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

"Construction of left-over work (2-lane with paved shoulder) of the road stretch of Pkg-III at Kandni Village from design Ch. 0+000 to Ch. 4+037 (Ch. 70+900 to Ch. 74+650 of NH-244) in 4.037 km length on Khellani-Kishtwar-Chhatroo section of NH-244 in UT of Jammu & Kashmir on EPC Mode"

Technical Schedules

August 2025

National Highways & Infrastructure Development Corporation Ltd
National Highways & Infrastructure Development Corporation Ltd.
1st & 2nd Floor, Tower-A, World Trade Centre, Nauroji Nagar
New Delhi-110029

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1 The Site

(i) Site of the Two lanes 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 NH-244 commencing from km 70+900 to km 74+650, and its realignment i.e., the road stretch of Pkg-III at Kandni Village from design Ch. 0+000 to Ch. 4+037 on Khellani-Kishtwar-Chhatroo section in UT of Jammu & Kashmir. The land, carriageway and structures comprising the Site are described below.

2. Land

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

Sr. No.	Chainage (km)		Right of Way (m)	Remarks
	From	To		
01	70+900	74+650	25- 35 m	-

3. Carriageway

The present carriageway of the Project Highway is Two-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		
Nil						

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:

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

11. Bus bays

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

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

12. Truck Lay byes

The details of truck lay byes are as follows:

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

13. Road side drains

The details of the roadside drains are as follows:

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

14. Major junctions

The details of major junctions are as follows:

Khellani-Kishtwar-Chhatroo road (Pkg-IIIA)

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

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

15. Minor junctions

The details of the minor junctions are as follows:

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

16. **Bypasses**

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

S. No.	Name of bypass (town)	Chainage (km) From km to km	Length (in Km)
1	Kandni village	km 70+900 to km 74+650	3.950 Km

17. Other structures : Nil

18. Details of Existing Utilities: The details of existing utilities are given in Sheet-I.

Sheet-I

(Annexure-I of Schedule-A)

(i) ELECTRICAL UTILITIES

The site includes the following electrical utilities: -

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

Sr. No	Chainage		Length along NH (in Km)				ROW Crossings (in km)			
	From km	To km	400KV	220KV	110KV	66KV	400KV	220KV	110KV	66KV
Nil										

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

Sr. No	Chainage (in Km)	Length (in Km)				Crossings (no's)				Transformer	
		33KV	22KV	11KV	LT	33KV	22KV	11KV	LT	No	Capacity
1	2+820	-	-	0.13	-	-	-	1	-	-	-
2	3+540	0.52	-	-	-	1	-	-	-	-	-

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

(a) The site includes the following public health utilities: -

Sr. No	Chainage(km)		Type	Length (in Km)				Crossings				Remarks
	From	To		Water Supply line		Sewage line		With pumping		Sewage line		
				With Pumping	With Gravity	With Pumping	With Gravity	With Pumping	With Gravity	With Pumping	With Gravity	
1	2+000	2+220	HDPE 63mm	-	1.510	-	-	-	1	-	-	-
2	2+000	2+220	HDPE 50mm	-	0.620	-	-	-	1	-	-	-
3	2+000	2+220	GI 50mm	-	1.220	-	-	-	1	-	-	-
4	2+000	2+220	GI 40mm	-	0.780	-	-	-	2	-	-	-
5	2+000	2+220	GI 32mm	-	0.420	-	-	-	2	-	-	-
6	2+120		Service Reservoir	-	-	-	-	-	-	-	-	1 Nos.

(ii) Any Other Line: N/A

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:

SI. No.		From km to km	Length (Km)	Width (m)	Date of providing Right of Way*
1		2	3	4	5
(i) Full Right of Way (full width)					
(a)	Stretch-I	0.000 to 0.600	0.6	25	On Appointed Date
		0.600 to 1.200	0.6	35	
		1.200 to 1.653	0.453	25	
		1.653 to 1.666	0.013	25	Within 90 days of Appointed Date
		1.666 to 2.000	0.334	25	On Appointed Date
		2.000 to 2.400	0.4	30	
		2.400 to 2.790	0.39	25	
		2.790 to 2.930	0.14	30	
		2.930 to 3.180	0.25	33	
		3.180 to 3.976	0.796	25	
		3.976 to 4.037	0.061	25	Within 90 days of Appointed Date
(ii) Part Right of Way (part width) : NIL					
(iii) Balance Right of Way (width) : NIL					

*The dates specified herein shall in no case be beyond 150 (one hundred and fifty) days after the Appointed Date.

Annex - III

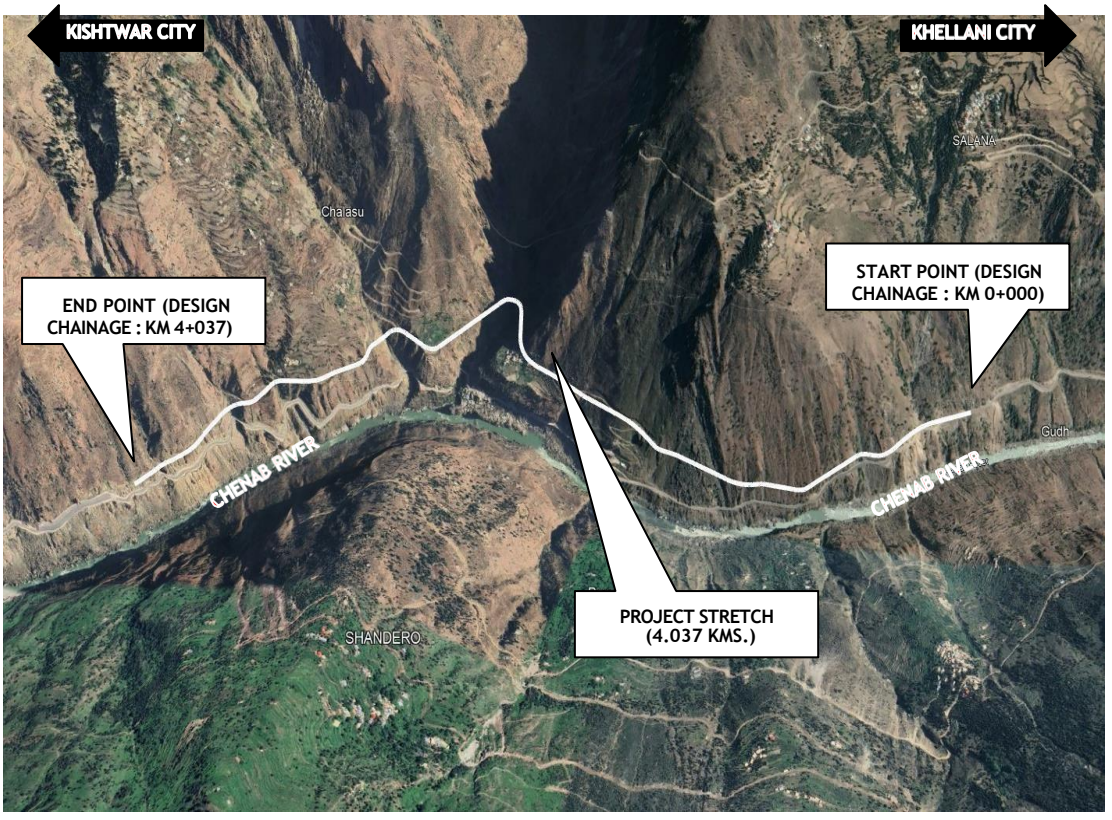
(Schedule-A)

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 the 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) The Traffic Signage plan of the Project Highway showing numbers & location of traffic signs is enclosed. The contractor shall, however, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirements as per the relevant specifications/IRC codes/Manual.



Annex – IV

(Schedule-A)

Environment Clearances

Not Applicable

Schedule - B

(See Clause 2.1)

Development of the Project Highway

1. Development of the Project Highway

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

2. Rehabilitation and augmentation

Rehabilitation and augmentation shall include Two-Laning 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 shoulders

[Note: Description of the Project Highway shall be given by the Authority in detail together with explanatory drawings (where necessary) to explain the Authority's requirements precisely in order to avoid subsequent changes in the Scope of the Project. The particulars that must be specified in this Schedule-B are listed below as per the requirements of the Manual of Specifications and Standards for Two Laning of Highways (IRC: SP:73) referred to as the Manual. If any standards, specifications or details are not given in the Manual, the minimum design/construction requirements shall be specified in this Schedule. In addition to these particulars, all other essential project specific details, as required, should be provided in order to define the Scope of the Project clearly and precisely.

1. Widening of the Existing Highway

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

(ii) Width of Carriageway

(a) Two-laning with paved shoulders shall be undertaken. The paved carriageway shall be 7 (Seven) m wide in accordance with the typical cross-section drawings in the Manual.

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
NIL				

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

2. Geometric Design and General Features

(i) General

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

(ii) Design speed

The design speed shall be the minimum design speed of 40 km per hr for Hilly terrain has been considered.

(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 (from km to km)	Type of deficiency	Remarks
Nil			

(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:

Sr. No.	Design Chainage Stretch (in km)		Fully paved shoulders	Footpaths	Reference to cross section
	Start	End			
Nil					

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

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

Sr. 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 crossroads 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

(a) The details of TCS are as below:

TCS Type	Description	Length (km)
TCS-1	Typical cross-section for two-lane carriageway with paved shoulder in mountainous terrain for one side fill with retaining structure & one side cut with protection work - new construction	0.470
TCS-2	Typical cross-section for two- lane carriageway with paved shoulder in mountainous	0.250

	terrain for one side fill with retaining structure & one side cut with protection work including wire mesh & guniting – new construction	
TCS-3	Typical cross-section for two-lane carriageway with paved shoulder in mountainous terrain for one side fill without retaining structure & one side cut with protection work – new construction	0.315
TCS-4	Typical cross section for bridges (major/minor)	0.305
TCS-5	Typical cross-section for two- lane carriageway with paved shoulder in mountainous terrain for one side cut without protection work & other side cut with protection work including wire mesh & guniting – new construction	0.030
TCS-6	Typical cross-section for two-lane carriageway with paved shoulder in mountainous terrain for one side cut with protection work & other side cut with protection work including wire mesh & guniting -new construction	0.537
TCS-7	Typical cross-section for two-lane carriageway with paved shoulder in mountainous terrain for both side cut with protection work including wire mesh & guniting on both sides -new construction	0.110
TCS-8	Typical cross-section for two-lane carriageway with paved shoulder in mountainous terrain for one side fill without retaining structure &other side cut without protection work - new construction	0.000
TCS-9	Typical cross-section for two-lane carriageway with paved shoulder in mountainous terrain for one side fill with retaining structure & other side fill without retaining structure - new construction	0.105
TCS-10	Typical cross-section for two-lane carriageway with paved shoulder in mountainous terrain for one side fill with retaining structure & one side cut without protection work - new construction	0.120
TCS-11	Typical cross-section for two-lane carriageway with paved shoulder in mountainous terrain for bothside fill with retaining structure on both sides - new construction	0.015
TCS-12	Typical cross-section for two- lane carriageway with paved shoulder in mountainous terrain for one side cut without protection work & other side cut with protection work – new construction	0.210
TCS-13	Typical cross-section for two- lane carriageway with paved shoulder in mountainous terrain for one side cut with protection work on both sides - new construction	1.510
TCS-14	Typical cross-section for two- lane carriageway with paved shoulder in mountainous terrain for one side fill without retaining structure & other side cut with protection work including wire mesh & guniting - new construction	0.060
	Total Proposed length of project road	4.037

(b) **Typical Cross section of the Project Highway with chainage:**

S.No.	Design Chainage		Length (m)	Type of TCS
	From km	To km		
1	0.000	0.030	30	TCS-10
2	0.030	0.040	10	TCS-9
3	0.040	0.050	10	TCS-3
4	0.050	0.060	10	TCS-10
5	0.060	0.070	10	TCS-1
6	0.070	0.080	10	TCS-3
7	0.080	0.090	10	TCS-1
8	0.090	0.110	20	TCS-3
9	0.110	0.130	20	TCS-12
10	0.130	0.190	60	TCS-13
11	0.190	0.210	20	TCS-1
12	0.210	0.230	20	TCS-9
13	0.230	0.250	20	TCS-1
14	0.250	0.260	10	TCS-3
15	0.260	0.270	10	TCS-13
16	0.270	0.340	70	TCS-6
17	0.340	0.350	10	TCS-14

S.No.	Design Chainage		Length (m)	Type of TCS
	From km	To km		
18	0.350	0.380	30	TCS-2
19	0.380	0.440	60	TCS-6
20	0.440	0.450	10	TCS-5
21	0.450	0.540	90	TCS-2
22	0.540	0.550	10	TCS-14
23	0.550	0.560	10	TCS-5
24	0.560	0.580	20	TCS-6
25	0.580	0.590	10	TCS-14
26	0.590	0.600	10	TCS-2
27	0.600	0.610	10	TCS-14
28	0.610	0.630	20	TCS-6
29	0.630	0.670	40	TCS-2
30	0.670	0.680	10	TCS-14
31	0.680	0.690	10	TCS-2
32	0.690	0.800	110	TCS-7
33	0.800	0.820	20	TCS-13
34	0.820	0.850	30	TCS-6
35	0.850	0.870	20	TCS-13
36	0.870	0.880	10	TCS-12
37	0.880	0.890	10	TCS-3
38	0.890	0.960	70	TCS-1
39	0.960	0.980	20	TCS-13
40	0.980	0.985	5	TCS-3
41	0.985	1.010	25	TCS-4
42	1.010	1.020	10	TCS-1
43	1.020	1.100	80	TCS-13
44	1.100	1.125	25	TCS-4
45	1.125	1.130	5	TCS-1
46	1.130	1.140	10	TCS-3
47	1.140	1.150	10	TCS-12
48	1.150	1.550	400	TCS-13
49	1.550	1.570	20	TCS-12
50	1.570	1.650	80	TCS-13
51	1.650	1.670	20	TCS-12
52	1.670	1.710	40	TCS-13
53	1.710	1.720	10	TCS-12
54	1.720	1.850	130	TCS-13
55	1.850	1.870	20	TCS-12
56	1.870	1.880	10	TCS-1
57	1.880	1.890	10	TCS-10
58	1.890	1.900	10	TCS-9
59	1.900	1.940	40	TCS-1
60	1.940	1.990	50	TCS-3
61	1.990	2.000	10	TCS-5
62	2.000	2.010	10	TCS-14
63	2.010	2.160	150	TCS-6
64	2.160	2.190	30	TCS-2
65	2.190	2.230	40	TCS-6
66	2.230	2.240	10	TCS-1
67	2.240	2.345	105	TCS-4
68	2.345	2.360	15	TCS-1
69	2.360	2.370	10	TCS-2
70	2.370	2.390	20	TCS-6

