- Reconstruction/ New 2-Lane realignment/bypass (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) Course	0.00%

		C1- Reconstruction/ New Service Road (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-base Course	0.00%
		(3) Non Bituminous Base Course	0.00%
		(4) Bituminous Base Course	0.00%
		(5) Wearing Coat	0.00%
		C2- Reconstruction/ New Service Road (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) Course	0.00%
		D - Re-Construction and new culverts on existing road, realignments on existing road, realignments,bypasses:	
		Culverts(Length<6m)	12.90%
Minor Bridges/Underpasses/Overpasses	10.70%	**A1-<u>Widening and Repairs of Minor Bridges (Length>6m and <60m)</u>**	
		Minor bridges	0.00%
		A2-New <u>Minor Bridges (Length>6m and <60m)</u>	
		(1) Foundation+Sub Structure: On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap	62.00%
		(2) Super Structure: On completion of the super structure in all respect includong wearing coat, bearings, expansion joints, hand rails, crash barriers,road sign & markings, tests on completion etc. complete in all respect,	33.00%

		(3) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use	5.00%
		(4) Guide Bund and River Training Works: On completion of Guide Bund and River Training Works complete in all respect.	0.00%
		B.1- Widening and repair of Underpasses/overpasses Underpasses/Overpasses	0.00%
		B.2- New Underpasses/overpasses **(1) Foundation+Sub Structure:** On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap	0.00%
		(2) Super Structure: On completion of the super structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers,road sign & markings, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass- wearing coat including expansion joint complete in all respect as specified and (b) in case of underpass rigid pavement including drainage facility complete in all respects as specified.	0.00%
		(3) Approaches: On completion of approaches including Retaining Walls, stone pitching, protection works complete in all respect and fit for use	0.00%
Major Bridge	2.82%	**A.1 -<u>Widening and repairs of Major</u>**	

(length>60m) works and RUB/ROB/elevated sections/flyovers including viaducts, if any		**Bridges**	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing coat including expansion joints	0.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Guide bunds, River Training Works etc	0.00%
		(8) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		A.2 -New Major Bridges	
		(1) Foundation	40.00%
		(2) Sub-structure	17.00%
		(3) Super-structure (including bearings)	33.00%
		(4) Wearing Coat including expansion joints	5.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	5.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Guide bunds, River Training Works etc	0.00%
		(8) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		B.1-Widening and repair of	
		(a) ROB	
		(b) RUB	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respects as specified.	0.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%

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

		(6) Wing walls/Return Walls	0.00%
		(7) Approaches (including retaining walls, stone pitching and protection works)	0.00%
Other works	26.23%	(i) Toll Plaza	0.00%
		(ii)Road side drains	8.75%
		(iii)Road signs, markings, km stones, safety devices, …	14.50%
		(iv)Project facilities	0.00%
		a) Bus bays	1.06%
		b) Truck lay bye	0.00%
		c) Rest Areas	0.00%
		d) Others(Junction and Site Clearance)	4.53%
		(v)Road side plantation	0.00%
		(vi) Repair of protection works other than approaches to the bridges, elevated sections/ flyovers/grade separators and ROBs/RUBs	0.00%
		(vii)Safety and traffic management during construction	0.00%
		(viii)Protection works(Includes retaining wall and breast wall)	71.16%
Utiltiy Shifting	0.71%	PHED	73.71%
		Electric Shifting	26.29%
		Others	

1.3 Procedure of estimating the value of work done.

1.3.1 Road works

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

Table 1.3.1

Stage of Payment	**Percentage - weightage**	**Payment Procedure**
A- Widening and strengthening of existing road		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 5 (five) percent of the total length.
(1) Earthwork up to top of the sub-grade	18.14%	
(2) Sub-base Course	6.41%	
(3) Non Bituminous Base Course	3.94%	
(4) Bituminous Base Course	0.83%	

(5) Wearing Coat	3.41%	
(6) Widening and repair of culvert	0.00%	Cost of ten completed culverts shall be determined pro rate with respect to the total number of culverts. Payment shall be made on the completion of atleast one culverts.
B1- Reconstruction/ New 2-Lane realignment/bypass (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 0.5 (zero point five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	33.69%	
(2) Sub-base Course	9.61%	
(3) Non Bituminous Base Course	5.91%	
(4) Bituminous Base Course	1.01%	
(5) Wearing Coat	4.17%	
B2- Reconstruction/ New 2-Lane realignment/bypass (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 0.5 (zero point five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	
C1- Reconstruction/ New Service Road (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 0.5 (zero point five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-base Course	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing Coat	0.00%	
C2- Reconstruction/ New Service Road (Rigid Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 0.5 (zero point five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-base Course	0.00%	

