National Highways & Infrastructure Development Corporation Limited

BUILDING INFRASTRUCTURE - BUILDING THE NATION

SCHEDULES

FOR

Rehabilitation and Up-gradation to 2-lane with paved shoulders of Kwalkulh-Chawngtlai section (International Corridor) of NH-6 from Existing chainage Km 80+080 to Km 115+000 (Design Chainage 72+820 to Km 104+460) (Pkg-I) in the state of Mizoram under Bharatmala Pariyojna on EPC Mode.

on

ENGINEERING, PROCUREMENT & CONSTRUCTION (EPC) MODE

NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD
(MINISTRY OF ROAD TRANSPORT & HIGHWAYS, GOVT. OF INDIA)

JANUARY, 2020

NHIDCL, 3RD FLOOR, PRESS TRUST OF INDIA BUILDING, 4, PARLIAMENT STREET, NEW DELHI – 110001

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1 The Site

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

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

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

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

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

Annex – I

(Schedule-A)

Site

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

1. Site

The Site of the Two-Lane Project Highway comprises the section of National Highway 06 commencing **from km 80+080 (Kawlkulh) to km115+000 (Chawngtlai) i.e. the Kawlkulh - Chawngtlai section of Champai Seling NH-6 road in the State of Mizoram**. The land, carriageway and structures comprising the Site are described below.

Package No.	Existing Chainages	Design Chainages	Design Length
Package I	From Km 80+080 to Km 115+000	From Ch 72.820 to Ch. 104.460	31.640

2. Land

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

S. No.	Chainage (km)		Right of Way (m)	Remarks
	From	To		
1	80+080	82+400	8.00	**International Corridor-Package I Starts At 80+080**
2	82+400	82+600	9.00	
3	82+600	84+000	8.00	
4	84+000	84+600	7.80	
5	84+600	86+600	8.00	
6	86+600	86+800	7.80	
7	86+800	87+600	8.00	
8	87+600	88+000	7.00	
9	88+000	88+600	8.00	
10	88+600	89+000	7.00	
11	89+000	92+200	8.00	
12	92+200	92+400	8.90	
13	92+400	92+600	8.00	
14	92+600	92+800	7.00	
15	92+800	95+000	8.00	
16	95+000	95+200	8.50	

S. No.	Chainage (km)		Right of Way (m)	Remarks
	From	To		
17	95+200	97+000	8.00	
18	97+000	97+200	8.50	
19	97+200	102+000	8.00	
20	102+000	102+200	8.40	
21	102+200	103+200	8.20	
22	103+200	103+800	8.40	
23	103+800	105+800	8.00	
24	105+800	106+000	8.10	
25	106+000	106+600	8.00	
26	106+600	106+800	8.10	
27	106+800	107+400	8.00	
28	107+400	107+600	8.10	
29	107+600	107+800	8.50	
30	107+800	108+200	11.00	
31	108+200	108+600	10.00	
32	108+600	108+800	8.00	
33	108+800	109+000	9.00	
34	109+000	109+200	10.00	
35	109+200	109+400	8.00	
36	109+400	109+600	11.00	
37	109+600	112+000	12.00	
38	112+000	112+800	10.00	
39	112+800	113+000	8.50	
40	113+000	113+400	8.20	
41	113+400	113+600	8.00	
42	113+600	113+800	7.80	
43	113+800	114+400	8.00	
44	114+400	115+000	7.80	**International Corridor-Package I Ends At Km 115+000**

3. Carriageway

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

4. Major Bridges

The Site includes the following Major Bridges:

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

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

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

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

6. Grade separators

The Site includes the following grade separators:

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

7. Minor bridges

The Site includes the following minor bridges:

S. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Super-structure		
1	93+340	Open Foundation	RCC	PSC	1 x 51.10	8.40

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location (km)	Remarks
-----NIL-----		

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

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

10. Culverts

The Site has the following culverts:

(a) Slab/Box Culverts: - 154 Nos.

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
Package I				
1	80+195	Slab Culvert	1x1.00	6.60
2	80+295	Slab Culvert(D)	1x1.00	6.80
3	80+578	Slab Culvert	1x2.00	7.00
4	80+755	Slab Culvert	1x1.50	6.80
5	80+985	Slab Culvert	1 x 1.00	7.10
6	81+120	Slab Culvert	1 x 1.10	6.80
7	81+235	Slab Culvert	1x1.00	7.10
8	82+025	Slab Culvert	1 x 1.50	6.80
9	82+078	Slab Culvert	1 x 1.20	6.70
10	82+124	Slab Culvert	1 x 1.40	7.10
11	82+404	Slab Culvert	1 x 1.50	6.90
12	82+898	Slab Culvert	1 x 1.00	7.10
13	83+181	Slab Culvert	1 x 1.50	6.90
14	83+365	Slab Culvert	1 x 1.20	7.00
15	83+564	Slab Culvert	1 x 1.20	7.10
16	83+685	Slab Culvert(D)	1 x 1.50	6.80
17	84+01	Slab Culvert(D)	chock-up	-
18	84+729	Slab Culvert(D)	1 x 1.50	6.80
19	85+215	Slab Culvert	1 x 1.50	6.80
20	85+296	Slab Culvert	chock-up	-
21	85+580	Slab Culvert	1 x 1.70	7.00
22	85+609	Slab Culvert	1 x 1.30	7.20
23	85+809	Slab Culvert	1 x 1.50	7.00
24	85+931	Slab Culvert	1 x 1.50	6.80
25	86+100	Slab Culvert	1 x 2.0 x 2.00	6.60
26	86+175	Slab Culvert(D)	1 x 1.70	7.00
27	86+375	Slab Culvert(D)	1 x 2.0 x 2.00	6.90
28	86+640	Slab Culvert(D)	1 x 2.0 x 2.00	7.00
29	86+810	Slab Culvert	1 x 2.0 x 2.00	7.10
30	86+990	Slab Culvert	1 x 1.50	6.80
31	87+160	Slab Culvert	1 x 1.50	6.80
32	87+238	Slab Culvert	1 x 1.30	6.90
33	87+318	Slab Culvert	1 x 3.0 x 3.00	6.60
34	87+45	Slab Culvert	1 x 2.50	7.20
35	87+628	Slab Culvert	1 x 2.60	6.80
36	87+866	Slab Culvert	1 x 1.20	6.70
37	87+922	Slab Culvert	1 x 1.30	6.60
38	88+137	Slab Culvert	1 x 1.10	6.70
39	88+393, 88+435	Slab Culvert	1 x 1.80	6.80
40	88+565	Slab Culvert	1 x 1.20	6.90
41	88+823	Slab Culvert	1 x 2.50	-

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
42	89+050	Slab Culvert	1 x 1.30	7.00
43	89+120	Slab Culvert(D)	1 x 1.50	7.00
44	89+233	Slab Culvert(D)	1 x 2.50	6.80
45	89+459	Slab Culvert(D)	1 x 1.20	7.00
46	89+521	Slab Culvert	1 x 2.0 x 2.00	7.10
47	89+850	Slab Culvert	1 x 2.0 x 2.00	7.10
48	90+050, 90+115	Slab Culvert	1x1.20 + 1x2.00	6.80
49	90+272	Slab Culvert	1 x 1.30	6.80
50	90+452	Slab Culvert	1 x 2.20	7.00
51	90+505	Slab Culvert	1 x 1.20	6.80
52	91+097	Slab Culvert	1 x 2.0 x 2.00	6.90
53	91+160	Slab Culvert	1 x 1.30	7.00
54	91+263	Slab Culvert(D)	1 x 1.20	6.80
55	91+428	Slab Culvert	1 x 2.0 x 2.00	6.70
56	91+630	Slab Culvert	Chock-up	7.00
57	91+777	Slab Culvert	1 x 1.00	6.80
58	92+054	Slab Culvert(D)	1 x 1.30	6.70
59	92+178	Slab Culvert	1 x 6.50	6.80
60	92+335	Slab Culvert	1 x 1.80	6.50
61	92+546	Slab Culvert	1 x 2.0 x 2.00	6.60
62	92+713	Slab Culvert	1 x 1.30	6.20
63	93+048	Slab Culvert	1 x 1.30	6.80
64	93+45	Slab Culvert	1 x 1.30	6.70
65	93+548	Slab Culvert(D)	1 x 1.30	6.90
66	93+873	Slab Culvert	1 x 1.00	6.70
67	94+145	Slab Culvert	1 x 1.20	6.30
68	94+429	Slab Culvert	1 x 1.20	6.20
69	94+605	Slab Culvert	1 x 1.30	6.30
70	94+727	Slab Culvert	1 x 2.10	6.20
71	94+947	Slab Culvert	1 x 1.00	6.60
72	95+030	Slab Culvert(D)	1 x 1.00	6.50
73	95+095	Slab Culvert	1 x 1.00	5.80
74	95+240	Slab Culvert	1 x 1.20	5.90
75	95+358	Slab Culvert	1 x 1.20	6.60
76	95+535	Slab Culvert(D)	1 x 1.00	7.20
77	96+185	Slab Culvert	1 x 1.20	6.80
78	96+325	Slab Culvert	1 x 1.00	6.80
79	96+519	Slab Culvert	1 x 1.20	6.60
80	96+743	Slab Culvert	1 x 1.30	6.60
81	97+048	Slab Culvert(D)	1 x 2.20	6.80
82	97+526	Slab Culvert	1 x 2.0 x 2.00	7.00
83	98+068	Slab Culvert	1 x 1.30	6.70
84	98+198	Slab Culvert(D)	1 x 2.0 x 2.00	6.80
85	98+342	Slab Culvert(D)	1 x 1.30	6.80

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
86	98+390	Slab Culvert	1 x 1.30	6.80
87	98+988	Slab Culvert	1 x 2.60	7.00
88	99+090	Slab Culvert	1 x 2.0 x 2.00	6.80
89	99+230	Slab Culvert	1 x 1.00	6.80
90	99+448	Slab Culvert	1 x 3.50	6.80
91	99+567	Slab Culvert	1 x 2.0 x 2.00	6.80
92	100+130	Slab Culvert	1 x 1.00	6.80
93	100+195	Slab Culvert	1 x 1.30	6.60
94	101+520	Slab Culvert(D)	1 x 1.20	7.00
95	100+700	Slab Culvert	1 x 1.30	6.80
96	100+860	Slab Culvert	1 x 2.0 x 2.00	6.80
97	100+990	Slab Culvert	1 x 1.20	6.70
98	101+415	Slab Culvert	1 x 1.30	6.60
99	101+525	Slab Culvert	1 x 2.0 x 2.00	6.80
100	101+615	Slab Culvert(D)	1 x 1.30	7.00
101	101+705	Slab Culvert	1 x 1.30	6.90
102	101+805	Slab Culvert	1 x 3.50	7.00
103	102+162	Slab Culvert	1 x 2.0 x 2.00	6.90
104	102+545	Slab Culvert(D)	1 x 1.20	7.00
105	102+898	Slab Culvert(D)	1 x 1.80	7.10
106	103+128	Slab Culvert	1 x 1.30	7.20
107	103+367	Slab Culvert(D)	1 x 1.50	6.80
108	103+425	Slab Culvert	1 x 1.80	7.00
109	103+720	Slab Culvert	1 x 2.0 x 2.00	6.80
110	103+963	Slab Culvert	1 x 1.50	7.00
111	104+125	Slab Culvert	1 x 1.30	6.90
112	104+262	Slab Culvert	1 x 2.50	7.00
113	104+490	Slab Culvert	1 x 1.40	6.80
114	104+615	Slab Culvert	1 x 3.0 x 3.00	6.60
115	104+685	Slab Culvert	1 x 1.30	6.80
116	104+925	Slab Culvert	1 x 1.40	6.60
117	105+185	Slab Culvert	1 x 1.00	6.70
118	105+385	Slab Culvert	1 x 1.20	6.80
119	105+565	Slab Culvert	Choke-up	6.90
120	105+748	Slab Culvert	1 x 1.30	7.10
121	105+855	Slab Culvert	1 x 1.30	7.00
122	105+955	Slab Culvert	1 x 1.30	6.60
123	106+100	Slab Culvert	1 x 1.30	-
124	106+470	Slab Culvert	1 x 2.0 x 2.00	6.80
125	106+600	Slab Culvert	1 x 1.60	6.80
126	106+755	Slab Culvert(D)	1 x 1.50	6.50
127	106+982	Slab Culvert	1 x 1.30	6.80
128	107+345	Slab Culvert	1 x 1.00	6.70
129	107+395	Slab Culvert	1 x 1.30	6.80
130	107+595	Slab Culvert	1 x 1.30	6.70

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
131	108+040	Slab Culvert	1 x 1.30	6.70
132	108+175	Slab Culvert	1 x 1.30	6.80
133	108+358	Slab Culvert	Chock-up	6.70
134	108+450	Slab Culvert	1 x 1.20	6.60
135	108+588	Slab Culvert	1 x 1.70	6.80
136	108+690	Slab Culvert	1 x 1.30	6.60
137	109+045	Slab Culvert	1 x 1.30	7.00
138	109+165	Slab Culvert	1 x 1.40	6.80
139	109+202	Slab Culvert	1 x 1.30	6.70
140	109+438	Slab Culvert	1 x 1.20	6.60
141	110+160	Slab Culvert	1 x 1.30	6.70
142	110+330	Slab Culvert	1 x 1.00	6.80
143	110+855	Slab Culvert	1 x 1.30	7.50
144	112+038	Slab Culvert	1 x 2.50	6.80
145	112+540	Slab Culvert	1 x 1.20	8.00
146	113+140	Slab Culvert	chock-up	7.00
147	113+490	Slab Culvert	1 x 1.70	6.80
148	113+660	Slab Culvert	1 x 1.30	7.00
149	113+880	Slab Culvert	1 x 1.20	7.00
150	114+030	Slab Culvert(D)	1 x 1.30	7.00
151	114+446	Slab Culvert	1 x 1.30	6.90
152	114+608	Slab Culvert	1 x 2.50	7.00
153	114+800	Slab Culvert(D)	chock-up	6.80
154	114+862	Slab Culvert	1 x 1.50	6.90

(b) HP Culverts: - 02 Nos.