S.No.	Design Chainage		Length (m)	Type of TCS
	From km	To km		
71	2.390	2.400	10	TCS-2
72	2.400	2.410	10	TCS-1
73	2.410	2.420	10	TCS-11
74	2.420	2.430	10	TCS-9
75	2.430	2.440	10	TCS-1
76	2.440	2.450	10	TCS-9
77	2.450	2.460	10	TCS-1
78	2.460	2.470	10	TCS-10
79	2.470	2.500	30	TCS-1
80	2.500	2.510	10	TCS-10
81	2.510	2.530	20	TCS-9
82	2.530	2.540	10	TCS-10
83	2.540	2.550	10	TCS-9
84	2.550	2.560	10	TCS-1
85	2.560	2.570	10	TCS-3
86	2.570	2.580	10	TCS-1
87	2.580	2.590	10	TCS-3
88	2.590	2.600	10	TCS-12
89	2.600	2.610	10	TCS-3
90	2.610	2.630	20	TCS-1
91	2.630	2.650	20	TCS-10
92	2.650	2.680	30	TCS-3
93	2.680	2.710	30	TCS-13
94	2.710	2.730	20	TCS-1
95	2.730	2.740	10	TCS-13
96	2.740	2.750	10	TCS-12
97	2.750	2.810	60	TCS-1
98	2.810	2.820	10	TCS-9
99	2.820	2.830	10	TCS-10
100	2.830	2.835	5	TCS-9
101	2.835	2.935	100	TCS-4
102	2.935	2.940	5	TCS-11
103	2.940	3.000	60	TCS-13
104	3.000	3.040	40	TCS-6
105	3.040	3.050	10	TCS-3
106	3.050	3.080	30	TCS-13
107	3.080	3.090	10	TCS-3
108	3.090	3.100	10	TCS-12
109	3.100	3.140	40	TCS-13
110	3.140	3.150	10	TCS-3
111	3.150	3.160	10	TCS-12
112	3.160	3.350	190	TCS-13
113	3.350	3.360	10	TCS-12
114	3.360	3.380	20	TCS-1
115	3.380	3.390	10	TCS-3
116	3.390	3.550	160	TCS-13
117	3.550	3.560	10	TCS-12
118	3.560	3.610	50	TCS-4
119	3.610	3.620	10	TCS-1
120	3.620	3.630	10	TCS-12
121	3.630	3.660	30	TCS-13
122	3.660	3.700	40	TCS-13
123	3.700	3.710	10	TCS-12

S.No.	Design Chainage		Length (m)	Type of TCS
	From km	To km		
124	3.710	3.740	30	TCS-3
125	3.740	3.750	10	TCS-1
126	3.750	3.760	10	TCS-10
127	3.760	3.790	30	TCS-1
128	3.790	3.820	30	TCS-3
129	3.820	3.830	10	TCS-12
130	3.830	3.860	30	TCS-3
131	3.860	3.870	10	TCS-12
132	3.870	3.930	60	TCS-13
133	3.930	3.950	20	TCS-2
134	3.950	4.037	87	TCS-6
	Total		**4037**	

3. Intersections and Grade Separators

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

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

(i) At-grade intersections

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

(ii) Grade separated intersection with/without ramps

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

4. Road Embankment and Cut Section

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in Section 4 of the Manual 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

(iii) The existing road shall be raised in the following sections:

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

5. Pavement Design

(i) Pavement design shall be carried out in accordance with the provision of relevant Manual.

(ii) Type of pavement

The type of pavement proposed for the proposed new alignment is flexible throughout the stretch.

(iii) Design requirements

(a) Design Period and strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for a design traffic of 20 million standard axles.

(iv) Reconstruction of stretches

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

Sl. No.	Stretch From km to km	Remarks
Nil		

6. Roadside Drainage

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

(a) Catch drain shall be provided as per typical cross sections or as per site conditions where ever applicable. The chainages where the drain (PCC drain near paved shoulders) is to be provided is as under :

S. NO.	CHAINAGE (KM)		LENGTH (M)	SIDE	TCS
	FROM	TO			
1	0.000	0.030	30	RHS	TCS-10
2	0.040	0.050	10	RHS	TCS-3
3	0.050	0.060	10	RHS	TCS-10
4	0.060	0.070	10	RHS	TCS-1
5	0.070	0.080	10	RHS	TCS-3
6	0.080	0.090	10	RHS	TCS-1
7	0.090	0.110	20	RHS	TCS-3
8	0.110	0.130	2 X 20	BOTH SIDES	TCS-12
9	0.130	0.190	2 X 60	BOTH SIDES	TCS-13
10	0.190	0.210	20	RHS	TCS-1
11	0.230	0.250	20	RHS	TCS-1
12	0.250	0.260	10	RHS	TCS-3
13	0.260	0.270	2 X 10	BOTH SIDES	TCS-13
14	0.270	0.340	2 X 70	BOTH SIDES	TCS-6
15	0.340	0.350	10	RHS	TCS-14
16	0.350	0.380	30	RHS	TCS-2
17	0.380	0.440	2 X 60	BOTH SIDES	TCS-6

S. NO.	CHAINAGE (KM)		LENGTH (M)	SIDE	TCS
	FROM	TO			
18	0.440	0.450	2 X 10	BOTH SIDES	TCS-5
19	0.450	0.540	90	RHS	TCS-2
20	0.540	0.550	10	RHS	TCS-14
21	0.550	0.560	2 X 10	BOTH SIDES	TCS-5
22	0.560	0.580	2 X 20	BOTH SIDES	TCS-6
23	0.580	0.590	10	RHS	TCS-14
24	0.590	0.600	10	RHS	TCS-2
25	0.600	0.610	10	RHS	TCS-14
26	0.610	0.630	2 X 20	BOTH SIDES	TCS-6
27	0.630	0.670	40	RHS	TCS-2
28	0.670	0.680	10	RHS	TCS-14
29	0.680	0.690	10	RHS	TCS-2
30	0.690	0.800	2 X 110	BOTH SIDES	TCS-7
31	0.800	0.820	2 X 20	BOTH SIDES	TCS-13
32	0.820	0.850	2 X 30	BOTH SIDES	TCS-6
33	0.850	0.870	2 X 20	BOTH SIDES	TCS-13
34	0.870	0.880	2 X 10	BOTH SIDES	TCS-12
35	0.880	0.890	10	RHS	TCS-3
36	0.890	0.960	70	RHS	TCS-1
37	0.960	0.980	2 X 20	BOTH SIDES	TCS-13
38	0.980	0.985	5	RHS	TCS-3
39	1.010	1.020	10	RHS	TCS-1
40	1.020	1.100	2 X 80	BOTH SIDES	TCS-13
41	1.125	1.130	5	RHS	TCS-1
42	1.130	1.140	10	RHS	TCS-3
43	1.140	1.150	2 X 10	BOTH SIDES	TCS-12
44	1.150	1.550	2 X 400	BOTH SIDES	TCS-13
45	1.550	1.570	2 X 20	BOTH SIDES	TCS-12
46	1.570	1.650	2 X 80	BOTH SIDES	TCS-13
47	1.650	1.670	2 X 20	BOTH SIDES	TCS-12
48	1.670	1.710	2 X 40	BOTH SIDES	TCS-13
49	1.710	1.720	2 X 10	BOTH SIDES	TCS-12
50	1.720	1.850	2 X 130	BOTH SIDES	TCS-13
51	1.850	1.870	2 X 20	BOTH SIDES	TCS-12
52	1.870	1.880	10	RHS	TCS-1
53	1.880	1.890	10	RHS	TCS-10
54	1.900	1.940	40	RHS	TCS-1
55	1.940	1.990	50	RHS	TCS-3
56	1.990	2.000	2 X 10	BOTH SIDES	TCS-5
57	2.000	2.010	10	RHS	TCS-14
58	2.010	2.160	2 X 150	BOTH SIDES	TCS-6
59	2.160	2.190	30	RHS	TCS-2
60	2.190	2.230	2 X 40	BOTH SIDES	TCS-6
61	2.230	2.240	10	RHS	TCS-1
62	2.345	2.360	15	RHS	TCS-1
63	2.360	2.370	10	RHS	TCS-2
64	2.370	2.390	2 X 20	BOTH SIDES	TCS-6

S. NO.	CHAINAGE (KM)		LENGTH (M)	SIDE	TCS
	FROM	TO			
65	2.390	2.400	10	RHS	TCS-2
66	2.400	2.410	10	RHS	TCS-1
67	2.430	2.440	10	RHS	TCS-1
68	2.450	2.460	10	RHS	TCS-1
69	2.460	2.470	10	RHS	TCS-10
70	2.470	2.500	30	RHS	TCS-1
71	2.500	2.510	10	RHS	TCS-10
72	2.530	2.540	10	RHS	TCS-10
73	2.550	2.560	10	RHS	TCS-1
74	2.560	2.570	10	RHS	TCS-3
75	2.570	2.580	10	RHS	TCS-1
76	2.580	2.590	10	RHS	TCS-3
77	2.590	2.600	2 X 10	BOTH SIDES	TCS-12
78	2.600	2.610	10	RHS	TCS-3
79	2.610	2.630	20	RHS	TCS-1
80	2.630	2.650	20	RHS	TCS-10
81	2.650	2.680	30	RHS	TCS-3
82	2.680	2.710	2 X 30	BOTH SIDES	TCS-13
83	2.710	2.730	20	RHS	TCS-1
84	2.730	2.740	2 X 10	BOTH SIDES	TCS-13
85	2.740	2.750	2 X 10	BOTH SIDES	TCS-12
86	2.750	2.810	60	RHS	TCS-1
87	2.820	2.830	10	RHS	TCS-10
88	2.940	3.000	2 X 60	BOTH SIDES	TCS-13
89	3.000	3.040	2 X 40	BOTH SIDES	TCS-6
90	3.040	3.050	10	RHS	TCS-3
91	3.050	3.080	2 X 30	BOTH SIDES	TCS-13
92	3.080	3.090	10	RHS	TCS-3
93	3.090	3.100	2 X 10	BOTH SIDES	TCS-12
94	3.100	3.140	2 X 40	BOTH SIDES	TCS-13
95	3.140	3.150	10	RHS	TCS-3
96	3.150	3.160	2 X 10	BOTH SIDES	TCS-12
97	3.160	3.350	2 X 190	BOTH SIDES	TCS-13
98	3.350	3.360	2 X 10	BOTH SIDES	TCS-12
99	3.360	3.380	20	RHS	TCS-1
100	3.380	3.390	10	RHS	TCS-3
101	3.390	3.550	2 X 160	BOTH SIDES	TCS-13
102	3.550	3.560	2 X 10	BOTH SIDES	TCS-12
103	3.610	3.620	10	RHS	TCS-1
104	3.620	3.630	2 X 10	BOTH SIDES	TCS-12
105	3.630	3.660	2 X 30	BOTH SIDES	TCS-13
106	3.660	3.700	2 X 40	BOTH SIDES	TCS-13
107	3.700	3.710	2 X 10	BOTH SIDES	TCS-12
108	3.710	3.740	30	RHS	TCS-3
109	3.740	3.750	10	RHS	TCS-1
110	3.750	3.760	10	RHS	TCS-10
111	3.760	3.790	30	RHS	TCS-1

S. NO.	CHAINAGE (KM)		LENGTH (M)	SIDE	TCS
	FROM	TO			
112	3.790	3.820	30	RHS	TCS-3
113	3.820	3.830	2 X 10	BOTH SIDES	TCS-12
114	3.830	3.860	30	RHS	TCS-3
115	3.860	3.870	2 X 10	BOTH SIDES	TCS-12
116	3.870	3.930	2 X 60	BOTH SIDES	TCS-13
117	3.930	3.950	20	RHS	TCS-2
118	3.950	4.037	2 X 87	BOTH SIDES	TCS-6
	TOTAL LENGTH (M)		5959		

(b) The chainages where the drain (catch drain) has been provided is as under :

