National Highways & Infrastructure Development Corporation Limited

BUILDING INFRASTRUCTURE - BUILDING THE NATION

Ministry of Road Transport & Highways,
(Govt. of India)

SCHEDULES

For

"Up-gradation to 2 lane with paved shoulders of Tuivai - Keifang road, NH-102B of Aizawl - Imphal Economic Corridor from Design Chainage Km 0.000 (Bridge across Tuivai River at Manipur Mizoram Border) to Design Chainage Km 31.280 (Ngopa Village) (Package-I) in the State of Mizoram under Bharatmala Pariyojna on EPC mode"

June, 2021

National Highways & Infrastructure Development Corporation Ltd
3rd floor, PTI Building, 4-Parliament Street,
New Delhi – 110001

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Schedules

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1. The Site

(i) Site of the **"Tuivai - Keifang road, NH-102B from Design Chainage Km 0.000 (Bridge across Tuivai River at Manipur Mizoram Border) to Design Chainage Km 31.280 (Ngopa Village) (Package-I) in the State of Mizoram"** Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

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

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

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

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

Annex -I

(Schedule-A)

Site

1. Site

The Site of the **"Tuivai - Keifang road, NH-102B from Design Chainage Km 0.000 (Bridge across Tuivai River at Manipur Mizoram Border) to Design Chainage Km 31.280 (Ngopa Village) (Package-I) in the State of Mizoram"** Project Highway comprises the section of NH-102B commencing from km 0+000 to km 32+796 i.e. Tuivai Bridge to Near Ngopa Village in the state of Mizoram. The land, carriageway and structures comprising the Site are described below.

2. Land

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

Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)
From	To		
0.000	0.100	6.70	22
0.100	0.200	11.70	22
0.200	0.300	8.70	24
0.300	0.400	10.40	24
0.400	0.500	10.40	24
0.500	0.600	13.20	18
0.600	0.700	10.60	18
0.700	0.800	13.30	24
0.800	0.900	14.50	24
0.900	1.000	12.20	24
1.000	1.100	11.70	24
1.100	1.200	12.40	24
1.200	1.300	12.10	24
1.300	1.400	10.30	24
1.400	1.500	12.70	24
1.500	1.600	9.40	24
1.600	1.700	9.30	24
1.700	1.800	10.40	24
1.800	1.900	12.80	24
1.900	2.000	12.40	24
2.000	2.100	18.10	24
2.100	2.200	15.40	24
2.200	2.300	9.20	24
2.300	2.400	9.20	24
2.400	2.500	14.00	24
2.500	2.600	10.50	24
2.600	2.700	10.90	24

Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)
From	To		
2.700	2.800	11.50	24
2.800	2.900	11.20	14
2.900	3.000	10.90	14
3.000	3.100	11.50	14
3.100	3.200	11.70	24
3.200	3.300	10.80	24
3.300	3.400	15.90	24
3.400	3.500	9.20	24
3.500	3.600	10.80	24
3.600	3.700	11.20	24
3.700	3.800	12.50	24
3.800	3.900	10.00	24
3.900	4.000	11.00	24
4.000	4.100	14.90	24
4.100	4.200	12.90	24
4.200	4.300	10.70	24
4.300	4.400	12.10	24
4.400	4.500	12.70	24
4.500	4.600	16.60	24
4.600	4.700	10.80	24
4.700	4.800	10.30	24
4.800	4.900	11.40	24
4.900	5.000	11.90	24
5.000	5.100	12.30	24
5.100	5.200	11.30	24
5.200	5.300	11.10	24
5.300	5.400	11.80	24
5.400	5.500	13.90	24
5.500	5.600	11.60	24
5.600	5.700	11.50	24
5.700	5.800	11.60	24
5.800	5.900	11.70	24
5.900	6.000	11.60	24
6.000	6.100	11.50	24
6.100	6.200	11.90	24
6.200	6.300	9.40	24
6.300	6.400	6.80	24
6.400	6.500	11.00	24
6.500	6.600	9.20	24
6.600	6.700	9.40	24
6.700	6.800	7.30	24
6.800	6.900	10.30	24
6.900	7.000	10.10	24

Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)
From	To		
7.000	7.100	12.60	24
7.100	7.200	9.90	24
7.200	7.300	8.60	24
7.300	7.400	9.70	24
7.400	7.500	9.20	24
7.500	7.600	10.20	24
7.600	7.700	12.60	24
7.700	7.800	9.50	24
7.800	7.900	11.20	24
7.900	8.000	11.80	24
8.000	8.100	9.60	24
8.100	8.200	9.50	24
8.200	8.300	10.30	24
8.300	8.400	9.10	24
8.400	8.500	10.90	24
8.500	8.600	10.40	24
8.600	8.700	9.60	24
8.700	8.800	8.90	24
8.800	8.900	9.40	24
8.900	9.000	9.40	24
9.000	9.100	9.80	24
9.100	9.200	9.30	16
9.200	9.300	8.90	16
9.300	9.400	9.90	16
9.400	9.500	9.40	16
9.500	9.600	11.80	24
9.600	9.700	8.80	24
9.700	9.800	8.60	16
9.800	9.900	8.50	16
9.900	10.000	9.60	16
10.000	10.100	9.30	16
10.100	10.200	9.30	16
10.200	10.300	9.60	16
10.300	10.400	8.30	16
10.400	10.500	9.30	16
10.500	10.600	10.40	16
10.600	10.700	9.80	16
10.700	10.800	11.10	24
10.800	10.900	8.80	24
10.900	11.000	11.20	24
11.000	11.100	9.10	24
11.100	11.200	9.00	24
11.200	11.300	10.30	24

Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)
From	To		
11.300	11.400	11.90	24
11.400	11.500	11.20	24
11.500	11.600	10.70	24
11.600	11.700	14.90	24
11.700	11.800	11.30	24
11.800	11.900	10.90	24
11.900	12.000	9.60	24
12.000	12.100	9.70	24
12.100	12.200	9.90	24
12.200	12.300	10.00	24
12.300	12.400	12.20	24
12.400	12.500	14.40	24
12.500	12.600	10.00	24
12.600	12.700	12.00	24
12.700	12.800	10.90	24
12.800	12.900	11.60	24
12.900	13.000	10.40	24
13.000	13.100	8.50	24
13.100	13.200	9.00	24
13.200	13.300	10.20	24
13.300	13.400	9.30	24
13.400	13.500	9.70	24
13.500	13.600	11.30	24
13.600	13.700	10.10	24
13.700	13.800	12.10	24
13.800	13.900	12.70	24
13.900	14.000	11.50	24
14.000	14.100	15.60	24
14.100	14.200	18.20	24
14.200	14.300	14.80	24
14.300	14.400	11.80	24
14.400	14.500	11.00	24
14.500	14.600	10.10	24
14.600	14.700	8.90	24
14.700	14.800	12.60	24
14.800	14.900	10.70	24
14.900	15.000	10.10	24
15.000	15.100	10.00	24
15.100	15.200	11.00	24
15.200	15.300	10.60	24
15.300	15.400	9.60	24
15.400	15.500	11.60	24
15.500	15.600	9.60	24

Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)
From	To		
15.600	15.700	8.90	24
15.700	15.800	12.00	24
15.800	15.900	8.30	24
15.900	16.000	9.10	24
16.000	16.100	9.10	20
16.100	16.200	12.60	20
16.200	16.300	16.10	20
16.300	16.400	12.10	20
16.400	16.500	15.00	20
16.500	16.600	10.00	20
16.600	16.700	7.50	14
16.700	16.800	7.80	14
16.800	16.900	7.70	14
16.900	17.000	8.90	14
17.000	17.100	8.90	14
17.100	17.200	10.20	14
17.200	17.300	8.10	14
17.300	17.400	8.60	24
17.400	17.500	9.00	24
17.500	17.600	9.70	24
17.600	17.700	9.80	24
17.700	17.800	10.40	24
17.800	17.900	8.50	24
17.900	18.000	11.90	24
18.000	18.100	9.60	24
18.100	18.200	10.50	24
18.200	18.300	12.90	24
18.300	18.400	11.00	24
18.400	18.500	10.20	24
18.500	18.600	12.40	24
18.600	18.700	12.60	24
18.700	18.800	10.00	24
18.800	18.900	11.80	24
18.900	19.000	12.40	24
19.000	19.100	14.10	24
19.100	19.200	10.50	24
19.200	19.300	11.00	24
19.300	19.400	8.80	24
19.400	19.500	11.00	24
19.500	19.600	10.90	24
19.600	19.700	14.60	24
19.700	19.800	10.80	24
19.800	19.900	9.40	24

Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)
From	To		
19.900	20.000	8.70	24
20.000	20.100	9.00	24
20.100	20.200	8.90	24
20.200	20.300	10.70	24
20.300	20.400	10.60	24
20.400	20.500	11.10	24
20.500	20.600	11.80	24
20.600	20.700	17.40	24
20.700	20.800	9.90	24
20.800	20.900	9.60	24
20.900	21.000	15.70	24
21.000	21.100	7.60	24
21.100	21.200	9.50	24
21.200	21.300	9.30	24
21.300	21.400	9.60	24
21.400	21.500	9.90	24
21.500	21.600	10.50	14
21.600	21.700	12.00	14
21.700	21.800	8.90	14
21.800	21.900	10.30	24
21.900	22.000	9.80	24
22.000	22.100	8.60	24
22.100	22.200	10.20	14
22.200	22.300	7.40	14
22.300	22.400	12.70	14
22.400	22.500	13.60	14
22.500	22.600	11.10	14
22.600	22.700	9.60	20
22.700	22.800	9.90	20
22.800	22.900	7.50	14
22.900	23.000	8.90	14
23.000	23.100	9.30	20
23.100	23.200	10.20	20
23.200	23.300	13.30	14
23.300	23.400	16.00	14
23.400	23.500	9.90	14
23.500	23.600	13.20	14
23.600	23.700	12.90	24
23.700	23.800	10.30	24
23.800	23.900	14.20	24
23.900	24.000	9.70	24
24.000	24.100	11.00	24
24.100	24.200	11.10	24

Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)
From	To		
24.200	24.300	11.40	24
24.300	24.400	9.60	24
24.400	24.500	10.40	24
24.500	24.600	10.50	24
24.600	24.700	10.70	24
24.700	24.800	12.10	24
24.800	24.900	11.80	24
24.900	25.000	14.80	24
25.000	25.100	10.50	24
25.100	25.200	10.80	24
25.200	25.300	12.00	24
25.300	25.400	10.70	24
25.400	25.500	11.90	24
25.500	25.600	12.70	24
25.600	25.700	10.10	24
25.700	25.800	9.90	24
25.800	25.900	8.70	24
25.900	26.000	9.20	24
26.000	26.100	13.00	24
26.100	26.200	9.70	24
26.200	26.300	10.30	24
26.300	26.400	19.60	24
26.400	26.500	9.70	24
26.500	26.600	11.70	24
26.600	26.700	12.90	24
26.700	26.800	10.50	24
26.800	26.900	11.10	24
26.900	27.000	14.60	24
27.000	27.100	12.80	24
27.100	27.200	10.50	24
27.200	27.300	6.50	24
27.300	27.400	10.80	24
27.400	27.500	8.00	16
27.500	27.600	12.40	16
27.600	27.700	13.20	16
27.700	27.800	11.10	16
27.800	27.900	14.50	16
27.900	28.000	8.60	16
28.000	28.100	10.90	16
28.100	28.200	9.70	16
28.200	28.300	10.70	16
28.300	28.400	10.70	16
28.400	28.500	10.10	16

Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)
From	To		
28.500	28.600	14.40	16
28.600	28.700	10.90	16
28.700	28.800	12.00	16
28.800	28.900	10.60	16
28.900	29.000	13.00	16
29.000	29.100	10.80	16
29.100	29.200	12.30	16
29.200	29.300	12.40	16
29.300	29.400	9.10	16
29.400	29.500	9.50	16
29.500	29.600	8.60	16
29.600	29.700	10.20	24
29.700	29.800	9.30	24
29.800	29.900	12.70	24
29.900	30.000	16.20	24
30.000	30.100	10.10	24
30.100	30.200	9.90	24
30.200	30.300	10.10	24
30.300	30.400	11.00	24
30.400	30.500	7.10	24
30.500	30.600	9.70	24
30.600	30.700	9.70	24
30.700	30.800	12.80	24
30.800	30.900	9.10	24
30.900	31.000	11.00	24
31.000	31.100	10.30	24
31.100	31.200	12.30	24
31.200	31.300	12.70	24
31.300	31.400	13.20	24
31.400	31.500	10.40	24
31.500	31.600	11.00	24

3. Carriageway

The present carriageway of the Project Highway is Single Lane to Intermediate Lane of width 3.75 m to 5.5 m from km 00+000 to km 32+796. The type of existing pavement is flexible.