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
Package I				
1	97+218	HPC	1 x 1200 Ø	8.00
2	98+308	HPC	1 x 1200 Ø	8.00

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
1	95+140	-	LHS	-
2	95+510	-	LHS	-
3	98+890	-	LHS	-
4	106+130	-	LHS	-
5	106+870	-	-	RHS

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:

Sr. No	Location		Type	
	From Km	to Km	Masonry/CC (Pucca)	Earthern (Kutcha)
1	80+080	81+600	-	LHS
2	81+600	82+000	-	RHS
3	83+600	87+800	-	RHS
4	88+200	90+000	-	RHS
5	92+400	95+200	-	RHS
6	96+000	96+800	-	RHS
7	97+200	99+000	-	RHS
8	100+200	101+200	-	RHS
9	101+800	103+400	-	RHS
10	104+000	106+800	-	RHS
11	106+800	107+800	-	LHS
12	107+800	107+840	RHS & LHS	-
13	107+840	107+950	RHS	-
14	107+950	108+050	LHS	-
15	108+600	109+000	-	LHS
16	109+000	109+400	LHS	-
17	109+420	109+580	LHS	
18	109+580	109+820	-	LHS
19	109+820	110+050	LHS	-
20	110+420	110+440	LHS	-
21	110+730	110+920	LHS	-
22	111+000	111+090	LHS	-
23	111+600	111+800	LHS	-
24	112+030	112+090	LHS	-
25	112+090	112+800	-	LHS
26	112+800	115+000	-	RHS

14. Major junctions

The details of major junctions are as follows:

S. No.	Location	At	Separated	Category of Cross Road

	Chainage	Location	grade		NH	SH	MDR	Others
---NIL---								

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

15. Minor junctions

The details of the minor junctions are as follows:

S. No.	Location		Type	
	Chainage	Location	T -junction	Cross road
1	95+510	Towards PHE	Y	-
2	106+870	Towards AARO	Y	-
3	107+810	Towards Village (Khazawal)	T	-
4	107+950	Towards Village (Khazawal)	Y	-
5	108+200	Towards Village (Khazawal)	Y	-
6	109+080	Towards Village (Khazawal)	-	X
7	109+460	Towards Village (Khazawal)	Y	-
8	109+820	Towards Village (Khazawal)	Y	-
9	110+120	Towards Village (Khazawal)	Y	-
10	110+390	Towards Village (Khazawal)	Y	-
11	110+580	Towards Village (Khazawal)	T	-
12	110+790	Towards Village (Khazawal)	Y	-
13	110+980	Towards Village (Khazawal)	T	-
14	111+100	Towards Village (Khazawal)	Y	-
15	111+575	Towards Neihdawn	T	-
16	111+580	Towards Hospital (Khawzawl)	T	-
17	112+060	Towards Village (Khazawl)	Y	-

S. No.	Location		Type	
	Chainage	Location	T -junction	Cross road
18	112+430	Towards Village (Khazawl)	Y	-
19	112+790	Towards N.Vanlaiphai	Y	-

16. Bypasses

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

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

17. Other structures- 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:

Sr. No	Design Chainage		Design Length	PROW	Remark
	From	To			
1	72.820	73.010	0.190	24	Minimum 90% on Appointed Date. Remaining within 150 days of Appointed Date.
2	73.010	73.020	0.010	42	
3	73.020	74.350	1.330	24	
4	74.350	74.370	0.020	27	
5	74.370	75.290	0.920	24	
6	75.290	75.320	0.030	42	
7	75.320	76.490	1.170	24	
8	76.490	76.520	0.030	42	
9	76.520	78.110	1.590	24	
10	78.110	78.120	0.010	42	
11	78.120	78.890	0.770	24	
12	78.890	78.910	0.020	42	
13	78.910	80.400	1.490	24	
14	80.400	80.440	0.040	40	
15	80.440	80.530	0.090	24	
16	80.530	80.550	0.020	32	
17	80.550	85.780	5.230	24	
18	85.780	85.790	0.010	42	
19	85.790	86.510	0.720	24	
20	86.510	86.540	0.030	42	
21	86.540	88.380	1.840	24	
22	88.380	88.400	0.020	28	
23	88.400	88.550	0.150	24	
24	88.550	88.560	0.010	40	
25	88.560	94.400	5.840	24	
26	94.400	94.420	0.020	36	
27	94.420	97.060	2.640	24	
28	97.060	97.070	0.010	42	
29	97.070	97.600	0.530	24	
30	97.600	98.000	0.400	12	
31	98.000	98.470	0.470	24	
32	98.470	98.480	0.010	30	
33	98.480	98.940	0.460	24	
34	98.940	102.000	3.060	12	
35	102.000	102.300	0.300	24	

Sr. No	Design Chainage		Design Length	PROW	Remark
	From	To			
36	102.300	102.510	0.210	12	
37	102.510	103.650	1.140	24	
38	103.650	103.660	0.010	42	
39	103.660	104.460	0.800	24	

*The dates specified herein shall in no case be beyond 150 (one hundred and fifty) 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 minimum FRL. In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.

(ii) Traffic Signage plan of the Project Highway showing numbers & location of traffic signs is enclosed. The contractor shall, however, imp

(iii) rove/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

Environmental Clearance is not required as per new Notification of MoEF dated 22/08/2013.

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, up-gradation and augmentation shall include Two-Laning with Paved Shoulder and widening/reconstruction/ new construction and Strengthening of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

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

Annex – I

(Schedule-B)

Description of Two-Laning with 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 mountainous and steep terrain to the extent land is available.

(ii) Width of Carriageway

(a) Two-Laning with paved shoulders shall be undertaken. The paved carriageway shall be 10 (ten) m wide in accordance with the typical cross sections drawings in the Manual (IRC: SP 73-2018).

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

Sl. No.	Built-up stretch (Township)	Location (km to km)		Width (m)	Typical cross section (Ref. to Manual)
		From	To		
1	---	80.100	80.200	11.00	Fig No.06
2	---	95.900	96.100	11.00	Fig No.06
3	Khawzawl	97.500	98.400	11.00	Fig No.06
4	Khawzawl	98.500	98.600	11.00	Fig No.06
5	Khawzawl	98.800	102.150	11.00	Fig No.06
6	Khawzawl	102.200	102.900	11.00	Fig No.06

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

2. Geometric Design and General Features

(i) General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual IRC: SP 73-2018.

(ii) Design speed

The design speed shall be the minimum design speed of 30/40 km per hour for mountainous and steep terrain.

(iii) Improvement of the existing road geometrics

In the following sections, where improvement of the existing road geometrics to the

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

Sl. No.	Stretch/Design Chainages	Type of deficiency		Remarks
		Radius of curve	Design Speed	
1	97.643	20	20	Built Up Location At Khawzawl

(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	80.100	80.200	1.5m Footpath	Fig No.06
2	95.900	96.100	1.5m Footpath	Fig No.06
3	97.500	98.400	1.5m Footpath	Fig No.06
4	98.500	98.600	1.5m Footpath	Fig No.06
5	98.800	102.150	1.5m Footpath	Fig No.06
6	102.200	102.900	1.5m Footpath	Fig No.06

(b) In open country, paved shoulders of 1.5 m width shall be provided and balance 1.0m width shall be covered with 150 mm thick compacted layer of granular material.

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

(vi) Lateral and vertical clearances at underpasses

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

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

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

(vii) Lateral and vertical clearances at overpasses

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

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

follows:

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

(viii) Service roads

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

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

(ix) Grade separated structures

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

Sl. No.	Location of structure	Length (m)	Number and length of spans (m)	Approach gradient	Remarks, if any
NIL					

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

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

(x) Cattle and pedestrian underpass /overpass

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

Sl. No.	Location	Type of crossing
NIL		

(xi) Typical cross-sections of the Project Highway

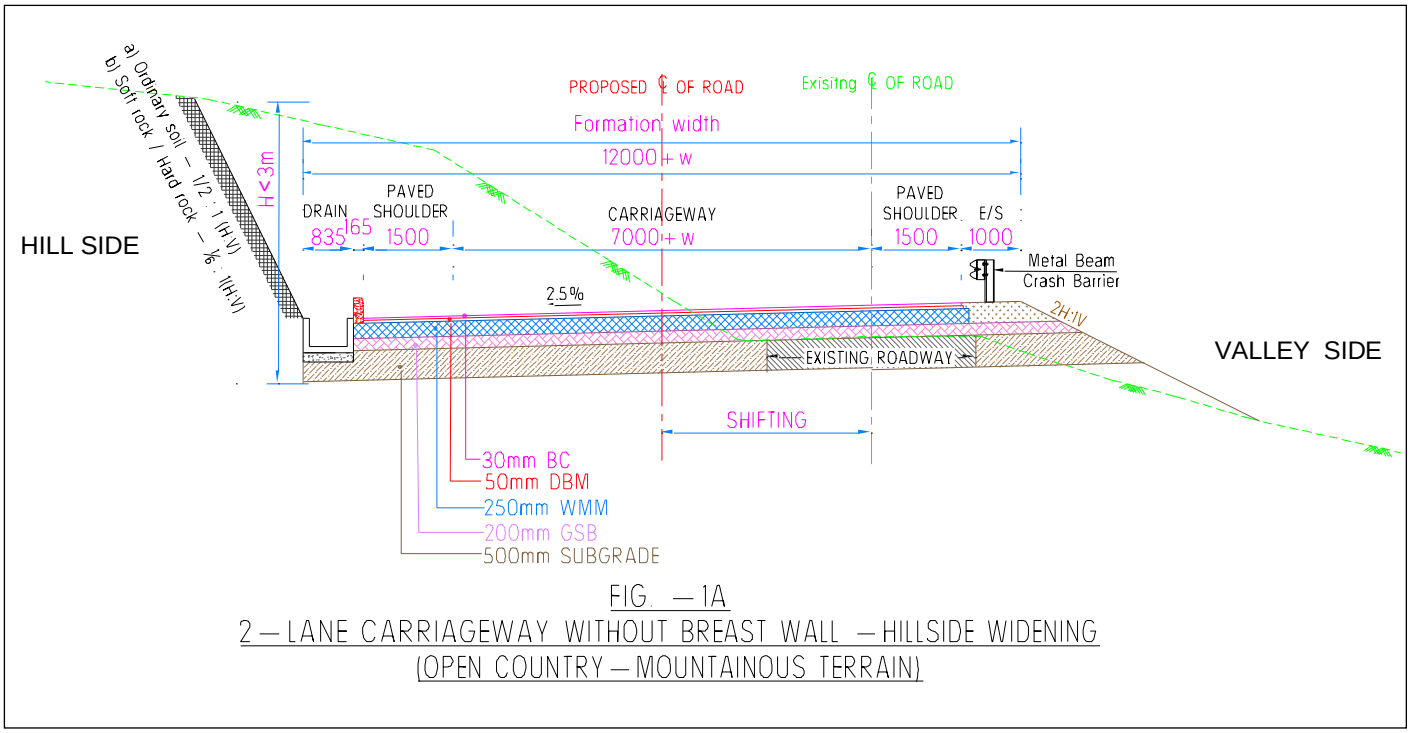

FIG. – 1A

2 – LANE CARRIAGEWAY WITHOUT BREAST WALL – HILLSIDE WIDENING
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

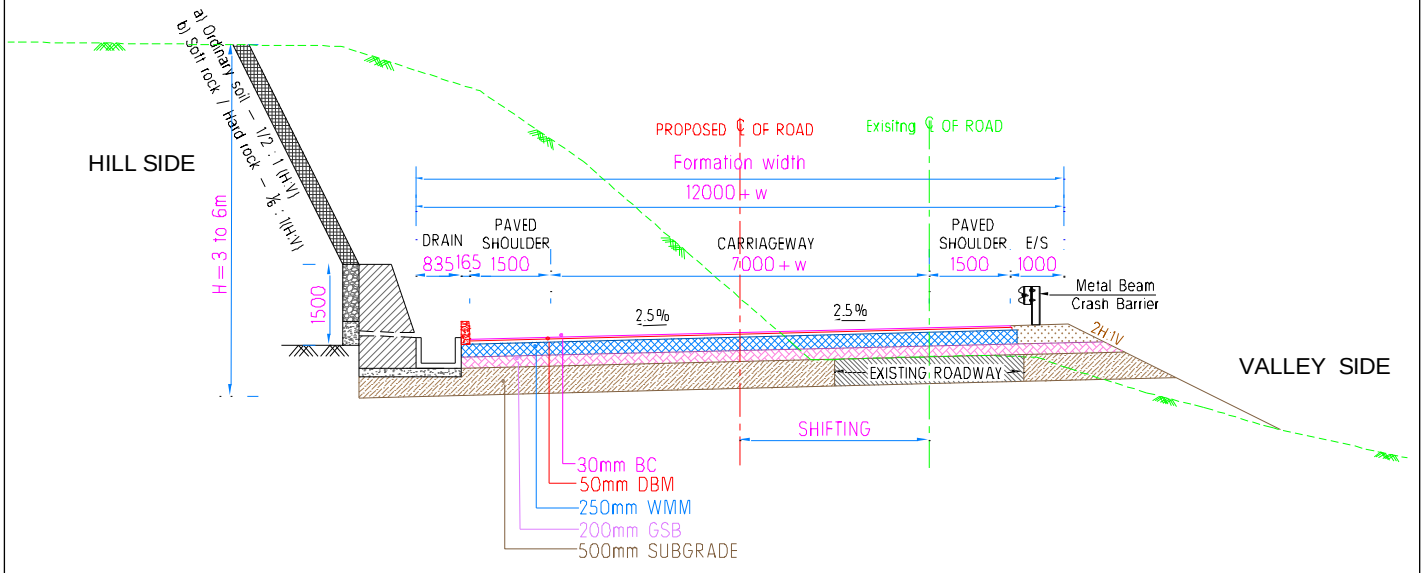

FIG. – 1B

2 – LANE CARRIAGEWAY WITH BREAST WALL OF 1.5M HEIGHT – HILLSIDE WIDENING
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

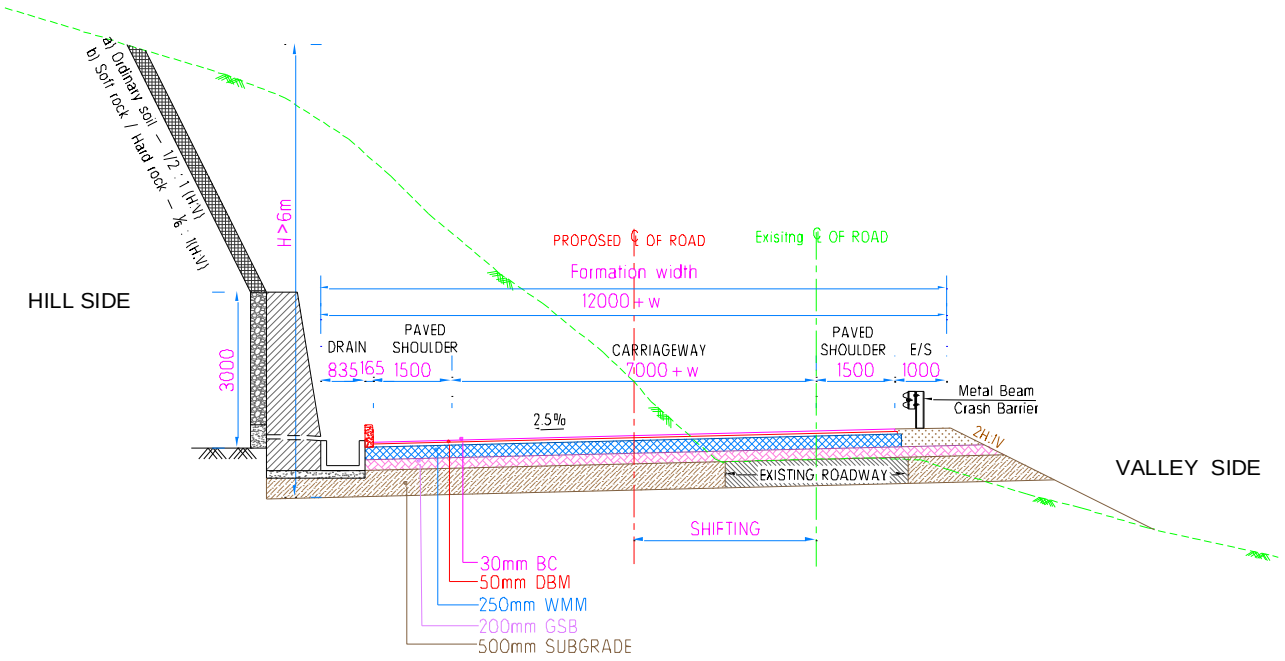

FIG. – 1C

2 – LANE CARRIAGEWAY WITH BREAST WALL OF 3M HEIGHT – HILLSIDE WIDENING (OPEN COUNTRY – MOUNTAINOUS TERRAIN)

