Technical Schedule

Schedules - A

Schedule-A

(See Clauses 2.1and 8.1)

Site of the Project

1 The Site

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

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

(iii) An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause8.2 (i) of this Agreement.

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

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

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-129A commencing from km 173+850 to km 190+896 i.e. Longari River to 7th Mile junction with NH-39 in Chumukhdima Town in the state of Nagalad.
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 in Annex-I of Schedule-B in article no. 2(iv).

3. Carriageway

The present carriage way of the Project Highway is Single/Intermediate/two Lane from km 173+850 to km 190+896. The type of the existing pavement is [Earthen/WBM/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.	**Survey Chainage (km)**	**Design Chainage (km)**	**Type of Structure**		**No. of Spans with span**	**Width (m)**	**ROB/ RUB**
			Foundation	**Superstructure**			

1	182.175	183.066	-	RCC Box	2 x 7.25m x [illegible]	16.5	RUB

6. Grade separators

The Site includes the following grade separators:

S. No.	Chainage (km)	Type of Structure		No.ofSpanswith spanlength(m)	Width (m)
		Foundation	Superstructure		
Nil					

7. Minor bridges

The Site includes the following minor bridges:

S. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Super-structure		
1	187.687	-	-	RCC Slab	1X6.3	12

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location(km)	Remarks
Nil		

9. Under passes(vehicular, non-vehicular)

The Site includes the following underpasses:

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

10. Culverts

The Site has the following culverts:

Sl. No.	Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
1	179.500	HP Culvert	1 x 1.2m dia	9.8
2	179.701	HP Culvert	1 x 0.9m dia	10.1
3	179.950	Slab Culvert	1 x 2.6mm	9.2
4	180.162	HP Culvert	1 x 1.0m dia	9.8
5	180.294	HP Culvert	1 x 0.6m dia	10.0
6	181.376	HP Culvert	1 x 1.2m dia	10.1
7	184.167	HP Culvert	1 x 0.4m dia	13.2
8	184.506	HP Culvert	1 x 1.0m dia	12.8
9	184.692	HP Culvert	1 x 0.6m dia	10

Sl. No.	Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
10	184.832	HP Culvert	1 x 0.6m dia	13.0
11	185.046	HP Culvert	1 x 0.9m dia	12.3
12	185.472	Box Culvert	1 x 4.0mm	13.3
13	185.720	HP Culvert	1 x 0.6m dia	13.6
14	185.757	HP Culvert	1 x 0.9m dia	13.1
15	185.941	HP Culvert	1 x 0.9m dia	12.5
16	186.018	HP Culvert	2 x 0.9m dia	13.7
17	186.120	HP Culvert	1 x 0.9m dia	13.3
18	186.153	HP Culvert	1 x 0.9m dia	13.2
19	186.238	HP Culvert	1 x 0.9m dia	13.1
20	186.542	HP Culvert	1 x 0.6m dia	17.5
21	186.633	HP Culvert	3 x 0.9m dia	13.3
22	187.283	HP Culvert	1 x 0.9m dia	12.3
23	187.422	HP Culvert	1X0.9m	13.6
24	187.992	HP Culvert	1 x 0.9m dia	13.5
25	189.121	Slab Culvert	1 x 6.0m	14.2
26	189.209	HP Culvert	1 x 0.9m dia	14.9
27	190.194	HP Culvert	1 x 0.9m dia	14.7
28	190.616	Slab Culvert	1 x 1.0m	13.5

11. Bus bays

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

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

12. Truck Lay byes

The details of trucklay byes are as follows:

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

13. Road side drains

The details of the roadside drains are as follows:

Sl. No.	Location		Type	
	From km	To km	Masonry/cc (Pucca)	Earthen (Kutcha)
1	178.350	178.436		Earthen (Single Side)
2	178.557	180.744		Earthen (Single Side)
3	180.776	180.899		Earthen (Single Side)
4	182.222	180.335		Earthen (Single Side)
5	182.722	182.760		Earthen (Single Side)
6	183.017	183.215		Earthen (Single Side)

Sl. No.	Location		Type	
	From km	To km	Masonry/cc (Pucca)	Earthen (Kutcha)
7	183.215	183.284	Pucca(Single Side)	
8	183.284	184.633		Earthen (Single Side)
9	185.264	185.528		Earthen (Single Side)
10	187.336	187.679	Pucca(Single Side)	
11	188.385	188.968	Pucca(Single Side)	
12	189.213	190.728	Pucca(Single Side)	
13	190.728	190.811	Pucca(both Sides)	
14	190.811	190.826	Pucca(Single Side)	

14. Major junctions

The details of major junctions are as follows:

S. No.	Location		At grade	Separated	Category of Cross Road			
	From km	to km			NH	SH	MDR	Others
1	183.800		✓					Towards Sokhuvi Village
2	184.455		✓					Towards Virazouma Village
3	190.896		✓		NH-29			

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

15. Minor junctions

The details of the minor junctions are as follows:

Sl. No.	Location		Type of intersection	
	From Km	To Km	T-Junction	Cross Road
1	179.335		Y	3-legged
2	180.410		Y	3-legged
3	180.910		Y	3-legged
4	181.370		T	3-legged
5	181.985		Y	3-legged
6	182.760		Y	3-legged
7	182.955		T	3-legged
8	183.470		T	3-legged
9	183.515		T	3-legged
10	183.630		T	3-legged
11	183.730		T	3-legged
12	184.615		T	3-legged
13	184.650		T	3-legged
14	184.780		T	3-legged
15	186.060		T	3-legged

Sl. No.	Location		Type of intersection	
	From Km	To Km	T-Junction	Cross Road
16	186.220		T	3-legged
17	186.460		Y	3-legged
18	186.565		Y	3-legged
19	186.600		T	3-legged
20	186.800		T	3-legged
21	186.855		T	3-legged
22	187.010		T	3- legged
23	187.090		T	3- legged
24	187.215		T	3- legged
25	187.250		T	3- legged
26	187.430		T	3- legged
27	187.670		X	4- legged
28	187.900		T	3- legged
29	188.155		T	3- legged
30	188.270		T	3- legged
31	188.475		T	3- legged
32	188.940		T	3- legged
33	188.970		T	3- legged
34	189.035		T	3- legged
35	189.435		X	4-legged
36	189.485		T	3- legged
37	189.860		T	3- legged
38	190.135		Y	3- legged
39	190.325		X	4-legged
40	190.610		X	4-legged
41	190.725		T	3- legged
42	190.785		T	3- legged

6. By passes

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

Sl.No.	Name of bypass (town)	Chainage(km)From km tokm	Length (inKm)
Nil			

17. Other structures

[Provide details of other structures, if any.]