4. Major Bridges

The Site includes the following Major Bridges:

S. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Super-structure		

Nil

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

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

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

6. Grade separators

The Site includes the following grade separators:

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

7. Minor bridges

The Site includes the following minor bridges

Sr. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Superstructure		
Nil						

8. Railway level crossings

The Site includes the following railway level crossings

Sr. No.	Location (km)	Remarks
Nil		

9. Underpasses (vehicular, non vehicular)

The Site includes the following underpasses:

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

10. Culverts

The Site has the following culverts:

Sl. No.	Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
1	0.283	Hume Pipe	1X0.9	7.1

2	0.563	Hume Pipe	1X0.9	7.1
3	0.841	Hume Pipe	1X0.9	7.1
4	0.984	Hume Pipe	1X0.9	7.1
5	1.079	Hume Pipe	1X0.9	7.1
6	1.208	Hume Pipe	1X0.9	7.1
7	1.895	Hume Pipe	1X0.9	7.1
8	1.98	Hume Pipe	1X1.0	7.1
9	2.382	Hume Pipe	1X0.9	7.5
10	2.56	Hume Pipe	1X0.9	7.2
11	2.823	Hume Pipe	1X0.9	7.3
12	3.128	Hume Pipe	1X0.9	7.2
13	3.285	Hume Pipe	1X0.9	7.2
14	3.437	Hume Pipe	1X0.9	7.1
15	4.012	Hume Pipe	1X0.9	7.1
16	4.166	Hume Pipe	1X1.0	7.2
17	4.429	Hume Pipe	1X0.9	7.1
18	4.677	Hume Pipe	1X0.9	7.2
19	4.963	Hume Pipe	1X0.9	7.3
20	5.123	Hume Pipe	1X0.9	6.9
21	5.243	Hume Pipe	1X1.0	6.8
22	5.56	Hume Pipe	1X0.9	7.2
23	5.599	Hume Pipe	1X1.0	6.5
24	5.862	Hume Pipe	1X1.0	6.2
25	6.24	Slab	1X2.5	7.3
26	6.454	Hume Pipe	1X0.9	7.2
27	6.651	Hume Pipe	1X0.9	7.2
28	6.711	Hume Pipe	1X0.9	7.2
29	6.952	Hume Pipe	1X0.9	7.3
30	7.192	Box	1X2.43	7.3
31	7.207	Hume Pipe	1X0.9	7.2
32	7.425	Slab	1X2.654	7.1
33	7.568	Hume Pipe	1X0.9	7.3
34	7.997	Hume Pipe	1X0.9	7.2
35	8.205	Hume Pipe	1X1.0	7.1
36	8.336	Hume Pipe	1X0.9	7.2
37	8.937	Hume Pipe	1X0.9	7.2
38	9.658	Hume Pipe	1X0.9	7.2
39	9.775	Hume Pipe	1X0.9	7.3
40	9.971	Hume Pipe	1X0.9	7.3
41	10.21	Hume Pipe	1X0.9	7.3
42	10.331	Hume Pipe	1X0.9	7.2

43	10.468	Hume Pipe	1X0.9	7.3
44	10.629	Hume Pipe	1X0.9	7.5
45	10.825	Hume Pipe	1X0.9	7.5
46	11.164	Hume Pipe	1X0.9	7.2
47	11.206	Hume Pipe	1X0.9	7.3
48	11.26	Hume Pipe	1X1.0	7.3
49	11.418	Hume Pipe	1X0.9	7.5
50	11.599	Hume Pipe	1X0.9	7.5
51	11.913	Hume Pipe	1X0.9	7.4
52	12.497	Hume Pipe	1X0.9	7.4
53	12.655	Hume Pipe	1X0.9	7.4
54	12.81	Hume Pipe	1X0.9	7.3
55	13.024	Hume Pipe	1X0.9	7.3
56	13.357	Hume Pipe	1X0.9	7.4
57	13.517	Hume Pipe	1X0.9	7.3
58	13.717	Hume Pipe	1X0.9	7.3
59	13.933	Hume Pipe	1X0.9	7.2
60	14.277	Hume Pipe	1X0.9	7.1
61	14.358	Hume Pipe	1X0.9	7.4
62	14.46	Hume Pipe	1X0.9	7.4
63	14.556	Hume Pipe	1X0.9	7.4
64	14.862	Hume Pipe	1X0.9	7.3
65	15.047	Hume Pipe	1X0.9	7.3
66	15.182	Hume Pipe	1X0.9	7.2
67	15.6	Hume Pipe	1X0.9	7.5
68	15.8	Hume Pipe	1X0.9	7.4
69	16	Hume Pipe	1X0.9	7.5
70	16.098	Hume Pipe	1X0.9	7.4
71	16.459	Hume Pipe	1X0.9	7.4
72	17.623	Hume Pipe	1X0.9	7.4
73	17.709	Hume Pipe	1X0.9	7.4
74	17.982	Hume Pipe	1X0.9	7.5
75	18.25	Hume Pipe	1X0.9	7.5
76	18.336	Hume Pipe	1X0.9	7.4
77	18.55	Hume Pipe	1X0.9	7.5
78	18.702	Hume Pipe	1X0.9	7.4
79	18.783	Hume Pipe	1X0.9	7.5
80	19.092	Hume Pipe	1X0.9	7.4
81	19.27	Hume Pipe	1X0.9	7.5
82	19.846	Hume Pipe	1X0.9	7.3
83	20.143	Hume Pipe	1X0.9	7.4

84	20.567	Hume Pipe	1X0.9	7.2
85	21.203	Hume Pipe	1X0.9	7.2
86	21.526	Hume Pipe	1X0.9	7.3
87	21.824	Hume Pipe	1X0.9	7.4
88	22.016	Hume Pipe	1X0.9	7.5
89	22.256	Hume Pipe	1X0.9	7.3
90	22.66	Hume Pipe	1X0.9	7.3
91	22.97	Hume Pipe	1X0.9	7.4
92	23.025	Slab	1X0.9	7.3
93	23.161	Hume Pipe	1X0.9	7.3
94	23.384	Hume Pipe	1X0.9	7.2
95	23.46	Hume Pipe	1X1.0	7.5
96	23.575	Hume Pipe	1X1.0	7.3
97	23.748	Hume Pipe	1X0.9	7.3
98	23.93	Hume Pipe	1X0.9	7.2
99	24.224	Hume Pipe	1X0.9	7.3
100	24.555	Hume Pipe	1X0.9	7.2
101	24.783	Hume Pipe	1X0.9	7.4
102	25.068	Hume Pipe	1X1.0	7.2
103	25.42	Hume Pipe	1X0.9	7.3
104	25.706	Hume Pipe	1X0.9	7.4
105	25.962	Hume Pipe	1X0.9	7.3
106	26.123	Hume Pipe	1X0.9	7.3
107	26.42	Hume Pipe	1X0.9	7.2
108	26.563	Hume Pipe	1X0.9	7.3
109	26.816	Hume Pipe	1X0.9	7.3
110	28.11	Hume Pipe	1X0.9	7.2
111	28.411	Hume Pipe	1X0.9	7.2
112	28.612	Hume Pipe	1X0.9	7.2
113	28.82	Hume Pipe	1X0.9	7.3
114	29.13	Hume Pipe	1X0.9	7.3
115	29.443	Hume Pipe	1X0.9	7.2
116	29.568	Hume Pipe	1X0.9	7.3
117	29.763	Hume Pipe	1X0.9	7.3
118	30.063	Hume Pipe	1X0.9	7.3
119	30.173	Hume Pipe	1X0.9	7.3
120	30.247	Hume Pipe	1X0.9	6.9
121	30.552	Hume Pipe	1X0.9	6.9
122	30.895	Hume Pipe	1X0.9	7
123	31.097	Hume Pipe	1X0.9	7
124	31.224	Hume Pipe	1X0.9	7

125	31.39	Hume Pipe	1X0.9	6.7
126	31.733	Hume Pipe	1X0.9	6.6
127	32.282	Hume Pipe	1X0.9	6.3
128	32.467	Hume Pipe	1X0.9	6.6
129	32.668	Hume Pipe	1X0.9	7

11. Bus bays

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

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

12. Truck Lay byes

The details of truck lay byes are as follows:

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

13. Road side drains

The details of the roadside drains are as follows:

S. No.	Location		Type	
	From km	To km	Masonry/cc (Pucca)	Earthen (Kutcha)
Nil				

14. Major junctions

The details of major junctions are as follows:

Sr. No.	Location (Km)	At grade	Separated	Category of Cross Road			
				NH	SH	MDR	Others
Nil							

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

15. Minor junctions

The details of the minor junctions are as follows:

Sl. No.	Chainage	Type of intersection	
		T-Junction	Cross Road
1	10.141	T	3 Legged

Sl. No.	Chainage	Type of intersection	
		T-Junction	Cross Road
2	10.590	Y	3 Legged
3	14.538	Y	3 Legged
4	16.526	T	3 Legged
5	16.775	Y	3 Legged
6	18.945	T	3 Legged
7	22.277	Y	3 Legged
8	22.376	Y	3 Legged
9	22.711	Y	3 Legged
10	22.790	Y	3 Legged
11	23.212	Y	3 Legged

16. Bypasses

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

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

17. Existing Utilities

(i) Electrical utilities
The site includes the following electrical utilities: -

a) Extra High-Tension Lines (EHT Lines)

Sl. No.	Chainage		Length (in km)				Crossings			
	From	To	400 KV	220 KV	110 KV	66 KV	400 KV	220 KV	110 KV	66 KV
1	0+000	32+796	Nil							

b) High Tension/Low Tension Lines (HT/LT Lines)

Sl. No.	Chainage		HT/LT Lines (Kms)			Crossings			Transformer	
	From	To	33 KV	11 KV	LT	33 KV	11 KV	LT	No	Capacity
1	0+000	32+796	-	2.6	1.75		11	7	3	2 Nos. 25 KVA & 1 No. 100 KVA

(ii) Public Health utilities (Water/Sewage Pipe Lines)
The site includes the following Public Health utilities: -

Sl.No.	Existing Chainage		Length (in km)								Remarks
	From	To	Gravity Main Line		Feeding Main Line		Village Water Pipe line		Private House Water Connections *		
			With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	
1	15.7	16.24		0.594							Khawkawn Village
2	16.15	16.12				0.11					
3	15.56	16.38						0.902			
4	15.56	16.38								0.4	
5	16.6	16.72						0.132			
6	16.15	16.12		0.759							NE Khawdungsei Village
7	18.24	21.6				3.652					
8	20.84	22.85						1.447			
9	NE Khawdungsei Village									1.015	
	Total			**1.353**		**3.762**		**2.481**		**1.415**	

(iii) Any Other line: Nil

18. Other structures

NIL.

Annex - II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

Sl. No	Existing Chainage(km)		Length in km	Existing ROW	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To				
(i) 90% Right of Way (full width)	0.000	32.796	16.005	6 m-18 m	14.0 m to 24.0 m	on Appointed Date
(ii) Balance Right of Way (width)	0.000	32.796	16.005	6 m-18 m	14.0 m to 24.0 m	Within 150 days after the Appointed Date

Annex - III

(Schedule-A)

Alignment Plans

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

(i) The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the contractor as 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 the relevant specifications/IRC Codes/Manual.

Annex - IV

(Schedule-A)

Environment Clearances

The following environment clearances have been obtained: NA

The following environment clearances are awaited: NA

Environmental Clearances are not required for the project.

Schedule - B

(See Clause 2.1)

Development of the Project Highway

1. Development of the Project Highway

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

2. Rehabilitation and Augmentation

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

3. Specifications and Standards

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

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Annex -I

(Schedule –B)

Description of Two –Laning with Paved Shoulder

1. Widening of the Existing Highway

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

(ii) Width of Carriageway

(a) Two-Lanning with paved shoulders shall be undertaken. The paved carriageway shall be **10 (ten) m wide**.

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

Sl. No.	Built-up stretch (Township)	Location		Width (m)	Typical Cross Section (Refer to Manual)	Remarks
1	Khawkawn	15+-550	16+250	10	Fig- 2.10 & Table 2.3 of manual (TCS drawing attached)	10 m Carriageway + 1.0 m Footpath on covered RCC drain
2	Ne. khawdungsei	20+700	22+700	10	Fig- 2.10 & Table 2.3 of manual (TCS drawing attached)	10 m Carriageway + 1.0 m Footpath on covered RCC drain

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

2. Geometric Design and General Features

(i) General

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

(ii) Design speed

The design speed shall be as per section 2.2 of IRC 73: 2018 for Mountainous and Steep terrain. However, in exceptional cases the minimum design speed of 30 km per hour may be adopted and 20 km per hour for hair pin bend locations shall be adopted in accordance with IRC SP 48:1998.