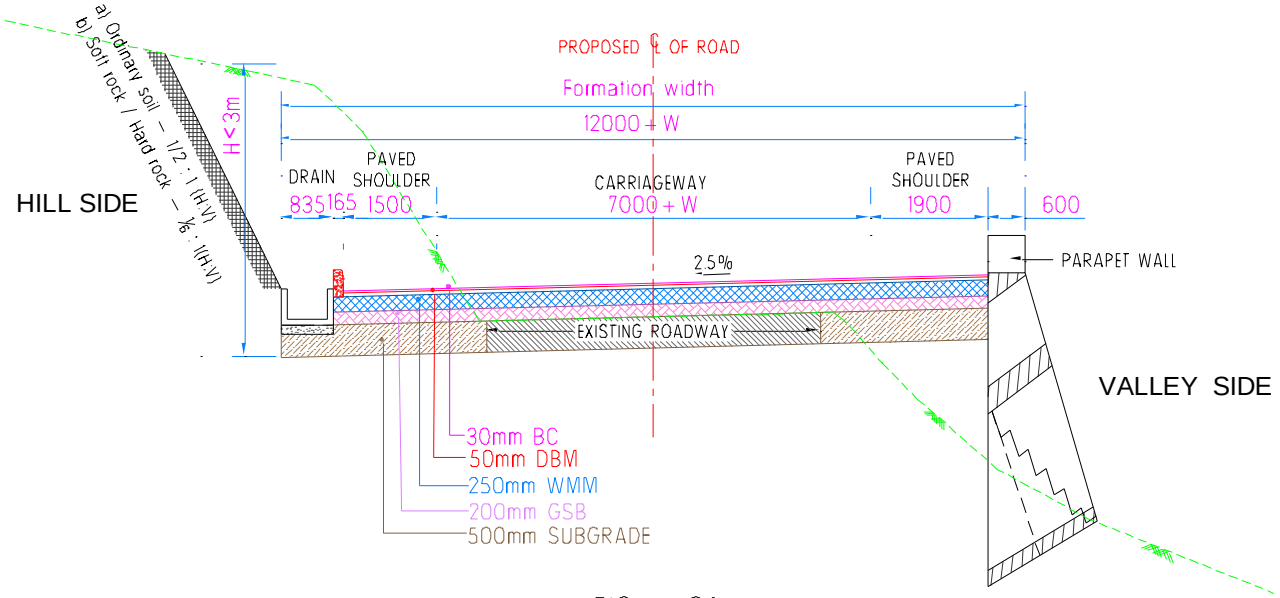

FIG. – 2A

2 – LANE CARRIAGEWAY WITHOUT BREAST WALL AND WITH RETAINING WALL ON VALLY SIDE – CONCENTRIC WIDENING (OPEN COUNTRY – MOUNTAINOUS TERRAIN)

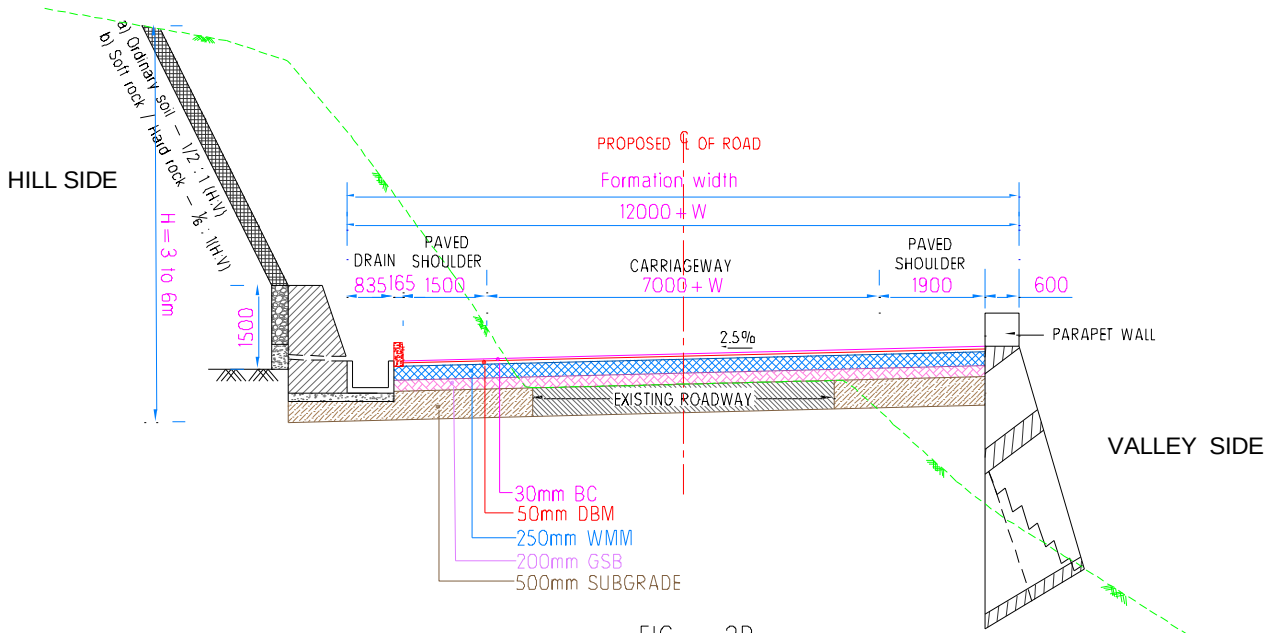

FIG. – 2B
2 – LANE CARRIAGEWAY WITH BREAST WALL OF 1.5M HEIGHT ON HILL SIDE AND RETAINING WALL ON VALLY SIDE – CONCENTRIC WIDENING (OPEN COUNTRY – MOUNTAINOUS TERRAIN)

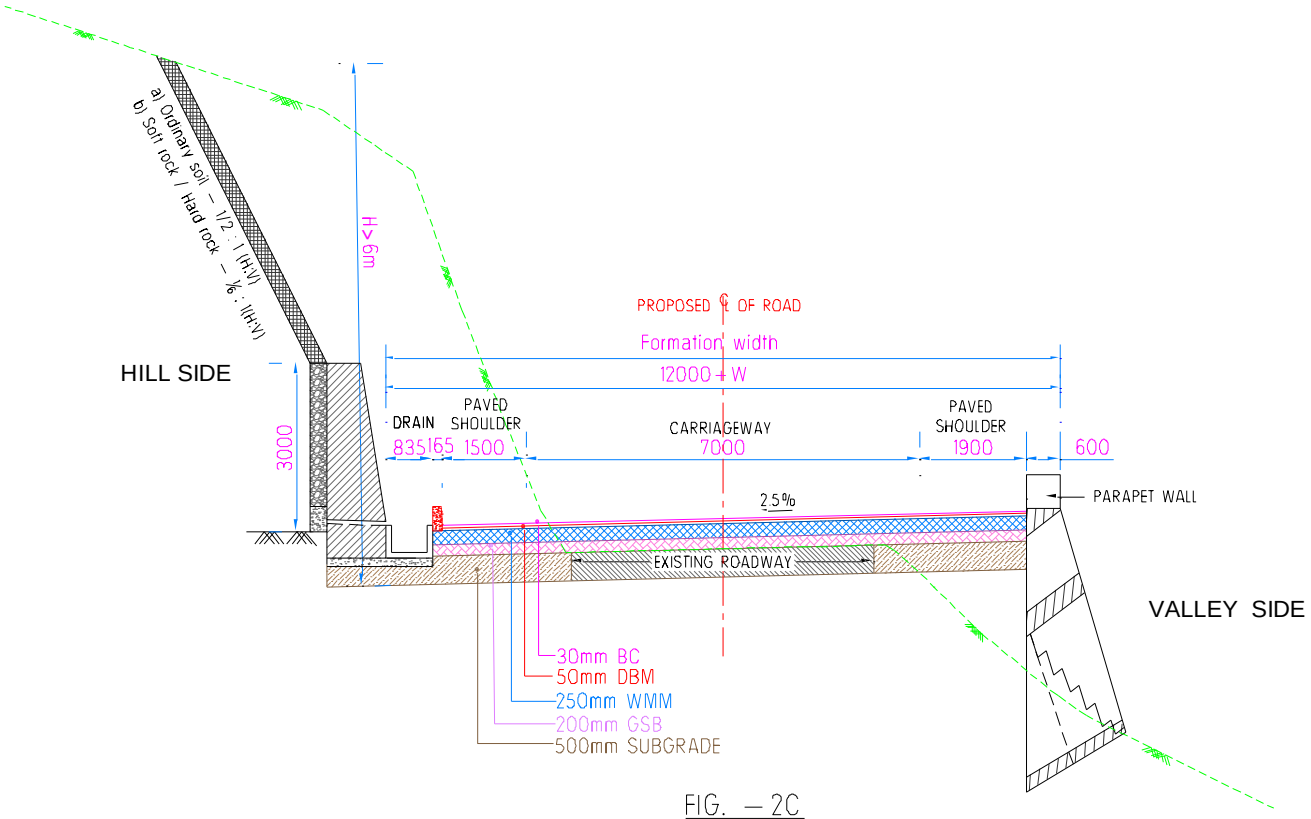

FIG. – 2C
2 – LANE CARRIAGEWAY WITH BREAST WALL OF 3M HEIGHT ON HILL SIDE AND RETAINING WALL ON VALLY SIDE – CONCENTRIC WIDENING (OPEN COUNTRY – MOUNTAINOUS TERRAIN)

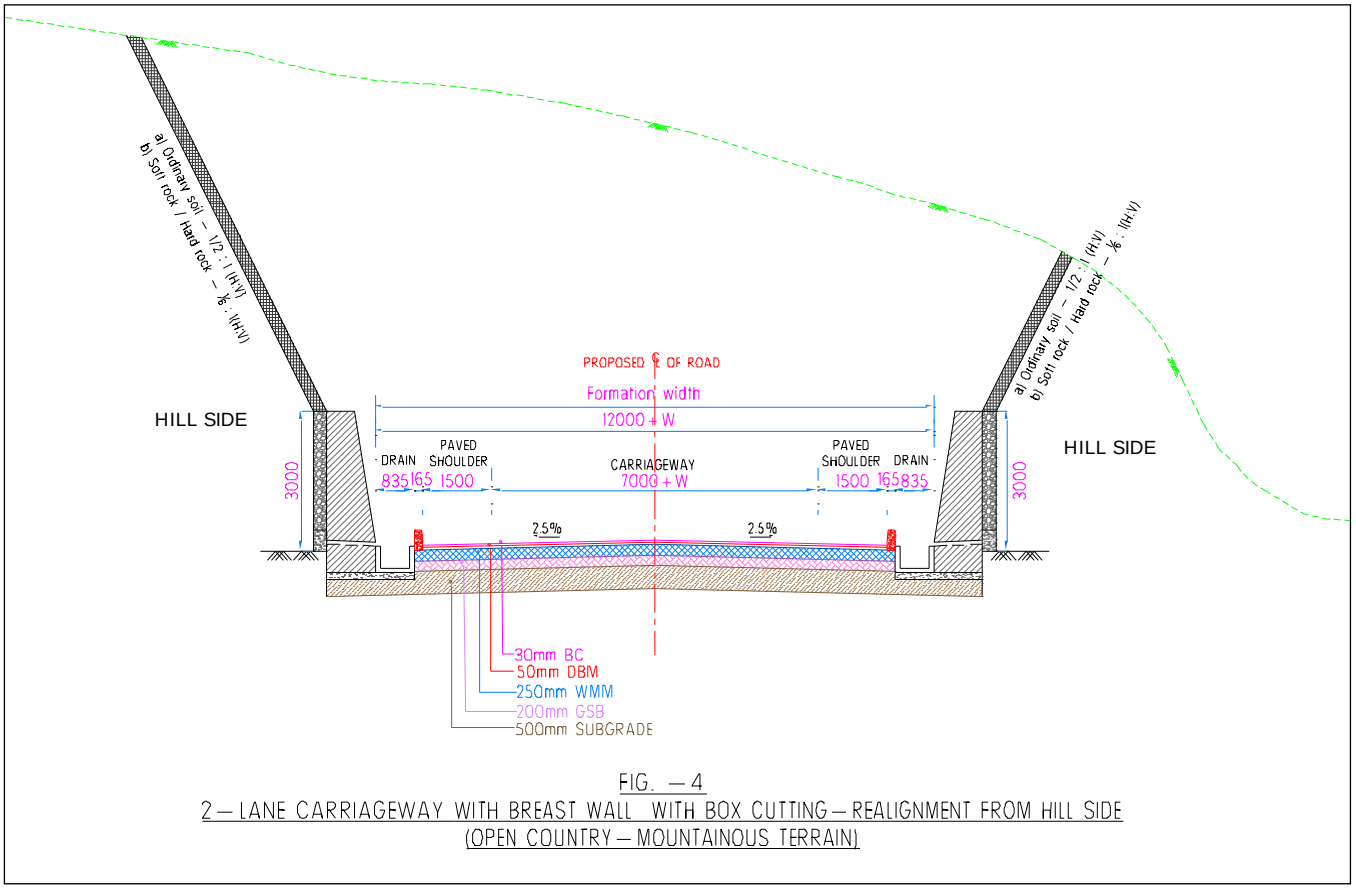

FIG. – 4
2 – LANE CARRIAGEWAY WITH BREAST WALL WITH BOX CUTTING – REALIGNMENT FROM HILL SIDE
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

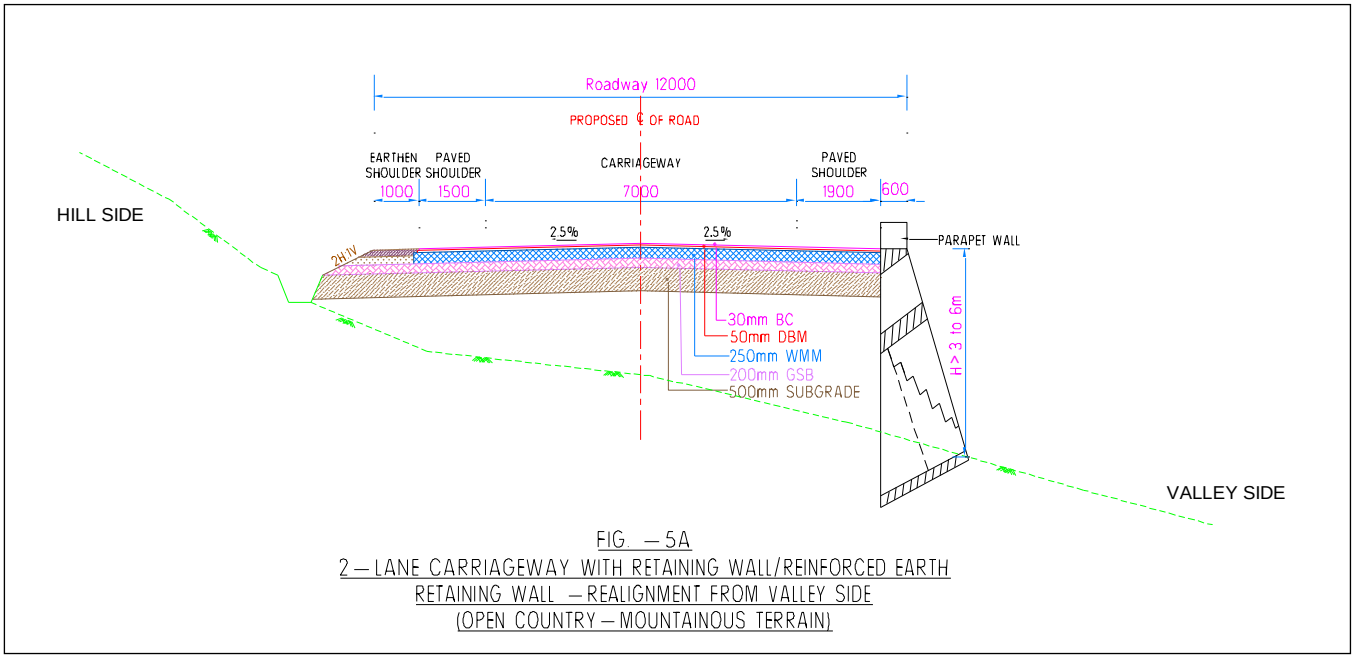

FIG. – 5A
2 – LANE CARRIAGEWAY WITH RETAINING WALL/REINFORCED EARTH RETAINING WALL – REALIGNMENT FROM VALLEY SIDE
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