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

The Construction of Project Highway will be implemented as per Manual, details of which are given in Article-2(iv) of Annexure – I of Schedule –B.

Annex-III

(Schedule-A)

Alignment Plans

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

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

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

(Schedule-A)

Environment Clearances

The following environment clearances have been obtained: [***]

The following environment clearances are awaited:[***]

Schedule - B

Schedule - B

(See Clause 2.1)

Development of the Project Highway

1. Development of the Project Highway

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

2. [Rehabilitation and augmentation]

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

3. Specifications and Standards

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

(Schedule-B)

Description of [Two-Lanning]

[Note: Description of the Project Highway shall be given by the Authority in detail together with explanatory drawings (where necessary) to explain the Authority's requirements precisely in order to avoid subsequent changes in the Scope of the Project. The particulars that must be specified in this Schedule-B are listed below as per the requirements of the Manual of Specifications and Standards for [Two Lanning of Highways (IRC: SP: 73-2018 and IRC: 52-2019)] 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 all other essential project specific details as required should be provided in order to define the Scope of the Project clearly and precisely.]

1. Widening of the Existing Highway

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

(ii) Width of Carriageway

(a) Two-Lanning [with]hard shoulders shall be undertaken. The paved carriageway shall be [7(seven)m]wide.

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

Sl. No.	Built-up stretch (Township)	Location		Width (m)	Typical Cross Section (Refer to Manual)	Remarks
1	Chmukdima-A Village	184.600	184.700	9m	As per attached TCS drawing	9 m Carriageway (7 m Carriageway+2x1m Paved shoulder)
2	Chmukdima-A Village	184.700	185.325	9m		9 m Carriageway (7 m Carriageway+2x1m Paved shoulder)
3	Chmukdima-A Village	185.325	187.010	9m		9 m Carriageway (7 m Carriageway+2x1m Paved shoulder)
4	Chmukdima Village	187.010	187.220	9m		9 m Carriageway (7 m Carriageway+2x1m Paved shoulder)

5	Chmukdima Village	187.220	191.150	9m		9 m Carriageway (7 m Carriageway+2x1m Paved shoulder)
6	Chmukdima Town	191.150	191.687	9m		9 m Carriageway (7 m Carriageway+2x1m Paved shoulder)

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

2. Geometric Design and General Features

(i) General

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

(ii) Design speed

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

(iii) Improvement of the existing road geometrics

The stretches where design speed reduces below 30 kmph are summarized below:

Sl. No.	Stretch(from km to km)	Remarks
1	174.488 to 174.540	Design Speed = 20 Kmph
2	174.617 to 174.636	Design Speed = 20 Kmph
3	174.673 to 174.695	Design Speed = 20 Kmph
4	175.171 to 175.215	Design Speed = 20 Kmph
5	176.625 to 176.658	Design Speed = 20 Kmph
6	176.659 to 176.700	Design Speed = 20 Kmph
7	176.928 to 176.966	Design Speed = 20 Kmph
8	176.966 to 177.003	Design Speed = 20 Kmph
9	177.517 to 177.569	Design Speed = 20 Kmph
10	178.210 to 178.247	Design Speed = 20 Kmph
11	178.829 to 178.842	Design Speed = 20 Kmph
12	179.833 to 179.867	Design Speed = 25 Kmph
13	179.868 to 179.830	Design Speed = 20 Kmph
14	180.372 to 180.393	Design Speed = 25 Kmph
15	180.440 to 180.470	Design Speed = 25 Kmph
16	180.802 to 180.816	Design Speed = 20 Kmph
17	180.895 to 180.935	Design Speed = 20 Kmph

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

(iv) Right of Way

[Refer to provision of relevant Manual].Details of the Right of Way are given below.

Design ch.(m)	PROW width (m)	EROW width (m)
173850	40	-
173950	40	-
174050	24	-
174150	40	-
174250	24	-
174350	24	-
174450	24	-
174550	24	-
174650	32	-
174750	32	-
174850	32	-
174950	26	-
175050	26	-
175150	26	-
175250	35	-
175350	24	-
175450	24	-
175550	35	-
175650	35	-
175750	30	-
175850	30	-
175950	30	-
176050	30	-
176150	30	-
176250	30	-
176350	30	-
176450	HAIRPIN BEND	-
176550	HAIRPIN BEND	-
176650	HAIRPIN BEND	-
176750	HAIRPIN BEND	-
176850	HAIRPIN BEND	-
176950	HAIRPIN BEND	-
177050	HAIRPIN BEND	-
177150	HAIRPIN BEND	-
177250	24	-

Design ch.(m)	PROW width (m)	EROW width (m)
177350	40	-
177450	30	-
177550	30	-
177650	30	-
177750	30	-
177850	30	-
177950	30	-
178050	30	-
178150	30	-
178250	35	-
178350	40	-
178450	40	-
178550	40	-
178650	40	-
178750	40	-
178850	35	-
178950	30	-
179050	30	-
179150	35	-
179250	30	-
179350	24	-
179450	24	-
179550	24	-
179650	35	-
179750	40	-
179850	40	-
179950	24	-
180050	24	-
180150	50	-
180250	50	-
180350	50	-
180450	50	-
180550	20	-
180650	20	-
180750	20	-
180850	30	-

Design ch.(m)	PROW width (m)	EROW width (m)
180950	30	-
181050	24	-
181150	24	-
181250	24	-
181350	20	-
181450	20	-
181550	20	-
181650	20	-
181750	20	-
181850	20	-
181950	30	-
182050	30	-
182150	30	-
182250	30	-
182350	30	-
182450	30	-
182550	30	-
182650	30	-
182750	30	-
182850	30	-
182950	20	-
183050	20	-
183150	20	-
183250	20	-
183350	20	-
183450	20	-
183550	20	-
183650	20	-
183750	20	-
183850	20	-
183950	20	-
184050	20	-
184150	20	-
184250	20	-
184350	20	-
184450	20	-