(iii) Improvement of the existing road geometrics

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

(iv) Right of Way

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

(v) Type of shoulders

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

Sl. No.	Stretch (from km to km)	Fully Paved shoulders/footpaths	Reference to cross section
1	15+540 TO 15+640	2 X 1.5 m width Footpath	TCS-10A
2	15+640 TO 16+180	2 X 1.5 m width Footpath	TCS-9A
3	16+180 TO 16+260	2 X 1.5 m width Footpath	TCS-10A
4	20+680 TO 20+830	2 X 1.5 m width Footpath	TCS-8A
5	20+830 TO 21+520	2 X 1.5 m width Footpath	TCS-9A
6	21+520 TO 21+620	2 X 1.5 m width Footpath	TCS-10A
7	21+620 TO 22+020	2 X 1.5 m width Footpath	TCS-9A
8	22+020 TO 22+120	2 X 1.5 m width Footpath	TCS-10A
9	22+120 TO 22+440	2 X 1.5 m width Footpath	TCS-9B
10	22+440 TO 22+530	2 X 1.5 m width Footpath	TCS-10B
11	22+530 TO 22+630	2 X 1.5 m width Footpath	TCS-9B
12	22+630 TO 22+690	2 X 1.5 m width Footpath	TCS-8B

(b) Width of Shoulders in open country shall be as mentioned in the following table:

Type of Section		Width of Shoulder (m)		
		Paved	Earthen	Total
Open Country with isolated built-up area	Hill Side	1.5	-	1.5
	Valley Side	1.5	1.0	2.5

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

(vi) Lateral and vertical clearances at underpasses

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

Nil

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

Nil

(vii) Lateral and vertical clearances at overpasses

Nil

(viii) Service roads

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

Nil

(ix) Grade separated structures

Nil

(x) Cattle and pedestrian underpass /overpass:

Nil

(xi) Typical cross-sections of the Project Highway

Typical cross-section of the Project Highway is as per attached Drawings.

Sl No	TCS Type	Description
1	TCS-1A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with both side RR Masonry trapezoidal drain
2	TCS-1B	New construction of 2 Lane carriageway with paved shoulder in open area with both side RR Masonry trapezoidal drain
3	TCS-2A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with both side Retaining wall
4	TCS-2B	New construction of 2 Lane carriageway with paved shoulder in open area with both side Retaining wall
5	TCS-3A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with Hill side RR Masonry trapezoidal drain and Valley side retaining wall

Sl No	TCS Type	Description
6	TCS-3B	New construction of 2 Lane carriageway with paved shoulder in open area with Hill side RR Masonry trapezoidal drain and Valley side retaining wall
7	TCS-4A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with Hill side RR Masonry trapezoidal drain
8	TCS-4B	New construction of 2 Lane carriageway with paved shoulder in open area with Hill side RR Masonry trapezoidal drain
9	TCS-5A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with Valley side retaining wall
10	TCS-5B	New construction of 2 Lane carriageway with paved shoulder in open area with Valley side retaining wall
11	TCS-6A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with Valley side retaining wall and Hill side breast wall with drain
12	TCS-7A	Reconstruction of 2 Lane carriageway with paved shoulder in open area, Hill side breast wall with drain and other side Trapezoidal drain.
13	TCS - 7B	New construction of 2 Lane carriageway with paved shoulder in open area, Hill side breast wall with drain and other side Trapezoidal drain.
14	TCS - 8A	Reconstruction of 2 Lane carriageway with paved shoulder in Built-up area with Both side Breast wall, drain and footpath
15	TCS-8B	New construction of 2 Lane carriageway with paved shoulder in Built-up area with Both side Breast wall, drain and footpath
16	TCS-9A	Reconstruction of 2 Lane carriageway with paved shoulder in Built-up Area with Hill side Breast wall and Both side drain cum footpath
17	TCS-9B	New construction of 2 Lane carriageway with paved shoulder in Built-up Area with Hill side Breast wall and Both side drain cum footpath
18	TCS-10A	Reconstruction of 2 Lane carriageway with paved shoulder in Built-up Area with Both side drain cum footpath
19	TCS-10B	New construction of 2 Lane carriageway with paved shoulder in Built-up Area with Both side drain cum footpath

The following TCS shall be adopted in these sections:

Chainage (km)		Net Length (m)	TCS No.
From	To		
00+000	0+065	65	TCS-5B
00+065	0+350	285	TCS-4A
00+350	0+470	120	TCS-4B
00+470	0+520	50	TCS-4A
00+520	0+620	100	TCS-4B
00+620	1+165	545	TCS-4A
01+165	1+210	45	TCS-3B
01+210	1+265	55	TCS-3A
01+265	1+320	55	TCS-5A

Chainage (km)		Net Length (m)	TCS No.
From	To		
01+320	1+345	25	TCS-2B
01+345	1+420	75	TCS-5A
01+420	1+670	250	TCS-1A
01+670	1+880	210	TCS-7A
01+880	1+960	80	TCS-6A
01+960	2+080	120	TCS-4B
02+080	2+120	40	TCS-1B
02+120	2+140	20	TCS-4B
02+140	2+170	30	TCS-3A
02+170	2+265	95	TCS-7A
02+265	2+390	125	TCS-3A
02+390	2+605	215	TCS-1A
02+605	2+640	35	TCS-4A
02+640	2+670	30	TCS-3A
02+670	2+770	100	TCS-4A
02+770	2+860	90	TCS-3A
02+860	2+910	50	TCS-1B
02+910	3+115	205	TCS-4A
03+115	3+260	145	TCS-4B
03+260	3+720	460	TCS-4A
03+720	3+740	20	TCS-3A
03+740	3+770	30	TCS-2A
03+770	3+820	50	TCS-5A
03+820	3+940	120	TCS-1B
03+940	4+020	80	TCS-2A
04+020	4+260	240	TCS-3A
04+260	4+380	120	TCS-1B
04+380	4+480	100	TCS-7B
04+480	4+580	100	TCS-7A
04+580	4+710	130	TCS-1A
04+710	4+820	110	TCS-7B
04+820	5+040	220	TCS-1A
05+040	5+080	40	TCS-3A
05+080	5+170	90	TCS-4A
05+170	5+220	50	TCS-3A
05+220	5+320	100	TCS-1B
05+320	5+360	40	TCS-4A
05+360	7+340	1980	TCS-1A
07+340	7+410	70	TCS-1B
07+410	7+760	350	TCS-1A
07+760	7+940	180	TCS-7A
07+940	8+060	120	TCS-7B
08+060	8+210	150	TCS-1B

Chainage (km)		Net Length (m)	TCS No.
From	To		
08+210	8+690	480	TCS-1A
08+690	8+990	300	TCS-1B
08+990	9+140	150	TCS-1A
09+140	9+240	100	TCS-3A
09+240	9+485	245	TCS-1A
09+485	9+580	95	TCS-3B
09+580	9+640	60	TCS-3A
09+640	9+760	120	TCS-4A
09+760	9+840	80	TCS-1A
09+840	9+960	120	TCS-5B
09+960	10+120	160	TCS-4B
10+120	10+380	260	TCS-4A
10+380	10+480	100	TCS-4B
10+480	10+570	90	TCS-1B
10+570	10+640	70	TCS-1A
10+640	10+910	270	TCS-4A
10+910	11+060	150	TCS-4B
11+060	11+520	460	TCS-1B
11+520	11+620	100	TCS-4B
11+620	11+680	60	TCS-1B
11+680	11+760	80	TCS-5A
11+760	11+840	80	TCS-1B
11+840	12+580	740	TCS-4A
12+580	12+780	200	TCS-5A
12+780	13+130	350	TCS-4A
13+130	13+180	50	TCS-4B
13+180	13+240	60	TCS-2B
13+240	13+340	100	TCS-3B
13+340	13+380	40	TCS-2B
13+380	13+430	50	TCS-4B
13+430	13+980	550	TCS-4A
13+980	14+030	50	TCS-5A
14+030	14+210	180	TCS-4A
14+210	14+690	480	TCS-7A
14+690	14+780	90	TCS-1A
14+780	15+130	350	TCS-4A
15+130	15+260	130	TCS-4B
15+260	15+320	60	TCS-1B
15+320	15+540	220	TCS-4A
15+540	15+640	100	TCS-10A
15+640	16+180	540	TCS-9A
16+180	16+260	80	TCS-10A
16+260	16+580	320	TCS-4A

Chainage (km)		Net Length (m)	TCS No.
From	To		
16+580	16+660	80	TCS-1B
16+660	17+060	400	TCS-4A
17+060	17+160	100	TCS-1A
17+160	17+240	80	TCS-4A
17+240	17+280	40	TCS-3A
17+280	17+340	60	TCS-1B
17+340	17+520	180	TCS-4A
17+520	17+670	150	TCS-4B
17+670	17+780	110	TCS-4A
17+780	17+880	100	TCS-1A
17+880	17+930	50	TCS-4A
17+930	18+290	360	TCS-1B
18+290	18+460	170	TCS-1A
18+460	18+520	60	TCS-3A
18+520	18+590	70	TCS-2A
18+590	18+760	170	TCS-3A
18+760	18+960	200	TCS-4A
18+960	19+060	100	TCS-3A
19+060	19+320	260	TCS-1B
19+320	19+420	100	TCS-4B
19+420	19+520	100	TCS-3B
19+520	19+640	120	TCS-1B
19+640	19+720	80	TCS-4B
19+720	19+820	100	TCS-1B
19+820	19+980	160	TCS-4B
19+980	20+120	140	TCS-1B
20+120	20+360	240	TCS-1A
20+360	20+680	320	TCS-4A
20+680	20+830	150	TCS-8A
20+830	21+520	690	TCS-9A
21+520	21+620	100	TCS-10A
21+620	22+020	400	TCS-9A
22+020	22+120	100	TCS-10A
22+120	22+440	320	TCS-9B
22+440	22+530	90	TCS-10B
22+530	22+630	100	TCS-9B
22+630	22+690	60	TCS-8B
22+690	22+820	130	TCS-4A
22+820	23+230	410	TCS-4A
23+230	25+320	2090	TCS-1A
25+320	25+660	340	TCS-1B
25+660	26+220	560	TCS-1A
26+220	26+530	310	TCS-3A

Chainage (km)		Net Length (m)	TCS No.
From	To		
26+530	26+840	310	TCS-2A
26+840	26+920	80	TCS-3A
26+920	26+980	60	TCS-4A
26+980	27+180	200	TCS-1A
27+180	27+240	60	TCS-3A
27+240	27+320	80	TCS-4B
27+320	27+360	40	TCS-1B
27+360	27+855	495	TCS-4B
27+855	27+960	105	TCS-4A
27+960	28+060	100	TCS-5A
28+060	28+280	220	TCS-3B
28+280	29+560	1280	TCS-1B
29+560	29+860	300	TCS-4A
29+860	29+960	100	TCS-3B
29+960	30+060	100	TCS-4B
30+060	30+410	350	TCS-4A
30+410	30+460	50	TCS-1B
30+460	30+680	220	TCS-1A
30+680	30+740	60	TCS-4A
30+740	30+820	80	TCS-3A
30+820	30+860	40	TCS-4A
30+860	31+020	160	TCS-4B
31+020	31+280	260	TCS-4A
Total		**31280**	

2. Inter sections and Grade Separators

All intersections and grade separators shall be as per Section 3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards. Properly designed intersections shall be provided at the locations and of the types and features given in the tables below:

(i) At-grade intersections

Major Intersections

Sl. No.	Location of intersection (Km)	Type of intersection	Other features	Remarks
Nil				

Minor Intersections

Sl. No.	Location of intersection (km)	Type of intersection	Other features
1	9.880	T-Type	4-Legged

Sl. No.	Location of intersection (km)	Type of intersection	Other features
2	10.300	Y-Type	3-Legged
3	13.920	Y-Type	3-Legged
4	15.840	T Type	3-Legged
5	16.330	Y Type	3-Legged
6	18.180	T Type	3-Legged
7	21.380	Y Type	3-Legged
8	21.480	Y Type	3-Legged
9	21.805	Y Type	3-Legged
10	21.890	Y Type	3-Legged
11	23.290	Y Type	3-Legged

(ii) Grade separated intersection with/without ramps

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

4. Road Embankment and Cut Section

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment / cuttings shall conform to the Specifications and Standards given in Section 4 of the Manual (IRC: SP: 73-2018) and the specified cross-sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

(ii) Raising of the existing road

The existing road shall be raised in the following sections:

Sl. No.	Section (from km to km)	Length (km)	Extent of raising [Top of finished road level]
As per attached plan profile drawing			

5. Pavement Design

(i) Pavement design shall be carried out in accordance with section 5 of the IRC: SP: 73-2018.

(ii) Type of pavement: Flexible Pavement

(iii) Design requirements

Notwithstanding anything to the contrary contained in this agreement or the manual, the contractor shall design the pavement of main carriageway for design traffic of 20 MSA with a minimum design period of 20 years. CBR value as

obtained at site shall be taken for design if less than 8%. Maximum value of CBR to be taken for design shall not exceed 8%.

Bituminous Grade VG 30 or VG 40 shall be used for BC.

(iv) Reconstruction of stretches.