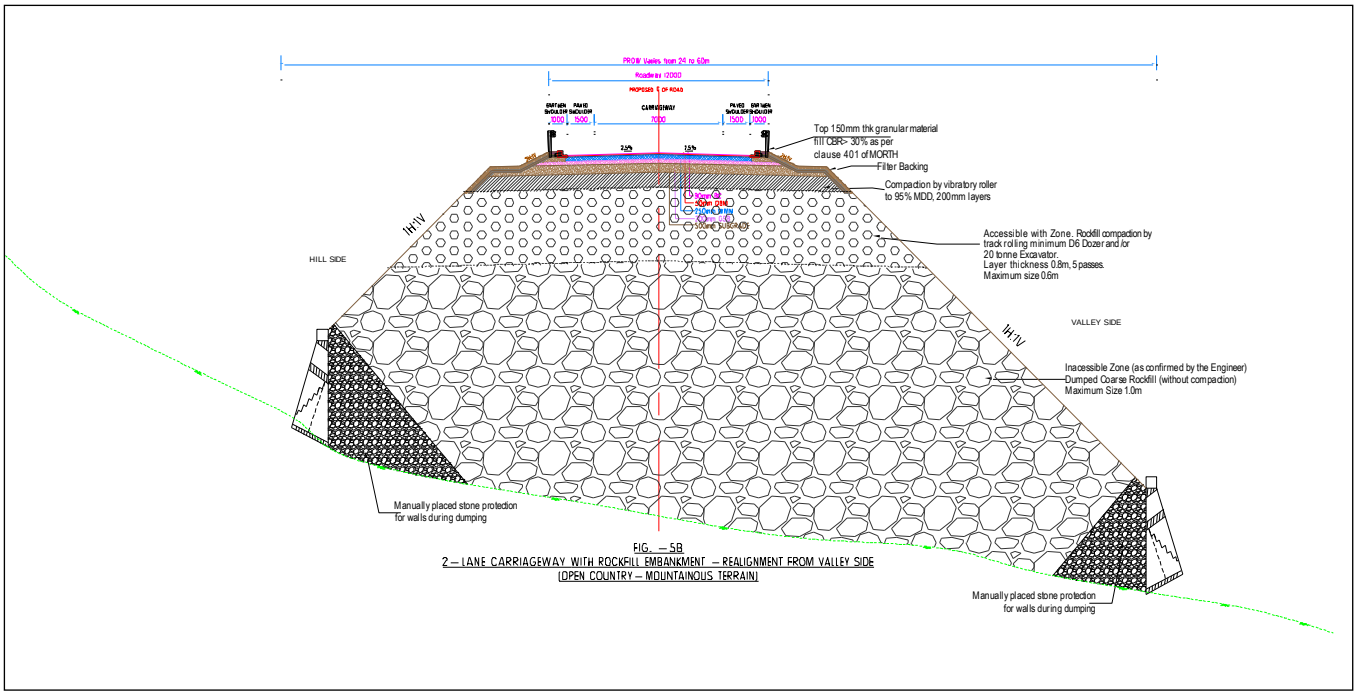

FIG. – 5B
2 – LANE CARRIAGEWAY WITH ROCKFILL EMBANKMENT – REALIGNMENT FROM VALLEY SIDE
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

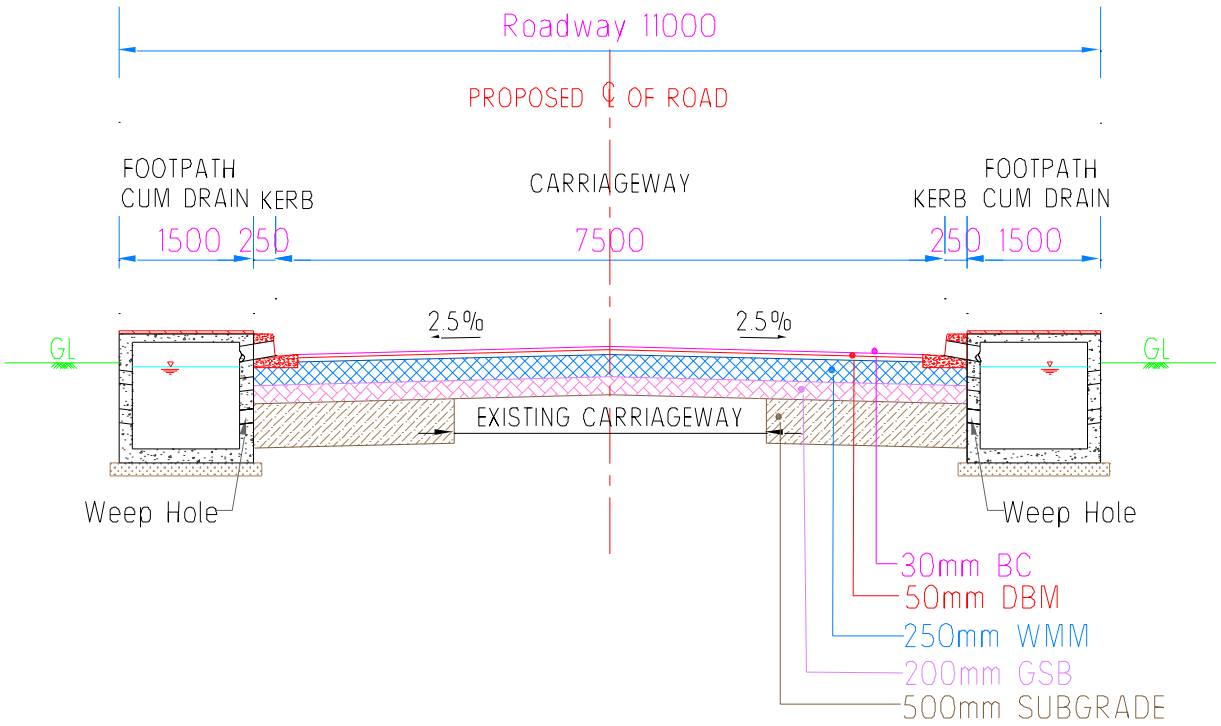

FIG. – 6
2 – LANE CARRIAGEWAY WITHOUT BREAST AND RETAINING WALL
(BUILT UP AREA – MOUNTAINOUS TERRAIN)

3. Intersections and Grade Separators

All intersections and grade separators shall be as per the provision of Section 3 of the Manual (IRC: SP 73-2018). 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

(a) Major Junction – NIL.

Sl. No.	Location of intersection	Type of intersection	Other features
NIL			

(b) Minor Junction – 14 Nos.

Sl. No.	Location of intersection	Type of intersection	Other features
1	82.100	T	Towards Oil Plant
2	82.660	T	--
3	86.480	T	--
4	96.750	T	--
5	97.610	T	--
6	97.740	T	--
7	97.830	T	--
8	98.130	T	--
9	98.260	T	--
10	99.580	T	--
11	100.340	T	--
12	100.760	T	--

(ii) Grade separated intersection with/without ramps

Sl. No.	Location	Salient features	Minimum length of viaduct to be	Road to be carried over/under the
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 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	Extent of raising [Top of finished road level]
NIL			

5. Pavement Design

(i) Pavement design shall be carried out in accordance with the provision of Section 5 of the Manual (IRC: SP 73-2018), IRC relevant codes and International Standards.

(ii) Type of pavement

Flexible Pavement – Flexible Pavement shall be constructed in entire length of 31.640 km (from km 72.820 to km 104.460) project highway.

Flexible Pavement shall be constructed in full length of Main Carriageway of project highway.

(iii) Design requirements

(a) Design Period and strategy

Flexible pavement for new pavement or for widening and reconstruction of the existing pavement shall be designed for a minimum design period of 15 (Fifteen) years and minimum CBR of subgrade should be 8%. Stage construction shall not be permitted.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of 20 million standard axles (MSA) for WMM, GSB and Sub-grade and 5 MSA for DBM & BC. Minimum pavement composition should be adopted for new pavement/reconstruction of road as below:-

i. Main Carriageway:-

S. No.	Description	Minimum Crust Composition of Flexible Pavement
1	BC	30 mm
2	DBM	50 mm
3	WMM	250 mm
4	GSB	200 mm
5	Sub-grade	500 mm
	Total	**1030 mm**

ii. The Crust Composition for Truck Lay Byes shall be as per Main Carriageway Clause 5.3.2 (a) above.

iii. The Crust composition for Minor roads, Bus bay shall be as per section

5 of IRC: SP: 73-2018.

(iv) Reconstruction of stretches

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

Sr. No.	Stretch	Design Length (Km)
1	Existing Ch. from Km 80+080 to Km 115+000 (Design Ch. from Ch 72.820 to Ch. 104.460)	15.200

6. Roadside Drainage

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

Sr. No.	Stretch	Design Length (Km)
1	Existing Ch. from Km 80+080 to Km 115+000 (Design Ch. from Ch 72.820 to Ch. 104.460)	(i) CC Open Drain= 8.593 Km (ii) RCC Covered Drain= 9.88 Kms (iii) L Shape Stone masonry Drain= 18.09 kms

On hill side open CC Drain with kerb shall be provided for typical cross sections mentioned in Clause 2.11 of Schedule B and as per cross section type given at Schedule D. In all built up areas RCC covered drains with Footpath shall be provided. Suitable crossing shall be provided at approaches to properties etc. invert levels of drains shall be decided on the basis of ground slopes of adjoining properties and open grounds.

In cutting portions CC open drain of suitable size shall be constructed for a minimum length of **8.593 Kms** as per typical cross sections mentioned in Clause 2.11 of Schedule B in consultation with Authority Engineer.

7. Design of Structures

(i) General

(a) All bridges, culverts and structures shall be designed and constructed in accordance with the provision of section 7 of the Manual (IRC: SP 73-2018) and shall conform to the cross- sectional features and other details specified therein.

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

Sl. No.	Bridge at km	Width of carriageway and cross-sectional features*
NIL		

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

Sl. No.	Location at km	Remarks
NIL		

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

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

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 the provision of section 7 of the Manual (IRC:SP: 73-2018) and deviations given at Schedule D.

(ii) Culverts

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

(b) Reconstruction of existing culverts:

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

Refer to the provision of 7.3 (ii) of the Manual (IRC: SP 73-2018)

SLAB CULVERT: 31 Nos.

Sl. No.	Culvert location		Proposed Span/ Opening (m.)	Proposed Width (m)	Remark
	Existing Chainage (Km)	Design Chainage (Km)			
Package I					
1	80+578	73.286	1 x 2.0 x 2.0	12.00	
2	84+01	76.520	1 x 2.0 x 2.0	12.00	
3	85+580	77.930	1 x 2.0 x 2.0	12.00	
4	85+931	78.220	1 x 2.0 x 2.0	12.00	
5	86+100	78.395	1 x 2.0 x 2.0	12.00	
6	86+640	78.910	1 x 4.0 x 4.0	12.00	
7	87+318	79.540	1 x 4.0 x 4.0	12.00	
8	87+45	79.655	1 x 2.0 x 2.0	12.00	
9	87+628	79.720	1 x 2.0 x 2.0	12.00	
10	88+393, 88+435	80.430	1 x 4.0 x 4.0	12.00	
11	88+823	80.790	1 x 3.0 x 3.0	12.00	
12	89+233	81.195	1 x 2.0 x 2.0	12.00	
13	90+452	82.260	1 x 2.0 x 2.0	12.00	
14	92+546	83.870	1 x 2.0 x 2.0	12.00	
15	95+095	86.145	1 x 4.0 x 4.0	12.00	

SI. No.	Culvert location		Proposed Span/ Opening (m.)	Proposed Width (m)	Remark
	Existing Chainage (Km)	Design Chainage (Km)			
16	96+743	87.670	1 x 2.0 x 2.0	12.00	
17	97+048	87.945	1 x 2.0 x 2.0	12.00	
18	98+198	88.950	1 x 2.0 x 2.0	12.00	
19	98+988	89.770	1 x 3.0 x 3.0	12.00	
20	99+448	90.240	1 x 6.0 x 6.0	12.00	
21	100+130	90.860	1 x 2.0 x 2.0	12.00	
22	101+805	92.405	1 x 6.0 x 6.0	12.00	
23	102+162	92.730	1 x 2.0 x 2.0	12.00	
24	104+262	94.415	1 x 2.0 x 2.0	12.00	
25	104+615	94.700	1 x 2.0 x 2.0	12.00	
26	105+185	95.210	1 x 4.0 x 4.0	12.00	
27	106+470	96.417	1 x 2.0 x 2.0	12.00	
28	108+588	98.480	1 x 2.0 x 2.0	12.00	
29	112+038	101.800	1 x 2.0 x 2.0	12.00	
30	113+490	103.175	1 x 2.0 x 2.0	12.00	
31	114+608	104.090	1 x 3.0 x 3.0	12.00	

PIPE CULVERTS: 110 Nos.