Design ch.(m)	PROW width (m)	EROW width (m)
184550	20	-
184650	12	11
184750	12	11
184850	12	10
184950	12	10
185050	12	11
185150	12	11
185250	12	11
185350	12	11
185450	12	11
185550	12	12
185650	12	12
185750	12	10
185850	12	10
185950	12	10
186050	12	10
186150	12	11
186250	12	10
186350	12	11
186450	12	11
186550	12	11
186650	12	11
186750	12	11
186850	12	11
186950	12	11
187050	12	11
187150	12	11
187250	12	10
187350	12	11
187450	12	11
187550	12	11
187650	12	12
187750	12	12
187850	12	12
187950	12	11
188050	12	11

Design ch.(m)	PROW width (m)	EROW width (m)
188150	12	11
188250	12	12
188350	12	12
188450	12	10
188550	12	11
188650	12	11
188750	12	11
188850	12	10
188950	12	10
189050	12	10
189150	12	12
189250	12	10
189350	12	11
189450	12	11
189550	12	11
189650	12	11
189750	12	12
189850	12	11
189950	12	11
190050	12	12
190150	12	12
190250	12	12
190350	12	10
190450	12	11
190550	12	12
190650	12	10
190750	12	10
190850	12	12
190950	12	12
191050	12	11
191150	12	11
191250	12	12
191350	12	11
191450	12	12
191550	12	10
191650	12	10

(v) Type of shoulders
[Refer to provision of relevant Manual and specify]

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

Sl. No.	Stretch (from Km to Km)	Fully Paved shoulders/footpaths	Reference to cross section
1	184.600 to 184.700, 184.700 to 185.325, 185.325 to 187.010, 187.010 to 187.220, 187.220 to 191.150, 191.150 to 191.687	2x1m Paved Shoulder /2x 1m width Footpath Cum Drain	TCS-1 & TCS-1A

(b) Hard shoulders of 1m width shall be provided with selected earth wherever applicable as per TCS drawing.

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

(vi) Lateral and vertical clearances at underpasses

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

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

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

(vii) Lateral and vertical clearances at overpasses

(a) Lateral and vertical clearances at overpasses shall be as per requirements specified in the relevant Manual.

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

Sl. No.	Location (Chainage) (from km to km)	Span/Opening (m)	Remarks
Nil			

(viii) Service roads
Service roads shall be constructed at the locations and for the lengths indicated below:
[Refer requirements specified in the relevant Manual]

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

(ix) Grade separated structures

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

[Refer to requirements specified in the relevant Manual]

Sl. No.	Location of Structure (VUP)	Length (m)	Number and length of spans	Approach gradient	Remarks. If any
Nil					

(b) In the case of grade separated structures the type of structure and the level of the Project Highway and the crossroads shall be as follows:[Refer to provision of the Manual and specify the type of vehicular underpass/ overpass structure and whether the cross road is to be carried at the existing Level. Raised or lowered]

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

(x) Cattle and pedestrian underpass /overpass

Cattle and pedestrian underpass/overpass shall be constructed as follows: [Refer to provision of the relevant Manual and specify the requirements of cattle and pedestrian underpass/overpass]

Sl.No.	Location	Type of crossing
Nil		

(xi) Typical cross-sections of the Project Highway

[Give typical cross-sections of the Project Highway by reference to the Manual]As per attached Drawings

TCS TYPE	DESCRIPTION	Length (m)
TCS-1	Reconstruction of Two Lane Carriageway In Built Up Area With Both Side Footpath Cum RCC Rectangular Drain	5715
TCS-1A	Reconstruction of Two Lane Carriageway In Built Up Area With Both Side Footpath Cum RCC Rectangular Drain and Existing Subgrade Retained as	1372
TCS-2	Reconstruction of two lane carriageway in rural area with Both Side PCC Trapezoidal Open Drain	1525
TCS-3	Reconstruction of two lane carriageway in rural area With Breast Wall on Hill Side And PCC Trapezoidal Open Drain on Valley Side with Steel Reinforced Geomat protection on hill side	1830
TCS-3A	Typical Cross Section of Two Lane carriageway in Rural Area (at New 2 Lane Realignment Stretch) with Breast Wall on Hill Side And PCC Trapezoidal Open Drain on Valley Side with Steel Reinforced Geomat protection on Hill Side (Cutting height above 10m)	1825
TCS-4	Reconstruction of Two Lane Carriageway In Rural Area with New	1450

TCS TYPE	DESCRIPTION	Length (m)
TCS-4A	Typical Cross Section of Two Lane Carriageway (at New 2 Lane Realignment Stretch) In Rural Area(Pavement Section With GEOGRID	475
TCS-5	Reconstruction of Two Lane Carriageway In Rural Area With PCC Trapezoidal Open Drain on Hill Side And Earthen Shoulder on Valley Side	500
TCS-6	Reconstruction of Two Lane Carriageway In Rural Area With Both Side PCC Trapezoidal Open Drain with Steel Reinforced Geomat protection on hill	225
TCS-7	Reconstruction of Two Lane Carriageway in Rural Area With Retaining Wall on Valley Side And PCC Trapezoidal Open Drain on Hill Side	150
TCS-8	Typical Cross Section of Two Lane Carriageway (at New 2 Lane Realignment Stretch) In Rural Area With Retaining Wall on Valley Side And Breast Wall on Hill Side	395
TCS-8A	Reconstruction of Two Lane Carriageway in Rural Area With Both side Geocell Protection (Filling height above 10m)	350
TCS-9	Typical Cross Section of Two Lane Carriageway (at New 2 Lane Realignment Stretch) In Rural Area With Breast Wall on Hill Side And PCC Trapezoidal Open Drain on Valley Side with Steel Reinforced Geo mat protection on hill side	1475
TCS-10	Typical Cross Section of Two Lane Carriageway (at New 2 Lane Realignment Stretch) In Rural Area With Both side Breast Wall & Steel Reinforced Geomat Protection on hill side	550
	Total length =	**17837**