S. NO.	CHAINAGE (KM)		LENGTH (M)	SIDE	TCS
	FROM	TO			
1	0.040	0.050	10	RHS	TCS-3
2	0.060	0.070	10	RHS	TCS-1
3	0.070	0.080	10	RHS	TCS-3
4	0.080	0.090	10	RHS	TCS-1
5	0.090	0.110	20	RHS	TCS-3
6	0.110	0.130	20	RHS	TCS-12
7	0.130	0.190	2 X 60	Both Sides	TCS-13
8	0.190	0.210	20	RHS	TCS-1
9	0.230	0.250	20	RHS	TCS-1
10	0.250	0.260	10	RHS	TCS-3
11	0.260	0.270	2 X 10	Both Sides	TCS-13
12	0.270	0.340	70	LHS	TCS-6
13	0.380	0.440	60	LHS	TCS-6
14	0.560	0.580	20	LHS	TCS-6
15	0.610	0.630	20	LHS	TCS-6
16	0.800	0.820	2 X 20	Both Sides	TCS-13
17	0.820	0.850	30	LHS	TCS-6
18	0.850	0.870	2 X 20	Both Sides	TCS-13
19	0.870	0.880	10	RHS	TCS-12
20	0.880	0.890	10	RHS	TCS-3
21	0.890	0.960	70	RHS	TCS-1
22	0.960	0.980	2 X 20	Both Sides	TCS-13
23	0.980	0.985	5	RHS	TCS-3
24	1.010	1.020	10	RHS	TCS-1
25	1.020	1.100	2 X 80	Both Sides	TCS-13
26	1.125	1.130	5	RHS	TCS-1
27	1.130	1.140	10	RHS	TCS-3
28	1.140	1.150	10	RHS	TCS-12
29	1.150	1.550	2 X 400	Both Sides	TCS-13
30	1.550	1.570	20	RHS	TCS-12
31	1.570	1.650	2 X 80	Both Sides	TCS-13
32	1.650	1.670	20	RHS	TCS-12
33	1.670	1.710	2 X 40	Both Sides	TCS-13

S. NO.	CHAINAGE (KM)		LENGTH (M)	SIDE	TCS
	FROM	TO			
34	1.710	1.720	10	RHS	TCS-12
35	1.720	1.850	2 X 130	Both Sides	TCS-13
36	1.850	1.870	20	RHS	TCS-12
37	1.870	1.880	10	RHS	TCS-1
38	1.900	1.940	40	RHS	TCS-1
39	1.940	1.990	50	RHS	TCS-3
40	2.010	2.160	150	LHS	TCS-6
41	2.190	2.230	40	LHS	TCS-6
42	2.230	2.240	10	RHS	TCS-1
43	2.345	2.360	15	RHS	TCS-1
44	2.370	2.390	20	LHS	TCS-6
45	2.400	2.410	10	RHS	TCS-1
46	2.430	2.440	10	RHS	TCS-1
47	2.450	2.460	10	RHS	TCS-1
48	2.470	2.500	30	RHS	TCS-1
49	2.550	2.560	10	RHS	TCS-1
50	2.560	2.570	10	RHS	TCS-3
51	2.570	2.580	10	RHS	TCS-1
52	2.580	2.590	10	RHS	TCS-3
53	2.590	2.600	10	RHS	TCS-12
54	2.600	2.610	10	RHS	TCS-3
55	2.610	2.630	20	RHS	TCS-1
56	2.650	2.680	30	RHS	TCS-3
57	2.680	2.710	2 X 30	Both Sides	TCS-13
58	2.710	2.730	20	RHS	TCS-1
59	2.730	2.740	2 X 10	Both Sides	TCS-13
60	2.740	2.750	10	RHS	TCS-12
61	2.750	2.810	60	RHS	TCS-1
62	2.940	3.000	2 X 60	Both Sides	TCS-13
63	3.000	3.040	40	LHS	TCS-6
64	3.040	3.050	10	RHS	TCS-3
65	3.050	3.080	2 X 30	Both Sides	TCS-13
66	3.080	3.090	10	RHS	TCS-3
67	3.090	3.100	10	RHS	TCS-12
68	3.100	3.140	2 X 40	Both Sides	TCS-13
69	3.140	3.150	10	RHS	TCS-3
70	3.150	3.160	10	RHS	TCS-12
71	3.160	3.350	2 X 190	Both Sides	TCS-13
72	3.350	3.360	10	RHS	TCS-12
73	3.360	3.380	20	RHS	TCS-1
74	3.380	3.390	10	RHS	TCS-3
75	3.390	3.550	2 X 160	Both Sides	TCS-13
76	3.550	3.560	10	RHS	TCS-12
77	3.610	3.620	10	RHS	TCS-1
78	3.620	3.630	10	RHS	TCS-12
79	3.630	3.660	2 X 30	Both Sides	TCS-13

S. NO.	CHAINAGE (KM)		LENGTH (M)	SIDE	TCS
	FROM	TO			
80	3.660	3.700	2 X 40	Both Sides	TCS-13
81	3.700	3.710	10	RHS	TCS-12
82	3.710	3.740	30	RHS	TCS-3
83	3.740	3.750	10	RHS	TCS-1
84	3.760	3.790	30	RHS	TCS-1
85	3.790	3.820	30	RHS	TCS-3
86	3.820	3.830	10	RHS	TCS-12
87	3.830	3.860	30	RHS	TCS-3
88	3.860	3.870	10	RHS	TCS-12
89	3.870	3.930	2 X 60	Both Sides	TCS-13
90	3.950	4.037	87	LHS	TCS-6
TOTAL LENGTH (M)			**4552**		

7. Design of Structures

(i) General

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

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

Sl. No.	Bridge at km	Width of carriageway and cross-sectional features
1	0.985 to 1.010	Total Deck Width = 12.5 m (11.5) Main Carriageway & Drainage spouts + (0.5*2) Crash Barriers (Refer Typical Cross Section-4)
2	1.100 to 1.125	
3	2.240 to 2.345	
4	2.835 to 2.935	
5	3.560 to 3.610	

(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 relevant Manual.

(ii) Culverts

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

(b) Reconstruction of existing culverts: The existing culverts at the following locations shall be re-constructed as new culverts:

S. No.	Culvert location	Span/Opening (m)	Remarks, if any
Nil			

(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:

Sl. No	Culvert location	Span/Opening (m)
1	0+215	1 x 4.0
2	0+355	1 x 2.0
3	0+485	1 x 2.0
4	0+915	1 x 2.0
5	1+885	1 x 2.0
6	2+170	1 x 2.0
7	2+420	1 x 2.0
8	2+510	1 x 2.0
9	2+800	1 x 4.0
10	3+375	1 x 3.0
11	3+935	1 x 2.0

(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:

Sl. No.	Bridge location (km)	Salient details of existing bridge	Adequacy or otherwise of the existing waterway, vertical clearance, etc*	Remarks
Nil				

*Attach GAD

(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.

Sl. No.	Location (km)	Total length (m)	Remarks
1.	Km 0+998	25.0 m	-
2.	Km 1+112	25.0 m	-
3.	Km 2+293	105.0 m	(Composite Steel girder)
4.	Km 2+885	100.0 m	-
5.	Km 3+585	50.0 m	-

(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		

(a) Drainage system for bridge decks

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

(f) Structures in marine environment:

NA

(iv) Rail-road bridges

(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

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

(vi) Repairs and strengthening of bridges and structures

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

(a) Bridges

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

(b) ROB / RUB

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

(c) Overpasses/Underpasses and other structures

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

Nil

(vii) List of Major Bridges and structures

The following is the list of the Bridges proposed:

Sr. No.	Location
1.	Km 2+293
2.	Km 2+885

8. Traffic Control Devices and Road Safety Works

(i) Traffic control devices and road safety works shall be provided in accordance with the Manual.
(ii) Specifications of the reflective sheeting.

9. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provision of the relevant manual.

(ii) Overhead traffic sign: Nil.

10. Compulsory Afforestation : Nil

11. Hazardous Locations

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

S. NO.	CHAINAGE (KM)		SIDE
	FROM	TO	
1	0.000	0.030	BOTH SIDES
2	0.030	0.040	LHS
3	0.050	0.060	LHS
4	0.060	0.070	LHS
5	0.080	0.090	LHS
6	0.190	0.210	LHS
7	0.210	0.230	LHS
8	0.230	0.250	LHS
9	0.350	0.380	LHS
10	0.450	0.540	LHS
11	0.590	0.600	LHS
12	0.630	0.670	LHS
13	0.680	0.690	LHS
14	0.890	0.960	LHS
15	1.010	1.020	LHS

S. NO.	CHAINAGE (KM)		SIDE
	FROM	TO	
16	1.125	1.130	LHS
17	1.870	1.880	LHS
18	1.880	1.890	LHS
19	1.890	1.900	LHS
20	1.900	1.940	LHS
21	2.160	2.190	LHS
22	2.230	2.240	LHS
23	2.345	2.360	LHS
24	2.360	2.370	LHS
25	2.390	2.400	LHS
26	2.400	2.410	LHS
27	2.410	2.420	BOTH SIDES
28	2.420	2.430	LHS
29	2.430	2.440	LHS
30	2.440	2.450	LHS
31	2.450	2.460	LHS
32	2.460	2.470	LHS
33	2.470	2.500	LHS
34	2.500	2.510	LHS
35	2.510	2.530	LHS
36	2.530	2.540	LHS
37	2.540	2.550	LHS
38	2.550	2.560	LHS
39	2.570	2.580	LHS
40	2.610	2.630	LHS
41	2.630	2.650	LHS
42	2.710	2.730	LHS
43	2.750	2.810	LHS
44	2.810	2.820	LHS
45	2.820	2.830	LHS
46	2.830	2.835	LHS
47	2.935	2.940	BOTH SIDES
48	3.360	3.380	LHS
49	3.610	3.620	LHS
50	3.740	3.750	LHS
51	3.750	3.760	LHS
52	3.760	3.790	LHS
53	3.930	3.950	LHS

12. Special Requirement for Hill Roads:

S. No.	Description	Unit	Quantity
1	Retaining Works (Valley Side)		
a.	Plum Concrete Wall	m.	795
b.	Gabion Wall	m.	155
c.	RCC Wall	m.	5
	Sub-total (Retaining Works)	m.	955

2	Protection Works (Hill Side)		
a.	Plum Concrete Wall	m.	4572
b.	Wire Mesh with Guniting and Rock Bolting/Barbed Wire	m.	1097

13. Change of Scope

The length of Structures and bridges specified hereinabove shall be treated as an approximate assessment. The actual lengths as required based on detailed investigations shall be determined by the Contractor in accordance with the 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.

(Annex-I to Schedule-B)

Utility Shifting (Utility Shifting Plan will be provided separately)

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

Notes:

a) The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work shall be as per the guidelines of Utility Owing Department and it is to be agreed solely between the Contractor and the Utility Owing Department. No change of scope shall be admissible, and no cost shall be paid for using different type/spacing/size/specifications in shifted work in comparison to those in the existing work or for making any overhead crossings to underground as per requirement of Utility Owing Department and/or/construction of project highway. The Contractor shall carry out joint inspection with Utility Owing Department and get the estimates from Utility Owing Department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor to Utility Owing Department whenever asked by the Contractor. The decision/approval of Utility Owing Department shall be binding on the Contractor.

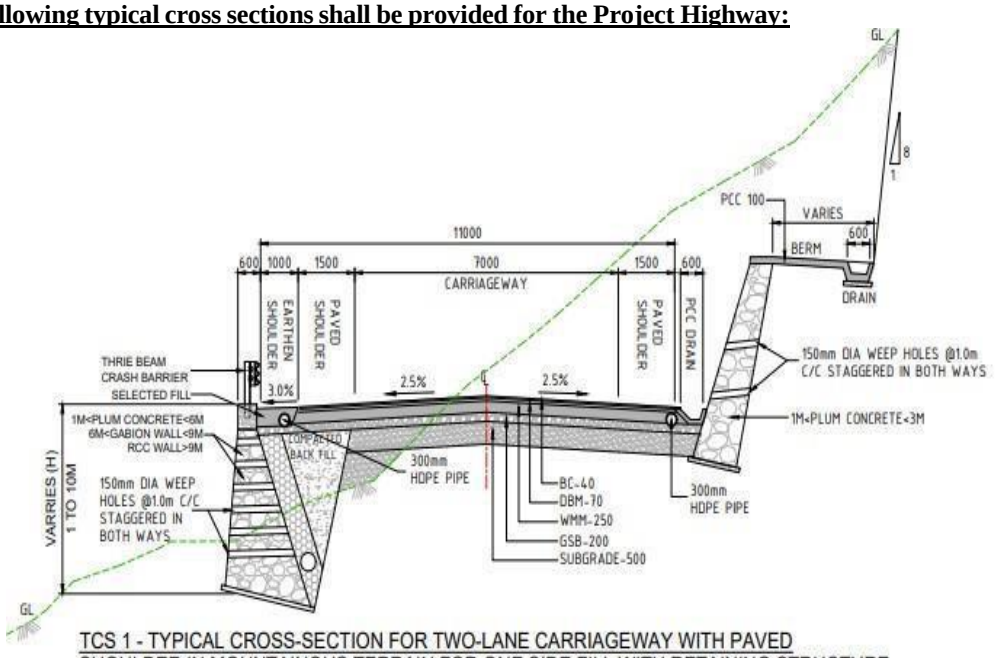
b) The supervision charges at the rates/charges applicable of the Utility Owing Department shall be paid directly by the Authority to the Utility Owing Department as and when Contractor furnishes demand of Utility Owning Department along with a copy of estimated cost given by the latter.