(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	
D - Re-Construction and new culverts on existing road, realignments on existing road, realignments,bypasses:		Cost of ten completed culverts shall be determined pro rate with respect to the total number of culverts. Payment shall be made on the completion of atleast one culverts.
Culverts(Length<6m)	12.90%	

@ For calculation of payment stage for main carriageway the project length shall be converted into equivalent 2 lane length . For example, if the total length of 4 lane main carriageway is 100km , then the equivalent length for calculation of payment stage will be 2x100km. Now, if the total length of bituminous work to be done is 100km, the cost per km of bituminous work shall be determined as follows :

Cost per km = P x weightage for road work x weightage for bituminous work x (1/L)
Where P = Contract Price
L = Total equivalent 2-Lane length in km as defined above.

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

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

1.3.2 Minor Bridge and Underpasses/Overpasses

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

Table 1.3.2

Stage of Payment	Percentage - weightage	Payment Procedure
1	2	3
A1-<u>Widening and Repairs of Minor Bridges (Length>6m and <60m)</u>	0.00%	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of widening and repair works of a minor bridge.
A2-New <u>Minor Bridges</u> **(i) Foundation+Sub Structure:** On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap	62.00%	**(i) Foundation+Sub Structure:** Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation+sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation+ sub structure of each bridge subject to completion of atleast two foundations along with sub structure upto abutment/pier cap level of each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Super Structure: On completion of the super structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers,road sign & markings, tests on completion etc. complete in	33.00%	**(ii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure of atleast one span in all respect as specified in the column of " Stage of Payment" in this sub clause.

all respect, **(iii) Approaches:** On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use **(iv) Guide Bund and River Training Works:** On completion of Guide Bund and River Training Works complete in all respect.	5.00% 0.00%	**(iii) Approaches:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of " Stage of Payment" in this sub clause. **(iv) Guide Bund and River Training Works:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of Guide Bunds and River Training Works in all respect as specified.
B.1- Widening and repair of Underpasses/overpasses	0.00%	Cost of each overpass/underpass shall be determined on pro rata basis with respect to the total linear length of the underpass/overpass. Payment shall be made on the completion of wiening & repair works of a underpass/overpass.
B.2- New Underpasses/overpasses **(i) Foundation+Sub Structure:** On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap **(ii) Super Structure:**	0.00%	**(i) Foundation+Sub Structure:** Cost of each Underpass/Overpass shall be determined on pro rata basis with respect to the total linear length (m) of the Underpass/Overpass. Payment against foundation+sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation+ sub structure of each Underpass/Overpass subject to completion of atleast two foundations along with sub structure upto abutment/pier cap level of each Underpass/Overpass. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified. **(ii) Super Structure:**

On completion of the super structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers,road sign & markings, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass- wearing coat including expansion joint complete in all respect as specified and (b) in case of underpass rigid pavement including drainage facility complete in all respects as specified.	0.00%	Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure of atleast one span in all respect as specified in the column of " Stage of Payment" in this sub clause.
(iii) Approaches: On completion of approaches including Retaining Walls, stone pitching, protection works complete in all respect and fit for use	0.00%	**(iii) Approaches:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of " Stage of Payment" in this sub clause.

Major Bridge Works, ROB/RUB and Structures

Stage of Payment	Percentage - weightage	Payment Procedure
1	2	3
A1-Widening and Repairs of Major Bridges		
(i) Foundation:	0.00%	**(i) Foundation:** Cost of each Major bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major bridges. Payment against foundation shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation of Major Bridge subject to completion of atleast two foundationsof the Major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:		**(ii) Sub Structure:**

	0.00%	Payment against sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of sub structure of Major Bridge subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the major bridge.
(iii) Super Structure (including bearings)	0.00%	**(iii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respect as specified.
(iv) Wearing Coat including expansion joints.	0.00%	**Wearing Coat** Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous** Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.
(vi) Wing walls/Return Walls	0.00%	**(vi) Wing walls/Return Walls** Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Guide bunds, River Training Works etc	0.00%	**(vii) Guide bunds, River Training Works etc** Payment shall be made on completion of all Guide bunds/River Training Works etc. complete in all respect as specified.
(viii) Approaches (including retaining walls, stone pitching and protection works)	0.00%	**(viii) Approaches:** Payment shall be made on completion of both approaches including stone pitching, protection works,etc. complete in all respects as specified.