Chainage (m)		Length(m)	TCS No.
From	To		
173850	173950	100.0	TCS-9
173950	174050	100.0	TCS-8
174050	174100	50.0	TCS-7
174100	174350	250.0	TCS-5
174350	174475	125.0	TCS-9
174475	174550	75.0	TCS-7
174550	174650	100.0	TCS-5
174650	174875	225.0	TCS-3
174875	174900	25.0	TCS-8
174900	175025	125.0	TCS-3
175025	175050	25.0	TCS-7
175050	175200	150.0	TCS-5
175200	175500	300.0	TCS-3
175500	175700	200.0	TCS-3
175700	175925	225.0	TCS-6
175925	176150	225.0	TCS-10
176150	176275	125.0	TCS-3
176275	176445	170.0	TCS-8
176445	176500	55.0	TCS-3
176500	176600	100.0	TCS-8
176600	176825	225.0	TCS-3
176825	177500	675.0	TCS-3A
177500	177700	200.0	TCS-3

Chainage (m)		Length(m)	TCS No.
From	To		
177700	178200	500.0	TCS-3A
178200	178475	275.0	TCS-10
178475	178925	450.0	TCS-9
178925	179300	375.0	TCS-3A
179300	179450	150.0	TCS-3
179450	179600	150.0	TCS-3A
179600	179700	100.0	TCS-3
179700	179825	125.0	TCS-3A
179825	179875	50.0	TCS-10
179875	180075	200.0	TCS-2
180075	180425	350.0	TCS-8A
180425	180725	300.0	TCS-2
180725	181100	375.0	TCS-9
181100	181900	800.0	TCS-2
181900	182025	125.0	TCS-3
182025	182150	125.0	TCS-2
182150	182300	150.0	TCS-4
182300	182400	100.0	TCS-2
182400	182825	425.0	TCS-9
182825	183300	475.0	TCS-4A
183300	184600	1300.0	TCS-4
184600	184700	100.0	TCS-1
184700	185325	625.0	TCS-1A
185325	187010	1685.0	TCS-1
187010	187220	210.0	TCS-1A
187220	191150	3930.0	TCS-1
191150	191687	537.0	TCS-1A
Total Length		**17837**	**m**

3. Intersections and Grade Separators

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

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

Properlydesignedintersectionsshallbeprovidedatthelocationsandofthetypes and features given in the tables below:

(i) At-grade intersections

Major Intersections

Sl. No.	Location of intersection (Km)	Type of intersection	Other features	Remarks
1	184.600	3-Legged	LHS - Towards Sokhuvi Village	At-grade improvement proposed
2	185.250	3-Legged	LHS - Towards Virazouma Village	At-grade improvement proposed

3	191.687	3-Legged	NH-29	At-grade improvement proposed

Minor Intersections

Sl. No.	Location of intersection (Km)	Type of intersection	Other features
1	180.300	Y	3- legged
2	181.330	Y	3- legged
3	181.830	Y	3- legged
4	182.280	T	3- legged
5	182.690	Y	3- legged
6	183.590	Y	3- legged
7	183.760	T	3- legged
8	184.270	T	3- legged
9	184.315	T	3- legged
10	184.430	T	3- legged
11	184.530	T	3- legged
12	185.410	T	3- legged
13	185.450	T	3- legged
14	185.580	T	3- legged
15	186.860	T	3- legged
16	187.015	T	3- legged
17	187.250	Y	3- legged
18	187.360	Y	3- legged
19	187.400	T	3- legged
20	187.590	T	3- legged
21	187.650	T	3- legged
22	187.805	T	3- legged
23	187.890	T	3- legged
24	188.010	T	3- legged
25	188.040	T	3- legged
26	188.230	T	3- legged
27	188.460	X	4- legged
28	188.700	T	3- legged
29	188.950	T	3- legged
30	189.070	T	3- legged
31	189.270	T	3- legged
32	189.730	T	3- legged
33	189.770	T	3- legged
34	189.825	T	3- legged
35	190.230	X	4-legged
36	190.280	T	3- legged
37	190.660	T	3- legged
38	190.940	Y	3- legged
39	191.120	X	4-legged
40	191.410	X	4-legged
41	191.520	T	3- legged
42	191.575	T	3- legged

(ii) Grade separated intersection with/without ramps

Sl. No.	Location	Salient features	Minimum length of viaduct to be provided	Roadtobecarried over/underthe 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[Refer to provision of the relevant Manual and specify sections to be raised]

The existing road shall be raised in the following sections:

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

5. Pavement Design

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

(ii) Type of pavement

Flexible Pavement

(iii) Design requirements

[Refer to provision of the relevant Manual and specify design requirements and strategy]

(a) Design Period and strategy

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

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual. The Contractor shall design the pavement for design traffic of 20 msa.

(iv) Reconstruction of stretches

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

The Entire stretches of the existing road (from Km 173.850 to Km 191.687) shall be

reconstructed. These shall be designed as new pavement.

6. Road side Drainage-

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

Footpath cum cover drain has been proposed in built up area for safe maneuverability of pedestrians. RCC open drain and PCC trapezoidal open drain has been proposed in rural area for proper drainage purpose. Details are given below:

Footpath cum RCC Covered Drain

Chainage (m)		Length of CD(m)	Net Length (m)	TCS No.	Side
From	To				
184600	184700	2.6	194.8	TCS-1	Both
184700	185325	5.2	1239.6	TCS-1A	Both
185325	187010	32.4	3305.2	TCS-1	Both
187010	187220	2.6	414.8	TCS-1A	Both
187220	191150	44.9	7770.2	TCS-1	Both
191150	191687	2.6	1068.8	TCS-1A	Both
Total Length=			**13993**		

RCC Open Drain

Chainage (m)		Length of CD(m)	Net Length (m)	TCS No.	Side
From	To				
182825	183300	2.7	944.6	TCS-4A	Both
Total Length=			**945**		

PCC Trapezoidal Open Drain

Chainage (m)		Length of CD(m)	Net Length (m)	TCS No.	Side
From	To				
173850	173950	59.24	81.5	TCS-9	Both
173950	174050		100.0	TCS-8	Hill
174050	174100		50.0	TCS-7	Hill
174100	174350	2.6	247.4	TCS-5	Hill
174350	174475		250.0	TCS-9	Both
174475	174550	2.7	72.3	TCS-7	Hill
174550	174650		100.0	TCS-5	Hill
174650	174875	2.6	444.8	TCS-3	Both
174875	174900		25.0	TCS-8	Hill
174900	175025		250.0	TCS-3	Both
175025	175050	2.6	22.4	TCS-7	Hill
175050	175200	3.92	146.1	TCS-5	Hill
175200	175500		600.0	TCS-3	Both
175500	175700		400.0	TCS-3	Both
175700	175925	3.92	442.2	TCS-6	Both
175925	176150		450.0	TCS-10	Both