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

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

Copy of utility shifting plans is enclosed

Following typical cross sections shall be provided for the Project Highway:

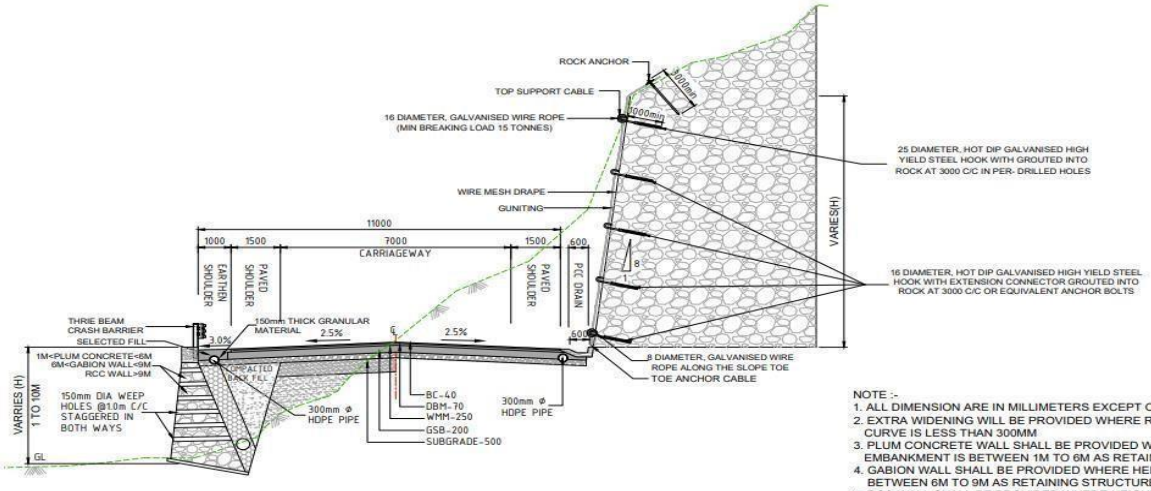


TCS 1 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE FILL WITH RETAINING STRUCTURE & ONE SIDE CUT WITH PROTECTION WORK - NEW CONSTRUCTION

NOTE :-

1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

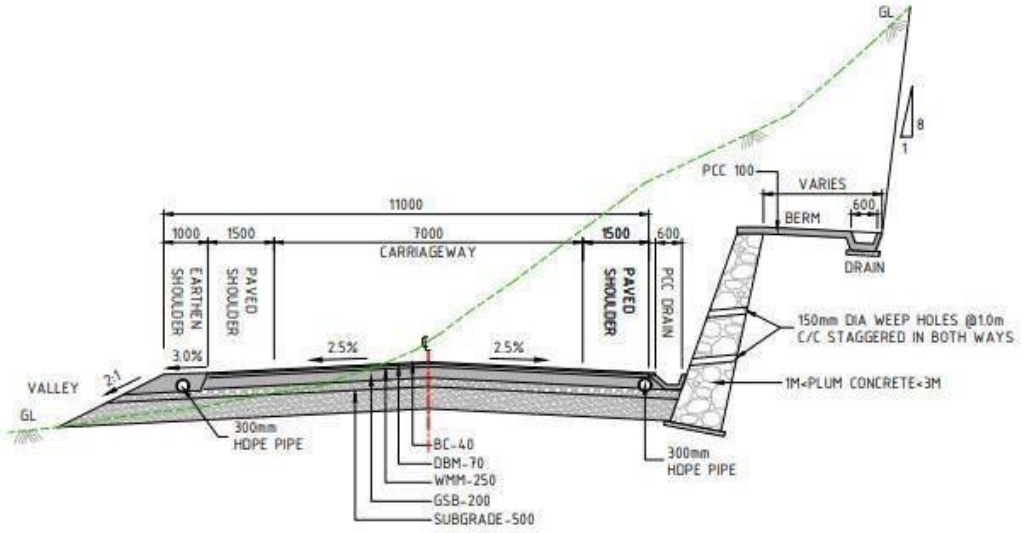
Typical Cross Section-1



TCS 2 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE FILL WITH RETAINING STRUCTURE & ONE SIDE CUT WITH PROTECTION WORK INCLUDING WIRE MESH & GUNITING - NEW CONSTRUCTION

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

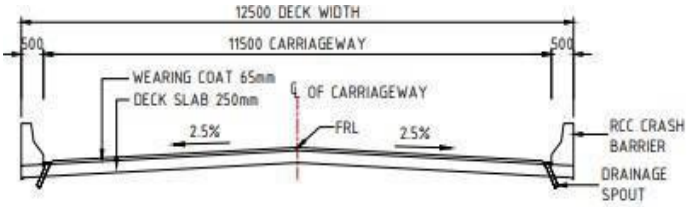
Typical Cross Section-2



TCS 3 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE FILL WITHOUT RETAINING STRUCTURE & ONE SIDE CUT WITH PROTECTION WORK - NEW CONSTRUCTION

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

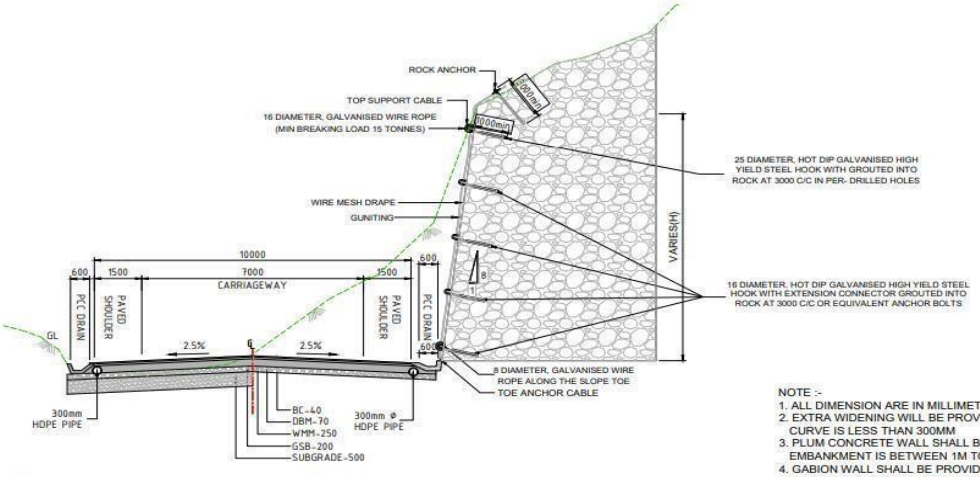
Typical Cross Section-3



TYPE-4- TYPICAL CROSS SECTION FOR BRIDGES (MAJOR/MINOR)

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

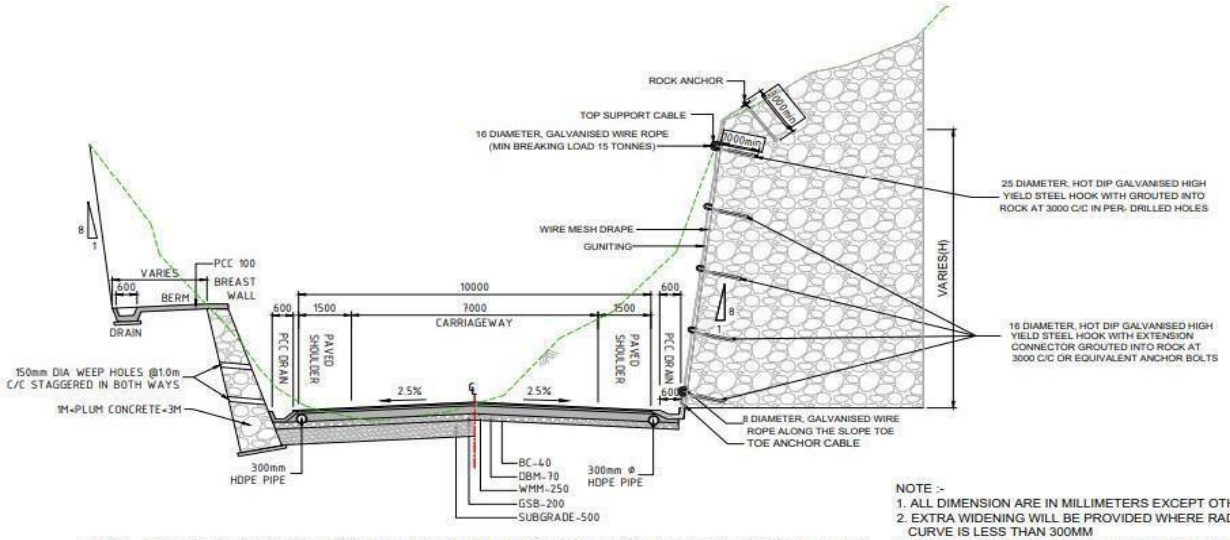
Typical Cross Section-4



TCS 5 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE CUT WITHOUT PROTECTION WORK & OTHER SIDE CUT WITH PROTECTION WORK INCLUDING WIRE MESH & GUNITING - NEW CONSTRUCTION.

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

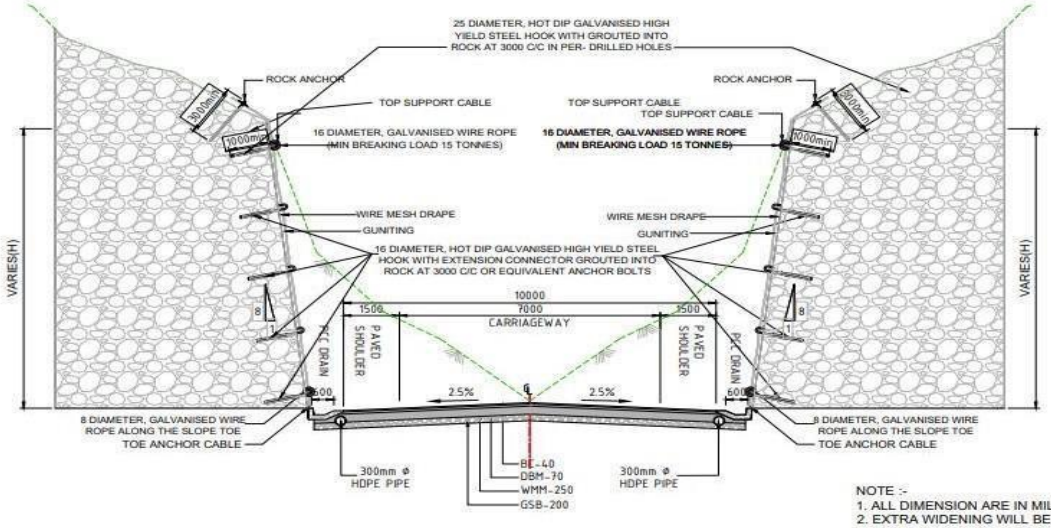
Typical Cross Section-5



TCS 6 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE CUT WITH PROTECTION WORK & OTHER SIDE CUT WITH PROTECTION WORK INCLUDING WIRE MESH & GUNITING - NEW CONSTRUCTION.

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

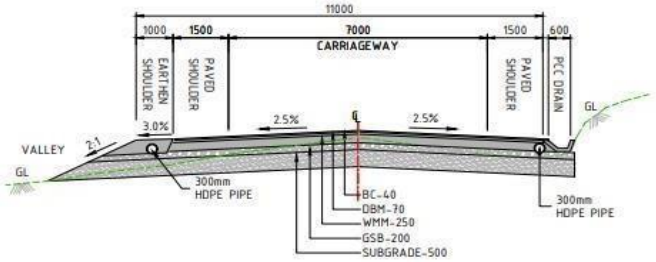
Typical Cross Section-6



TCS 7 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR BOTH SIDE CUT WITH PROTECTION WORK INCLUDING WIRE MESH & GUNITING ON BOTH SIDES - NEW CONSTRUCTION.

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

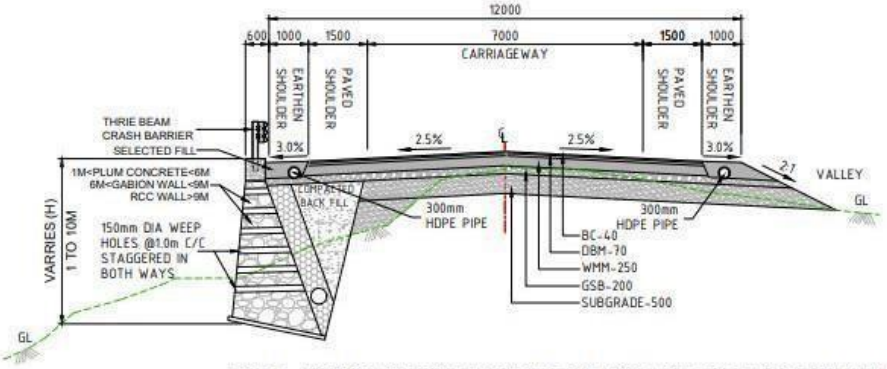
Typical Cross Section-7



TCS 8 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE FILL WITHOUT RETAINING STRUCTURE & ONE SIDE CUT WITHOUT PROTECTION WORK - NEW CONSTRUCTION

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

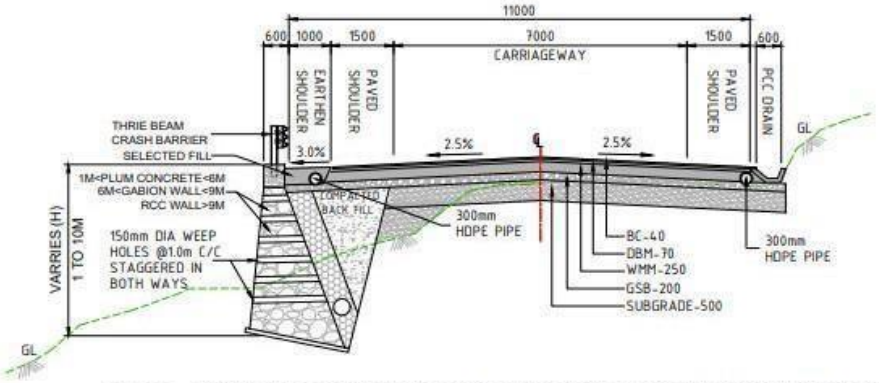
Typical Cross Section-8



TCS 9 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE FILL WITH RETAINING STRUCTURE & OTHER SIDE FILL WITHOUT RETAINING STRUCTURE - NEW CONSTRUCTION