1.3.3 Major Bridge Works, ROB/RUB and Structures.

Procedure for estimating the value of Major Bridge Works, ROB/RUB and Structures work shall be

as stated in table 1.3.3:

Table 1.3.3

Stage of Payment	Percentage - weightage	Payment Procedure
1	2	3
(i) Foundation:	40.00%	**(i) Foundation:** Cost of each Major bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major bridges. Payment against foundation shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation of Major Bridge subject to completion of atleast two foundationsof the Major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:	17.00%	**(ii) Sub Structure:** Payment against sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of sub structure of Major Bridge subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the major bridge.
(iii) Super Structure (including bearings)	33.00%	**(iii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respect as specified.
(iv) Wearing Coat including expansion joints.	5.00%	**Wearing Coat** Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.	5.00%	**(v) Miscellaneous** Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.
(vi) Wing walls/Return Walls	0.00%	**(vi) Wing walls/Return Walls** Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.

(vii) Guide bunds, River Training Works etc	0.00%	**(vii) Guide bunds, River Training Works etc** Payment shall be made on completion of all Guide bunds/River Training Works etc. complete in all respect as specified.
(viii) Approaches (including retaining walls, stone pitching and protection works)	0.00%	**(viii) Approaches:** Payment shall be made on completion of both approaches including stone pitching, protection works,etc. complete in all respects as specified.
B1 - Widening and repairs of **(a) ROB** **(b) RUB**		
(i) Foundation:	0.00%	**(i) Foundation:** Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB. Payment against foundation shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation of ROB/RUB subject to completion of atleast two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:	0.00%	**(ii) Sub Structure:** Payment against sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of sub structure of ROB/RUB subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the ROB/RUB.
(iii) Super Structure (including bearings)	0.00%	**(iii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respect as specified.
(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage		**(iv) Wearing Coat:**

facility as specified.		
	0.00%	Payment shall be made on completion of (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respects as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.		**(v) Miscellaneous**
	0.00%	Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.
(vi) Wing walls/Return Walls		**(vi) Wing walls/Return Walls**
	0.00%	Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Approaches (including retaining walls, stone pitching and protection works)		**(viii) Approaches:**
	0.00%	Payment shall be made on completion of both approaches including stone pitching, protection works,etc. complete in all respects as specified.
B2 - New **(a) ROB** **(b) RUB**		
(i) Foundation:	0.00%	**(i) Foundation:** Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB. Payment against foundation shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation of ROB/RUB subject to completion of atleast two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:		**(ii) Sub Structure:**

	0.00%	Payment against sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of sub structure of ROB/RUB subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the ROB/RUB.
(iii) Super Structure (including bearings)	0.00%	**(iii) Super Structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respect as specified.
(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified.	0.00%	**(iv) Wearing Coat:** Payment shall be made on completion of (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respects as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous** Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.
(vi) Wing walls/Return Walls	0.00%	**(vi) Wing walls/Return Walls** Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Approaches (including retaining walls, stone pitching and protection works)	0.00%	**(viii) Approaches:** Payment shall be made on completion of both approaches including stone pitching, protection works,etc. complete in all respects as specified.
C1 - Widening and repairs of Elevated Section/Flyovers/		

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

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

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

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

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

1.3.4 Other works.

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Toll Plaza	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(ii)Road side drains	8.75%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 05% (five per cent) of the total length.
(iii)Road signs, markings, km stones, safety devices, etc.	14.50%	
(iv)Project facilities	0.00%	Payment shall be made on pro rata basis for completed facilities.
a) Bus Bays	1.06%	
b) Truck Lay Bye	0.00%	
c) Rest Areas	0.00%	
d) Others(Junctions and site clearance)	4.53%	
(v)Road side plantation	0.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a

(vi) Repair of Protection works other than approaches to the bridges, elevated sections/ flyovers/ grade separators and ROBs/RUBs.	0.00%	stage in a length of not less than 05% (five per cent) of the total length.
(vii) Safety and traffic management during construction	0.00%	Payment shall be made on prorate basis every six month.
(viii)Protection works(Includes retaining wall, breast wall and gabion structure for muck disposal)	71.16%	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 per cent) of the total length.

1.3.5 Utility Shifting

Procedure for estimating the value of Utility shifting works done shall be as stated in table 1.3.5:

Stage of Payment	**Weightage**	**Payment Procedure**	
PHED	73.71%	Payment is divided in following activities and Payment of each activity shall be made on pro rata basis on completion of 5km of linear project length.	
		Removal of existing utility	30%
		Erection/Laying	30%
		Commissioning	40%
Electric Utility Shifting	26.29%	Dismantling will include proper listing and stocking of usable and non-usable items. Commissioning will be completed on furnishing the commissioning certificate from concerned utility owning department.	
Water resource shifting	0.00%		

2. Procedure for payment for Maintenance

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

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

SCHEDULE - J
(See Clause 10.3(ii))

PROJECT COMPLETION SCHEDULE

1 Project Completion Schedule

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

2 Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the 192nd (One hundred and ninety second) day from the Appointed Date (the "**Project Milestone-I**").