Chainage (m)		Length of CD(m)	Net Length (m)	TCS No.	Side
From	To				
176150	176275	2.6	244.8	TCS-3	Both
176275	176445	59.24	110.8	TCS-8	Hill
176445	176500		110.0	TCS-3	Both
176500	176600		100.0	TCS-8	Hill
176600	176825		450.0	TCS-3	Both
176825	177500		1350.0	TCS-3A	Both
177500	177700	2.6	394.8	TCS-3	Both
177700	178200	2.6	994.8	TCS-3A	Both
178200	178475		550.0	TCS-10	Both
178475	178925		900.0	TCS-9	Both
178925	179300	2.7	744.6	TCS-3A	Both
179300	179450	2.7	294.6	TCS-3	Both
179450	179600	2.6	294.8	TCS-3A	Both
179600	179700		200.0	TCS-3	Both
179700	179825		250.0	TCS-3A	Both
179825	179875		100.0	TCS-10	Both
179875	180075		400.0	TCS-2	Both
180425	180725	5.2	589.6	TCS-2	Both
180725	181100	2.6	744.8	TCS-9	Both
181100	181900	11.6	1576.8	TCS-2	Both
181900	182025		250.0	TCS-3	Both
182025	182150		250.0	TCS-2	Both
182300	182400		200.0	TCS-2	Both
182400	182725		650.0	TCS-10	Both
182725	182825		200.0	TCS-9	Both
Total Length=			**15632**		

PCC Trapezoidal Catch Water Drain on Berm (2.0m wide berm with PCC catch water drain up to the second level from hill toe shall be provided as given in the TCS Drawing.)

Chainage (m)		No of layer	Structure Length (m)	Net Length (m)	TCS Type
From	To				
173850	173950	2	59.24	81.52	TCS-9
174350	174475	1		125	TCS-9
174650	174875	1	2.6	222.4	TCS-3
174900	175025	1		125	TCS-3
175200	175500	1		300	TCS-3
175500	175700	1		200	TCS-3
175700	175925	1	3.92	221.08	TCS-6
175925	176150	2		450	TCS-10
176150	176275	1	2.6	122.4	TCS-3
176445	176500	1		55	TCS-3
176600	176825	2		450	TCS-3
176825	177500	2		1350	TCS-3A
177500	177700	1	2.6	197.4	TCS-3
177700	178200	2	2.6	994.8	TCS-3A
178200	178475	2		550	TCS-10

Chainage (m)		No of layer	Structure Length (m)	Net Length (m)	TCS Type
From	To				
178475	178925	2		900	TCS-9
178925	179300	2	2.7	744.6	TCS-3A
179300	179450	1	2.7	147.3	TCS-3
179450	179600	1	2.6	147.4	TCS-3A
179600	179700	1		100	TCS-3
179700	179825	2		250	TCS-3A
179825	179875	2		100	TCS-10
180725	181100	1	2.6	372.4	TCS-9
181900	182025	1		125	TCS-3
182400	182725	2		650	TCS-10
182725	182825	1		100	TCS-9
Total Length=				**9081**	

7. Design of Structures

(i) General

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

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

[Refer to provision of the relevant Manual and specify the width of carriageway of new bridges and structures of more than 60(sixty)metre length. If the carriageway width is different from 7.5(seven point five)metres in the table below.]

Sl. No.	Bridge/Structure at km	Width of carriageway and cross-sectional features
1	173.912	Carriageway Width =11.000 m Overall width = 12.00 m
2	176.389	
3	188.482	

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

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

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

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

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

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

[Refer to provision of the relevant Manualand provide details]

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

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

(ii) Culverts

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

(b) Reconstruction of existing culverts:

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

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

- Total no. of reconstruction with box culverts=28nos.

Sl. No.	Culvert Location(km)	Span/Opening (m)	Remarks*
1	180.469	1 X 2.0 X 2.0	Single Cell Box Culvert
2	180.661	1 X 2.0 X 2.0	Single Cell Box Culvert
3	180.909	1 X 2.0 X 2.0	Single Cell Box Culvert
4	181.114	1 X 2.0 X 2.0	Single Cell Box Culvert
5	181.248	1 X 5.0 X 5.0	Single Cell Box Culvert
6	182.287	1 X 2.0 X 2.0	Single Cell Box Culvert
7	184.962	1 X 2.0 X 2.0	Single Cell Box Culvert
8	185.302	1 X 2.0 X 2.0	Single Cell Box Culvert
9	185.488	1 X 2.0 X 2.0	Single Cell Box Culvert
10	185.628	1 X 2.0 X 2.0	Single Cell Box Culvert
11	185.841	1 X 2.0 X 2.0	Single Cell Box Culvert
12	186.268	1 X 5.0 X 5.0	Single Cell Box Culvert
13	186.515	1 X 2.0 X 2.0	Single Cell Box Culvert
14	186.552	1 X 2.0 X 2.0	Single Cell Box Culvert
15	186.736	1 X 2.0 X 2.0	Single Cell Box Culvert
16	186.815	1 X 2.0 X 2.0	Single Cell Box Culvert
17	186.915	1 X 2.0 X 2.0	Single Cell Box Culvert
18	186.949	1 X 2.0 X 2.0	Single Cell Box Culvert
19	187.045	1 X 2.0 X 2.0	Single Cell Box Culvert
20	187.337	1 X 2.0 X 2.0	Single Cell Box Culvert
21	187.428	1 X 3.0 X 3.0	Single Cell Box Culvert
22	188.068	1 X 2.0 X 2.0	Single Cell Box Culvert
23	188.217	1 X 2.0 X 2.0	Single Cell Box Culvert
24	188.787	1 X 2.0 X 2.0	Single Cell Box Culvert
25	189.916	1 X 2.0 X 3.0	Single Cell Box Culvert
26	190.004	1 X 2.0 X 2.0	Single Cell Box Culvert
27	190.988	1 X 2.0 X 2.0	Single Cell Box Culvert
28	191.413	1 X 2.0 X 2.0	Single Cell Box Culvert

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

(c)Widening of existing culverts:

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

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

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

- Total no. of new box culverts =23 nos.