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

Sl. No.	Stretch from km to km	Remarks	TCS Type *
1	00+000 to 0+065	Reconstruction	TCS-5B
2	00+065 to 0+350	Reconstruction	TCS-4A
3	00+350 to 0+470	Reconstruction	TCS-4B
4	00+470 to 0+520	Reconstruction	TCS-4A
5	00+520 to 0+620	Reconstruction	TCS-4B
6	00+620 to 1+165	Reconstruction	TCS-4A
7	01+165 to 1+210	Reconstruction	TCS-3B
8	01+210 to 1+265	Reconstruction	TCS-3A
9	01+265 to 1+320	Reconstruction	TCS-5A
10	01+320 to 1+345	Reconstruction	TCS-2B
11	01+345 to 1+420	Reconstruction	TCS-5A
12	01+420 to 1+670	Reconstruction	TCS-1A
13	01+670 to 1+880	Reconstruction	TCS-7A
14	01+880 to 1+960	Reconstruction	TCS-6A
15	01+960 to 2+080	Reconstruction	TCS-4B
16	02+080 to 2+120	Reconstruction	TCS-1B
17	02+120 to 2+140	Reconstruction	TCS-4B
18	02+140 to 2+170	Reconstruction	TCS-3A
19	02+170 to 2+265	Reconstruction	TCS-7A
20	02+265 to 2+390	Reconstruction	TCS-3A
21	02+390 to 2+605	Reconstruction	TCS-1A
22	02+605 to 2+640	Reconstruction	TCS-4A
23	02+640 to 2+670	Reconstruction	TCS-3A
24	02+670 to 2+770	Reconstruction	TCS-4A
25	02+770 to 2+860	Reconstruction	TCS-3A
26	02+860 to 2+910	Reconstruction	TCS-1B
27	02+910 to 3+115	Reconstruction	TCS-4A
28	03+115 to 3+260	Reconstruction	TCS-4B
29	03+260 to 3+720	Reconstruction	TCS-4A
30	03+720 to 3+740	Reconstruction	TCS-3A
31	03+740 to 3+770	Reconstruction	TCS-2A

32	03+770 to 3+820	Reconstruction	TCS-5A
33	03+820 to 3+940	Reconstruction	TCS-1B
34	03+940 to 4+020	Reconstruction	TCS-2A
35	04+020 to 4+260	Reconstruction	TCS-3A
36	04+260 to 4+380	Reconstruction	TCS-1B
37	04+380 to 4+480	Reconstruction	TCS-7B
38	04+480 to 4+580	Reconstruction	TCS-7A
39	04+580 to 4+710	Reconstruction	TCS-1A
40	04+710 to 4+820	Reconstruction	TCS-7B
41	04+820 to 5+040	Reconstruction	TCS-1A
42	05+040 to 5+080	Reconstruction	TCS-3A
43	05+080 to 5+170	Reconstruction	TCS-4A
44	05+170 to 5+220	Reconstruction	TCS-3A
45	05+220 to 5+320	Reconstruction	TCS-1B
46	05+320 to 5+360	Reconstruction	TCS-4A
47	05+360 to 7+340	Reconstruction	TCS-1A
48	07+340 to 7+410	Reconstruction	TCS-1B
49	07+410 to 7+760	Reconstruction	TCS-1A
50	07+760 to 7+940	Reconstruction	TCS-7A
51	07+940 to 8+060	Reconstruction	TCS-7B
52	08+060 to 8+210	Reconstruction	TCS-1B
53	08+210 to 8+690	Reconstruction	TCS-1A
54	08+690 to 8+990	Reconstruction	TCS-1B
55	08+990 to 9+140	Reconstruction	TCS-1A
56	09+140 to 9+240	Reconstruction	TCS-3A
57	09+240 to 9+485	Reconstruction	TCS-1A
58	09+485 to 9+580	Reconstruction	TCS-3B
59	09+580 to 9+640	Reconstruction	TCS-3A
60	09+640 to 9+760	Reconstruction	TCS-4A
61	09+760 to 9+840	Reconstruction	TCS-1A
62	09+840 to 9+960	Reconstruction	TCS-5B
63	09+960 to 10+120	Reconstruction	TCS-4B
64	10+120 to 10+380	Reconstruction	TCS-4A
65	10+380 to 10+480	Reconstruction	TCS-4B
66	10+480 to 10+570	Reconstruction	TCS-1B
67	10+570 to 10+640	Reconstruction	TCS-1A
68	10+640 to 10+910	Reconstruction	TCS-4A
69	10+910 to 11+060	Reconstruction	TCS-4B
70	11+060 to 11+520	Reconstruction	TCS-1B
71	11+520 to 11+620	Reconstruction	TCS-4B
72	11+620 to 11+680	Reconstruction	TCS-1B

73	11+680 to 11+760	Reconstruction	TCS-5A
74	11+760 to 11+840	Reconstruction	TCS-1B
75	11+840 to 12+580	Reconstruction	TCS-4A
76	12+580 to 12+780	Reconstruction	TCS-5A
77	12+780 to 13+130	Reconstruction	TCS-4A
78	13+130 to 13+180	Reconstruction	TCS-4B
79	13+180 to 13+240	Reconstruction	TCS-2B
80	13+240 to 13+340	Reconstruction	TCS-3B
81	13+340 to 13+380	Reconstruction	TCS-2B
82	13+380 to 13+430	Reconstruction	TCS-4B
83	13+430 to 13+980	Reconstruction	TCS-4A
84	13+980 to 14+030	Reconstruction	TCS-5A
85	14+030 to 14+210	Reconstruction	TCS-4A
86	14+210 to 14+690	Reconstruction	TCS-7A
87	14+690 to 14+780	Reconstruction	TCS-1A
88	14+780 to 15+130	Reconstruction	TCS-4A
89	15+130 to 15+260	Reconstruction	TCS-4B
90	15+260 to 15+320	Reconstruction	TCS-1B
91	15+320 to 15+540	Reconstruction	TCS-4A
92	15+540 to 15+640	Reconstruction	TCS-10A
93	15+640 to 16+180	Reconstruction	TCS-9A
94	16+180 to 16+260	Reconstruction	TCS-10A
95	16+260 to 16+580	Reconstruction	TCS-4A
96	16+580 to 16+660	Reconstruction	TCS-1B
97	16+660 to 17+060	Reconstruction	TCS-4A
98	17+060 to 17+160	Reconstruction	TCS-1A
99	17+160 to 17+240	Reconstruction	TCS-4A
100	17+240 to 17+280	Reconstruction	TCS-3A
101	17+280 to 17+340	Reconstruction	TCS-1B
102	17+340 to 17+520	Reconstruction	TCS-4A
103	17+520 to 17+670	Reconstruction	TCS-4B
104	17+670 to 17+780	Reconstruction	TCS-4A
105	17+780 to 17+880	Reconstruction	TCS-1A
106	17+880 to 17+930	Reconstruction	TCS-4A
107	17+930 to 18+290	Reconstruction	TCS-1B
108	18+290 to 18+460	Reconstruction	TCS-1A
109	18+460 to 18+520	Reconstruction	TCS-3A
110	18+520 to 18+590	Reconstruction	TCS-2A
111	18+590 to 18+760	Reconstruction	TCS-3A
112	18+760 to 18+960	Reconstruction	TCS-4A
113	18+960 to 19+060	Reconstruction	TCS-3A

114	19+060 to 19+320	Reconstruction	TCS-1B
115	19+320 to 19+420	Reconstruction	TCS-4B
116	19+420 to 19+520	Reconstruction	TCS-3B
117	19+520 to 19+640	Reconstruction	TCS-1B
118	19+640 to 19+720	Reconstruction	TCS-4B
119	19+720 to 19+820	Reconstruction	TCS-1B
120	19+820 to 19+980	Reconstruction	TCS-4B
121	19+980 to 20+120	Reconstruction	TCS-1B
122	20+120 to 20+360	Reconstruction	TCS-1A
123	20+360 to 20+680	Reconstruction	TCS-4A
124	20+680 to 20+830	Reconstruction	TCS-8A
125	20+830 to 21+520	Reconstruction	TCS-9A
126	21+520 to 21+620	Reconstruction	TCS-10A
127	21+620 to 22+020	Reconstruction	TCS-9A
128	22+020 to 22+120	Reconstruction	TCS-10A
129	22+120 to 22+440	Reconstruction	TCS-9B
130	22+440 to 22+530	Reconstruction	TCS-10B
131	22+530 to 22+630	Reconstruction	TCS-9B
132	22+630 to 22+690	Reconstruction	TCS-8B
133	22+690 to 22+820	Reconstruction	TCS-4A
134	22+820 to 23+230	Reconstruction	TCS-4A
135	23+230 to 25+320	Reconstruction	TCS-1A
136	25+320 to 25+660	Reconstruction	TCS-1B
137	25+660 to 26+220	Reconstruction	TCS-1A
138	26+220 to 26+530	Reconstruction	TCS-3A
139	26+530 to 26+840	Reconstruction	TCS-2A
140	26+840 to 26+920	Reconstruction	TCS-3A
141	26+920 to 26+980	Reconstruction	TCS-4A
142	26+980 to 27+180	Reconstruction	TCS-1A
143	27+180 to 27+240	Reconstruction	TCS-3A
144	27+240 to 27+320	Reconstruction	TCS-4B
145	27+320 to 27+360	Reconstruction	TCS-1B
146	27+360 to 27+855	Reconstruction	TCS-4B
147	27+855 to 27+960	Reconstruction	TCS-4A
148	27+960 to 28+060	Reconstruction	TCS-5A
149	28+060 to 28+280	Reconstruction	TCS-3B
150	28+280 to 29+560	Reconstruction	TCS-1B
151	29+560 to 29+860	Reconstruction	TCS-4A
152	29+860 to 29+960	Reconstruction	TCS-3B
153	29+960 to 30+060	Reconstruction	TCS-4B
154	30+060 to 30+410	Reconstruction	TCS-4A

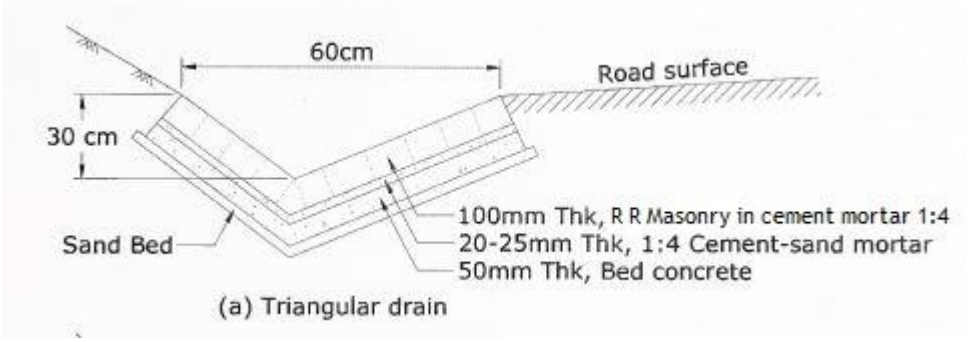
155	30+410 to 30+460	Reconstruction	TCS-1B
156	30+460 to 30+680	Reconstruction	TCS-1A
157	30+680 to 30+740	Reconstruction	TCS-4A
158	30+740 to 30+820	Reconstruction	TCS-3A
159	30+820 to 30+860	Reconstruction	TCS-4A
160	30+860 to 31+020	Reconstruction	TCS-4B
161	31+020 to 31+280	Reconstruction	TCS-4A

*- Annexure-II of Schedule-B

6. Road side Drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per Section 6 of the Manual (IRC: SP: 73-2018).

Drain Type	Side	Net length (m)
RCC Covered Drain	Both Side	5460
RR Masonry Triangular Drain	Both/One Side	38055
Total		**43515**



(a) Triangular drain

Note 1: The length of side drains given above are minimum and it may vary as per site condition. In case of increase of length, no positive change of scope will be payable.

Note 2: Box cut sections will have drains on both sides.

7. Design of Structures

(i) General

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

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

Sl. No.	Bridge/Structure at km	Width of carriageway and cross-sectional features
Nil.		

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

Sl. No.	Bridge/Structure at km	Width of carriageway and cross-sectional features
Nil		

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

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

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

[Refer to provision of the relevant Manualand provide details]

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

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

(ii) Culverts

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

(b) Distance between any two culverts shall not be more than 200 m.

(c) Minimum of five culverts per Km shall be provided.