SI. No.	Existing Chainage (Km)	Design Chainage (Km)	Proposed Span/ Opening (No. x Dia.) (m)	Proposed Width (m)	Remark
Package I					
1	80+195	72.921	1 x 1200	12.00	Reconstruction
2	80+755	73.460	1 x 1200	12.00	Reconstruction
3	80+985	73.690	1 x 1200	12.00	Reconstruction
4	81+120	73.750	1 x 1200	12.00	Reconstruction
5	82+078	74.653	1 x 1200	15.00	Reconstruction
6	82+124	74.705	1 x 1200	12.00	Reconstruction
7	82+898	75.510	1 x 1200	12.00	Reconstruction
8	83+181	75.775	1 x 1200	12.00	Reconstruction
9	83+365	75.980	1 x 1200	12.00	Reconstruction
10	83+564	76.240	1 x 1200	12.00	Reconstruction
11	83+685	76.350	1 x 1200	12.00	Reconstruction
12	84+729	77.177	1 x 1200	12.00	Reconstruction
13	85+215	77.570	1 x 1200	12.00	Reconstruction
14	85+296	77.657	1 x 1200	12.00	Reconstruction
15	85+609	78.035	1 x 1200	12.00	Reconstruction
16	85+809	78.120	1 x 1200	12.00	Reconstruction
17	86+175	78.465	1 x 1200	12.00	Reconstruction
18	86+810	79.040	1 x 1200	12.00	Reconstruction
19	86+990	79.260	1 x 1200	12.00	Reconstruction
20	87+160	79.430	1 x 1200	12.00	Reconstruction
21	87+238	79.490	1 x 1200	12.00	Reconstruction
22	87+866	79.930	1 x 1200	12.00	Reconstruction
23	87+922	80.000	1 x 1200	12.00	Reconstruction
24	88+137	80.190	1 x 1200	12.00	Reconstruction
25	88+565	80.550	1 x 1200	12.00	Reconstruction

SI. No.	Existing Chainage (Km)	Design Chainage (Km)	Proposed Span/ Opening (No. x Dia.) (m)	Proposed Width (m)	Remark
26	89+120	81.080	1 x 1200	12.00	Reconstruction
27	89+459	81.400	1 x 1200	12.00	Reconstruction
28	89+521	81.455	1 x 1200	12.00	Reconstruction
29	90+050, 90+115	82.015	1 x 1200	12.00	Reconstruction
30	90+272	82.130	1 x 1200	12.00	Reconstruction
31	90+505	82.340	1 x 1200	12.00	Reconstruction
32	91+097	82.545	1 x 1200	12.00	Reconstruction
33	91+160	82.600	1 x 1200	12.00	Reconstruction
34	91+263	82.690	1 x 1200	12.00	Reconstruction
35	91+428	82.850	1 x 1200	12.00	Reconstruction
36	91+630	82.990	1 x 1200	12.00	Reconstruction
37	91+777	83.183	1 x 1200	12.00	Reconstruction
38	92+054	83.385	1 x 1200	12.00	Reconstruction
39	92+335	83.670	1 x 1200	12.00	Reconstruction
40	92+713	84.010	1 x 1200	12.00	Reconstruction
41	93+048	84.215	1 x 1200	12.00	Reconstruction
42	93+45	84.595	1 x 1200	12.00	Reconstruction
43	93+548	84.695	1 x 1200	12.00	Reconstruction
44	93+873	85.010	1 x 1200	12.00	Reconstruction
45	94+145	85.245	1 x 1200	12.00	Reconstruction
46	94+429	85.525	1 x 1200	12.00	Reconstruction
47	94+605	85.697	1 x 1200	12.00	Reconstruction
48	94+947	86.000	1 x 1200	12.00	Reconstruction
49	95+030	86.090	1 x 1200	12.00	Reconstruction
50	95+240	86.285	1 x 1200	12.00	Reconstruction
51	95+535	86.540	1 x 1200	12.00	Reconstruction
52	96+185	87.130	1 x 1200	12.00	Reconstruction
53	96+325	87.270	1 x 1200	12.00	Reconstruction
54	96+519	87.455	1 x 1200	12.00	Reconstruction
55	97+218	88.120	1 x 1200	12.00	Reconstruction
56	98+068	88.830	1 x 1200	12.00	Reconstruction
57	98+308	89.055	1 x 1200	12.00	Reconstruction
58	98+342	89.385	1 x 1200	12.00	Reconstruction
59	98+390	89.435	1 x 1200	12.00	Reconstruction
60	99+090	89.880	1 x 1200	12.00	Reconstruction
61	99+230	90.020	1 x 1200	12.00	Reconstruction
62	99+567	90.365	1 x 1200	12.00	Reconstruction
63	100+195	90.920	1 x 1200	12.00	Reconstruction
64	101+520	91.240	1 x 1200	12.00	Reconstruction
65	100+700	91.395	1 x 1200	12.00	Reconstruction
66	100+860	91.555	1 x 1200	12.00	Reconstruction
67	100+990	91.680	1 x 1200	12.00	Reconstruction
68	101+415	92.070	1 x 1200	12.00	Reconstruction
69	101+615	92.220	1 x 1200	12.00	Reconstruction
70	101+705	92.310	1 x 1200	12.00	Reconstruction
71	102+545	93.075	1 x 1200	12.00	Reconstruction
72	102+898	93.310	1 x 1200	12.00	Reconstruction

SI. No.	Existing Chainage (Km)	Design Chainage (Km)	Proposed Span/ Opening (No. x Dia.) (m)	Proposed Width (m)	Remark
73	103+128	93.460	1 x 1200	12.00	Reconstruction
74	103+367	93.760	1 x 1200	12.00	Reconstruction
75	103+963	94.155	1 x 1200	12.00	Reconstruction
76	104+125	94.300	1 x 1200	12.00	Reconstruction
77	104+490	94.610	1 x 1200	12.00	Reconstruction
78	104+685	94.790	1 x 1200	12.00	Reconstruction
79	104+925	94.950	1 x 1200	12.00	Reconstruction
80	105+385	95.410	1 x 1200	12.00	Reconstruction
81	105+565	95.550	1 x 1200	12.00	Reconstruction
82	105+748	95.710	1 x 1200	12.00	Reconstruction
83	105+855	95.815	1 x 1200	12.00	Reconstruction
84	105+955	95.905	1 x 1200	12.00	Reconstruction
85	106+100	96.030	1 x 1200	12.00	Reconstruction
86	106+600	96.580	1 x 1200	12.00	Reconstruction
87	106+755	96.680	1 x 1200	12.00	Reconstruction
88	106+982	96.900	1 x 1200	12.00	Reconstruction
89	107+345	97.260	1 x 1200	12.00	Reconstruction
90	107+395	97.320	1 x 1200	12.00	Reconstruction
91	107+595	97.525	1 x 1200	12.00	Reconstruction
92	108+040	98.000	1 x 1200	12.00	Reconstruction
93	108+175	98.130	1 x 1200	12.00	Reconstruction
94	108+358	98.280	1 x 1200	12.00	Reconstruction
95	108+450	98.365	1 x 1200	12.00	Reconstruction
96	108+690	98.560	1 x 1200	12.00	Reconstruction
97	109+045	98.880	1 x 1200	12.00	Reconstruction
98	109+165	98.990	1 x 1200	12.00	Reconstruction
99	109+202	99.030	1 x 1200	12.00	Reconstruction
100	109+438	99.265	1 x 1200	12.00	Reconstruction
101	110+160	99.985	1 x 1200	12.00	Reconstruction
102	110+330	100.155	1 x 1200	12.00	Reconstruction
103	110+855	100.620	1 x 1200	12.00	Reconstruction
104	112+540	102.230	1 x 1200	12.00	Reconstruction
105	113+140	102.850	1 x 1200	12.00	Reconstruction
106	113+660	103.320	1 x 1200	12.00	Reconstruction
107	114+030	103.600	1 x 1200	12.00	Reconstruction
108	114+446	103.945	1 x 1200	12.00	Reconstruction
109	114+800	104.280	1 x 1200	12.00	Reconstruction
110	114+862	104.350	1 x 1200	12.00	Reconstruction

(c) Widening of existing culverts:

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

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

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

BOX CULVERT: 13 Nos.

SI. No.	Design Chainage (Km)	Proposed Span/ Opening (m.)	Proposed Width (m)	Type	Remark
Package I					
1	73.560	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
2	73.850	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
3	74.970	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
4	75.300	1 x 3.0 x 3.0	12.00	Box Culvert	New Construction
5	76.100	1 x 4.0 x 4.0	12.00	Box Culvert	New Construction
6	76.810	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
7	78.640	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
8	81.750	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
9	85.795	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
10	88.400	1 x 3.0 x 3.0	12.00	Box Culvert	New Construction
11	92.150	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
12	93.800	1 x 3.0 x 3.0	12.00	Box Culvert	New Construction
13	94.065	1 x 4.0 x 4.0	12.00	Box Culvert	New Construction

PIPE CULVERTS: 26 Nos.

Sr. No.	Design Chainage (Km)	No. x Dia.(mm)	Proposed Width (m)	Type	Remark
Package I					
1	73.020	1 x 1200	12.00	HPC	New Construction
2	73.950	1 x 1200	12.00	HPC	New Construction
3	74.100	1 x 1200	12.00	HPC	New Construction
4	74.280	1 x 1200	12.00	HPC	New Construction
5	74.370	1 x 1200	12.00	HPC	New Construction
6	74.500	1 x 1200	12.00	HPC	New Construction
7	74.600	1 x 1200	12.00	HPC	New Construction
8	76.935	1 x 1200	12.00	HPC	New Construction
9	77.380	1 x 1200	12.00	HPC	New Construction
10	78.780	1 x 1200	12.00	HPC	New Construction
11	80.600	1 x 1200	12.00	HPC	New Construction
12	80.920	1 x 1200	12.00	HPC	New Construction
13	84.065	1 x 1200	12.00	HPC	New Construction
14	86.400	1 x 1200	12.00	HPC	New Construction
15	87.750	1 x 1200	12.00	HPC	New Construction
16	88.560	1 x 1200	12.00	HPC	New Construction
17	90.620	1 x 1200	12.00	HPC	New Construction

Sr. No.	Design Chainage (Km)	No. x Dia.(mm)	Proposed Width (m)	Type	Remark
18	91.890	1 x 1200	12.00	HPC	New Construction
19	97.060	1 x 1200	12.00	HPC	New Construction
20	97.440	1 x 1200	12.00	HPC	New Construction
21	101.175	1 x 1200	12.00	HPC	New Construction
22	101.505	1 x 1200	12.00	HPC	New Construction
23	101.670	1 x 1200	12.00	HPC	New Construction
24	101.955	1 x 1200	12.00	HPC	New Construction
25	103.020	1 x 1200	12.00	HPC	New Construction
26	103.440	1 x 1200	12.00	HPC	New Construction

(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		

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

(iii) Bridges

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

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

Refer to the provision of 7.3.2 of the Manual (IRC: SP 73-2018)

MAJOR BRIDGES: - Nil

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	Details of Existing Structure			Details of Proposed structure			Remark
			Type of Structure	Span Arrang-ement	Width of Structure (m)	Span Arrang-ement	Proposed Width (m)	Type of Bridge	
--NIL--									

MINOR BRIDGES: - 01 No.

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	Details of Existing Structure			Details of Proposed structure			Remark
			Type of Structure	Span Arrang-ement	Width of Structure (m)	Span Arrang-ement*	Proposed Width (m)	Type of Bridge	
Package I									
1	92+178	83.515	Slab Culvert	1 x 6.50	6.20	1 x 20.00	12.00	Minor Bridge	Reconst ruction

(ii) The following narrow bridges shall be widened:

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

@ Attach cross-section

(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.

Major Bridges: NIL

Sl. No.	Location (km)	Total length (m)	Remarks, if any
NIL			

Minor Bridges:

Sr. No.	Location km (Design Ch.)	Total Length of bridge (m)	Total Width (m)
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 at km	Remarks
NIL		

(e) Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in the provision of paragraph 7.21 of the Manual IRC SP 73 2018.

(f) Structures in marine environment: NIL

(iv) Rail-road bridges: NIL

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

(b) Road over-bridges

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

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

(c) Road under-bridges

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

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

(v) Grade separated structures: NIL

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

Major Bridges:

Sr. No.	Location of Bridge (km)	Nature and extent of repairs /strengthening to be carried out
-----NIL-----		

Minor Bridges:

Sr. No.	Location of Bridge (km)	Nature and extent of repairs /strengthening to be carried out
1	Ch. 84.470	Replacement of expansion joints & wearing coat, providing crash barrier and approach slab on bridge, painting & bed protection work and other repair work, if any.

(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
NIL	

(i) Traffic Control Devices and Road Safety Works Traffic control devices and road safety works shall be provided in accordance with the provision of Section 9 of the Manual.

(ii) Specifications of the reflective sheeting shall be provided in accordance with Section 9 of the Manual.

8. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provision of Section 9 of the Manual.

(ii) Overhead traffic signs: location and size

S. No	Location (Design Chainage)	Type	Remark
Nil			

9. Compulsory Afforestation
Deleted

10. Hazardous Locations

The safety barriers shall be provided at the hazardous locations as per Clause 7.18 of the Manual (IRC:SP 73-2018). W-Beam metal crash barriers shall however be provided for a minimum length of 5.620 Km. at all hazardous locations. All hazardous locations shall be finalized in consultation with the Authority Engineer.

Above length of the W-Beam metal crash barriers is indicative and minimum specified. The actual length of the W-Beam metal crash barriers shall be determined by the Contractor in accordance with the Manual requirements

with approval from the Authority's Engineer. Any increase in the length specified in this Clause of Schedule B shall not constitute a Change of Scope.

a) RCC Retaining Wall : Retaining Wall shall be constructed as per typical cross sections as per Schedule D and at other locations mentioned below:

Retaining Wall Chainages International Corridor					
RHS			**LHS**		
From	**To**	**Length**	**From**	**To**	**Length**
72+990	73+000	10.000	73+000	73+010	10.000
73+270	73+290	20.000	73+840	73+860	20.000
73+450	73+470	20.000	74+250	74+260	10.000
73+540	73+550	10.000	74+300	74+340	40.000
73+560	73+590	30.000	74+430	74+460	30.000
73+620	73+640	20.000	74+580	74+590	10.000
73+820	73+860	40.000	75+080	75+090	10.000
73+910	73+970	60.000	75+100	75+110	10.000
74+050	74+060	10.000	75+120	75+130	10.000
74+260	74+300	40.000	75+140	75+160	20.000
74+340	74+350	10.000	75+200	75+240	40.000
74+370	74+380	10.000	75+270	75+280	10.000
74+590	74+600	10.000	75+340	75+360	20.000
74+960	74+980	20.000	75+500	75+510	10.000
75+280	75+290	10.000	75+530	75+570	40.000
75+320	75+340	20.000	75+690	75+710	20.000
76+080	76+090	10.000	75+750	75+770	20.000
76+480	76+490	10.000	76+080	76+100	20.000
76+520	76+530	10.000	76+350	76+360	10.000
76+540	76+550	10.000	76+470	76+480	10.000
76+790	76+810	20.000	76+530	76+550	20.000
78+100	78+110	10.000	76+640	76+650	10.000
78+910	78+920	10.000	76+660	76+710	50.000
79+640	79+670	30.000	76+780	76+800	20.000
79+710	79+720	10.000	76+820	76+830	10.000
80+440	80+450	10.000	77+160	77+180	20.000
80+520	80+530	10.000	77+390	77+410	20.000
80+780	80+790	10.000	77+420	77+430	10.000
83+860	83+870	10.000	77+450	77+460	10.000
85+770	85+780	10.000	77+500	77+520	20.000
86+500	86+510	10.000	78+220	78+240	20.000
88+370	88+380	10.000	78+260	78+270	10.000
88+530	88+550	20.000	78+320	78+330	10.000
88+560	88+570	10.000	78+380	78+410	30.000
92+130	92+140	10.000	78+460	78+470	10.000
92+150	92+160	10.000	78+620	78+630	10.000
94+060	94+070	10.000	78+710	78+800	90.000
94+390	94+400	10.000	78+810	78+840	30.000
94+420	94+430	10.000	78+880	78+890	10.000
97+090	97+100	10.000	78+920	78+930	10.000
97+420	97+430	10.000	79+000	79+010	10.000

Retaining Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
97+440	97+460	20.000	79+040	79+050	10.000
98+120	98+140	20.000	79+140	79+160	20.000
98+190	98+200	10.000	79+200	79+210	10.000
98+350	98+370	20.000	79+230	79+270	40.000
98+450	98+460	10.000	79+540	79+550	10.000
98+610	98+630	20.000	79+640	79+660	20.000
98+640	98+660	20.000	79+670	79+680	10.000
99+910	99+920	10.000	79+700	79+710	10.000
103+150	103+170	20.000	79+730	79+740	10.000
103+430	103+440	10.000	79+870	79+880	10.000
103+640	103+650	10.000	80+180	80+280	100.000
103+930	103+940	10.000	80+290	80+310	20.000
			80+380	80+390	10.000
			80+500	80+510	10.000
			80+560	80+570	10.000
			80+610	80+620	10.000
			80+640	80+650	10.000
			80+730	80+740	10.000
			80+750	80+770	20.000
			80+800	80+810	10.000
			80+990	81+000	10.000
			81+010	81+020	10.000
			81+170	81+180	10.000
			81+370	81+380	10.000
			81+400	81+410	10.000
			81+570	81+580	10.000
			82+110	82+130	20.000
			82+250	82+260	10.000
			82+470	82+510	40.000
			82+530	82+540	10.000
			82+680	82+690	10.000
			83+000	83+010	10.000
			83+110	83+120	10.000
			83+260	83+270	10.000
			83+650	83+660	10.000
			83+670	83+680	10.000
			83+710	83+720	10.000
			83+850	83+860	10.000
			83+990	84+000	10.000
			84+010	84+070	60.000
			84+970	84+980	10.000
			85+000	85+010	10.000
			85+070	85+090	20.000
			85+520	85+530	10.000
			85+690	85+710	20.000
			85+760	85+770	10.000
			86+130	86+140	10.000
			86+380	86+390	10.000