Sl. No.	Culvert Location(km)	Span /Opening (m)	Remarks*
1	174.250	1 X 2.0 X 2.0	Single Cell Box Culvert
2	174.506	1 X 2.0 X 3.0	Single Cell Box Culvert
3	174.775	1 X 2.0 X 2.0	Single Cell Box Culvert
4	175.039	1 X 2.0 X 2.0	Single Cell Box Culvert
5	175.190	1 X 3.0 X 4.0	Single Cell Box Culvert
6	175.725	1 X 3.0 X 4.0	Single Cell Box Culvert
7	176.198	1 X 2.0 X 2.0	Single Cell Box Culvert
8	177.535	1 X 2.0 X 2.0	Single Cell Box Culvert
9	178.002	1 X 2.0 X 2.0	Single Cell Box Culvert
10	178.965	1 X 2.0 X 3.0	Single Cell Box Culvert
11	179.332	1 X 2.0 X 3.0	Single Cell Box Culvert
12	179.536	1 X 2.0 X 2.0	Single Cell Box Culvert
13	180.150	1 X 5.0 X 5.0	Single Cell Box Culvert
14	181.718	1 X 2.0 X 2.0	Single Cell Box Culvert
15	182.832	1 X 2.0 X 3.0	Single Cell Box Culvert
16	183.385	1 X 2.0 X 2.0	Single Cell Box Culvert
17	183.650	1 X 2.0 X 2.0	Single Cell Box Culvert
18	183.985	1 X 2.0 X 2.0	Single Cell Box Culvert
19	184.235	1 X 2.0 X 2.0	Single Cell Box Culvert
20	184.435	1 X 2.0 X 2.0	Single Cell Box Culvert
21	184.636	1 X 2.0 X 2.0	Single Cell Box Culvert
22	186.038	1 X 2.0 X 2.0	Single Cell Box Culvert
23	189.267	1 X 2.0 X 2.0	Single Cell Box Culvert

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

[Refer provision of the relevant Manual and provide details]

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

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

(iii) Bridges

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

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

[Refer provision of the relevant Manual and provide details]

Sl. No.	Bridge location	Existing Bridge		Proposed Bridge		Total Width (m)	Remarks
	(km)	Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)	Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)		
1	188.482	RCC Slab Bridge	1X6.3m	RCC Integral Slab	1 x 12m	12	Insufficient width and not conform to IRC Loading

(ii) The following narrow bridges shall be widened:

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

(b) Additional new bridges

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

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

Sl. No.	Location (km)	Type of Structures	Total Length (m)	Total Width (m)	Remarks. If any
1	173.912	Bow String Girder	1x50	12	New Bridge
2	176.389	Bow String Girder	1x50	12	New Bridge

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

[Refer provision of the relevant Manualand provide details:]

Sl.No.	Location at km	Remarks
Nil		

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

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

Sl.No.	Location atkm	Remarks
Nil		

(e) Drainage system for bridge decks

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

(f) Structures in marine environment

[Refer to provision of the relevant Manual and specify the necessary measures/ treatments for protecting structures in marine environment. Where applicable]

(v) Rail-road bridges

(a) Design construction and detailing of ROB/RUB shall be as specified in provision of the relevant Manual [Refer to provision of the relevant Manual and specify modification, if any]

(b) Road over-bridges

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

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

(c) Road under-bridges

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

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

(v) Grade separated structures

[Refer provision of the relevant Manual]

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

(vi) Repairs and strengthening of bridges and structures

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

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

(a) Bridges

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

(b)ROB / RUB

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

(c) Overpasses/Underpasses and other structures

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

(vii) List of Major Bridges and Structures

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

Sl. No.	Location (Km)
Nil	

8. Traffic Control Devices and Road Safety Works

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

Sl. No	Traffic Signages, Road Marking and other appurtenances	unit	Quantity
1	Total No of Street Light	Nos	374
2	Kilometre stones	Nos	15
3	5th Kilometre stones	Nos	4
4	Hectometer stones	Nos	72
5	Boundary Stones	Nos	180
6	Delineators (100 cm long and circular shaped)	Nos	1308
7	Road Stud	Nos	7354
8	900 mm Octagonal	Nos	49
9	600 mm circular	Nos	12
10	900 mm Triangular	Nos	277
11	500x600 Rectangular (Chevron)	Nos	6
12	2300x600 Rectangular (Chevron)	Nos	18
13	Direction Sign < 0.9 sqm	sqm	90
14	Direction Sign > 0.9 sqm	sqm	9
15	Convex Mirror for Blind Curve	Nos	18
16	Object Hazard 900 mm x 300 mm rectangular	Nos	108
17	Rumble Strip	Nos	10
18	Pavement Marking	sqm	5997

*All above quantities are minimum to be installed/executed. Additional may be provided if required as per site condition.

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

9. Roadside Furniture

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

(ii) Overhead traffic signs: location and size

Sl. No.	Location (Km)	Size			
		Clear Width (m)	Min. Clear Height (m)	Total Width	Plate Height (m)
1	End Point, at Chumukedima Junction (Ch. 191+675 km)	14.70 (Double Pole)	5.50	16.00	1.20

10. Landscaping and Tree Plantation

Landscaping and Tree Plantation of the Project Highway shall be in accordance with Section 11 of the Manual. The construction Contractor should plant at least 5750 nos. of tress beside the project road.