(d) Reconstruction of existing culverts:

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

Sl. No.	Design Chainage	Size (m)
1	0.289	2.0 X 2.0
2	0.566	2.0 X 2.0
3	0.825	2.0 X 2.0

Sl. No.	Design Chainage	Size (m)
4	0.968	2.0 X 2.0
5	1.054	2.0 X 2.0
6	1.185	2.0 X 2.0
7	1.836	2.0 X 2.0
8	1.922	2.0 X 2.0
9	2.335	2.0 X 2.0
10	2.515	2.0 X 2.0
11	2.772	2.0 X 2.0
12	3.047	2.0 X 2.0
13	3.203	2.0 X 2.0
14	3.347	2.0 X 2.0
15	3.905	2.0 X 2.0
16	4.055	2.0 X 2.0
17	4.317	2.0 X 2.0
18	4.547	2.0 X 2.0
19	4.833	2.0 X 2.0
20	5.122	2.0 X 3.0
21	5.407	2.0 X 2.0
22	5.443	2.0 X 2.0
23	5.694	2.0 X 2.0
24	6.063	3.0 X 4.0
25	6.276	2.0 X 2.0
26	6.457	2.0 X 2.0
27	6.516	2.0 X 2.0
28	9.441	2.0 X 2.0
29	9.734	2.0 X 2.0
30	9.963	2.0 X 2.0
31	10.083	2.0 X 2.0
32	10.218	2.0 X 2.0
33	10.373	2.0 X 2.0
34	10.535	2.0 X 2.0
35	10.847	3.0 X 4.0
36	10.884	2.0 X 2.0
37	10.938	2.0 X 2.0
38	11.084	2.0 X 2.0
39	11.240	2.0 X 2.0
40	11.507	2.0 X 2.0
41	12.068	2.0 X 2.0
42	12.228	2.0 X 2.0
43	12.388	2.0 X 2.0
44	12.601	2.0 X 2.0
45	12.925	2.0 X 2.0
46	13.078	2.0 X 2.0

Sl. No.	Design Chainage	Size (m)
47	13.733	2.0 X 2.0
48	13.896	2.0 X 2.0
49	13.996	2.0 X 2.0
50	14.291	2.0 X 2.0
51	14.474	2.0 X 2.0
52	14.596	2.0 X 2.0
53	14.985	2.0 X 2.0
54	15.184	2.0 X 2.0
55	15.374	2.0 X 2.0
56	15.471	2.0 X 2.0
57	15.827	2.0 X 2.0
58	16.969	2.0 X 2.0
59	17.058	2.0 X 2.0
60	17.331	2.0 X 2.0
61	17.582	2.0 X 2.0
62	17.668	2.0 X 2.0
63	17.880	2.0 X 2.0
64	18.100	2.0 X 2.0
65	18.388	2.0 X 2.0
66	18.541	2.0 X 2.0
67	19.131	2.0 X 2.0
68	19.396	2.0 X 2.0
69	20.395	2.0 X 2.0
70	20.721	2.0 X 2.0
71	21.006	2.0 X 2.0
72	21.429	2.0 X 2.0
73	21.831	2.0 X 2.0
74	22.138	2.0 X 2.0
75	22.180	2.0 X 2.0
76	22.310	2.0 X 2.0
77	22.578	2.0 X 2.0
78	22.696	2.0 X 2.0
79	22.780	2.0 X 2.0
80	22.957	2.0 X 2.0
81	23.245	2.0 X 2.0
82	23.572	2.0 X 2.0
83	23.788	2.0 X 2.0
84	24.071	2.0 X 2.0
85	25.741	2.0 X 2.0
86	26.992	2.0 X 2.0
87	27.289	2.0 X 2.0
88	27.485	2.0 X 2.0
89	27.675	2.0 X 2.0

Sl. No.	Design Chainage	Size (m)
90	27.962	2.0 X 2.0
91	28.273	2.0 X 3.0
92	28.398	2.0 X 2.0
93	29.800	2.0 X 2.0
94	29.915	2.0 X 2.0
95	30.062	3.0 X 4.0
96	30.366	2.0 X 2.0
97	30.889	2.0 X 2.0
98	31.272	2.0 X 2.0

Note : The above Design Chainages are indicative and may vary as per site requirement to be approved by Authority's Engineer.

(c) Widening of existing culverts:

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

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

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

Sl. No.	Design Chainage	Size (m)
1	0.147	2.0 X 2.0
2	0.646	2.0 X 2.0
3	1.309	2.0 X 2.0
4	1.410	2.0 X 2.0
5	1.505	2.0 X 2.0
6	1.640	2.0 X 2.0
7	2.144	2.0 X 2.0
8	2.421	2.0 X 2.0
9	2.640	2.0 X 2.0
10	2.695	2.0 X 2.0
11	2.880	2.0 X 2.0
12	2.966	2.0 X 2.0
13	3.110	2.0 X 2.0
14	3.430	2.0 X 2.0
15	3.523	2.0 X 2.0
16	3.700	2.0 X 2.0

Sl. No.	Design Chainage	Size (m)
17	3.989	2.0 X 2.0
18	4.176	2.0 X 2.0
19	4.765	2.0 X 2.0
20	4.993	2.0 X 2.0
21	5.266	2.0 X 2.0
22	8.812	2.0 X 2.0
23	8.990	2.0 X 2.0
24	9.178	2.0 X 2.0
25	9.550	2.0 X 2.0
26	11.600	2.0 X 2.0
27	11.773	2.0 X 2.0
28	11.990	2.0 X 2.0
29	12.749	2.0 X 2.0
30	13.182	2.0 X 2.0
31	13.260	2.0 X 2.0
32	13.348	2.0 X 2.0
33	13.430	2.0 X 2.0
34	13.625	2.0 X 2.0
35	13.806	2.0 X 2.0
36	14.135	2.0 X 2.0
37	14.560	2.0 X 2.0
38	15.660	2.0 X 2.0
39	16.050	2.0 X 2.0
40	16.365	2.0 X 2.0
41	16.544	2.0 X 2.0
42	16.865	2.0 X 2.0
43	16.895	2.0 X 2.0
44	17.190	2.0 X 2.0
45	17.934	2.0 X 2.0
46	18.150	2.0 X 2.0
57	18.496	2.0 X 2.0
48	18.680	2.0 X 2.0
49	19.525	2.0 X 2.0
50	19.708	2.0 X 2.0
51	19.900	2.0 X 2.0
52	20.170	2.0 X 2.0
53	20.293	2.0 X 2.0
54	20.586	2.0 X 2.0
55	21.260	2.0 X 2.0
56	22.000	2.0 X 2.0
57	23.035	2.0 X 2.0
58	23.122	2.0 X 2.0
59	23.458	2.0 X 2.0
60	23.895	2.0 X 2.0

Sl. No.	Design Chainage	Size (m)
61	26.108	2.0 X 2.0
62	26.396	2.0 X 2.0
63	26.827	2.0 X 2.0
64	27.104	2.0 X 2.0
65	27.378	2.0 X 2.0
66	27.881	2.0 X 2.0
67	28.134	2.0 X 2.0
68	29.610	2.0 X 2.0
69	29.890	2.0 X 2.0
70	30.188	2.0 X 2.0
71	30.457	2.0 X 2.0
72	31.012	2.0 X 2.0
73	31.147	2.0 X 2.0

Note : The above Design Chainages are indicative and may vary as per site requirement to be approved by Authority's Engineer.

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

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

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

(iii) Bridges

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

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

Sl. No.	Bridge location (km)	Salient details of existing bridge		Adequacy or otherwise of the existing waterway, vertical clearance etc.*	Remarks
		Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)		
Nil.					

(ii) The following narrow bridges shall rewidened:

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

(b) Additional new bridges

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

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

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

Sl.No.	Location at km	Remarks
Nil		

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

Sl. No.	Location of bridge	Nature and extent of repairs /strengthening to be carried
1	Nil	

(e) Drainage system for bridge decks

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

Nil

(f) Structures in marine environment

Nil

(v) Rail-road bridges

(a) Design construction and detailing of ROB/RUB shall be as specified in provision of the relevant Manual

Nil

(b) Road over-bridges

Road over-bridges (road over ail) shall be provided at the following level crossings. As per GAD drawings attached:

Sl. No.	Location of Level crossing (Chainage km)	Length of bridge (m)
Nil		

(c)Road under-bridges

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

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

(v) Grade separated structures

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

(vi) Repairs and strengthening of bridges and structures

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

(a) Bridges

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

(b) ROB / RUB

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

(c) Overpasses/Underpasses and other structures

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

(vii) List of Major Bridges and Structures

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

Sl. No.	Location (Km)
Nil	

8. Traffic Control Devices and Road Safety Works

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

Sl. No	Traffic Signage, Road Marking and other appurtenances	Unit	Quantity
1	200 meter stones	Nos.	123
2	Kilometre stones	Nos	26

Sl. No	Traffic Signage, Road Marking and other appurtenances	Unit	Quantity
1	200 meter stones	Nos.	123
3	5th Kilometre stones	Nos	7
4	Boundary Stones	Nos	123
5	Delineators (100 cm long and circular shaped) +Hazard marker	Nos	3380
6	Road Stud	Nos	14200
7	900 mm Octagonal Road Sign	Nos	22
8	600 mm circular Road Sign	Nos	35
9	900 mm Triangular Road Sign	Nos	647
10	800 mm x 600 mm rectangular Road Sign	Nos	55
11	Direction Sign < 0.9 Sqm.	sqm	sqm
12	Rumble Strip	sqm	300
13	Painting for Traffic Marking	sqm	10427

(ii) Specifications of the reflective sheeting as per Manual.

9. Road side Furniture

(i) Road side furniture shall be provided in accordance with article 8(i) of this schedule.

(ii) Overhead traffic signs: location and size

Sl. No.	Location (Km)	Remarks
1	0.000	Full Width, Area - 36 m^2

10. Compulsory Afforestation

Nil

11. Hazardous Locations

11.1 Metal Beam crash barrier of minimum length of **13000 m (single runner, heavy duty and W-shape)** shall be provided at the locations of bridge approaches, high embankments (3.0m and more) and at sharp curves on both sides of the highway, at the locations finalized in consultation with AE. Typical details of metal crash barrier are given in manual. Increase in length if any as per site requirement will not constitute change of scope.

11.2 Rest of the complete length of the project highway shall have parapet wall as per IRC SP 48:1998.

12. Special Requirement for Hill Roads

Refer to section 13 of IRC: SP: 73-2018. The **minimum quantity** of protection work may be taken as below:

Type of Protection Work		
Protection Work	**Unit**	**Quantity**
Breast wall of RRM in cement mortar, 2m high	Rm	3000
Breast wall of RRM in cement mortar, 3m high	Rm	1000
Retaining wall, 6m high	Rm	450
Retaining wall, 5m high	Rm	300
Retaining wall, 4m high	Rm	1450
Retaining wall, 3m high	Rm	1500
Retaining wall, 2m high	Rm	850
Retaining wall, 4m high at Muck Disposal Location	Rm	66
Gabion Breast Wall	cum	35500
Seeding and Mulching with Jute Net	sqm	15000
Seeding and Mulching with Coir net	sqm	15000
Hydro seeding	sqm	50000
Chute for Culvert	No.	At Every Culvert Location

Note-

(i) The Contractor shall be responsible for accurate assessment of the actual requirement as per site situation & prepare designs for slope protection & stabilization as per the specifications & standards stipulated in schedule 'D' and submit the same to the AE for review through the proof consultant and implement it accordingly thereafter.

(ii) Any increase in quantity over and above the minimum qty. as mentioned in above table or through change in specifications will not be considered as change of scope**. Therefore contractor shall make thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features at his own before submission of bid.**

(iii) The length of Retaining Wall shown above is minimum, to be constructed at site for proper geometrics and will not be converted to Breast Wall. Any reduction in the total length of Retaining Wall constructed at site shall constitute of negative change of scope.

(iv) **Entire slope/formation which has been cut, apart from the above tabulated lengths/area shall have to be stabilized by the Contractor using techniques approved by AE.**

13. Change of Scope

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

14. Utility Shifting

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

Note-I:

(a) The type/ spacing/ size/ specifications of poles/ towers/ lines/ cables to be used in shifting work shall be as per the guidelines of utility owning department and it is to be agreed solely between the Contractor and the utility owning department. No change of scope shall be admissible and no cost shall be paid for using different type/ spacing/ size/ specifications in shifted work in comparison to those in the existing work or for making any overhead crossings to underground as per requirement of

utility owning department and/or construction of project highway. The Contractor shall carry out joint inspection with utility owning department and get the estimates from the utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor to utility owning department whenever asked by the Contractor. The decision/ approval of utility owning department shall be binding on the Contractor.

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

(c) The dismantled material/scrap of existing Utility to be shifted/ dismantled shall belong to the Contractor who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor is required to deposit the dismantled material to utility owning department as per the norm and practice and in that case the amount of credit for dismantled material may be availed by the Contractor as per estimate agreed between them.

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

Note-II:

Utility Shifting/Relocation Plan and drawings incorporating the details, such as the length and category of lines, types of circuits, type and number of poles, size and type of conductor/cable, the number and type of crossings and the capacity and the number of transformer, the length and category of pipes etc., shall be prepared by the Contractor in consultation with Utility Owning Department and the Authority's Engineer as per the site requirement.

(Schedule-B1)

1. The shifting of utilities

(iv) Electrical utilities

The site includes the following electrical utilities: -

c) Extra High-Tension Lines (EHT Lines)

Sl. No.	Chainage		Length (in km)				Crossings			
	From	To	400 KV	220 KV	110 KV	66 KV	400 KV	220 KV	110 KV	66 KV
1	0+000	32+796	Nil							

d) High Tension/Low Tension Lines (HT/LT Lines)

Sl. No.	Chainage		HT/LT Lines (Kms)			Crossings			Transformer	
	From	To	33 KV	11 KV	LT	33 KV	11 KV	LT	No	Capacity
1	0+000	32+796	-	2.6	1.75		11	7	3	2 Nos. 25 KVA & 1 No. 100 KVA

(v) Public Health utilities (Water/Sewage Pipe Lines)

The site includes the following Public Health utilities: -

Sl.No.	Existing Chainage		Length (in km)								Nos.	Nos.	Remarks
	From	To	Gravity Main Line		Feeding Main Line		Village Water Pipe line		Private House Water Connections *		Construction of Service Reservoir	Installation of T/Cluster	
			With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow			
1	15.7	16.24		0.594									
2	16.15	16.12				0.11							
3	15.56	16.38						0.902					
4	15.56	16.38								0.4			
5	Khawkawn Village										3		
6	16.6	16.72						0.132			2 of 5.0 Lakh Litres Capacity	5	Khawkawn Village
7	16.15	16.12		0.759								19	NE Khawdungsei Village
8	18.24	21.6				3.652							
9	20.84	22.85						1.447					

10	NE Khawdungsei Village								1.015			
	Total		**1.353**	**0**	**3.762**	**0**	**2.481**	**0**	**1.415**	**3**	**24**	

* Installation of Private House Water Connections also includes cost of connection to individual House damaged by proposed construction.