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

Typical Cross Section-9

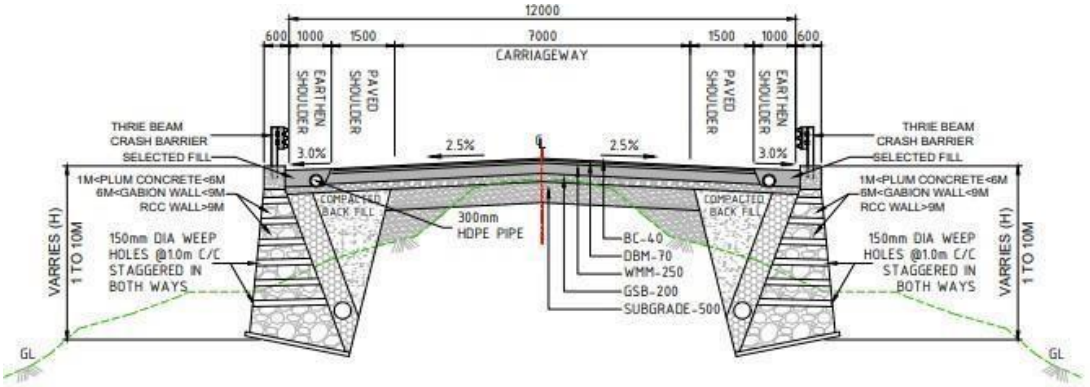


TCS 10 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE FILL WITH RETAINING STRUCTURE & ONE SIDE CUT (UPTO 1M.) WITHOUT PROTECTION WORK - NEW CONSTRUCTION

NOTE :-

1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

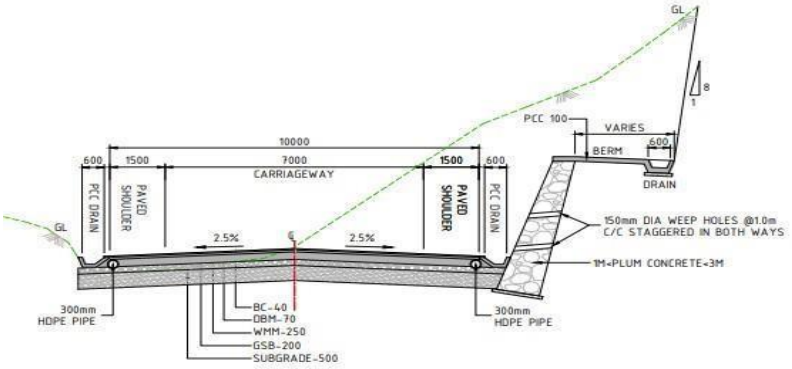
Typical Cross Section-10



TCS 11 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR BOTH SIDE FILL WITH RETAINING STRUCTURE ON BOTH SIDES - NEW CONSTRUCTION

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

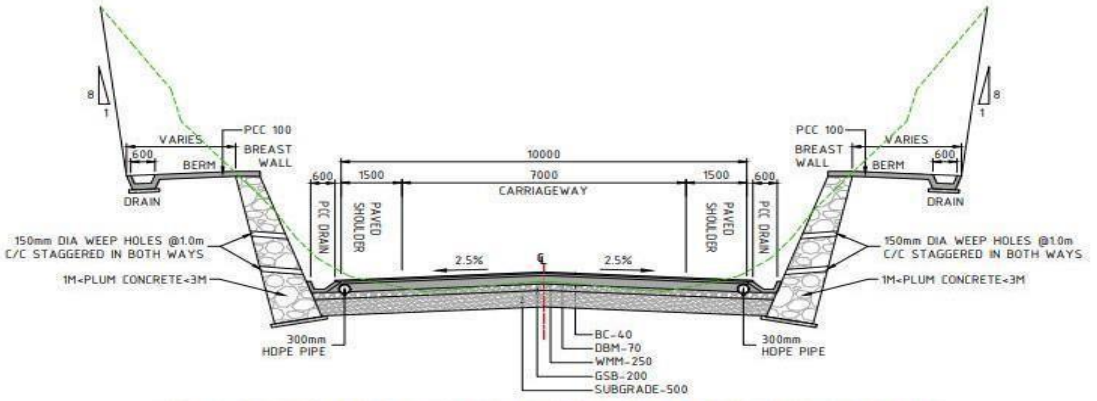
Typical Cross Section-11



TCS 12 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE CUT WITHOUT PROTECTION WORK & OTHER SIDE CUT WITH PROTECTION WORK - NEW CONSTRUCTION.

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

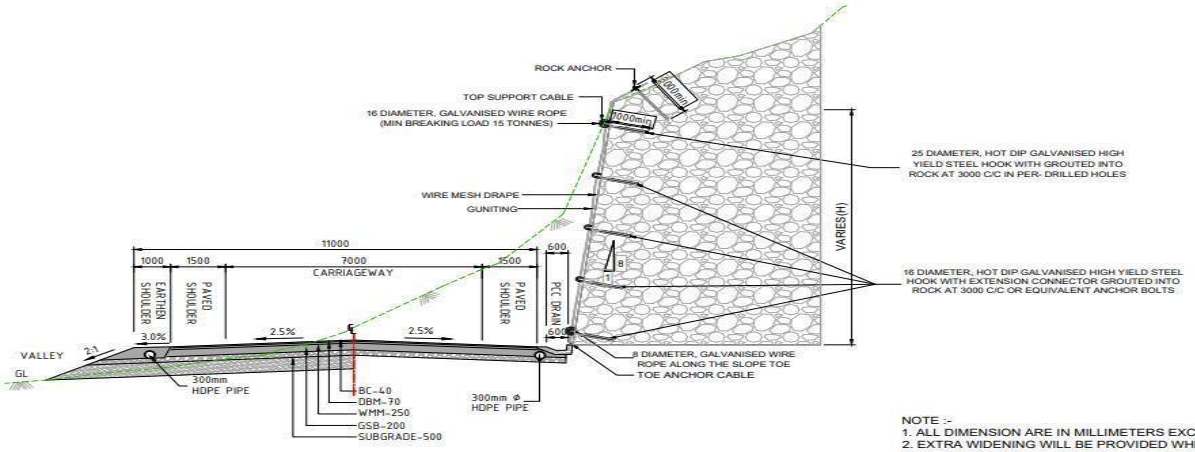
Typical Cross Section-12



TCS 13 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE CUT WITH PROTECTION WORK ON BOTH SIDES - NEW CONSTRUCTION.

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

Typical Cross Section-13



TCS 14 - TYPICAL CROSS-SECTION FOR TWO-LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN FOR ONE SIDE FILL WITHOUT RETAINING STRUCTURE & OTHER SIDE CUT WITH PROTECTION WORK INCLUDING WIRE MESH & GUNITING - NEW CONSTRUCTION

NOTE :-
1. ALL DIMENSION ARE IN MILLIMETERS EXCEPT OTHERWISE SPECIFIED
2. EXTRA WIDENING WILL BE PROVIDED WHERE RADIUS OF HORIZONTAL CURVE IS LESS THAN 300MM
3. PLUM CONCRETE WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 1M TO 6M AS RETAINING STRUCTURE
4. GABION WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS BETWEEN 6M TO 9M AS RETAINING STRUCTURE
5. RCC WALL SHALL BE PROVIDED WHERE HEIGHT OF EMBANKMENT IS >9M AS RETAINING STRUCTURE
6. PROTECTION WORK/WIRE MESH/GUNITING SHALL BE PROVIDED AS PER THE CROSS SECTIONS/SITE CONDITIONS
7. NO RETENTION/PROTECTION IS REQUIRED WHEN HEIGHT OF FILL IS LESS THAN 1M AND HEIGHT OF CUT IS LESS THAN 1M
8. DETAILS OF THRIE BEAM CRASH BARRIER TO BE SUBMITTED SEPARATELY.
9. DRAINAGE PLAN & PROFILE DRAWING ALONG WITH DESIGN CALCULATIONS TO BE SUBMITTED SEPARATELY
10. WIRE MESH/GUNITING OR OTHER SUITABLE METHOD SHALL BE PROVIDED IN HARD ROCK SECTION
11. PLUM CONCRETE PROTECTION WALL SHALL BE PROVIDED IN CASE OF LOOSE, FAULTED OR UNSTABLE SLOPE FOR HILL SIDE SLOPE, WHERE CHANCES OF LANDSLIDING ARE HIGH

Typical Cross Section-14

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; and

(h) others to be specified

2. Description of Project Facilities

Each of the Project Facilities is described below:

S. No.	Project facility	Location	Design requirements	Other essential details
1.	Toll Plaza	Nil		
2.	Tree plantation			
3.	Truck lay-byes	Km 3+060	As per Manual	LHS
4.	Bus-bays and bus shelters.	Km 2+100	As per Manual	LHS

Note: Provide adequate details of each Project Facility to ensure their design and completion in accordance

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 the construction of the Project Highway.

2. Design Standards

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

Manual of Specifications and Standards for Two Laning of Highways (IRC: SP: 73) & IRC: SP:48-Hill Road manual), referred to herein as the Manual.

(Schedule-D)

Annex – I

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works, and construction operations shall conform to the Manual of Specifications and Standards for Two-Laning of Highways (IRC: SP:73), IRC SP 48 & IRC SP 52, 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

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

Notwithstanding anything to the contrary contained in 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:

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.

Sl. No.	Item	Provision as per Manual	Description of Deviation	Clause Referred in Manual	Remarks
1	Design Speed	40 Kmph	35 kmph at HIP 1484.775 M.	IRC SP 52: 2019 Cl. 6.5 table 6.4	To match FRL along with Centerline
2	Design Speed	40 Kmph	30 kmph at HIP 2960.906 M.	IRC SP 52: 2019 Cl. 6.5 table 6.4	To reduce cutting & match FRL along with Centerline

iv. Following MoRT&H circulars are also to be followed :-

S. No.	Policy Circular No.	Dated	Subject
1	Efile No. RW/NH. 33044/55/2021-S&R (P&B)pt. /Hill Slope Monitoring (Computer No.219394)	28 November 2024	Expert Committee Report on Cost Effective Long-term Remedial Measures for Landslide Prone Areas In Hilly Regions.
2	Efile No. RW/NH 33044/27/2024/S&R(PG B) (Computer No. 243038)	23 September 2024	Policy Guidelines on use of Inert Material in construction of National Highways.
3	Efile No. RW/NH-34066/09/2017/S&R(B) (Computer No. 185417)	12 February 2021	Reinforcing Steel Bars (Clause 1000.9.3.1 of Ministry's Specifications for Road and Bridge Works).

4	Efile No RW/NH-34066/09/2017/S&R(B) (Computer No. 185417)	22 January 2021	Use of Stainless Steel Reinforcing Steel Bars in Bridges on National Highways and other centrally sponsored projects to be constructed in marine Environment Susceptible to Severe Corrosion.
5	EFile No. RW/NH: 34049/01/2020-S&R (PEB)pt No.-207229) (Computer No.207229)	20 September 2024	Use of New/ Alternative Material and Technology in Construction and Maintenance of National Highways Projects and adoption of Value Engineering Practices therein.
6	Efile No RW/NH-35083/02/2024-S&R (Computer No. 238879)	26TH Nov.2024	Use of Waste Plastic in Bituminous Concrete Wearing Course Mix In National Highways Construction & Maintenance Works.
7	EFile No. RW/NH: 35072/05/2018-S&R (P&B) No. 165688) (Computer	19 April, 2024	Recommended Bitumen Type & Grade for Different Climate it Traffic Loading for National Highway and Expressway Works in India.
8	EFile No. RW/NH- 23 35072/05/2018-SER (P&B) (E165688)	23rd August, 2023	Use of Bitumen: Demand-Supply. Type & Grade, Specifications, Source of Procurement and Quality in Construction Highways Projects. of National
9	EFile No. RW/NH-36098/25/2022-5GR (P&B)/pt.	16 March, 2023	Safety in Road Construction Zones In National Highway Projects effective and adequate measures to be taken.
10	EFile No: RW/NH-33044/10/2021-S&R(P&B)(171909)	15 March, 2023	Reuse of materials reclaimed from existing pavement layers
11	Efile No. RW/NH-36098/17/2022/S&R(B)	2 January, 2023	Provisions of crash barriers in existing bridges.
12	EFile No.RW/NH: 33049/01/2020-S&R (B) Pt.	22 February, 2022	Use of Ultra High Performance Fiber Reinforced Concrete (UHPFRC) in Design & Construction of Structures/Bridges of National Highways.
13	Efile No. 33044/04/2022-S&R(P&B)	15 February, 2022	Use of dynamite on hills/mountains for the construction of roads.

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 the occurrence of any breach hereunder, the Authority shall be entitled to effect a reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.

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

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex – I

(Schedule-E)

Repair/rectification of Defects and deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit set forth in the table below. **Table - 1: Maintenance Criteria for Pavements:**

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, Approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement like Unit Scale, odometer Tape, etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm any for 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 like Unit		2-7 days	IRC:82- 2015
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape odometer etc.		3-7 days	MORT&H Specification 3004.4
	Raveling /Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81

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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency ofInspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limitfor Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily	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	7- 15 days	IRC:82- 2015
	Roughness BI	2000 mm/km	2400 mm/km	Bi- Annually			180 days	IRC:82- 2015
	Skid Number	60SN	50SN	Bi- Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi- Annually			180 days	IRC:82- 2015
	Other Pavement Distresses			Bi- Annually			2-7 days	IRC:82- 2015
	Deflection/ Remaining Life			Annual ly	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115- 2014
Rigid Pavement	Roughness BI	2200mm/km	2400mm/km	Bi- Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 94: 2000	180 days	IRC:SP:83- 2008

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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	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. 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 > lm. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		

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

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 > 12 mm, usually associated with spalling, and/or slab rocking under traffic	may be full depth	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 subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts	Seal with epoxy seal with epoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken	Within 7 days	
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure	Full depth repair Reinstate sub-

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			4	w > 1.5 mm; L > 0.6 m or three corners broken	8.3 of IRC:SP: 83-2008) Within 15 days	base, and reconstruct the slab as per norms and specifications within 30days
			5	three or four corners broken		
6	**Punch out (Applicable to Continuous Reinforced Concrete Paveme nt (CRCP) only)**	w = width of crack L = length (m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m2	Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3 m/m2		
			3	w > 1.5 mm and L < 3 m/m2		
			4	w > 3 mm, L < 3 m/m2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m2 and deformation		
7	Raveling Honeycomb o surface r type	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	Short Term	Long Term
					No action.	Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			3	r = 10-25%	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	**Short Term**	**Long Term**
					No action.	
			1	r < **2 %**	Local repair of areas damaged and liable to be damaged. Within 7days	Not Applicable
			2	r = 2 - 10 %		
			3	r = 10 - 20%	Bonded Inlay within 15 days	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 mm	Reconstruct slab within 30 days	
9	**Polished Surface/Glazing**	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm		
			2	t = 1 - 0.6 mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		
			5	t < 0.1 mm	Diamond Grinding 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	0	d < 50 mm; h < 25 mm; n < 1 per 5 m2	No action.	
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m2	Partial depth rep mm deep. Within	Not Applicable
			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		
			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.	**Short Term**	**Long Term**
					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.	