Retaining Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
			86+490	86+500	10.000
			86+540	86+550	10.000
			86+590	86+600	10.000
			86+620	86+630	10.000
			86+730	86+760	30.000
			87+140	87+150	10.000
			87+260	87+270	10.000
			87+660	87+680	20.000
			88+120	88+130	10.000
			88+360	88+380	20.000
			88+400	88+410	10.000
			88+520	88+530	10.000
			88+810	88+830	20.000
			88+930	88+950	20.000
			89+500	89+520	20.000
			89+560	89+580	20.000
			89+640	89+650	10.000
			89+860	89+880	20.000
			90+390	90+400	10.000
			90+460	90+470	10.000
			90+610	90+640	30.000
			91+270	91+290	20.000
			92+130	92+140	10.000
			92+300	92+310	10.000
			92+490	92+530	40.000
			92+720	92+750	30.000
			93+420	93+430	10.000
			93+440	93+480	40.000
			93+750	93+760	10.000
			94+170	94+180	10.000
			94+280	94+290	10.000
			94+300	94+310	10.000
			94+390	94+400	10.000
			94+430	94+440	10.000
			94+500	94+530	30.000
			94+540	94+550	10.000
			94+700	94+710	10.000
			94+780	94+800	20.000
			95+000	95+020	20.000
			95+200	95+210	10.000
			95+260	95+270	10.000
			97+050	97+060	10.000
			97+070	97+090	20.000
			102+730	102+750	20.000
			102+850	102+880	30.000
			103+130	103+140	10.000
			103+440	103+450	10.000
			103+590	103+600	10.000

Retaining Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
			103+690	103+700	10.000
			103+920	103+940	20.000
			104+120	104+140	20.000
			104+300	104+320	20.000
	TOTAL	**810.000**		**TOTAL**	**2,380.000**

Above length of the Retaining Wall is indicative and minimum specified. The actual length of the Retaining Wall shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority's Engineer. Any increase in the length specified in this Clause of Schedule B shall not constitute a Change of Scope.

b) Breast Wall: Breast Retaining Wall shall be constructed as per typical cross sections as per Schedule D and at other locations mentioned below:

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
73+690	73+700	10.000	72+820	72+830	10.000
74+180	74+200	20.000	72+880	72+910	30.000
74+240	74+250	10.000	72+920	72+930	10.000
74+390	74+400	10.000	72+970	72+980	10.000
74+510	74+520	10.000	73+300	73+310	10.000
74+610	74+620	10.000	73+480	73+490	10.000
74+770	74+780	10.000	74+000	74+010	10.000
74+860	74+870	10.000	74+020	74+030	10.000
74+930	74+940	10.000	74+070	74+090	20.000
75+010	75+020	10.000	74+660	74+670	10.000
75+040	75+050	10.000	74+880	74+890	10.000
75+450	75+480	30.000	76+120	76+130	10.000
75+580	75+590	10.000	77+310	77+320	10.000
75+600	75+620	20.000	77+610	77+620	10.000
75+630	75+640	10.000	77+630	77+640	10.000
75+670	75+680	10.000	77+670	77+680	10.000
75+790	75+810	20.000	77+820	77+830	10.000
75+830	75+850	20.000	77+950	77+960	10.000
75+860	75+870	10.000	78+070	78+080	10.000
75+880	75+900	20.000	78+150	78+160	10.000
76+020	76+050	30.000	79+070	79+080	10.000
76+230	76+240	10.000	79+500	79+510	10.000
76+390	76+410	20.000	79+610	79+620	10.000
76+750	76+760	10.000	79+980	79+990	10.000
76+880	76+890	10.000	80+000	80+020	20.000
77+070	77+090	20.000	80+120	80+130	10.000
77+640	77+660	20.000	80+150	80+160	10.000
77+700	77+730	30.000	81+410	81+450	40.000
77+890	77+900	10.000	81+720	81+730	10.000
78+010	78+020	10.000	81+810	81+820	10.000
78+160	78+170	10.000	82+040	82+050	10.000

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
78+190	78+210	20.000	82+060	82+070	10.000
78+420	78+430	10.000	82+170	82+180	10.000
78+560	78+570	10.000	82+630	82+640	10.000
78+580	78+590	10.000	82+790	82+800	10.000
78+600	78+610	10.000	82+810	82+820	10.000
78+860	78+870	10.000	82+870	82+880	10.000
78+970	78+980	10.000	82+900	82+910	10.000
79+410	79+420	10.000	83+460	83+480	20.000
79+430	79+480	50.000	84+090	84+110	20.000
79+490	79+500	10.000	84+250	84+270	20.000
79+790	79+800	10.000	84+400	84+410	10.000
79+850	79+860	10.000	84+720	84+730	10.000
79+910	79+930	20.000	85+400	85+410	10.000
79+990	80+000	10.000	86+550	86+570	20.000
80+090	80+100	10.000	89+700	89+710	10.000
80+320	80+330	10.000	89+740	89+750	10.000
80+350	80+360	10.000	90+180	90+190	10.000
80+470	80+490	20.000	90+670	90+680	10.000
80+650	80+660	10.000	90+880	90+890	10.000
80+690	80+710	20.000	92+550	92+560	10.000
80+810	80+830	20.000	92+570	92+580	10.000
80+840	80+850	10.000	92+680	92+690	10.000
80+890	80+920	30.000	93+060	93+100	40.000
80+980	80+990	10.000	93+210	93+220	10.000
81+070	81+090	20.000	93+850	93+870	20.000
81+160	81+170	10.000	94+080	94+090	10.000
81+340	81+350	10.000	94+610	94+620	10.000
81+410	81+420	10.000	94+840	94+850	10.000
81+430	81+440	10.000	95+610	95+620	10.000
81+460	81+470	10.000	97+020	97+030	10.000
81+840	81+850	10.000	97+110	97+120	10.000
81+900	81+920	20.000	97+150	97+160	10.000
82+080	82+090	10.000	97+260	97+270	10.000
82+140	82+160	20.000	97+320	97+330	10.000
82+660	82+670	10.000	97+360	97+400	40.000
82+840	82+860	20.000	97+630	97+640	10.000
82+920	82+950	30.000	97+680	97+700	20.000
83+210	83+220	10.000	98+010	98+020	10.000
83+230	83+240	10.000	98+160	98+170	10.000
83+290	83+330	40.000	98+380	98+390	10.000
83+380	83+390	10.000	98+430	98+440	10.000
83+530	83+540	10.000	98+510	98+520	10.000
83+930	83+970	40.000	98+530	98+540	10.000
84+070	84+080	10.000	98+680	98+690	10.000
84+180	84+190	10.000	98+740	98+750	10.000
84+210	84+230	20.000	98+760	98+780	20.000
84+600	84+610	10.000	98+790	98+800	10.000
84+750	84+760	10.000	98+970	98+980	10.000
84+780	84+800	20.000	99+150	99+160	10.000

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
84+810	84+820	10.000	99+400	99+410	10.000
84+830	84+840	10.000	99+850	99+870	20.000
84+870	84+880	10.000	100+160	100+180	20.000
84+900	84+910	10.000	100+240	100+250	10.000
84+970	85+000	30.000	100+580	100+590	10.000
85+010	85+020	10.000	100+670	100+690	20.000
85+040	85+050	10.000	100+870	100+880	10.000
85+130	85+140	10.000	101+380	101+390	10.000
85+210	85+220	10.000	101+690	101+730	40.000
85+280	85+290	10.000	101+920	101+950	30.000
85+300	85+330	30.000	101+960	102+010	50.000
85+350	85+360	10.000	102+180	102+190	10.000
85+440	85+450	10.000	102+260	102+300	40.000
85+530	85+540	10.000	102+320	102+340	20.000
85+570	85+600	30.000	103+290	103+300	10.000
85+630	85+650	20.000	103+820	103+840	20.000
85+850	85+860	10.000	104+010	104+020	10.000
85+890	85+900	10.000	104+060	104+070	10.000
85+910	85+920	10.000			
85+930	85+960	30.000			
85+980	85+990	10.000			
86+040	86+050	10.000			
86+160	86+170	10.000			
86+210	86+230	20.000			
86+310	86+330	20.000			
86+350	86+360	10.000			
86+430	86+440	10.000			
86+460	86+470	10.000			
86+550	86+560	10.000			
86+650	86+670	20.000			
86+700	86+710	10.000			
86+870	86+880	10.000			
86+890	86+900	10.000			
86+960	86+970	10.000			
87+040	87+050	10.000			
87+080	87+090	10.000			
87+100	87+110	10.000			
87+160	87+170	10.000			
87+240	87+250	10.000			
87+310	87+320	10.000			
87+360	87+390	30.000			
87+420	87+430	10.000			
87+520	87+540	20.000			
87+550	87+560	10.000			
87+730	87+740	10.000			
87+780	87+790	10.000			
87+850	87+860	10.000			
87+850	87+860	10.000			
87+870	87+890	20.000			

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
87+900	87+910	10.000			
87+920	87+930	10.000			
87+940	87+950	10.000			
87+980	87+990	10.000			
88+010	88+040	30.000			
88+050	88+070	20.000			
88+230	88+240	10.000			
88+250	88+270	20.000			
88+280	88+310	30.000			
88+340	88+350	10.000			
88+480	88+490	10.000			
88+670	88+700	30.000			
88+770	88+780	10.000			
88+840	88+850	10.000			
88+890	88+910	20.000			
89+010	89+030	20.000			
89+050	89+060	10.000			
89+120	89+160	40.000			
89+180	89+200	20.000			
89+250	89+260	10.000			
89+290	89+300	10.000			
89+310	89+320	10.000			
89+350	89+370	20.000			
89+380	89+390	10.000			
89+410	89+420	10.000			
89+440	89+460	20.000			
89+750	89+760	10.000			
89+790	89+800	10.000			
89+820	89+840	20.000			
89+890	89+900	10.000			
89+950	89+980	30.000			
90+080	90+090	10.000			
90+150	90+160	10.000			
90+220	90+230	10.000			
90+340	90+350	10.000			
90+380	90+410	30.000			
90+460	90+480	20.000			
90+650	90+660	10.000			
90+800	90+820	20.000			
90+930	90+940	10.000			
90+960	90+970	10.000			
91+030	91+050	20.000			
91+070	91+090	20.000			
91+110	91+120	10.000			
91+260	91+270	10.000			
91+310	91+330	20.000			
91+360	91+370	10.000			
91+500	91+510	10.000			
91+600	91+610	10.000			

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
91+640	91+650	10.000			
91+710	91+730	20.000			
91+740	91+750	10.000			
91+790	91+800	10.000			
91+810	91+820	10.000			
91+890	91+910	20.000			
91+920	91+950	30.000			
91+990	92+000	10.000			
92+010	92+020	10.000			
92+230	92+240	10.000			
92+470	92+480	10.000			
92+540	92+550	10.000			
92+640	92+650	10.000			
92+760	92+790	30.000			
92+800	92+810	10.000			
92+820	92+830	10.000			
92+950	92+960	10.000			
92+990	93+010	20.000			
93+020	93+030	10.000			
93+130	93+150	20.000			
93+660	93+670	10.000			
93+810	93+820	10.000			
93+900	93+910	10.000			
93+990	94+000	10.000			
94+150	94+160	10.000			
94+660	94+670	10.000			
94+730	94+740	10.000			
94+760	94+770	10.000			
95+020	95+050	30.000			
95+080	95+100	20.000			
95+110	95+150	40.000			
95+180	95+190	10.000			
95+230	95+240	10.000			
95+300	95+310	10.000			
95+350	95+370	20.000			
95+570	95+580	10.000			
95+700	95+710	10.000			
95+750	95+800	50.000			
95+810	95+880	70.000			
96+070	96+080	10.000			
96+090	96+200	110.000			
96+270	96+340	70.000			
96+470	96+480	10.000			
96+500	96+510	10.000			
96+530	96+550	20.000			
96+650	96+660	10.000			
96+700	96+710	10.000			
97+290	97+300	10.000			
97+550	97+580	30.000			

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
97+690	97+720	30.000			
98+860	98+870	10.000			
98+920	98+930	10.000			
101+020	101+030	10.000			
101+170	101+190	20.000			
101+200	101+210	10.000			
102+010	102+020	10.000			
102+080	102+090	10.000			
102+210	102+220	10.000			
102+540	102+550	10.000			
102+590	102+610	20.000			
102+630	102+660	30.000			
102+680	102+690	10.000			
102+770	102+780	10.000			
102+810	102+820	10.000			
102+900	102+910	10.000			
102+990	103+000	10.000			
103+110	103+120	10.000			
103+190	103+200	10.000			
103+700	103+710	10.000			
103+790	103+800	10.000			
104+070	104+080	10.000			
104+110	104+120	10.000			
104+270	104+280	10.000			
104+290	104+310	20.000			
104+330	104+340	10.000			
	TOTAL	**3,850.000**		**TOTAL**	**1,350.000**

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
72+840	72+850	10.000	72+820	72+880	60.000
73+700	73+720	20.000	72+930	72+970	40.000
74+130	74+150	20.000	73+310	73+320	10.000
74+200	74+240	40.000	73+490	73+520	30.000
74+400	74+420	20.000	73+700	73+730	30.000
74+470	74+510	40.000	74+010	74+020	10.000
74+620	74+690	70.000	74+090	74+240	150.000
74+720	74+770	50.000	74+890	74+920	30.000
74+870	74+930	60.000	76+130	76+140	10.000
75+020	75+040	20.000	76+440	76+450	10.000
75+590	75+600	10.000	76+560	76+630	70.000
75+640	75+670	30.000	77+020	77+060	40.000
76+000	76+010	10.000	77+230	77+260	30.000
76+050	76+060	10.000	77+320	77+340	20.000
76+110	76+230	120.000	77+620	77+630	10.000
76+240	76+290	50.000	77+680	77+690	10.000
76+410	76+460	50.000	77+960	78+010	50.000
76+560	76+630	70.000	78+140	78+150	10.000