11. Hazardous Locations

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

a) Breast Wall

Chainage (m)		Length of CD	Net Length (m)	TCS No.	Side	Height
From	To					
Breast Wall (2m height)						
173950	174050		100.0	TCS-8	Hill	2
174350	174475		125.0	TCS-9	Hill	2
174650	174875	2.6	222.4	TCS-3	Hill	2
174875	174900		25.0	TCS-8	Hill	2
174900	175025		125.0	TCS-3	Hill	2
175200	175500		300.0	TCS-3	Hill	2
175925	176150		225.0	TCS-10	Hill	2
176150	176275	2.6	122.4	TCS-3	Hill	2
176275	176445	59.24	110.8	TCS-8	Hill	2
176445	176500		55.0	TCS-3	Hill	2
176500	176600		100.0	TCS-8	Hill	2
178200	178475		275.0	TCS-10	Hill	2
179300	179450	2.7	147.3	TCS-3	Hill	2
179600	179700		100.0	TCS-3	Hill	2
179825	179875		50.0	TCS-10	Hill	2
180725	181100	2.6	372.4	TCS-9	Hill	2
181900	182025		125.0	TCS-3	Hill	2
182400	182725		325.0	TCS-10	Hill	2
182725	182825		100.0	TCS-9	Hill	2
Total =			**3005**			
Breast Wall (3m height)						
173850	173950	59.24	40.8	TCS-9	Hill	3

Chainage (m)		Length of CD	Net Length (m)	TCS No.	Side	Height
From	To					
175500	175700		200.0	TCS-3	Hill	3
175925	176150		225.0	TCS-10	Hill	3
176600	176825		225.0	TCS-3	Hill	3
176825	177500		675.0	TCS-3A	Hill	3
177500	177700	2.6	197.4	TCS-3	Hill	3
177700	178200	2.6	497.4	TCS-3A	Hill	3
178200	178475		275.0	TCS-10	Hill	3
178475	178925		450.0	TCS-9	Hill	3
178925	179300	2.7	372.3	TCS-3A	Hill	3
179450	179600	2.6	147.4	TCS-3A	Hill	3
179700	179825		125.0	TCS-3A	Hill	3
179825	179875		50.0	TCS-10	Hill	3
Total =			**3480**			

b) Retaining Wall

Chainage (m)		Length of CD(m)	Net Length (m)	TCS No.	Side	Avg. Height (m)
From	To					
173950	174050		100	TCS-8	Valley	4
174050	174100		50	TCS-7	Valley	4
174475	174550	2.7	72	TCS-7	Valley	5
174875	174900		25	TCS-8	Valley	4
175025	175050	2.6	22	TCS-7	Valley	3
176275	176445	59.24	111	TCS-8	Valley	7
176500	176600		100	TCS-8	Valley	4
180075	180425	6.4	344	TCS-8A	Left	2
Total Length=			**824**			

c) Metal Beam Crash Barrier

Chainage(m)		Side	CD Length(m)	Length(m)	TCS
From	To				
180075	180425	Both	6.4	687	TCS-8A
Length of crash barrier(For both approaches of 3nos. Bridges) =				600	
Total length of crash barrier =				**1287**	

d) Turfing

Turfing of 15037 Sqm in 3362m length has been proposed in the project stretch.

12. Special Requirement for Hill Roads

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

Special Treatment for Hill Cutting

The Hill side surficial protection and erosion control measures is proposed at locations where the cut height of side slope is more than 6m. The minimum details of locations with length and average height are as below.

Stepped cutting should be maintained with maximum 6.0m height and minimum 2.0m wide berm as given in the TCS Drawing.

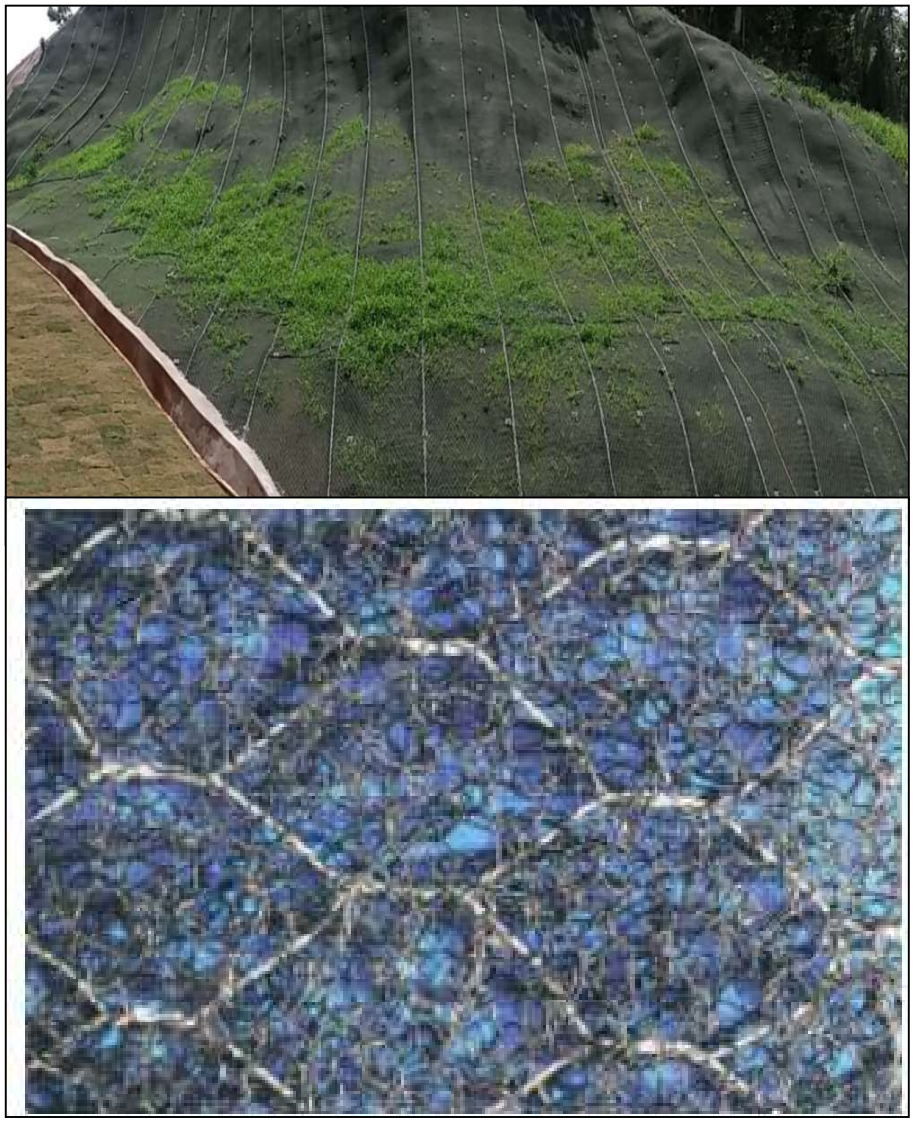
2.0m wide berm with PCC catch water drain up to the second level from hill toe shall be provided as given in the TCS Drawing.