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

3 Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the 329th (Three hundred and Twenty Ninth) day from the Appointed Date (the "**Project Milestone-II**").

(ii) Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 35% (thirty per cent) of the Contract Price and should have started construction of all bridges.

4 Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the 466th (Four hundred and sixty sixth) day from the Appointed Date (the "**Project Milestone-III**").

(ii) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 70% (sixty per cent) of the Contract Price and should have started construction of all project facilities.

5 Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the 548th (Five Hundred and forty eighth) day from the Appointed Date.

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

6 Extension of time

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

SCHEDULE - K
(See Clause 12.1 (ii))

Tests on Completion

1 Schedule for Tests

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

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

2 Tests

(i) Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [***].

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

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

(iv) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and standards, except tests as specified in clause 5,but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.

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

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

3 Agency for conducting Tests

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

4 Completion Certificate

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

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

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

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

Schedule – L

(See Clause 12.2)

Completion Certificate

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated …… (the "**Agreement**"), for **"Improvement/widening to Two-laning with earthen shoulder of Nongjri (Design Ch. 30.00km) to Maheshkola (Design Ch. 55.525km)[R-M-B Package-II] on SH-4 section of Ranikor-Maheshkhola-Baghmara Project in the state of Meghalaya on EPC basis"** (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through ……. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

For and on behalf of

the Authority's Engineer by:

(Signature)

(Name)

(Designation)

(Address)

SCHEDULE - M

(See Clauses 14.6, 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

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

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

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

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

2. Percentage reductions in lump sum payments

- The following percentages shall govern the payment reduction:

S. No.	**Item/Defect/Deficiency**	**Percentage**
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate crossfall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
S. No.	**Item/Defect/Deficiency**	**Percentage**
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%

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

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

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

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

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

L1 = Non-complying length

L = Total length of the road,

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

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

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

SCHEDULE - N
(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

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

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

2 Terms of Reference

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

3 Appointment of Government entity as Authority's Engineer

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

Annex – I
(Schedule - N)

TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

1 Scope

(i) These Terms of Reference (the "TOR") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "Agreement), which has been entered into between the NHIDCL(the "Authority") and ..... (the "Contractor")# **"Improvement/widening to Two-laning with earthen shoulder of Nongjri (Design Ch. 30.00km) to Maheshkola (Design Ch. 55.525km)[R-M-B Package-II] on SH-4 section of Ranikor- Maheshkhola-Baghmara Project in the state of Meghalaya on 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) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding Rs. 5,000,000 (Rs. fifty lakh).

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

(iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and

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

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

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

4 **Construction Period**

(i) During the Construction Period, the Authority's Engineer shall review and approve the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1 (vi). The Authority's Engineer shall complete such review and approval and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

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

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

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

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

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

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

(viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such

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

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

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

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

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

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

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

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

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

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

5. Maintenance Period

(i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.

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

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

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

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

6 Determination of costs and time

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

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

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

7. Payments

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

(ii) Authority's Engineer shall –

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

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

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

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

8. Other duties and functions

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

9 Miscellaneous

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

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

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

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

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

SCHEDULE – O

(See Clauses 19.4.1, 19.6.1, and 19.8.1)

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with Clause 19.3(i) subsequent to the last claim;
(b) amounts reflecting adjustments in price for the aforesaid claim;
(c) the estimated amount of each Change of Scope Order executed subsequent to the last claim;
(d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2(iii) (a);
(e) total of (a), (b), (c) and (d) above;
(f) Deductions:
  (i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
  (ii) Any amount towards deduction of taxes; and
  (iii) Total of (i) and (ii) above.
(g) Net claim: (e) – (f) (iii);
(h) The amounts received by the Contractor upto the last claim:
(i) For the Works executed (excluding Change of Scope orders);

(ii) For Change of Scope Orders, and

(iii) Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes.

3. Contractor's claim for Damages

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

SCHEDULE - P

(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

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

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

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

(ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

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

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

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

4. **Insurance to be in joint names**
The insurance under paragraphs 1 to 3 above shall be in the joint names of the Contractor

and the Authority.

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, …….. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated ……. (the "Agreement"), for **"Improvement/widening to Two-laning with earthen shoulder of Nongjri (Design Ch. 30.00km) to Maheshkola (Design Ch. 55.525km)[R-M-B Package-II] on SH-4 section of Ranikor- Maheshkhola-Baghmara Project in the state of Meghalaya on EPC basis"** (the "Project Highway") on Engineering, Procurement and Construction (EPC) basis through …….. (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

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