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

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**
	Cracks or Joints		1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace slab as the appropriate. Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	Replace slab as the appropriate. Within 30days
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	
14	**Blowup or Buckling**	h = vertical displacement from normal profile	0	Nil, not discernible	**Short Term**	**Long Term**
					No Action	
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic	
			3	h = 12 - 25 mm	within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical	0	Not discernible, h < 5 mm	No action.	Not Applicable

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

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

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

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.			Monthly	Manual Measurements with Odometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments. In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP 84-2014
		Design Speed, kmph	**Desirable Minimum Sight Distance (m)**	**Safe Stopping Sight Distance (m)**					
		100	360	180					
		80	260	130					
Pavement Marking	Wear	<70% of marking remaining			Bi- Annually	Visual Assessment as per Annexure-F of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect within 2 months-	IRC:35-2015
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m2/lux Bituminous Road - 100mcd/m2/lux			Monthly	As per Annexure-D of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35- 2015
	Night Time Visibility	Initial and Minimum Performance ~~for Dry Retro~~ reflectivity during			Bi-Annually	As per	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect –	IRC:35-2015

<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>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td></td><td></td><td colspan="3">night time:</td><td></td><td>Annexure-E of IRC:35-2015</td><td></td><td>within 2 months</td><td></td></tr>
<tr><td></td><td></td><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m2/lux)</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>Up to 65</td><td>200</td><td>80</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>65 - 100</td><td>250</td><td>120</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>Above 100</td><td>350</td><td>150</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="3">Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="3">Initial 7 days Retro reflectivity: 100 mcd/m2/lux
Minimum Threshold Level: 50 mcd/m2/lux</td><td></td><td></td><td></td><td></td><td></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
	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	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
		locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc					
Road Signs	Shape Position and	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 is of shape, in case if shape Damaged. as pe	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual	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
	Retro reflectivity	As per specifications in IRC:672012	Bi-Annually	Testing of each Signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Relocation r hange requirement of ignboard	post signs) 15 Days in case of Gantry/Cantilever Sign boards 48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilev er Sign boards	RC:67-2012
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repaintii	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84 2014 and IRC: 35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian	Functionality: Functioning of	Daily	Visual with		Within 15 days	IRC:SP:84-

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Guardrail	guardrail as intended		video/image backup	Rectification		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	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119- 2015
	Attenuators	Functionality: Functioning	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	Rectificatio n	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual wit h 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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with	Improvement in Lighting System	24 hours	IRC:SP:84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				luxmeter			
		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 i 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
and Trees Plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual wit h video/imag e backup	Removal of trees	Immediate	IRC:SP:84-2014

including median plantation	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	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84201 4
Rest Areas	Cleaning o 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
		Spalling of concrete not more tha 0.25 sqm					
	Structurally sound	Delamination of concrete not more than 0.25 sq.m.	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993.	15 days	IRC SP 40- 1993 and MORTH Specification s clause 2800
		Cracks wider than 0.3 mm not more than 1m aggregate length					

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:132004.
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:351990	Repairs to BC o wearing coat	15 days	MORT&H Specification 2811
Bridge - Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:351990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

	Rusted reinforcement Spalling of concrete Delamination	Not more than 0.25 sq.m Not more than 0.50 sq.m Not more than 0.50 sq.m	Bi- Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Br idge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-1993 and MORTH Specificatio n 1600.
	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 Br idge Inspection Unit	Grouting with epoxy mortar, investiga ting causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
				Detailed			
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	condition survey as per IRC SP: 35-1990 using Mobile B ridge Inspection Unit	Grouting of deck slab at leakage a reas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.

	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening structure of super	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of expansion joint seal in	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust debris expansion or in joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specification s 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 defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
		Delamination of bearing reinforcement not more	Bi-Annually	Detailed condition survey	In case of failure of even one bearing on	3 months	MORTH specificatio n
	Bearings	than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber		as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.		2810 and IRC SP: 40-199.

Bridge Foundations	Scouring around foundatio ns	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 Using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specificatio n 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	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	IRC: SP 40-1993 and IRC:SP:13-2004.
		sq.m, damage to solid apron (concrete apron) not more than 1 sq.m				weeks before onset of rainy season whichever is earlier.	
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Table 1: Maintenance Criteria for Structures and Culverts:

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measureme nt	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pipe/box/sla b culverts	Free waterway/uno	85% of culvert normal flow area to available.	2 times in a year (before	Inspection by Bridge Engineer as per IRC	Cleaning silt up soils and debris in culvert barrel after	15 days before onset of monsoon	IRC 5-2015, IRC SP:40-

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	bstructed flow section		and after rainy season)	SP: 35-1990 and recording of depth of silting and area of vegetation.	rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	and within 30 days after end of rainy season.	2019 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:40-2019 and IRC SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm Delamination of concrete not more than 0.25 Sqm. 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:40-2019.	15 days	IRC SP 40-2019 and MORTH Specifications clause 2800
	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 40-2019 and IRC: SP:13-2004.
Bridges including ROBs Flyove etc. as	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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
applicable							
Bridge - Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-2015, IRC SP: 73-2018 and IRC SP: 40-2019.
	Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-2019 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m					
	Delamination	Not more than 0.50 sq.m					
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-2019 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage – nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-2015.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-2019.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and IRC SP: 40-2019.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	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 defect noticed	30 days	IRC SP: 40-2019 and MORTH specification 2800.
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810, IRC 83 and IRC SP: 40-2019.
Bridge Foundation	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual	Suitable protection works around pier/abutment	1 month	IRC SP: 40-2019, MORTH specification

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				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.			2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-2019 and IRC: SP:13-2022.
Slope Protection (Landslide & Sinking)	Movement & deformation in landslide & sinking zones	Movement & deformation beyond permissible limit should be made good to the design standard	14 Days	Once in month/ as when noticed	Standard method as approved by the Authority QA/QC plan of the contractor	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier	Refer the Schedule B and Schedule D
	Any material or defect development in workmanship used in protection work	The material and workmanship specification should be in accordance with Schedule B and Schedule D	14 Days	Once in month/ as when noticed	Standard method as approved by the Authority QA/QC plan of the contractor	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	Refer the Schedule B and Schedule D

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 MoRT&H 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**	
(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)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty-eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days within (Immediately posing danger to safe
(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) License for use of explosives.

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

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

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

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

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

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

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

Schedule – G

(See Clauses 7.1 and 19.2)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

To,

The Managing Director,

National Highways & Infrastructure Development Corporation Ltd.,

1st & 2nd floor, Tower-A, World Trade Centre, Nauroji Nagar,

New Delhi - 110029

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).

(See Clauses 2.21)

Format of Insurance Surety Bond

[Performance Security/Additional Performance Security]

To

The Managing Director,
National Highway & Highway Development Corporation Ltd.
1st Floor, Tower-A, World Trade Centre, Nauroji Nagar
New Delhi- 110029

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

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

AND WHEREAS we, through our branch at …… (the "Surety Insurer") have agreed to furnish this Surety Bond by way of Performance security.

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

1. The Surety Insurer herby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the (Construction Period/ Defects Liability Period and Maintenance Period' under and in accordance with the Contract, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Surety Bond 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 [Superintending Engineer of Ministry of Road Transport Et Highways], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Contract shall be conclusive, final and binding on the Surety Insurer. The Surety Insurer further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Contract and its decision that the Contractor is in default shall be final and binding on the Surety Insurer, 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 Surety Bond, the Authority shalt be entitled to act as if the Surety Insurer were the principal debtor and any/Change in the constitution of the Contractor and/or the Surety Insurer, whether by their absorption with any other body or corporation or otherwise, shalt not in any way or manner affect the liability or obligation of the Surety insurer under this Surety Bond

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

5. The Authority shall have the liberty, without affecting in any manner the liability of the Surety Insurer under this Surety Bond, to vary at any time, the terms and conditions of the Contract or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Contract or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing

any of the terms and conditions contained in the Contract and/or the securities available to the Authority, and the Surety Insurer 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 Surety Insurer from its liability and obligation under this Surety Bond and the Surety Insurer hereby waives all of its rights under any such law

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

7. Notwithstanding anything contained hereinbefore, the liability of the Surety Insurer under this Surety Bond is restricted to the Surety Bond Amount and this Surety Bond 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 Surety Insurer under this Surety Bond all rights of the Authority under this Surety Bond shall be forfeited and the Surety Insurer shall be relieved from its liabilities hereunder

8. The Surety Bond shall cease to be in force and effect on ****[$]. Unless3 a demand or claim of one year more than the vailidity under this Surety Bond is made in writing before expiry of the Surety Bond, the Surety Insurer shall be discharged from its liabilities hereunder.

9. The Surety Insurer undertakes not to revoke this Surety Bond 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 Surety Bond and the undersigned has full powers to do so on behalf of the Surety Insurer.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Surety Insurer at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post 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 Surety Bond shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Contract.

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

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)

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

Annex – II

(Schedule - G)

(See Clause 19.2)

Form for Insurance Surety Bond for Advance Payment

To,

The Managing Director,

National Highways & Infrastructure Development Corporation Ltd.,

1st & 2nd floor, Tower-A, World Trade Centre, Nauroji Nagar,

New Delhi - 110029

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 Insurance Surety Bond 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 Insurance Surety Bond (hereinafter called the **"Guarantee"**) for the Guarantee Amount.

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

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

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways & Infrastructure Development Corporation Ltd], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Insurance company.

The Insurance company 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 Insurance company, 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 Insurance Surety Bond, the Authority shall be entitled to act as if the Insurance company were the principal debtor and any change in the constitution of the Contractor and/or the Insurance company, 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 Insurance company under this Guarantee.

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

5. The Authority shall have the liberty, without affecting in any manner the liability of the Insurance company 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 Insurance company 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 Insurance company from its liability and obligation under this Guarantee and the Insurance company hereby waives all of its rights under any such law.

6. This Insurance Surety Bond 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.

7. Notwithstanding anything contained hereinbefore, the liability of the Insurance company 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 Insurance company under this Guarantee all rights of the Authority under this Insurance Surety Bond shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Insurance Surety Bond shall cease to be in force and effect on ****.$ Unless a demand or claim of one year more than the vailidity under this Guarantee is made in writing on or before the aforesaid date, the Insurance company shall be discharged from its liabilities hereunder.

9. The Insurance company 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 Insurance company.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Insurance company 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 Insurance Surety Bond 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.

$ 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)

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Insurance company by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

(i) The Insurance Surety Bond should contain the name, designation and code number of the officer(s) signing the Insurance Surety Bond.

The address, telephone number and other details of the head office of the Insurance company as well as of issuing branch should be mentioned on the covering letter of issuing branch.

Schedule - H

(See Clauses10.1 (iv) and 19.3)

Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs. _____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 % of CP	Stage for Payment	Percentage weightage
Road Works including Culverts, widening and repair of culverts	23.42%	**B.1- Reconstruction/New Realignment / Bypass (Flexible Pavement)**	
		(1) Earthwork up to top of the embankment	45.82
		(2) Sub-Grade	1.98
		(3) Sub-base Course	9.37
		(4) Non bituminous Base course*	8.03
		(5) Bituminous Base course	13.78
		(6) Wearing Coat	9.18
		D- Reconstruction & New Culverts on existing road, realignments, bypasses - Culverts (length <6m)	11.84
Minor bridge/ Underpasses/ Overpasses	10.95%	**A.2- New Minor bridges (length >6 m and < 60 m)**	
		(1) Foundation: On completion of the foundation work of abutments and piers.	13.67
		(2) Sub-structure: On completion of abutments and piers with abutments/ pier cap	23.92
		(3) Super-structure: On completion of the super- structure upto deck slab including bearings	27.51
		(4) Miscellaneous Works: On completion of wearing coat, expansion joint, crash barrier, railings, protection works and any remaining work associated to bridge including tests on bridge.	12.00
		(5) Approaches: On completion of approaches including wing walls/return walls, retaining walls, stone pitching, protection works for floor, embankment slope etc. complete in all respect and fit for use	21.71
		(6) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	1.19
Major bridge(length>60m) works and ROB/RUB/elevated sections/flyovers including viaducts, if any	19.40%	**A.2- New Major Bridges**	
		(1) Foundation:	12.06
		Well foundation	-
		Pile foundation	-
		Open foundation	-
		(2) Sub-structure:	8.33
		(3) Super-structure (including bearings):	64.82
		(4) Wearing Coat including expansion joints	0.62
		(5) Miscellaneous Items (like hand rails, crash barrier, road markings etc.)	3.15

Item	Weightage in % of CP	Stage for Payment	Percentage weightage
		(6) Wing walls/return walls	3.27
		(7) Guide bunds, River Training works etc.	0.82
		(8) Approaches (including Retaining walls, stone pitching and protection works for floor, embankment slope, etc.)	6.93
Other Works	45.76%	(i) Toll Plaza	-
		(ii) Road side drains	-
		(a) Drain (incl Catch Water Drain)	5.28
		(b) Cover Slab	-
		(iii) Road signs, markings, km stones, safety Devices etc.	1.63
		(iv) Overhead gantry mounted signs	-
		(v) Project facilities	-
		a) Bus Bays	0.78
		b) Truck Lay-Byes	1.15
		c) Rest areas	-
		d) Others	4.72
		(vi) Road side Plantation	-
		(vii) Protection works# other than approaches to the bridges, elevated sections/ flyovers/grade separators and ROBs/RUBs.	-
		(a) Crash barrier	2.14
		(b) Retaining Wall & Gabion Wall	11.2
		(c) Breast wall	42.26
		d) Special Slope Protection	11.74
		(viii) Safety & Traffic Management during const.	19.1
Utility shifting	0.47%	Electrical utilities and Public Health Utilities (Water pipelines and sewage lines)	
		(i) HT/LT line	86.48
		(ii) Water pipeline crossing	13.52

*Note- In case of CTB and AIL layer, this stage may be modified suitably to permit separate weightages for each of these layers.