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
76+890	76+900	10.000	78+490	78+530	40.000
76+950	77+070	120.000	78+650	78+670	20.000
77+210	77+360	150.000	79+080	79+090	10.000
77+540	77+640	100.000	79+580	79+610	30.000
77+660	77+700	40.000	79+940	79+980	40.000
77+730	77+890	160.000	80+020	80+060	40.000
77+900	78+010	110.000	80+130	80+150	20.000
78+040	78+090	50.000	81+530	81+560	30.000
78+130	78+160	30.000	81+650	81+720	70.000
78+480	78+560	80.000	81+740	81+810	70.000
78+590	78+600	10.000	82+060	82+070	10.000
78+650	78+680	30.000	82+270	82+330	60.000
78+940	78+970	30.000	82+800	82+810	10.000
79+060	79+110	50.000	82+880	82+900	20.000
79+290	79+300	10.000	83+550	83+620	70.000
79+390	79+410	20.000	83+890	83+910	20.000
79+500	79+510	10.000	84+280	84+400	120.000
79+560	79+620	60.000	84+510	84+580	70.000
79+760	79+790	30.000	88+170	88+200	30.000
79+810	79+850	40.000	89+710	89+740	30.000
79+930	79+990	60.000	90+260	90+310	50.000
80+000	80+080	80.000	90+490	90+520	30.000
80+100	80+170	70.000	90+680	90+690	10.000
80+330	80+350	20.000	92+080	92+120	40.000
80+360	80+370	10.000	92+560	92+570	10.000
80+660	80+690	30.000	92+870	92+890	20.000
80+710	80+730	20.000	93+220	93+270	50.000
80+850	80+890	40.000	93+510	93+640	130.000
80+920	80+980	60.000	93+820	93+850	30.000
81+030	81+070	40.000	94+090	94+140	50.000
81+090	81+160	70.000	94+620	94+660	40.000
81+210	81+300	90.000	94+830	94+840	10.000
81+420	81+430	10.000	95+440	95+480	40.000
81+470	81+560	90.000	95+620	95+630	10.000
81+610	81+840	230.000	96+940	97+020	80.000
81+970	81+990	20.000	97+120	97+150	30.000
82+030	82+080	50.000	97+160	97+250	90.000
82+160	82+230	70.000	97+270	97+310	40.000
82+270	82+390	120.000	97+330	97+360	30.000
82+610	82+660	50.000	97+540	97+590	50.000
82+760	82+840	80.000	97+640	97+680	40.000
82+860	82+920	60.000	98+020	98+080	60.000
83+220	83+230	10.000	98+090	98+110	20.000
83+330	83+370	40.000	98+150	98+160	10.000
83+390	83+490	100.000	98+220	98+340	120.000
83+540	83+640	100.000	98+390	98+430	40.000
83+880	83+930	50.000	98+520	98+530	10.000
84+080	84+180	100.000	98+690	98+740	50.000
84+200	84+210	10.000	98+800	98+970	170.000

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
84+230	84+420	190.000	100+550	100+580	30.000
84+500	84+600	100.000	102+010	102+090	80.000
84+680	84+690	10.000	102+190	102+260	70.000
84+700	84+710	10.000	102+300	102+320	20.000
84+720	84+730	10.000	102+920	102+990	70.000
84+740	84+750	10.000	103+300	103+410	110.000
84+760	84+780	20.000	103+810	103+820	10.000
84+800	84+810	10.000	103+980	104+010	30.000
84+840	84+870	30.000	104+030	104+060	30.000
84+910	84+950	40.000	104+360	104+440	80.000
85+020	85+040	20.000			-
85+050	85+060	10.000			-
85+140	85+160	20.000			-
85+170	85+200	30.000			-
85+220	85+240	20.000			-
85+270	85+280	10.000			-
85+290	85+300	10.000			-
85+340	85+350	10.000			-
85+360	85+440	80.000			-
85+460	85+510	50.000			-
85+540	85+570	30.000			-
85+600	85+610	10.000			-
85+650	85+670	20.000			-
85+810	85+850	40.000			-
85+900	85+910	10.000			-
85+960	85+980	20.000			-
86+050	86+120	70.000			-
86+170	86+210	40.000			-
86+300	86+310	10.000			-
86+340	86+350	10.000			-
86+470	86+480	10.000			-
86+680	86+700	20.000			-
86+800	86+870	70.000			-
86+920	86+940	20.000			-
86+950	86+960	10.000			-
86+970	87+020	50.000			-
87+090	87+100	10.000			-
87+170	87+200	30.000			-
87+230	87+240	10.000			-
87+300	87+310	10.000			-
87+460	87+520	60.000			-
87+540	87+550	10.000			-
87+560	87+640	80.000			-
87+690	87+730	40.000			-
87+890	87+900	10.000			-
87+910	87+920	10.000			-
87+950	87+970	20.000			-
87+990	88+010	20.000			-
88+040	88+050	10.000			-

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
88+150	88+230	80.000			-
88+240	88+250	10.000			-
88+310	88+340	30.000			-
88+430	88+480	50.000			-
88+580	88+670	90.000			-
88+700	88+770	70.000			-
88+780	88+800	20.000			-
88+850	88+880	30.000			-
88+970	89+010	40.000			-
89+070	89+120	50.000			-
89+160	89+180	20.000			-
89+230	89+250	20.000			-
89+260	89+290	30.000			-
89+300	89+310	10.000			-
89+320	89+350	30.000			-
89+700	89+750	50.000			-
89+800	89+820	20.000			-
89+900	89+940	40.000			-
90+020	90+080	60.000			-
90+130	90+150	20.000			-
90+160	90+220	60.000			-
90+250	90+340	90.000			-
90+410	90+450	40.000			-
90+480	90+560	80.000			-
90+660	90+800	140.000			-
90+810	90+840	30.000			-
90+860	90+920	60.000			-
91+090	91+110	20.000			-
91+120	91+210	90.000			
91+340	91+360	20.000			
91+610	91+640	30.000			
91+750	91+790	40.000			
91+800	91+810	10.000			
91+830	91+890	60.000			
91+910	91+920	10.000			
92+020	92+120	100.000			
92+230	92+270	40.000			
92+330	92+380	50.000			
92+420	92+470	50.000			
92+550	92+600	50.000			
92+620	92+630	10.000			
92+650	92+700	50.000			
92+860	92+950	90.000			
93+030	93+130	100.000			
93+190	93+280	90.000			
93+320	93+410	90.000			
93+490	93+660	170.000			
93+820	93+900	80.000			
94+000	94+030	30.000			

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
94+080	94+150	70.000			
94+320	94+360	40.000			
94+570	94+660	90.000			
94+740	94+760	20.000			
94+810	94+930	120.000			
94+970	95+000	30.000			
95+100	95+110	10.000			
95+150	95+180	30.000			
95+240	95+260	20.000			
95+280	95+300	20.000			
95+420	95+490	70.000			
95+580	95+660	80.000			
95+710	95+750	40.000			
96+080	96+090	10.000			
96+550	96+580	30.000			
96+590	96+650	60.000			
97+000	97+020	20.000			
97+270	97+290	20.000			
98+830	98+860	30.000			
98+880	98+920	40.000			
99+700	99+710	10.000			
102+020	102+080	60.000			
102+200	102+210	10.000			
102+510	102+540	30.000			
102+610	102+620	10.000			
102+690	102+710	20.000			
102+780	102+810	30.000			
102+910	102+990	80.000			
103+200	103+220	20.000			
103+230	103+420	190.000			
103+490	103+580	90.000			
103+710	103+790	80.000			
103+800	103+900	100.000			
103+960	104+070	110.000			
104+090	104+110	20.000			
104+150	104+270	120.000			
104+340	104+460	120.000			
	TOTAL	**9,570.000**		**TOTAL**	**3,320.000**

Above length of the Breast Wall is indicative and minimum specified. The actual length of the Breast Wall shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority's Engineer. Any increase in the length specified in this Clause of Schedule B shall not constitute a Change of Scope.

RE WALL (International Corridor)

RE Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length

RE Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
73+000	73+010	10.000	74+260	74+300	40.000
73+030	73+050	20.000	74+340	74+350	10.000
73+550	73+560	10.000	74+380	74+390	10.000
76+530	76+540	10.000	74+590	74+600	10.000
84+730	84+740	10.000	74+960	74+980	20.000
97+040	97+060	20.000	75+160	75+200	40.000
97+080	97+100	20.000	75+280	75+290	10.000
97+430	97+440	10.000	75+330	75+350	20.000
98+460	98+470	10.000	75+510	75+530	20.000
98+490	98+500	10.000	75+950	75+980	30.000
98+630	98+640	10.000	76+480	76+490	10.000
		-	76+530	76+540	10.000
		-	76+650	76+660	10.000
		-	76+800	76+820	20.000
		-	76+920	76+940	20.000
		-	77+370	77+390	20.000
		-	77+430	77+450	20.000
		-	78+100	78+110	10.000
		-	78+130	78+140	10.000
		-	78+920	78+930	10.000
		-	79+010	79+040	30.000
		-	79+210	79+230	20.000
		-	79+530	79+540	10.000
		-	79+660	79+670	10.000
		-	79+710	79+730	20.000
		-	80+390	80+400	10.000
		-	80+450	80+470	20.000
		-	80+510	80+530	20.000
		-	80+560	80+570	10.000
		-	80+580	80+620	40.000
		-	80+770	80+800	30.000
		-	81+000	81+010	10.000
		-	81+180	81+200	20.000
		-	81+380	81+400	20.000
		-	81+580	81+590	10.000
		-	82+240	82+250	10.000
		-	82+540	82+550	10.000
		-	83+660	83+670	10.000
			83+860	83+870	10.000
			84+000	84+010	10.000
			85+680	85+690	10.000
			85+770	85+780	10.000
		-	86+390	86+400	10.000
		-	86+500	86+510	10.000
			86+600	86+620	20.000
			88+530	88+550	20.000
			88+570	88+580	10.000
			89+520	89+560	40.000
			92+160	92+180	20.000
			93+430	93+440	10.000
			94+040	94+050	10.000

RE Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
			94+070	94+080	10.000
			94+290	94+300	10.000
			94+430	94+440	10.000
			94+530	94+540	10.000
			103+140	103+180	40.000
			103+600	103+650	50.000
			103+670	103+700	30.000
	Total	**140.000**		**Total**	**1,010.000**

Rock Fill Chainages - (International Corridor)

SR. No.	Chainage		Length
	From	To	
Package I: From De. Ch 72.820 to Ch. 104.460(Kawlkulh to Chawngtlai)			
1	73010	73020	10
2	74350	74370	20
3	75290	75320	30
4	76490	76520	30
5	78110	78120	10
6	78890	78910	20
7	80400	80440	40
8	80530	80550	20
9	85780	85790	10
10	86510	86540	30
11	88380	88400	20
12	88550	88560	10
13	92140	92150	10
14	94050	94060	10
15	94400	94420	20
16	97060	97070	10
17	98470	98480	10
18	103650	103660	10
		TOTAL	**320**

11. Special Requirement for Hill Roads

The special requirements for Hill road as per Section 13 of Manual IRC: SP-73-2018 and IRC: SP-48-1988 Hill Road Manual, shall be constructed & provided as per requirements with approval from the Authority's Engineer.

12. Change of Scope

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

Schedule - 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) tree plantation;

(e) truck lay-byes;

(f) bus-bays and bus shelters;

(g) rest areas

(h) street lighting & high mast lighting

(i) Advanced Traffic Management System (ATMS)

(j) Rain Water Harvesting

(k) others

2. Description of Project Facilities

Each of the Project Facilities is described below:

a) Toll Plazas : NIL

Toll Plaza	Design Chainage (in km)
NIL	

The tentative location is mentioned as above however the exact location identified shall be finalised in consultation with the Authority Engineer.

Specifications and other requirements of the toll plazas shall be strictly as per Section 10 of Manual IRC SP 73-2018. Toll Plaza should be design such that roof canopy fixed with solar panels.

b) Road side Furniture shall be provided as follows: -

(i) Traffic Signs and Pavement Markings.

Traffic signs and pavement markings shall include road side signs, overhead signs, curve mounted signs and road marking along the project highway. The locations for these provisions shall be finalised in consultation with Authority's Engineer and as per latest IRC Standard.

(ii) Concrete Crash Barrier, Metal beam crash barrier, Separators (MS railings)

*The minimum length of **5.620 Km** Metal beam crash barrier, shall be provided as per Schedule D and for safety of traffic & users.*

(iii) Traffic Safety Devices in consultation with Authority's Engineer & Latest IRC standards

(iv) Boundary Stones shall be placed throughout the project road as per schedule 'D'

(v) Hectometer / Kilometer Stones as per schedule 'D'

(vi) Solar Traffic blinker signal (L.E.D) shall be provided at intersections.

c) Pedestrian Facilities

The additional pedestrians' facilities in the form of guard rails, footpath, lighting etc. shall be provided in built-up area.

d) Landscaping and Tree Plantation

Landscaping and road side plantation shall be provided in accordance with the Manual of Specifications and Standards as referred in Schedule B and D. Contractor Shall be responsible for implementation of Environment management Plan (EMP) on the project. The cost of EMP shall be Bourne by Contractor.

e) Truck Lay-byes

Truck Lay byes shall be provided at locations given below on both side of highway on each location as per Manual.

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Side
1	106+400	96.350	LHS

The tentative location is mentioned as above however the exact location identified shall be finalised in consultation with the Authority Engineer.

f) Bus-byes and Bus Shelter,

Bus Lay bye with bus shelter & bus shelter shall be provided at locations

given below.

Sr. No.	Existing Chainage (km)	Design Chainage (Km)	Side	Village Name
1	87+980	80.060	RHS	--
2	91+370	82.800	LHS	--
3	99+510	90.300	LHS	--
4	106+890	96.820	LHS	KHAWZAWL
5	108+100	98.060	LHS	KHAWZAWL
6	110+380	100.200	LHS	KHAWZAWL
7	112+220	101.980	LHS	KHAWZAWL

Note: The locations of Bus Lay byes with bus shelter/ Bus shelter are tentative & shall be got approved / provided in consultation with the Authority / Authority's Engineer.

g) Rest Area: **NIL.**

h) Street Lighting & High Mast Lighting - Nil

i) Advanced Traffic Management System (ATMS) - Nil

j) Rain Water Harvesting System - Nil

k) Slope protection

The slope protection by lawn or any other method using green technology will be provided as per Manual and as directed by Authority.

l) Utility pipe ducts

Utility pipe ducts in C.C. Pipe – 600mm @ 1000.00m c/c for rural & urban length of project road across road with proper inlet and chamber for crossing service lines such as irrigation pipe lines and cables. In urban areas the ducts shall be constructed along the project road for linear underground utility lines. The ducts shall be laid at a suitable depth as approved by Authority Engineer

m) Utilities

Utilities to be identified at site and certified by the Authority Engineer then shifting may be taken by contractor.

Note: In case of any discrepancy in numbers or locations of any of the project facilities mentioned in this Schedule C, facilities shall be constructed and provided in consultation with the Authority Engineer as per site/design requirement.