(vi) Any Other line: Nil

Note: Variation upto 10% in quantities of Utilities to be shifted will not constitute Change of Scope.

Schedule - C

(See Clause 2.1)

Project Facilities

1. Project Facilities

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

(a) toll plaza[s];

(b) roadside furniture;

(c) pedestrian facilities;

(d) truck lay-byes;

(e) bus-bays and passenger shelters;

(f) rest areas; and

(g) others to be specified

2. Description of Project Facilities

Each of the Project Facilities is described below:

(a) Toll Plaza

S. No.	Toll Plaza Location (Design Chainage in Km)
Nil	

(b) Roadside Furniture

The roadside furniture shall be provided in accordance with section 9.0 of the Manual of the standards and Specifications.

Sl. No.	Description	Location	Design Standard
1	Traffic sign & pavement marking	Entire Length (As per Schedule B)	As per Manual
2	200 m stone, km Stone, 5th kilometre stone	Entire Length	As per Manual
3	Boundary Stone	Entire Length	As per Manual
4	Roadside Delineator, marker & Road Stud	As per Schedule B	As per Manual
5	Metal beam crash barrier	As per Schedule B	As per Manual

(c) Pedestrian Facilities

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

(d) Truck Lay-byes

Truck lay byes shall be provided at the following locations.

Sr. No.	Proposed Chainage (km)
Nil	

(e) Bus Bays & Passenger Shelter:

Bus Bays shall be provided at locations given below:

S. No	Proposed Chainage (km)
Nil	

(f) Rest Areas

S. No	Proposed Chainage (km)
Nil	

(g) Others

Street Lighting:

Street lighting shall be provided in the built-up area.

Environment

The Project Highway during design, construction and maintenance during implementation period shall conform to the environmental rules and regulations in force. The Construction Contractor shall be responsible for the same.

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

Schedule - D

(See Clause 2.1)

Specifications and Standards

1. Construction

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

2. Design Standards

The Project Highway including Project Facilities shall conform to design requirements set out in the Manual of Specifications and Standards for Two-Laning of Highways (IRC: SP: 73-2018) referred to as the Manual, and MORTH Specifications for Road and Bridge Works 5th Revision 2013 or latest version. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

The Hill Road Manual IRC SP 48 -1998 should also be referred.

THE NATIONAL GREEN TRIBUNAL PRINCIPAL BENCH, NEW DELHI on 01th Nov, 2018

Following recommendations and suggestions have been made for dumping muck & dumping yard:-

a. Before dumping muck at the dumping yard first of all retaining/ gabion walls of specified capacity and suitable design should be constructed.

b. All the dumping sites should be properly designed with retaining wall/gabion structures and should be maintained regularly in order to check the spillage of the muck down the slope and into the rivers and other places.

c. Wherever boulders are rolling down along with much, gabion structures/retaining wall should have sufficient foundation and bottom width should be 4-5 m. Length of one gabion structure should not be more than 6-8 m. Wherever more length of gabion structure is required one gabion structure should be bound with another

d. If any new dumping sites are identified in future, then the retaining / gabion structures should be constructed at suitable vertical interval of 5-6 m so that entire disposed muck may not exert pressure only at one wall/ toe wall rather the load of muck should be distributed on different walls.

e. Angle of repose of muck should be maintained between 30 to 450. Long slopes should be intercepted to several short ones with the help of 1.5 to 2.0 m wide berms / terraces/ benches in between in order to maintain less than critical velocity for runoff water and simultaneously mass erosion with

be controlled.

f. The capacity/ volume of muck disposal site should be more than volume of muck to be disposed.

g. Proper sign boards indicating the name, number, location, dumping capacity, etc. should be installed at all the dumping sites.

h. Dumping sites which are full of their capacity they should be rehabilitated with local grass or shrubs. Jute geo textile (JGT) may also be used for establishment of vegetation at vulnerable sites.

i. Gabion walls should be constructed above HFL of River. If slope is very high to construct a gabion wall then a RCC/stone masonry retaining wall should be given at bank of River after proper design including foundation. Height of this wall should be well above the HFL of River.

j. All construction sites should follow and comply with the provisions of the Construction and Demolition Waste Management Rules, 2016".

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-Laning of Highways (IRC SP73: 2018)], referred to as the Manual, and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. Deviations from the Specifications and Standards

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

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

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

<table>
<tr><th>Item</th><th>Manual Clause Reference</th><th>Provision as per Manual</th><th colspan="2">Modified Provision</th></tr>
<tr><td rowspan="2">Design Speed</td><td rowspan="2">2.2</td><td><u>Mountainous or Steep Terrain:</u></td><td colspan="2"><u>Mountainous or Steep Terrain:</u></td></tr>
<tr><td><u>As per IRC SP 73: 2018</u>
Ruling: 60 km/ hr
Minimum: 40 km/ hr

<u>As per IRC SP 48: 1998/IRC 52: 2019</u>
Ruling: 40 km/ hr
Minimum: 30 km/ hr</td><td colspan="2">Minimum design speed of 30 km/hr has been taken as per IRC SP 48: 1998/IRC 52: 2019 and at some locations, design speed has been reduced to 20 km/ hr due to site constraints. The design speed shall be as per IRC 73: 2018. However in exceptional cases, the minimum design speed of 30 km per hour may be adopted and at hair pin bends, design speed may be reduced to 20 km per hour due to site constraints. (Refer Horizontal Alignment Drawing and Table 2.1 below)</td></tr>
<tr><td rowspan="7">Extra Widening</td><td rowspan="7">2.7</td><td colspan="2">Extra Widening has been proposed as per IRC: SP: 73-2018</td><td colspan="2">Extra Widening has been proposed as per IRC: SP: 48-1998 (Table 6.9) of Hill Road Manual.</td></tr>
<tr><td>Radius (in m)</td><td>Extra Widening (in m)</td><td>Radius (in m)</td><td>Extra Widening (in m)</td></tr>
<tr><td>75-100</td><td>0.9</td><td>21-40</td><td>1.5</td></tr>
<tr><td>101-300</td><td>0.6</td><td>41-60</td><td>1.2</td></tr>
<tr><td colspan="2"></td><td>61-100</td><td>0.9</td></tr>
<tr><td colspan="2"></td><td>75-100</td><td>0.9</td></tr>
<tr><td colspan="2"></td><td>101-300</td><td>0.6</td></tr>
<tr><td colspan="2"></td><td>Above 300</td><td>NIL</td></tr>
</table>

Item	Manual Clause Reference	Provision as per Manual	Modified Provision
Radii of Horizontal Curve	2.9.4	**Mountainous Terrain:** Desirable Minimum Radius: 150 m Absolute Minimum Radius: 75 m	Radius below 75 m has been provided in the location listed in table 2.2.

Table 2.1: Locations where Design Speed is less than 40 kmph due to Sharp Bend

Sl. No.	Stretch (from km to km)	Design Speed in km/ hr
1	0+023 To 0+070	30
2	0+114 To 0+131	30
3	0+522 To 0+638	30
4	0+765 To 0+823	30
5	0+860 To 0+898	30
6	0+936 To 0+940	30
7	0+979 To 0+988	30
8	1+036 To 1+055	30
9	1+099 To 1+120	30
10	1+170 To 1+214	30
11	1+253 To 1+267	30
12	1+311 To 1+365	30
13	1+404 To 1+417	30
14	1+487 To 1+502	30
15	1+763 To 1+771	30
16	1+817 To 1+835	30
17	1+881 To 1+889	30
18	1+957 To 1+999	20
19	2+041 To 2+052	30
20	2+299 To 2+327	30
21	2+375 To 2+387	30
22	2+485 To 2+517	30
23	2+567 To 2+572	30
24	2+796 To 2+806	30
25	2+857 To 2+902	20
26	2+936 To 2+972	30
27	3+016 To 3+052	20
28	3+119 To 3+147	30
29	3+184 To 3+188	30
30	3+308 To 3+329	30
31	3+373 To 3+391	30

32	3+422 To 3+441	30
33	3+482 To 3+510	30
34	3+694 To 3+734	20
35	3+874 To 3+906	30
36	3+974 To 4+006	30
37	4+037 To 4+057	30
38	4+093 To 4+113	30
39	4+232 To 4+256	30
40	4+323 To 4+434	30
41	4+486 To 4+543	30
42	4+622 To 4+650	30
43	4+689 To 4+706	30
44	4+812 To 4+831	30
45	4+892 To 4+928	30
46	4+969 To 5+019	30
47	5+259 To 5+287	30
48	5+385 To 5+447	30
49	5+531 To 5+585	30
50	5+885 To 5+914	30
51	5+967 To 5+985	30
52	6+037 To 6+062	30
53	6+245 To 6+259	30
54	6+293 To 6+332	30
55	6+380 To 6+391	30
56	6+435 To 6+456	30
57	6+504 To 6+518	30
58	6+569 To 6+592	30
59	6+959 To 7+001	20
60	7+075 To 7+105	30
61	7+189 To 7+223	20
62	7+271 To 7+292	30
63	7+454 To 7+514	30
64	7+741 To 7+768	30
65	7+803 To 7+811	30
66	7+889 To 7+912	30
67	7+946 To 7+959	20
68	8+005 To 8+050	20
69	8+88 To 8+147	30
70	8+190 To 8+294	30
71	8+328 To 8+363	30
72	8+404 To 8+448	30

73	9+398 To 9+435	30
74	9+663 To 9+699	30
75	9+757 To 9+829	30
76	9+881 To 9+893	30
77	9+967 To 9+973	30
78	10+036 To 10+078	30
79	10+223 To 10+266	30
80	10+334 To 10+354	30
81	10+401 To 10+422	30
82	10+802 To 10+839	20
83	10+919 To 10+932	30
84	10+990 To 10+997	30
85	11+049 To 11+102	30
86	11+171 To 11+212	30
87	11+270 To 11+314	30
88	11+838 To 11+844	30
89	11+897 To 11+919	30
90	12+237 To 12+341	30
91	12+376 To 12+385	30
92	12+499 To 12+502	30
93	12+553 To 12+557	30
94	12+603 To 12+609	30
95	12+641 To 12+644	30
96	12+680 To 12+713	20
97	12+856 To 12+891	30
98	12+930 To 12+954	30
99	13+009 To 13+052	30
100	13+112 To 13+149	30
101	13+654 To 13+677	30
102	13+828 To 13+844	30
103	13+938 To 13+957	30
104	13+994 To 14+210	30
105	14+142 To 14+149	30
106	14+220 To 14+247	30
107	14+295 To 14+315	30
108	14+403 To 14+407	30
109	14+461 To 14+473	30
110	14+529 To 14+561	30
111	14+634 To 14+650	30
112	14+699 To 14+741	20
113	14+797 To 14+820	30

114	14+880 To 14+948	30
115	15+011 To 15+042	30
116	15+106 To 15+143	30
117	15+191 To 15+234	30
118	15+405 To 15+423	30
119	15+478 To 15+490	30
120	15+537 To 15+587	30
121	15+631 To 15+653	30
122	15+724 To 15+736	30
123	15+786 To 15+830	30
124	16+012 To 16+069	30
125	16+085 To 16+101	30
126	16+122 To 16+182	30
127	16+209 To 16+225	20
128	16+315 To 16+341	20
129	17+283 To 17+339	30
130	17+504 To 17+508	30
131	20+643 To 20+676	30
132	20+757 To 20+786	20
133	20+834 To 20+857	30
134	20+904 To 20+925	30
135	20+981 To 20+992	30
136	21+044 To 21+052	30
137	21+093 To 21+107	30
138	21+197 To 21+209	30
139	21+254 To 21+263	30
140	22+937 To 22+951	30
141	23+026 To 23+035	30
142	23+088 To 23+092	30
143	23+182 To 23+198	30
144	23+260 To 23+283	30
145	23+339 To 23+353	30
146	23+396 To 23+415	30
147	23+498 To 23+566	30
148	23+626 To 23+636	30
149	23+697 To 23+801	30
150	23+864 To 23+902	30
151	23+960 To 23+984	30
152	24+031 To 24+068	20
153	24+144 To 24+198	20
154	24+229 To 24+282	30

155	24+825 To 24+840	30
156	24+898 To 24+908	30
157	24+983 To 25+004	30
158	25+145 To 25+189	20
159	25+277 To 25+291	30
160	25+762 To 25+767	30
161	25+823 To 25+888	30
162	25+924 To 25+932	30
163	25+974 To 26+350	30
164	26+068 To 26+110	30
165	26+142 To 26+191	20
166	26+279 To 26+300	30
167	26+343 To 26+346	30
168	27+442 To 27+490	30
169	27+546 To 27+571	30
170	28+435 To 28+484	30
171	28+568 To 28+602	30
172	29+083 To 29+104	30
173	29+148 To 29+186	30
174	29+318 To 29+338	30
175	29+660 To 29+692	30
176	29+875 To 29+894	30
177	29+989 To 30+024	30
178	30+152 To 30+158	30
179	30+237 To 30+269	30
180	30+412 To 30+435	30
181	31+039 To 31+074	30
182	31+115 To 31+160	30