#Note - For specific type of protection work detailed stages can be include

1.3 Procedure of estimating the value of work done:

1.3.1 Road works

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

Table 1.3.1

Stage of Payment	Weightage	Payment Procedure
B.1- Reconstruction/New 2-Lane Realignment / Bypass (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 500m length, whichever is less.
(1) Earthwork up to top of the embankment	45.82 %	

Stage of Payment	Weightage	Payment Procedure
(2) Sub-Grade	1.98 %	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 500 m length, whichever is less.
(3) Sub-base Course	9.37 %	
(4) Non bituminous Base course	8.03 %	
(5) Bituminous Base course	13.78 %	
(6) Wearing Coat	9.18 %	
D- Reconstruction & New Culverts on existing road, realignments, bypasses		Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least one culvert. 75% of the cost will be payable on completion of box/ abutments and slab/ pipe and head wall. Remaining 25% will become payable on completion of protection works including return/ wing walls and any other work associated with culverts.
Culverts (length <6m)	11.84 %	

*Note- In case of CTB and AIL layer, this stage may be modified suitably to permit separate weightages for each of these layers.

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

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

Where, P = Contract Price

L = Total length in km

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

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

1.3.2 Minor Bridges and Underpasses/Overpasses

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

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
A.2- New Minor Bridges (1) Foundation: On completion of the foundation work of abutments, piers.	13.67 %	Cost of each minor bridge shall be determined on pro- rata basis with respect to the total linear length (m) of the minor bridges. **(i) Foundation**: Payment against foundation shall be made on pro-rata basis on completion of a stage completion of atleast two-foundations of each bridge. In case where load testing is specified for foundation, the trigger of first payment shall include load testing also.
(2) Sub-structure: On completion of abutments and piers with abutments and piers	23.92 %	**Sub-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e., completion of at least one sub-structure upto abutment/pier cap level of each bridge.
(3) Super-structure: On completion of the super- structure upto deck slab including bearings	27.51 %	**Super-structure**: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure of atleast one span upto deck slab including bearing as specified in the column of "Stage of Payment" in this sub- clause. If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Miscellaneous Works:	12.00 %	Payment shall be made on pro-rata basis on completion of a stage i.e. completion of wearing coat, expansion joint, crash barrier, railing, protection works, drainage and any other remaining work associated to bridge including tests on bridge for each bridge
(5) Approaches: On completion of approaches including retaining walls, stone pitching, protection works for floor, embankment slope etc. complete in all respect and fit for use	21.71 %	**Approaches**: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches including wing walls/ return walls, retaining walls, stone pitching in all respect as specified in the column of "Stage of Payment" in this sub-clause for each bridge.
(6) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	1.19 %	**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 for each bridge.

1.3.3 Major Bridge works, ROB/RUB and Structures

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

Table 1.3.3

Stage of Payment	Weightage	Payment Procedure
A.2- New Major Bridges (1) Foundation:	12.06 %	Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. **Foundation**: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e., completion of atleast one foundation of each of the major Bridge as specified here in under:
(i) Well Foundation (a) On completion of Cutting Edge + Well Curb (b) Wellsteining : On completion of well steining upto bottom of well cap. (c) On completion of bottom plug + top plug (if provisioned as per design) + well cap		(i) Well Foundation (a) Cutting Edge + Well Curb: Payment of 10% shall be made on completion of a stage i.e. completion of cutting edge + well curb. (b) Well steining : Payment of 65% shall be made on completion of well steining upto bottom of well cap. The payment stage shall be further sub-divided on pro-rata basis i.e. (i) on completion upto 10 m and (ii) on completion of each subsequent 5 m or part thereof. (c) Bottom plug + top plug (if provisioned as per design) + well cap: Payment of 25% shall be made on completion of a stage i.e. completion of bottom plug, back fill, top plug and well cap.
(ii) Pile Foundation (a) Piling – On completion of pile upto bottom of pile cap (b) Pile Cap : On completion of pile cap		(ii) Pile Foundation (a) Piling : Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorota basis. (b) Pile Cap : Payment of 30% shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(iii) Open Foundation		(iii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-structure:	8.33 %	**Sub-structure:** Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the major bridge.
(3) Super-structure (including bearings):	64.82 %	**Super-structure**: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure upto deck slab

Stage of Payment	Weightage	Payment Procedure
		including bearings of atleast one span as specified herein under. If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon. (For cable stayed bridge and suspension cable bridge, detailed payment stage may be included on case to case basis)
(4) Wearing Coat including expansion joints	0.62 %	**Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each major bridge.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	3.15 %	**Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each major bridge.
(6) Wing walls/return walls	3.27 %	**Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each major bridge.
(7) Guide bunds, River Training works etc.	0.82 %	**Guide Bunds, River Training works:** Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified for each major bridge.
(8) Approaches (including Retaining walls, stone pitching and protection works for floor, embankment slope, etc.)	6.93 %	**Approaches**: Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each major bridge.

1.3.4 Other Works.

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(1) Road side drains	-	
(a) Drain (incl Catch Water Drain)	5.28 %	a) Drains: Unit of measurement is linear length in metre. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
(b) Cover Slab	-	(b) Cover slabs: Unit of measurement is linear length in metre. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.

Stage of Payment	Weightage	Payment Procedure
(3) Road signs, markings, km stones, safety Devices etc.	1.63 %	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than one Km on both sides.
(4) Overhead gantry mounted signs	-	Unit of measurement is each number. Payment shall be made on pro-rata basis on completion of each overhead gantry mounted sign
(5) Project facilities	-	Unit of measurement is each number. Payment shall be made on pro rata basis for completed facilities.
a) Bus Bays	0.78 %	
b) Truck Lay-Byes	1.15 %	
c) Rest areas	-	
d) Others	4.72 %	
(6) Roadside Plantation	-	Unit of measurement is linear length in Km. Payment shall be made on pro rata basis on completion of one Km.
(7) Protection Works other than approaches to the bridges, elevated sections/ flyover/ grade separators and ROBs/ RUBs	-	Unit of measurement is linear length. Payment against item (a), (b) & (c) 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 and 100 m whichever is less.
(a) Crash Barrier	2.14 %	
(b) Retaining Wall and Gabion Wall	11.20 %	
(c) Breast wall	42.26 %	
d) Special Slope Protection	11.74 %	
(16) Safety and traffic management during construction	19.10 %	Payment shall be made on prorate basis every six months.

1.3.5 Utility Shifting

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

Table 1.3.5

Stage of Payment	Weightage	Payment Procedure
(1) HT/LT crossings	86.48	Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 10 crossings.
(2) Water pipeline crossings	13.52	Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 8 crossings.

Note: (1) In case of innovative Major Bridge Projects like cable suspension/cable stayed and exceptionally long span bridges, the schedule may be modified as per site requirements before bidding with due approval of Competent Authority.

(2) The Schedule for exclusive Tunnel Projects may be prepared as per site requirements before bidding with due approval of Competent Authority.

(3) (a) In order to maintain cash flow in the project, the Authority shall also make interim monthly payments to the Contractor for the work done during the month for which the corresponding stage, as mentioned in Schedule-H, has not been achieved. Such work shall be measured, in a length, number or area as specified in corresponding stage of Schedule-H and valued in accordance with the proportion of the weightage of Contract Price assigned to that stage in Schedule-H. '90% of value of such work shall be paid as an 'Interim Monthly Payment' under clause 19.3 (i) of Contract Agreement.

(b) For Pre cast/ pre-fabricated elements to be used in permanent works, interim payments to be made @ 75% of cost of that element (to be derived from MoRT&H data book) as per schedule H.

(c) Upon completion of the defined 'stage', a reconciliation of the interim payments shall be carried out, and any balance amount shall be paid. For the avoidance of doubt, it is clarified that the interim monthly payments are made solely to maintain cash flow in the project. In the event of termination of the project, under Clause23.1, 23.2 or 23.3, as the case may be, such interim payments shall be dealt with as per Clause 23.5 (i) (b) of the Contract Agreement.

2. Procedure for payment for Maintenance

(a) The cost for maintenance shall be as stated in Clause 14.1.1.

(b) Payment for Maintenance shall be made in quarterly instalments in accordance with the provisions of Clause 19.7.

Schedule - I

(See Clause 10.2 (iv))

Drawings

1. Drawings

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

2. Additional Drawings

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

Annex – I

(Schedule - I)

List of Drawings

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

Schedule - J
Project Completion Schedule
(See Clause 10.3 (ii))

1. Project Completion Schedule

During the 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** (Two hundred and fifty-five) 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 **435th** (four hundred and thirty- five) 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 percent) 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 **615th** (Six hundred and fifteen) 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** (Seven hundred and thirty) 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
Tests on Completion
(See Clause 12.1 (ii))

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

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

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

v. Environmental audit: The Authority's Engineer shall carry out a check to determine the 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
Completion Certificate

(See Clause 12.2)

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 2 lanes of a new alignment with a paved shoulder for connecting link on PACKAGE -3 from Kandni village at design CH-0+000 to 4+037 (Existing CH- 70+900 to 74+650) of 4.037 km length on Khellani-Kishtwar-Chattro section on NH-244 In the union Territory of Jammu & Kashmir (Pkg-IIIA), subject to and by the provisions of the Agreement.(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 outlined 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 since weightage in percentage assigned to non-conforming items as given in Paragraph 2.

2. Percentage reductions in lump sum payments every month

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, rain cuts, 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, and 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%

vii. The amount to be deducted from the monthly lump-sum payment for non-compliance of a 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 Construction of 2 lanes of new alignment with paved shoulder for connecting link on PACKAGE -3 from Kandni village at design CH-0+000 to 4+037 (Existing CH- 70+900 to 74+650) of 4.037 km length on Khellani-Kishtwar-Chattro section on NH-244 In the union Territory of Jammu & Kashmir on EPC Mode, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

(ii) The TOR shall apply to the 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 geotechnical 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 up to 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 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 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 of 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 microfilm 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 the 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 by 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 after the last claim.

(d) amounts reflecting adjustment in price, if any, for (c) above by 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 by 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:

(i) the monthly payment admissible in accordance with the provisions of the Agreement.

(j) the deductions for maintenance work not done.

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

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

(m) amount towards the 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 the Construction Period

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:

(n) insurance of Works, Plant, and Materials and an additional sum of [15 (fifteen)] percent 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

(o) 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.

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 that 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. 2,00,00,000 /- (Two Crore only)

(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.

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

(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 2 lanes of new alignment with paved shoulder for connecting link on PACKAGE -3 from Kandni village at design CH-0+000 to 4+037 (Existing CH- 70+900 to 74+650) of 4.037 km length on Khellani-Kishtwar-Chattro section on NH-244 In the union Territory of Jammu & Kashmir on EPC Mode, 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)

SCHEDULE – S

Procedure for Dispute Resolution Board

The parties to the Contract Agreement mutually agree as follows:

1. The Board shall comprise of three Members having experience in the field of construction or have been involved in the Works related to construction and with the interpretation of contractual documents. One Member shall be selected by each of the Authority and the Contractor from the list maintained by NHIDCL hosted on its website website (https://nhidcl.com/). In the event the parties fail to select the member within 28 days of the date of the signing of Contract agreement, in that eventuality, upon the request of either or both parties such Member shall be selected by SAROD within 14 days. The third Member shall be selected by the other two members from the same list. If the two Members selected by or on behalf of the parties fail to select the third Member within 14 days after the later of their selections, then upon the request of either or both parties such third Member shall be selected by SAROD within 14 days. The third Member shall serve as DG (Road & Development) of the Board.

2. The Board shall be constituted when each of the three Board Members has signed a Board Member's declaration of Acceptance as required by the DRB's rules and procedures (which, along with the declaration of acceptance form, are attached as Annexure herewith).

3. In the event of death, disability, or resignation of any Member, such Member shall be replaced in the same manner as the Member being replaced was selected. If for any other reason, a Member fails or is unable to serve, the Managing Director, NHIDCL (or failing the action of the Managing Director then either of the other Members) shall inform the Parties and such non-serving Member shall be replaced in the same manner as the Member being replaced was selected. Any replacement made by the parties shall be completed within 28 days after the event giving rise to the vacancy on the Board, failing which the replacement shall be made by SAROD in the same manner as described above. Replacement shall be considered complete when the new Member signs the Board Member's Declaration of Acceptance. Throughout any replacement process, the Members not being replaced shall continue to serve and the Board shall continue to function and its activities shall have the same force and effect as if the vacancy had not occurred, provided, however that the Board shall not conduct a hearing nor issue a decision until the replacement is completed.