Schedule - D

(See Clause

2.1)

Specifications and Standards

1. Construction

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

2. Design Standards

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

Manual of Specifications and Standards for Two Laning of Highways (IRC: SP: 73-2018), referred to herein as the Manual

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 with Paved Shoulder of Highways (IRC:SP:73-2018) and Hill Road manual (IRC:SP:48-1988) 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:

S. No.	Clause No.	Provisions in Clause	Variation Proposed in Brief
1	Clause 2.2	For Mountainous and Steep terrain, Ruling and Minimum Speed is 60kmph and 40kmph respectively.	For Mountainous and Steep terrain, Ruling and Minimum Speed is 40kmph and 30kmph respectively.
2	Clause 2.16	Typical Cross Sections	Fig. 1, 2A, 2B, 3, 4 & 5 as Per Schedule-B

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

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

Annex – I

(Schedule-E)

Repair/rectification of Defects and deficiencies

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

Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspect ion	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	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2 -7 days	IRC:82-2015
	Bleeding	Nil	< 1 % of area	Daily				
	Ravelling / Stripping	Nil	< 1 % of area	Daily				
	Edge Deformation/	Nil	< 1 m for any 100m	Daily				

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspect ion	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	Breaking		section and width < 0.1 m at any location, restricted to 30 cm from the edge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50 SN	Bi-Annually			180 days	BS: 7941-1:2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Bi-Annually	Falling Weight Deflectometer	IRC 115: 2014		IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83-2008

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspect ion	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
approaches of connecting roads, Slip roads, lay byes etc. as applicable)	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway force Coefficient Routine Investigation Machine or equivalent)	IRC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN	**Traffic Speed (Km/h)**	Bi-Annually			180 days	
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					
	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	**IRC**	7-15 days	MORT&H Specification 408.4
		Nil	<2% variation in prescribed slope of camber/cross fall	Daily			7-15 days	MORT&H Specification 408.4
		Nil		Daily			7-15 days	MORT&H Specification 408.4
	Embankment Protection	Nil	Nil	Daily	**NA**		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	**NA**		7-15 days	MORT&H Specification

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

Table -2: Maintenance Criteria for Rigid Pavements

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	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. 3 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-moving car		
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car	Route, seal and stitch, if L > 1 m. Within 7 days	
			4	w = 1.5 - 3.0 mm	Dowel Bar Retrofit Within 15 days	Full Depth Repair Dismantle and reconstruct affected
			5	w > 3 mm.	Not Applicable, as it may be full depth	Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
3	Single Longitudinal Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > l m. Within 15 days	

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	w = 3.0 - 6.0 mm	Not Applicable, as it may be full depth	Partial Depth Repair with stapling. Within 15 days
			4	w = 6.0 - 12.0 mm, usually associated with spalling		
			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 > l m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate sub base, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces		
5	Corner Break		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 Full depth repair
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	
			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	Not Applicable, as it may be full depth	No Action
			1	w < 0.5 mm; L < 3 m/m2		Seal with low viscosity epoxy to secure broken parts. Within 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

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
						damaged area taking care not to damage reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m2 and deformation		
SURFACE DEFECTS						
					Short Term	**Long Term**
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	No action.	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 (%) h = maximum depth of damage	0	Nil, not discernible	No action.	Not Applicable
			1	r < 2 %	Local repair of areas Damaged and liable to be damaged Within 7days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay within 15 days	
			4	r = 25 - 50 %		
			5	r > 50% 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	

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m2	No action	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m2	Partial depth repair 65 mm deep Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m2		
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m2	Partial depth repair 110mm i.e.10 mm more than the Depth of the hole. Within 30 days Full depth repair Within 30 days	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m2		
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m2		
JOINT DEFECTS						
11	Joint Seal Defects	loss or damage L = Length as % total joint length	0	Difficult to discern.	No action.	Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			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	

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			5	w > 80 mm, and L > 25%		
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	Determine cause and observe, take action for diamond grinding Diamond Grinding	Replace the slab as appropriate. Within 30days
			2	f = 3 - 6 mm		
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f = 12 - 18 mm	Raise sunken slab.	
			5	f> 18 mm		
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	Short Term	Long Term
			1	h < 6 mm	No Action	
			2	h = 6 - 12 mm	Install Signs to Warn Traffic 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	Strengthen subgrade Reinstate pavement at normal level if L < 20 m. Within 30 days	
			4	h > 50 mm or > 20% joints		
			5	h > 100 mm		
16	Heave	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	Short Term No action	Long Term 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 displacement from	0	h < 4 mm	No action	
			1	h = 4 - 7 mm	Grind, in case of new	Construction Limit

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

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="3">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th colspan="2">Recommended Remedial measures</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="4">Highway</td><td rowspan="4">Availability of Safe Sight Distance</td><td colspan="3">As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.</td><td rowspan="4">Monthly</td><td rowspan="4">Manual Measurements with Odometer along with video/ image backup</td><td colspan="2" rowspan="4">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.
In case of permanent structure or design deficiency:
Removal of Obstruction / improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td rowspan="4">IRC:SP 84-2014</td></tr>
<tr><td>Design Speed, kmph</td><td>Desirable Minimum Sight Distance (m)</td><td>Safe Stopping Sight Distance (m)</td></tr>
<tr><td>100</td><td>360</td><td>180</td></tr>
<tr><td>80</td><td>260</td><td>130</td></tr>
<tr><td rowspan="5">Pavement Marking</td><td>Wear</td><td colspan="3"><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 colspan="3">During expected life Service Time
Cement Road - 130mcd/m2/lux
Bituminous Road - 100mcd/m2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours Cat-2 Defect within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td rowspan="4">Night Time Visibility</td><td colspan="3">Initial and Minimum Performance for Dry Retro reflectivity during night time:</td><td rowspan="4">Bi-Annually</td><td rowspan="4">As per Annexure-E of IRC:35-2015</td><td rowspan="4">Re - painting</td><td rowspan="4">Cat-1 Defect – within 24 hours Cat-2 Defect - within 2 months</td><td rowspan="4">IRC:35-2015</td></tr>
<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>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Up to 65	**250**	**80**					
		65 - 100	**250**	**120**					
		Above 100	**300**	**150**					
		Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity): Initial 7 days Retro reflectivity: 100 mcd/m2/lux Minimum Threshold Level: 50 mcd/m2/lux							
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc			Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	
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-			Bi-Annually	Testing of each	Change of	48 hours in	IRC:67-2012

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	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 lux meter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014
Trees and Plantation Including median plantation	Obstruction in a minimum head-room of 5.5 m above Carriageway or obstruction in visibility of road signs	No obstruction due to trees	Daily		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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Rest Areas	Cleaning of toilets		Daily			Every 4 hours	
	Defects in electrical, water and sanitary installations		Daily		Rectification	24 hours	
Other Project Facilities And Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily		Rectification	15 days	IRC:SP:84-2014
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	3 days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.
	Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m					
	Delamination	Not more than 0.50 sq.m					

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
					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 month	MORTH specifications 2600 & 2700
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper	Bi-Annually	Detailed condition survey as per IRC SP:35-1990	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		strip joint		using Mobile Bridge Inspection Unit			
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap	Monthly	Detailed condition survey as per IRCSP:35-1990 using	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.
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	30 days	IRC SP: 40-1993 and MORTH specification 2800.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
					defect noticed		
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring Around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use 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
	Protecton works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor							

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f)	**Rest area**	
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g)	**[Toll Plaza]**	
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a)	**Superstructure**	
(i)	Temporary measures Permanent measures	within 15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	

Nature of Defect or deficiency		Time limit for repair/ rectification
(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
(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

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

The Managing Director,
NHIDCL,
3rd Floor, PTI Building, 4, Parliament Street,
New Delhi-110001

WHEREAS:

(A) _____[name and address of contractor] (hereinafter called the "**Contractor**") and [name and address of the authority], (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "**Agreement**") for the construction of 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) The Agreement requires the Contractor to furnish a Performance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the {Construction Period/ Defects Liability Period and Maintenance Period} (as defined in the Agreement) in a sum of Rs….. cr. (Rupees …….….. crore) (the "**Guarantee Amount**").

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

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

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

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

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

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

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

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

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

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

be forfeited and the Bank shall be relieved from its liabilities hereunder.

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

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

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

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

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

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

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

[$] Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement).

Annex – II

(Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

The Managing Director,
NHIDCL,
3rd Floor, PTI Building, 4, Parliament Street,
New Delhi-110001

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the construction of 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")[$].**

(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

[$] The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment.

Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the installment 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 ****.[$] 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.

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.

[$] 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).

(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 Clause 19.3)

Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs (******** Cr.).

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage to Particular item (col.2)
1	2	3	4
Road works including culverts, widening and repair of culverts.	**62.54%**	**A- Widening and reconstruction of existing road (Flexible Pavement)**	
		(1) Earthwork up to top of the sub-grade	5.67%
		(2) Sub-base Course	4.44%
		(3) Non Bituminous Base Course	9.22%
		(4) Bituminous Base Course	5.19%
		(5) Wearing Coat	3.38%
		(6) Shoulder	0.85%
		B.1- Reconstruction/New 2 - lane realignment/ bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	20.15%
		(2) Sub-base Course	12.66%
		(3) Non Bituminous Base Course	9.98%
		(4) Bituminous Base Course	5.62%
		(5) Wearing Coat	3.65%
		B.2- Reconstruction/New 2 - lane realignment/ bypass (Rigid Pavement)	0.00%
		C.1 - Reconstruction/New Service Road (Flexible Pavement)	0.00%
		C.2 - Reconstruction/New Service Road (Rigid Pavement)	0.00%
		D - Reconstruction/New Culverts on existing road, realignment, bypasses	0.00%
		Culverts (length <6m)	19.19%
Minor Bridges	**1.34%**	**A.1 - Widening and Repair of Minor Bridges (Length > 6m and < 60m)**	0.00%
		A.2 - New Minor Bridges (Length > 6m and < 60m)	
		(1) **Foundation +Sub-Structure:** On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	68.25%
		(2) **Super-structure:** On completion of the super-structure in all respects including wearing	30.11%

		coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	
		(3) **Approaches:** On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	1.64%
		(4) **Guide Bunds and River Training Works:** On completion of Guide Bunds and river Training Works complete in all respects	0.00%
		B.1- Widening and Repair of underpasses/overpasses	0.00%
		B.2- New underpasses/overpasses	0.00%
Other works	**36.12%**	(i) Toll Plaza	0.00%
		(ii) Road side drains	15.38%
		(iii) Road signs, markings, km stones, safety devices and other road furniture etc.	6.53%
		(iv) Project facilities	
		(a) Bus Bays	0.20%
		(b) Truck lay-byes	0.22%
		(c) Rest areas	0.00%
		(d) others	
		I. Stone Masonry Retaining wall	14.59%
		II. Stone Masonry Breast wall (1.50m Height)	8.46%
		III. Stone Masonry Breast wall (3.00m Height)	40.07%
		IV. RE Wall including Anchor Bolts	7.07%
		V. Stone Masonry Toe wall (1.00m Height)	0.32%
		VI. Turfing with Sods	0.16%
		VII. Junction Improvement	1.63%
		VIII. Utility Pipe Ducts	0.15%
		IX. Dismantling of Structures	5.22%

1.3 Procedure of estimating the value of work done.

1.3.1 Road works including approaches to Minor bridges, Major Bridges and Structures (excluding service roads).

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

Table 1.3.1

Stage of Payment	Percentage - weightage	Payment Procedure
A- Widening and reconstruction of existing road (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than

(1) Earthwork up to top of the sub-grade	5.67%	**250 m.**
(2) Sub-base Course	4.44%	
(3) Non Bituminous Base Course	9.22%	
(4) Bituminous Base Course	5.19%	
(5) Wearing Coat	3.38%	
(6) Shoulder	0.85%	
B.1- Reconstruction/New 2 - lane realignment/ bypass (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than **250 m.**
(1) Earthwork up to top of the sub-grade	20.15%	
(2) Sub-base Course	12.66%	
(3) Non Bituminous Base Course	9.98%	
(4) Bituminous Base Course	5.62%	
(5) Wearing Coat	3.65%	
B.2- Reconstruction/New 2 - lane realignment/ bypass (Rigid Pavement)	0.00%	
C.1 - Reconstruction/New Service Road (Flexible Pavement)	0.00%	
C.2 - Reconstruction/New Service Road (Rigid Pavement)	0.00%	
D - Reconstruction/New Culverts on existing road, realignment, 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 **each** culvert.
Culverts (length <6m)	19.19%	

@ 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 stages (1), (2) and (4) above shall be worked out.

1.3.2 Minor Bridge works-

Procedure for estimating the value of Minor Bridge works shall be as stated in table 1.3.2:

Table 1.3.2

Stage of Payment	Percentage - weightage	Payment Procedure
A.1 - Widening and Repair of Minor Bridges (Length > 6m and < 60m)		
(1) **Foundation +Sub-Structure:** On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	68.25%	**(i) Foundation +Sub-Structure:** Cost of each minor bridge shall be determined on pro- rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation shall be made on pro-rata basis on completion of **each foundation+Substructure**. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) **Super-structure:** On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	30.11%	**(ii) Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub- clause.
(3) **Approaches:** On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	1.64%	**(iii) Approaches:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of “Stage of Payment” in this sub-clause.

(4) **Guide Bunds and River Training Works:** On completion of Guide Bunds and river Training Works complete in all respects	0.00%	(iv) **Guide Bunds and River Training Works:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training Works in all respects as specified.
A.2 - New Minor Bridges (Length > 6m and < 60m)	0.00%	
B.1- Widening and Repair of underpasses/overpasses	0.00%	
B.2- New underpasses/overpasses	0.00%	

1.3.3 Rail-road bridges

Procedure for estimating the value of Rail-road bridges works shall be as stated in table 1.3.3:

Table 1.3.3

Stage of Payment	Percentage - weightage	Payment Procedure
NIL		

1.3.4 Other Works

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

Table 1.3.4

Stage of Payment	Percentage - weightage	Payment Procedure
(i) Toll Plaza	0.00%	
(ii) Road side drains	15.38%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of stage in a length of not less than **250 m.**
(iii) Road signs, markings, km stones, safety devices etc.	6.53%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than **01 (one) km**.
(iv) Project facilities		
(a) Bus Bays	0.20%	Payment shall be made on pro rata basis for completed facilities.
(b) Truck lay-byes	0.22%	
(c) Rest areas	0.00%	
(d) others		
I. Stone Masonry Retaining wall	14.59%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 % (ten per cent) of the total length or 250m
II. Stone Masonry Breast wall (1.50m Height)	8.46%	

III. Stone Masonry Breast wall (3.00m Height)	40.07%	whichever is minimum.
IV. RE Wall including Anchor Bolts	7.07%	
V. Stone Masonry Toe wall (1.00m Height)	0.32%	
VI. Turfing with Sods	0.16%	
VII. Junction Improvement	1.63%	
VIII. Utility Pipe Ducts	0.15%	
IX. Dismantling of Structures	5.22%	

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)

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 **255th** 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 **438th** 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 **621st** 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 **730th** day from the Appointed Date.

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

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

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

2. Tests

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

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

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

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

(v) Environmental audit: The Authority's Engineer shall carry out a check to

determine conformity of the Project Highway with the environmental requirements set forth in Applicable Laws and Applicable Permits.

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

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

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

Schedule - L

(See Clause 12.2)

Completion Certificate

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

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

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name)

(Designation) (Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

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

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

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

2. Percentage reductions in lump sum payments on monthly basis

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

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%

S. No.	Item/Defect/Deficiency	Percentage
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

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

Where,

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

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

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

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

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

Terms of Reference for Authority's Engineer

1. Scope

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

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

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

2. Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time Extension;

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

(c) the Termination Payment; or

(d) issuance of Completion Certificate or

(e) any other matter which is not specified in (a), (b), (c) or (d) above and which

creates a financial liability on either Party.

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

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

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

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

4. Construction Period

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

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

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

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

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

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

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

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

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

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

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

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

(xiii) The Authority's Engineer may instruct the Contractor to execute any work which is

urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.

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

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

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

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

(xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5. Maintenance Period

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

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

(iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry

out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.

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

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

6. Determination of costs and time

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

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

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

7. Payments

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

(ii) Authority's Engineer shall -

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

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

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

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

8. Other duties and functions

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

9. Miscellaneous

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

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

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

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

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

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

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

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

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

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

(f) Deductions:

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

ii. Any amount towards deduction of taxes; and

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

(g) Net claim: (e) – (f) (iii);

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

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

ii. For Change of Scope Orders, and

iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause

20.1)

Insurance

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

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

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

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 *****