Table 2.2: Locations where Radii of Horizontal Curve is less than 75 m

Sl. No	Chainage (m)		Radius (m)
	from	to	
1	23.302	69.533	50
2	113.644	130.789	50
3	521.986	637.631	44.5
4	936.415	940.198	30
5	1035.635	1054.774	40
6	1170.083	1213.934	30
7	1311.393	1365.018	30
8	1486.585	1501.728	30
9	1680.890	1693.118	60

Sl. No	Chainage (m)		Radius (m)
	from	to	
10	1763.344	1771.020	30
11	1817.344	1834.727	50
12	1956.591	1999.215	20
13	2040.997	2051.815	60
14	2299.413	2326.600	30
15	2374.805	2386.972	50
16	2484.789	2516.695	30
17	2857.044	2902.204	20
18	3016.013	3051.927	20
19	3119.135	3146.906	60
20	3183.543	3188.280	60
21	3308.196	3328.518	30
22	3373.385	3390.747	30
23	3422.280	3441.420	60
24	3482.114	3509.926	60
25	3693.523	3733.766	20
26	3874.280	3905.875	50
27	3973.658	4005.512	30
28	4036.978	4057.118	50
29	4231.916	4255.547	55
30	4486.226	4543.228	40
31	4621.737	4649.826	30
32	4689.410	4706.265	70
33	4812.484	4831.423	40
34	4891.958	4928.173	30
35	4969.125	5018.703	35
36	5259.352	5286.666	30
37	5385.090	5447.397	40
38	5530.769	5585.105	40
39	5885.050	5914.408	30
40	5967.039	5984.799	60
41	6037.082	6061.668	30
42	6292.881	6332.263	30
43	6379.821	6390.519	50
44	6434.951	6455.538	30
45	6504.219	6518.275	30
46	6568.837	6592.496	30
47	6812.827	6826.667	70
48	6959.133	7001.156	20
49	7075.110	7104.543	30
50	7189.417	7223.478	20
51	7270.955	7292.142	60
52	7454.264	7514.201	30

Sl. No	Chainage (m)		Radius (m)
	from	to	
53	7741.226	7767.915	30
54	7802.961	7810.699	30
55	7888.691	7912.268	60
56	7946.036	7959.337	20
57	8005.331	8049.545	20
58	8088.165	8146.639	50
59	8190.190	8294.279	70
60	8327.851	8362.652	30
61	8403.825	8448.430	30
62	8593.116	8606.831	70
63	8698.635	8706.700	50
64	8768.130	8782.087	50
65	8996.853	9031.364	60
66	9398.481	9435.165	40
67	9588.547	9596.502	60
68	9662.737	9698.803	55
69	9756.766	9828.933	30
70	9880.594	9892.538	55
71	9967.088	9972.656	55
72	10035.975	10078.054	30
73	10223.273	10266.422	50
74	10333.997	10353.515	30
75	10400.959	10422.117	60
76	10660.899	10681.681	60
77	10801.882	10839.186	20
78	10918.843	10931.528	40
79	10990.105	10996.636	40
80	11049.477	11102.339	30
81	11171.333	11212.035	30
82	11269.733	11314.447	30
83	11448.391	11456.637	50
84	11583.033	11604.574	50
85	11703.182	11720.186	60
86	11838.184	11844.427	35
87	11897.006	11918.547	35
88	11957.965	11967.989	60
89	12088.310	12107.778	60
90	12237.347	12340.916	55
91	12499.117	12502.361	40
92	12553.247	12557.101	40
93	12602.552	12609.178	60
94	12640.774	12644.399	70
95	12680.330	12712.664	20

Sl. No	Chainage (m)		Radius (m)
	from	to	
96	12856.356	12890.507	30
97	12929.629	12953.906	30
98	13008.979	13052.153	30
99	13111.739	13149.260	50
100	13441.721	13477.902	60
101	13654.143	13676.754	40
102	13828.490	13843.771	30
103	13993.895	14020.952	30
104	14142.372	14148.962	30
105	14219.723	14247.143	30
106	14402.832	14407.393	30
107	14461.171	14473.145	50
108	14529.466	14561.301	30
109	14633.855	14649.930	30
110	14699.106	14740.825	20
111	14797.296	14820.405	50
112	14879.737	14947.843	40
113	15011.279	15042.045	40
114	15106.140	15142.933	25
115	15404.943	15422.949	40
116	15536.519	15587.465	40
117	15785.979	15829.569	45
118	16085.041	16100.829	30
119	16208.668	16225.495	20
120	16314.815	16341.272	20
121	17283.440	17338.932	30
122	17504.228	17508.481	30
123	17812.868	17821.863	60
124	18828.291	18851.911	60
125	18922.851	18946.243	60
126	19034.336	19061.842	50
127	20642.706	20676.055	30
128	20757.160	20786.000	20
129	20833.692	20857.205	30
130	20904.057	20924.766	30
131	20981.310	20992.200	60
132	21043.540	21051.799	30
133	21092.887	21107.339	50
134	21197.196	21208.861	30
135	21254.224	21262.998	30
136	21508.480	21518.795	70
137	22278.687	22291.899	70
138	22365.668	22412.178	50

Sl. No	Chainage (m)		Radius (m)
	from	to	
139	22502.200	22544.704	50
140	22936.784	22950.699	30
141	23026.499	23035.191	50
142	23087.564	23092.310	45
143	23181.742	23198.405	45
144	23260.457	23282.630	60
145	23339.115	23353.084	50
146	23395.552	23414.576	25
147	23498.118	23566.257	70
148	23625.779	23636.338	30
149	23697.234	23800.719	55
150	23864.425	23902.464	60
151	23960.177	23984.453	40
152	24030.559	24068.091	30
153	24144.487	24197.633	30
154	24228.674	24282.145	50
155	24385.842	24436.753	60
156	24561.372	24589.772	50
157	24690.134	24714.289	50
158	24825.008	24840.453	30
159	24897.701	24907.932	35
160	24983.458	25003.835	40
161	25145.087	25188.697	20
162	25277.372	25290.555	60
163	25477.280	25489.092	60
164	25666.379	25675.950	70
165	25761.856	25767.484	50
166	25823.318	25888.337	30
167	25923.610	25932.012	60
168	25973.696	26035.109	30
169	26067.644	26110.136	30
170	26141.804	26191.140	25
171	26279.076	26299.852	60
172	26342.813	26345.562	40
173	27441.631	27490.347	30
174	27545.822	27570.573	60
175	28567.550	28602.152	30
176	28697.312	28709.437	60
177	28801.943	28817.054	60
178	28939.411	28955.908	50
179	29083.150	29104.394	60
180	29148.217	29185.942	30
181	29317.551	29337.576	30

Sl. No	Chainage (m)		Radius (m)
	from	to	
182	29539.017	29549.319	60
183	29660.494	29692.296	30
184	29875.216	29894.424	50
185	29988.700	30024.164	40
186	30151.987	30158.280	60
187	30236.568	30268.508	30
188	30411.556	30434.977	30
189	30855.149	30889.687	70
190	31039.082	31073.755	30
191	31114.514	31159.862	50

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.

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex -I

(Schedule-E)

Annex –I Repair/rectification of Defects and deficiencies

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

Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
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 in depth	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 Scale, Tape, odometer etc.		2-7 days	IRC:82-2015
	Bleeding	Nil	< 1 % of area	Daily			3-7 days	MORT&H Specification 3004.4
	Ravelling/ Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily			7- 15 days	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	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006

<table>
<tr><th rowspan="2">Asset Type</th><th rowspan="2">Performance Parameter</th><th colspan="2">Level of Service (LOS)</th><th rowspan="2">Frequency of Inspection</th><th rowspan="2">Tools/ Equipment</th><th rowspan="2">Standards and References for Inspection and Data Analysis</th><th rowspan="2">Time limit for Rectification/Repair</th><th rowspan="2">Maintenance Specifications</th></tr>
<tr><th>Desirable</th><th>Acceptable</th></tr>
<tr><td rowspan="3"></td><td>Pavement Condition Index</td><td>3</td><td>2.1</td><td>Bi-Annually</td><td rowspan="2">(Sideway-force Coefficient Routine Investigation Machine or equivalent)</td><td rowspan="2">Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment</td><td>180 days</td><td>IRC:82-2015</td></tr>
<tr><td>Other Pavement Distresses</td><td></td><td></td><td>Bi-Annually</td><td>2-7 days</td><td>IRC:82-2015</td></tr>
<tr><td>Deflection/ Remaining Life</td><td></td><td></td><td>Annually</td><td>Falling Weight Deflectometer</td><td>IRC 115: 2014</td><td>180 days</td><td>IRC:115-2014</td></tr>
<tr><td rowspan="2">Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)</td><td>Roughness BI</td><td>2200mm/ km</td><td>2400mm/km</td><td>Bi-Annually</td><td>Class I Profilometer</td><td>ASTM E950 (98) :2004 and ASTM E1656 -94: 2000</td><td>180 days</td><td>IRC:SP:83-2008</td></tr>
<tr><td>Skid</td><td colspan="2">Skid Resistance no. at different speed of vehicles
<table><tr><th>Minimum SN</th><th>Traffic Speed (Km/h)</th></tr><tr><td>36</td><td>50</td></tr><tr><td>33</td><td>65</td></tr><tr><td>32</td><td>80</td></tr><tr><td>31</td><td>95</td></tr><tr><td>31</td><td>110</td></tr></table></td><td>Bi-Annually</td><td>SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)</td><td>IRC:SP:83-2008</td><td>180 days</td><td>IRC:SP:83-2008</td></tr>
<tr><td rowspan="3">Embankment / Slope</td><td>Edge drop at shoulders</td><td>Nil</td><td>40mm</td><td>Daily</td><td rowspan="3">Length Measurement Unit like Scale, Tape, odometer etc.</td><td rowspan="3">IRC</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Slope of camber/cross fall</td><td>Nil</td><td><2% variation in prescribed slope of camber /cross fall</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Embankment Slopes</td><td>Nil</td><td><15 % variation in prescribe side slope</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
	Embankment 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:

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

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected. Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	
3	**Single Longitudinal Crack intersecting with one or more joints**	w = width of crack L = length of 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 > 1 m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15 days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 15 days
4	**Multiple Cracks intersecting with one or more joints**	**w = width of crack**	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > 1 m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	three or four corners broken		Reinstate sub-base, and reconstruct the slab as per norms and specifications within 30days
6	**Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w = width of crack L = length (m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m²	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3 m/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		
Surface Defects						
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting. Within 30 days	
			4	r = 25 - 50 %		
			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 (%)	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			1	r < **2** %	Local repair of areas	

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
		h = maximum depth of damage	2	r = 2 - 10 %	damaged and liable to be damaged. Within 7days	
			3	r = 10 - 20%	Bonded Inlay within 15 days	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 mm	Reconstruct slab within 30 days	
9	**Polished Surface/Glazing**	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm		
			2 '	t = 1 - 0.6 mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	**Popout (Small Hole), Pothole Refer Para 8.4**	n = number/m^2 d = 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 i.e.10 mm more than the depth of the hole. Within 30 days	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m^2		
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	
Joint Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total	0	Difficult to discern.	**Short Term**	**Long Term**
					No action.	Not Applicable

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
		joint length	1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	**Spalling of Joints**	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion. Within 7 days	
			2	w = 10 - 20 mm, L < 25%		
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	**Faulting (or Stepping) in Cracks or Joints**	f = difference of level	0	not discernible, < 1 mm	No action.	No action.
			1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
14	**Blowup or Buckling**	h = vertical displacement from normal profile	0	Nil, not discernible	**Short Term**	**Long Term**
					No Action	
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic within 7 days	
			3	h = 12 - 25 mm		
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen sub-grade. Reinstate pavement at normal level if L < 20 m. Within 30 days	
			5	h > 100 mm		
16	**Heave**	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	**Short Term**	**Long Term**
					No action.	scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
17	**Bump**	h = vertical	0	h < 4 mm	No action	

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
		displacement from normal profile	1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term**	**Long Term**
					No action.	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder within 7 days	
			4	f = 50 - 75 mm		For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			5	f > 75 mm		
Drainage						
19	**Pumping**	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressed sections and upstream.
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	
		Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	
20	**Ponding**	Ponding on slabs	0-2	No discernible problem	No action.	