4. If either the Authority or the Contractor is dissatisfied with any decision of the Board, and/or if the Board fails to issue its decision within 56 days after receipt of all the pleadings (along with the supporting documents) of the parties by the DG (Road & Development) of the Board or any extension mutually agreed upon by the Authority and the Contractor, in such a case, either the Authority or the Contractor may, within 28 days after his receipt of the decision, or within 28 days after the expiry of the said period, as the case may be, give notice to the other party, with a copy for information to the Authority's Engineer, of his intention to refer the matter to the Conciliation Committee of Independent Experts (CCIE) of the Authority for Conciliation/amicable settlement.

5. It is mandatory to refer all the disputes to DRB before issuance of completion certificate and satisfactory completion of punch list items. No dispute shall be entertained after completion of aforementioned date.

6. If the Board has issued a decision to the Authority and the Contractor within the said 56 days or any extension mutually agreed upon by the Authority and the Contractor and no notice of intention to commence Conciliation by the Conciliation Committee of Independent Experts (CCIE) of the Authority for Conciliation/amicable settlement as to such dispute has been given by either the Authority or the Contractor within 28 days after the parties received such decision from the Board, the decision shall become final and binding upon the Authority and Contractor.

7. Whether or not it has become final and binding upon the Authority and the Contractor, a decision shall be admissible as evidence in any subsequent dispute resolution procedure, including any arbitration or litigation having any relation to the dispute to which the decision relates.

8. All decision of DRB which have become final and binding or till they have been reversed in subsequent conciliation/Arbitration process shall be implemented by the parties forthwith. Such implementation shall also include any relevant action of the Authority's Engineer.

9. If during the Contract Period, the Authority and the Contractor are of the opinion that the Disputes Resolution Board is not performing its functions properly, the Authority and the Contractor may together disband the Disputes Resolution Board and reconstitute it. In that case, a new board shall be selected in accordance with the provisions applying to the selection of the original Board as specified above, except that words "within 28 days after the signing of this Contract agreement" shall be replaced by the words "within 28 days after the date on which the notice disbanding the original Board became effective".
10. The Authority and the Contractor shall jointly signed a notice specifying that the Board shall stand disbanded with effect from the date specified in the notice. The notice shall be posted by the email to each member of the Board. A Member shall be deemed to have received the email even if he refuses to have received the same.
11. All other terms and conditions of the original Contract Agreement shall remain unaltered/unaffected and the parties shall remain bound by terms and conditions as contained therein.

Annexure to Schedule [S]

Disputes Resolution Board's Rules and Procedures

1. Except for providing the services required hereunder, the Board Members shall not give any advice to either party or to the Authority's Engineer concerning conduct of the Works. The Board Members:

   a. Shall have no financial interest in any party to the Contract, or the Authority's Engineer, or a financial interest in the contract, except for payment for services on the Board.

   b. Shall have had no previous employment by, or financial ties to, any party to the Contract Agreement, or the Authority's Engineer, except for fee based consulting services/advisers on other projects, and/or be Retired Government Officers (not connected in whole or part with the project), all of which must be disclosed in writing to both parties prior to appointment to the Board.

   c. Shall have disclosed in writing to both parties prior to appointment to the Board any and all recent or close professional or personal relationships with any director, officer, or employee of any party to the Contract, or the Authority's Engineer, and any and all prior involvement in the project to which the Contract relates:

   d. Shall not, while Board member, be employed whether as a consultant or adviser or otherwise by either party to the Contract, or the Authority's Engineer, except as a Board Member, without the prior consent of the parties and the other Board Members;

   e. Shall not, while a Board Member, engage in discussion or make any agreement with any party to the Contract, or with the Authority's Engineer, regarding employment whether as a consultant or otherwise whether after the Contract is completed or after service as a Board Member is completed.

   f. Shall remain and be impartial and independent of the parties and shall disclose in writing to the Authority, the Contractor and one another any fact or circumstance which might be such as to cause either the Authority or the Contractor to question the continued existence of the impartiality and independence required of Board Members, and

   g. Shall be fluent in the language of the Contract.

2. Except for its participation in the Board's activities as provided in the Contract Agreement and in this Agreement none of the Authority, the Contractor, and or the Authority's Engineer shall solicit advice or consultation from the Board or the Board Members on matters dealing with the conduct of the Works.

3. The Contractor shall:

a. Furnish to each Board member one copy of all documents which the Board may request including Contract Agreement, progress reports and other documents pertinent to the performance of the Contract Agreement.

b. In cooperation with the Authority, coordinate the site visits of the Board, including conference facilities, and secretarial and copying service.

4. The Board shall begin its activities following the signing of a Board Member's Declaration of Acceptance by all three Board Members, and it shall terminate these activities as set forth below:

   a. The Board shall terminate its regular activities when either (i) issuance of completion certificate and completion of punch list items or (ii) the parties have terminated the contract and when, in either case, the Board has communicated to the parties and the Authority's Engineer its decision on all disputes previously referred to it.

b. Once the Board has terminated its regular activities as provided by the previous paragraph, the Board shall remain available to process any dispute referred to it by either party. In case of such a referral, Board Members shall receive payments as provided in paragraphs 7(a) (ii), (iii) and (iv).

5. Board Members shall not assign or subcontract any of their work under these Rules and Procedures.

6. The Board Members are Independent and not employees or agents of either the Authority or the Contractor.

7. Payments to the Board Members for their services shall be governed by the following provisions.

a. Each Board Member will receive payments as follows:

i. A retainer fee per calendar month as specified in the schedule of fee made part of this Schedule and its revision from time to time. This retainer fee shall be considered as payment in full for:

A. Being available, on 7 days' notice, for all hearings, Site Visits, and other meetings of the Board.

B. Being conversant with all project developments and maintaining relevant files.

C. All offices and overhead expenses such as secretarial services, photocopying and office supplies (but not include telephone calls, faxes and telexes) incurred in connection with the duties as a Board Member.

ii. A daily fee as specified in the schedule of fee in respect of fee for site visit & meeting, fee for meeting/ hearing not at site and extra charges for days max. of 02 days for travel on each occasion) other than hearing / meeting days.

iii. Expenses, in addition to the above, all reasonable and necessary travel expenses (including economy class air fare, subsistence, and other direct travel expenses). Receipts for all expenses in excess of Rs. 2000/- (Rupees Two Thousand only) shall be provided.

iv. Reimbursement of any taxes that may be levied on payments made to the Board Member pursuant to this paragraph 7.

b. The retainer fee and other fees shall remain fixed for the period of each Board Member's term until revised by NHIDCL.

c. Phasing out of monthly retainer fee. Beginning with the next month after the completion certificate (or, if there are more than one, the one issued last) has been issued, the Board members shall receive only one-third of the monthly retainer fee till next one year. Beginning with the next month after the Board has terminated its regular activities pursuant to paragraph 4(a) above, the Board members shall no longer receive any monthly retainer fee.

d. Payments to the Board Members shall be shared equally by the Authority and the Contractor. The concerned Project Implementation Unit (PIU) of Authority shall pay members' invoices within 30 calendar days after receipt of such invoices and shall invoice the Contractor for one-half of the amounts of such invoices. The Contractor shall pay such invoices within 30 days' time period after receipt of such invoices.

8. Board Site Visits:

a. The Board shall visit the Site and meet the representatives of the Authority, the Contractor and the Authority's Engineer at regular intervals, at times of critical construction events, at the written request of either party, and in any case not less than 6 times in any period or 12 months. The timing of Site visits shall be as agreed among the Authority, the Contractor and the Board, but failing agreement shall be fixed by the Board.

b. Site visits shall include an informal discussion of the status of the construction of the Works. Site visits shall be attended by personnel from the Authority, the Contractor and the Authority's Engineer.

c. At the conclusion of each Site visit, the Board shall prepare a report covering its activities during the visit and shall send copies to the parties and to the Authority's Engineer.

9. Procedure for Dispute Referral to the Board

a. lf either party objects to any action or inaction of the other party or the Authority's Engineer, the objecting party may file a written Notice of Dispute to the other party with a copy to the Authority's Engineer stating that it is given pursuant to the Agreement and state clearly and in details the basis of the dispute.

b. The party receiving the Notice of Dispute will consider it and respond to it in writing within 14 days after receipt.

c. This response shall be final and conclusive on the subject, unless a written appeal to the response is filed with the responding party within 10 days after receiving the response and call upon Authority's Engineer to mediate and assist the parties in arriving an amicable settlement thereof. Both parties are encouraged to pursue the matter further to attempt to settle the dispute.

d. If the Authority's Engineer receiving the Notice of Dispute fails to provide a written response within 14 days after receipt of such Notice or failing mediation by Authority's Engineer, either party may require such dispute to be referred to the Board, either party may refer the dispute to the Board by written Request to the Board. The Request for decision shall state clearly and in full detail the specific issues of the dispute (s) to be considered by Board and shall be addressed to the DG (Road & Development) of the Board, with copies to the other Board Members, the other party, and the Authority Engineer, and it shall state that it is made pursuant to this Agreement.

e. When a dispute is referred to the Board, and the Board is satisfied that the dispute requires the Board's assistance, the Board decide when to conduct a hearing on the dispute. The Board may request that written documentation and arguments from both parties be submitted to each Board Member before the hearing begins. The parties shall submit insofar as possible agreed statements of the relevant facts.

f. During the hearing, the Contractor, the Authority, and the Authority's Engineer shall each have ample opportunity to be heard and to offer evidence. The Board's decision for resolution of the dispute will be given in writing to the Authority, the Contractor and the Authority's Engineer as soon as possible, and in any event not more than 56 days or any mutually extended period between the Authority and the Contractor. The time period of 56 days of issuance of DRB decision will reckon/start from the day of first hearing that begins after submission of complete pleadings (including supporting documents, if any) by the parties.

10. Conduct of Hearings:

a. Normally hearings will be conducted at the Site, but any location that would be more convenient and still provide all required facilities and access to necessary documentation may be utilized by the Board. Private session of the Board may be held at any cost-effective location convenient to the Board. Video recordings of all hearings shall invariably be made.

b. The Authority, the Authority's Engineer and the Contractor shall be given opportunity to have representatives at all hearings. Parties should restrain to bring any Advocate/Law Firm during DRB hearings.

c. During the hearings, no Board Member shall express any opinion concerning the merit of the respective arguments of the parties.

d. After the hearings are concluded, the Board shall meet privately to formulate its decision. The private meeting (s) of the Board shall not exceed 3 sittings. All Board deliberations shall be conducted in private, with all

Members' individual views kept strictly confidential. The Board's decisions, together with an explanation of its reasoning shall be submitted in writing to both parties and to the Authority's Engineer. The decision shall be based on the pertinent contract provisions, applicable laws and regulations and the facts and circumstances involved in the dispute.

e. The Board shall make every effort to reach a unanimous decision. If this proves impossible the majority shall decide and the dissenting Member may prepare a written minority report together with an explanation of its reasoning for submission to both parties and to the Authority's Engineer

11. In all procedural matters, including the furnishing of written documents and arguments relating to disputes, site visits and conduct of hearings, the Board shall have full and the final authority. If a unanimous decision on any such matter proves impossible, the majority shall prevail.
12. After having been selected and where necessary approved each Board Member shall sign two copies of the following declaration and make one copy available each to the Authority and to the Contractor.

BOARD MEMBER'S DECLARATION OF ACCEPTANCE

WHEREAS

a. A Contract Agreement (the Contract) for the_____ project [fill in the name of project] has been signed on _____ [fill in date] between_____ [name of Authority] and _____name of Contractor] (the Contractor).;

b. The provisions of Agreement and Dispute Resolution Board's rules and procedure provided for establishment and operation of Dispute Resolution Board (DRB).

c. The undersigned has been selected to serve as a Board Member on said Board;

NOW THEREFORE, the undersigned Board Member hereby declares as follows

1. I accept the selection as a Board Member and agree to serve on the Board and to be bound by the provisions of Contract Agreement and rules and procedure provided for establishment and operation of Dispute Resolution Board DRB).

2. With respect to paragraph 1 of Dispute Resolution Board's Rules and Procedure. said Annex A, I declare

   a. that I have no financial interest of the kind referred to in subparagraph (a):

   b. that I have had no previous employment nor financial ties of the kind referred to in subparagraph (b); and

   c. that I have made to both parties any disclosures that may be required by sub- paragraphs (b) and (c).

3. I declare that I have _____no. of Arbitrations (list enclosed) and _____ no. of DRBs (list enclosed) in progress and that I will give sufficient time for the current assignment.

BOARD MEMBER

_____

_____ [insert name of Board Member)
Date: _____

Schedule of expenses and fees payable to the Member(s) of Dispute Resolution Board (DRB)

The fee and other expenses payable to the Members of DRB shall be as under

S. No.	Particular	Amount Payable
1	Retainer-ship fee, secretarial assistance and incidental charges (telephone, fax, postage etc)	Rs. 50,000/- per month for one package and maximum of Rs. 75,000/- per month for 2 or more packages
2(i)	Fee for site visit or meetings at site	Rs. 25,000/- per day
(ii)	Fee for meetings/hearings not at site	Rs. 10,000/- per day
3	Traveling expenses	Economy class by air, AC first class by train and AC taxi by road
4	Lodging & Boarding	Rs. 15,000/- per day (Metro Cities): or Rs. 10,000/- per day (in other cities); or Rs. 5,000/- per day (own arrangement)
5	Extra charges for days other than hearing/meeting days (travel days maximum of 2 days on each occasion)	Rs. 5,000/-
6	Local conveyance	Rs. 2,000/-

Notes:

i. Lodging, boarding and travelling expenses will be allowed only for those members who are residing 100 kms away from the place of meeting.

ii. Delhi, Mumbai, Chennai, Kolkata, Bangalore and Hyderabad shall be considered as Metro Cites.

ii. The above schedule of fee and expenses shall be applicable on or after the date of issue of this circular.

iv. The expenses are to be shared equally by the parties i.e. Authority and Contractor.

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