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
		due to blockage of drains	3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do-	

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td>Highway</td><td>Availability of Safe Sight Distance</td><td>As per IRC SP: 84-2014, a minimum of safe stopping sight distance shall be available throughout.
<table><tr><th>Design Speed, kmph</th><th>Desirable Minimum Sight Distance (m)</th><th>Safe Stopping Sight Distance (m)</th></tr><tr><td>100</td><td>360</td><td>180</td></tr><tr><td>80</td><td>260</td><td>130</td></tr></table></td><td>Monthly</td><td>Manual Measurements with Odometer along with video/ image backup</td><td colspan="2">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.
In case of permanent structure or design deficiency:
Removal of obstruction/improvement of deficiency at the earliest
Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td>IRC:SP 84-2014</td></tr>
<tr><td rowspan="2">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>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>
</table>

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="2"></td><td>Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>
<table>
<tr><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m²/lux)</td></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<tr><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td>65 - 100</td><td>250</td><td>120</td></tr>
<tr><td>Above 100</td><td>350</td><td>150</td></tr>
</table>
<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u>
Initial 7 days Retro reflectivity: 100 mcd/m²/lux
Minimum Threshold Level: 50 mcd/m²/lux</td><td>Bi-Annually</td><td>As per Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td>Skid Resistance</td><td>Initial and Minimum performance for Skid Resistance:
Initial (7days): 55BPN
Min. Threshold: 44BPN
*Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc</td><td>Bi-Annually</td><td>As per Annexure-G of IRC:35-2015</td><td></td><td>Within 24 hours</td><td>IRC:35-2015</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each 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	RC: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	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Traffic Safety Barriers	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 with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014

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

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

Table 4: Maintenance Criteria for Structures and Culverts:

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 sq.m. Cracks wider than 0.3 mm not more than 1m aggregate length	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC: SP: 40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause 2800

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge - Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.
	Rusted reinforcement	Not more than 0.25 sqm	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	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sqm					

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Delamination	Not more than 0.50 sq.m			the repairs to affected concrete portion with epoxy mortar / concrete.		
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Bridge-substructure	Cracks/spalling of concrete/rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 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 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	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban	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
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road lighting**	
(i)	Any major failure of the system	24 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f)	**Rest area**	
(i)	Cleaning of toilets	Every 4 (four) hours

Nature of Defect or deficiency		Time limit for repair/ rectification
(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	within 48 (forty eight) hours
	Permanent measures	within15 (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)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days

Nature of Defect or deficiency		Time limit for repair/ rectification
(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 4.1 (vii)(a))

Applicable Permits

1. Applicable Permits

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

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

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

(c) Licence for use of explosives;

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

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

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

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

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

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

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

Schedule - G

(See Clauses 7.1 and 19.2)

Annex-I : Form of Bank Guarantee

(See Clause 7.1)

[Performance Security /Additional Performance Security]

To

_____[name of Authority]

_____ [address of Authority]

WHEREAS_____[name and address of Contractor] (hereafter called the "Contractor") has undertaken, in pursuance of Letter of Acceptance (LOA) No. _Dated__ for construction of [name of the Project] (hereinafter called the "Contract")

AND WHEREAS the Contract requires the Contractor to furnish an {Performance Security/ Additional Performance Security} for due and faithful performance of its obligations, under and in accordance with the Contract, during the {Construction Period/ Defects Liability Period and Maintenance Period} in a sum of Rs….. cr. (Rupees ……..….. crore) (the "**Guarantee Amount**"[1]).

AND WHEREAS 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 Contract, 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.

[1] Guarantee Amount for Performance Security and Additional Performance Security shall be calculated as per Contract.

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager of National Highways & Infrastructure Development Corporation Limited], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Contract 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 Contract 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 Contract 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 Contract 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 Contract 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 Contract or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Contract.

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 so posted shall be conclusive.

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

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

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

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

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

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

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

SIGNED, SEALED AND DELIVERED
For and on behalf of the Bank by:
(Signature)
(Name)
(Designation)
(Code Number)
(Address)

NOTES:

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

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

Annex - II

(Schedule - G)

(See Clause 19.2)

Annex – II: Form for Guarantee for Advance Payment

To

_____[name of Authority]

_____ [address of Authority]

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the construction of the ***** section of [National Highway No. **] on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing @Bank Rate + 3% advance payment (herein after called "**Advance Payment**") equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs._____cr. (Rupees_____crore) and the amount of this Guarantee is Rs._____cr. (Rupees_____crore) (the "**Guarantee Amount**")[2].

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

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

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

2 The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment

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

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

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

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

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

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

7. The Guarantee shall cease to be in force and effect on ****[3] 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 is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

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

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

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch IFSC	CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi

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

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

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

SIGNED, SEALED AND DELIVERED

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

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Schedule - H

(See Clauses10.1 (iv) and 19.3)

Contract Price Weightages

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

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

Item	Weightage in % of CP	Stage for Payment	Percentage
1	2	3	4
Road Works including Culverts, widening and repair of culverts	70.00	**A- Widening and strengthening of existing road**	[Nil]
		B.1-Reconstruction/New 2-Lane Realignment /Bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub- grade	30.00
		(2) Sub-base Course	15.00
		(3) Non bituminous Base course	12.00
		(4) Bituminous Basecourse	11.00
		(5) Wearing Coat	15.00
		B.2-Reconstruction/New 8-Lane Realignment/ Bypass (Rigid Pavement)	[Nil]
		C.1-Reconstruction/ New Service Road (Flexible Pavement)	[Nil]
		C.2- Reconstruction/New Service road (Rigid Pavement)	[Nil]
		D- Reconstruction & New Culverts on existing road, realignments, bypasses Culverts (length <6m)	17.00
Other Works	29.20	(i) Toll Plaza	[Nil]
		(ii) Road side drains	25.00
		(iii) Road signs, markings, km stones, safety devices etc	6.00
		(iv) Project facilities	[Nil]
		(v) Road side Plantation	[Nil]
		(vi) Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]
		(vii) Safety &Traffic Management during const.	[Nil]
		(viii) Breast Wall	12.00
		(ix) Toe Wall	[Nil]
		(x) Retaining Wall	26.00
		(xi) Crash Barrier	8.00
		(xi) Gabion Breast wall	12.00
		(xii) Hydro-seeding	4.00
		(xiii) Seeding and Mulching with Jute Net	2.00
		(xiv) Seeding and Mulching with Coir Net	2.00

Item	Weightage in % of CP	Stage for Payment	Percentage
		(xv) Balance Slope Protection work	3.00
		(xvi) Site Clearance & Dismantling	[Nil]
		(xvii) Junction Improvement	[Nil]
Electrical Utilities and Public Heath Utilities (Water and pipe lines and sewage lines)	0.80	(i) Shifting and Re-Alignment of LT Lines.	8.98
		(ii) Shifting and Re-Alignment of 11KV Lines	9.71
		(iii) Shifting of 3Nos of Distribution Transformer (2X25 kVA and 1X100 kVA)	2.95
		(iv) Installation of Gravity Main	4.69
		(v) Installation of Feeding Main	18.38
		(vi) Installation of Village water Pipe line- Khawkawn & NE Khawdungsei Village	8.22
		(vii) Construction of 2 number service reservoir	43.45
		(viii) Installation of Private House Connections damaged by widening	2.69
		(ix) Installation of T/Cluster	0.93

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 & Strengthening of road	[Nil]	
B.1- Reconstruction/New2-Lane Realignment/Bypass(Flexible Pavement)		Unit of measurement is linear length. Payment shall be made on pro-rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.
(1)Earthwork up to top of the sub-grade	30.00	
(2) Sub-base Course	15.00	
(3) Non bituminous Base course	12.00	
(4) Bituminous Base course	11.00	
(5) Wearing Coat	15.00	
B.2- Reconstruction/New 8-Lane Realignment/Bypass (Rigid Pavement)	[Nil]	
C.1- Reconstruction/New Service Road/ Slip Road (Flexible Pavement)	[Nil]	
C.2- Reconstruction/New Service Road (Rigid Pavement)	[Nil]	
D-Reconstruction & New Culverts on existing road, realignments, bypasses		Cost of each culvert shall be determined on pro-rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least three culverts.
Culverts (length <6m)	17.00	

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

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

Where,

P = Contract Price

L = Total length in km

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

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

1.3.2 Minor Bridges and Underpasses/Overpasses: Not Applicable

1.3.3 Major Bridge works, ROB/RUB and Structures: Not Applicable

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**
1	2	3
(1) Toll Plaza	[Nil]	
(2) Roadside drains	25.00	Unit of measurement is linear length. Payment shall be made on pro-rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.
(3) Road signs, markings, km stones, safety devices etc.	6.00	
(4) Project Facilities	[Nil]	
(5) Road side Plantation including Horticulture in Wayside Amenities	[Nil]	
(6) Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]	
(7) Safety and traffic management during construction	[Nil]	
(8) Protection Works		Unit of measurement is linear length. Payment shall be made on pro-rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length and 10% of the area
(a) Breast Wall	12.00	
(b) Toe Wall	[Nil]	
(c) Retaining Wall	26.00	

Stage of Payment	Weightage	Payment Procedure
(c) Crash Barrier	8.00	for Hydro-seeding, Seeding & Mulching and balance Slope Protection work.
(d) Gabion Wall	12.00	
(e) Hydro-seeding	4.00	
(f) Seeding and Mulching with Jute Net	2.00	
(g) Seeding and Mulching with Coir Net	2.00	
(h) Balance Slope Protection work	3.00	
(9) Site Clearance & Dismantling	[Nil]	
(10) Junction Improvement	[Nil]	

Table 1.3.5

Stage of Payment	Weightage	Payment Procedure
1	2	3
(i) Shifting and Re-Alignment of LT Lines.	8.98	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost. Payment shall be made for completed activity.
(ii) Shifting and Re-Alignment of 11KV Lines	9.71	
(iii) Shifting of 3Nos of Distribution Transformer (2X25 kVA and 1X100 kVA)	2.95	
(iv) Installation of Gravity Main	4.69	
(v) Installation of Feeding Main	18.38	
(vi) Installation of Village water Pipe line- Khawkawn & NE Khawdungsei Village	8.22	
(vii) Construction of 2 number service reservoir	43.45	
(viii) Installation of Private House Connections damaged by widening	2.69	
(ix) Installation of T/Cluster	0.93	

2. Procedure for payment for Maintenance

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

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

Schedule -I

(See Clause 10.2 (iv))

Drawings

1. Drawings

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

2. Additional Drawings

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

Annex -I

(Schedule -I)

Annex –I: List of Drawings

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

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the **150th** 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 **270th** day from the Appointed Date (the **"Project Milestone- II").**

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

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the **420th** day from the Appointed Date (the **"Project Milestone- III").**

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

5. Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the **540th day** from the Appointed Date.

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

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

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

2. Tests

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

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

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

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

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

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

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

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

Schedule - L

(See Clause 12.2)

Completion Certificate

1. I,…….. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated (the **"Agreement"),** for [construction of the ****section (km ** to km **) of National Highway No. ***] (the **"Project Highway")** on Engineering, Procurement and Construction (EPC) basis through……. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Authority's Engineer by:

(Signature)

(Name)

(Designation) (Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

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

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

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

2. Percentage reductions in lump sum payments on monthly basis

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

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

S. No.	Item/Defect/Deficiency	Percentage
(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:

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

Where,

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

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

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

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

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex -I

(Schedule - N)

Annex –I: Terms of Reference for Authority's Engineer

1. Scope

(i) These Terms of Reference (the **"TOR")** for the Authority's Engineer are being specified pursuant to the EPC Agreement dated (the **"Agreement),** which has been entered into between the [name and address of the Authority] (the **"Authority")** and…… (the **"Contractor")#** for [Two-Laning] of the **** section (km ** to km **) of National Highway No. ** in the State of *** on Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

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

2. Definitions and interpretation

(i) The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.

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

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

3. General

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

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

(a) any Time Extension;

(b) any additional cost to be paid by the Authority to the Contractor;

(c) the Termination Payment; or

(d) issuance of Completion Certificate or

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

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

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

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

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

4. Construction Period

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

(ii) The Authority's Engineer shall review and approve any revised Drawings sent to it by

the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.

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

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

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

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

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

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

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

(x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

(xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

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

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

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

(xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.

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

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

(xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the

Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5. Maintenance Period

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

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

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

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

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

6. Determination of costs and time

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

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

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

7. Payments

(i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2 (iv) (d).

(ii) Authority's Engineer shall -

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

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

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

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

8. Other duties and functions

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

9. Miscellaneous

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

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

custody.

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

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

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

Schedule - O

(See Clauses 19.4 (i), 19.6 (i), and 19.8 (i))

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with Clause 19.3 (i) subsequent to the last claim;

(b) amounts reflecting adjustments in price for the aforesaid claim;

(c) the estimated amount of each Change of Scope Order executed subsequent to the last claim;

(d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2 (iii) (a);

(e) total of (a), (b), (c) and (d) above;

(f) Deductions:

i. Any amount to be deducted in accordance with the provisions of the Agreement except taxes;

ii. Any amount towards deduction of taxes; and

iii. Total of (i) and (ii) above.

(g) Net claim: (e) - (f) (iii);

(h) The amounts received by the Contractor upto the last claim:

iv. For the Works executed (excluding Change of Scope orders);

v. For Change of Scope Orders, and

vi. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause 20.1)

Insurance

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

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

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I,…….. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated……. (the **"Agreement**"), for [construction of the****section (km ** to km **) of ****] (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis

Through …….. (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

*******END OF THE DOCUMENT*******