Erosion Control Measure with reinforced geomat obtained by a polymer made three-dimensional matrix extruded onto a double twisted steel woven mesh. The reinforcing hexagonal steel wire mesh has mechanical characteristics higher than the ones suggested from EN 10223-3. The wire is with a zinc coating in accordance with EN 10244-2, Class A.

Chainage (m)		Length of CD (m)	Net Length (m)	Avg. Height of Cutting (m)	TCS No.	Side
From	To					
173850	173950	59.24	40.8	12	TCS-9	Hill side
174350	174475		125.0	7	TCS-9	Hill side
174650	174875	2.6	222.4	6	TCS-3	Hill side
174900	175025		125.0	6	TCS-3	Hill side
175200	175500		300.0	7	TCS-3	Hill side
175500	175700		200.0	8.5	TCS-3	Hill side
175700	175925	3.92	221.1	10	TCS-6	Hill side
175925	176150		225.0	14	TCS-10	Hill side
176150	176275	2.6	122.4	8	TCS-3	Hill side
176445	176500		55.0	6.5	TCS-3	Hill side
176600	176825		225.0	15	TCS-3	Hill side
176825	177500		675.0	18	TCS-3A	Hill side
177500	177700	2.6	197.4	8	TCS-3	Hill side
177700	178200	2.6	497.4	17	TCS-3A	Hill side
178200	178475		275.0	22	TCS-10	Hill side
178475	178925		450.0	16	TCS-9	Hill side
178925	179300	2.7	372.3	12	TCS-3A	Hill side
179300	179450	2.7	147.3	8	TCS-3	Hill side
179450	179600	2.6	147.4	8	TCS-3A	Hill side
179600	179700		100.0	10	TCS-3	Hill side
179700	179825		125.0	14	TCS-3A	Hill side
179825	179875		50.0	18.5	TCS-10	Hill side
180725	181100	2.6	372.4	10	TCS-9	Hill side
181900	182025		125.0	8	TCS-3	Hill side
182400	182725		325.0	12.5	TCS-10	Hill side
182725	182825		100.0	9	TCS-9	Hill side
TOTAL LENGTH =			**5820.84**			

(a) **Hill side Breast wall for Isolated Soil Strata-** Breast wall with minimum height of wall 3.0 m shall be constructed for the locations wherever soil strata is encountered after cutting at the toe of hill side slope. Breast wall shall be constructed along with 300mm filter media behind the Breast Wall for filtration & separation and road edge drain.

(b) **Erosion Control Measures for Soil Surface -** Providing and Spreading Steel Reinforced Geomats made of Polypropylene Polymer made three dimensional matrix of minimum mass per unit area 420 grams/sqm extruded onto a mechanically woven double twisted hexagonal shaped steel wire Mesh of wire Dia. 2.7mm and Mesh Type 8 x 10 having Zn-5%Al +Polymer coating as per EN 10244 - 2, the composite shall have a combined mass per unit area more than 1650 Grams / Sq.m and nominal thickness more than 10mm including fixing of U pins of 10mm diameter of typical depth 1m at 1m c/c spacing or anchor fasteners (if required) , including top/bottom support ropes, lacing required to connect the nets and all accessories such as U-clamps, including safety, all other ancillary works, material, machinery, labour, etc. complete with all leads and lifts and as directed by Engineer - In - Charge.



Photograph of Steel Reinforced Geomats

Special Treatment for Filling above 10m Height

a) Geocell Stretch for Slope Protection Work

Chainage(m)		Length(m)	side	CD Length(m)	Length(m)	TCS
From	To					
180075	180425	350	Both	6.4	687	TCS-8A
				Total length =	**687**	**m**

Furnishing and lnstalling of the Geocell (TFI Geocell TCI-660x100mm) for Slope Protection including fixing and anchoring of cells with 'J' Hook at 1m C/C in the ground, preparation of ground, filling of cells wlth granular materlals, seeding,watering and all other incidentals lncluding all other items to complete the work as per these specifications drawing or as directed by the engineer. Geotextile filter media shall be provided under Geo cell for filtration & separation.

Execution on site :

- Prepare slope surface as per drawings. Remove debris, rocks, unacceptable soil from area where Geocell is to be laid.
- Replace removed soil with acceptable soil and compact earthwork.
- Excavate anchoring trench and toe trench according to provided design.
- Lay a layer of nonwoven geotextile specified in the design
- Install J shaped anchors along anchor trench with proper alignment to hold Geocell section in place on the slope.
- Expand down the Geocell section on the slope and allow settling then fix end Geocells by using J shaped anchors.
- Adjacent Geocell must be levelled with each other and tie with each other using cable string.
- Install J hooks at specified distance as mentioned in design and drawing.
- When Geocell has been laid in place properly, Geocell should be filled with specified material.
- To prevent possible damage, limit drop height of infill to not more than 1m.
- Infill should be delivered either to top of slope or bottom of slope using a loader.
- For vegetative slope, locally available vegetative soil should be utilized as infill. Vegetation grows naturally or can be implanted as required

Installation of Geocell

Slope is ready and filled with GSB

(c) Please refer drawing Annexure - II & III of Schedule B

13. Change of Scope

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

14. Utility Shifting

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

Note-I:

a) The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work shall be as per the guidelines of utility owning department and it is to

be agreed solely between the contractor/Concessionaire* and the utility owning department. No change of scope shall be admissible and no cost shall be paid for using different type/spacing/size/specifications in shifted work in comparison to those in the existing work or for making any overhead crossing to underground as per requirement of utility owning department and/or construction of project highway. The contractor/concessionaire* shall carry out joint inspection with utility owning department and get the estimates from the utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of contractor/concessionaire* to utility owning department whenever asked by the contractor/concessionaire*. The decision/ approval of utility owning department shall be on the contractor/concessionaire*.

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

c) The dismantled material/scrap of existing Utility to be shifted/Dismantled shall belong to the contractor/concessionaire* who would be free to dispose-off the dismantled material as deemed fit by them unless the contractor/concessionaire* is required to deposit the dismantled material may be availed by the contractor/concessionaire* as per estimate agreed between them.

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

Note-II:

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

Annex – II of Schedule-B

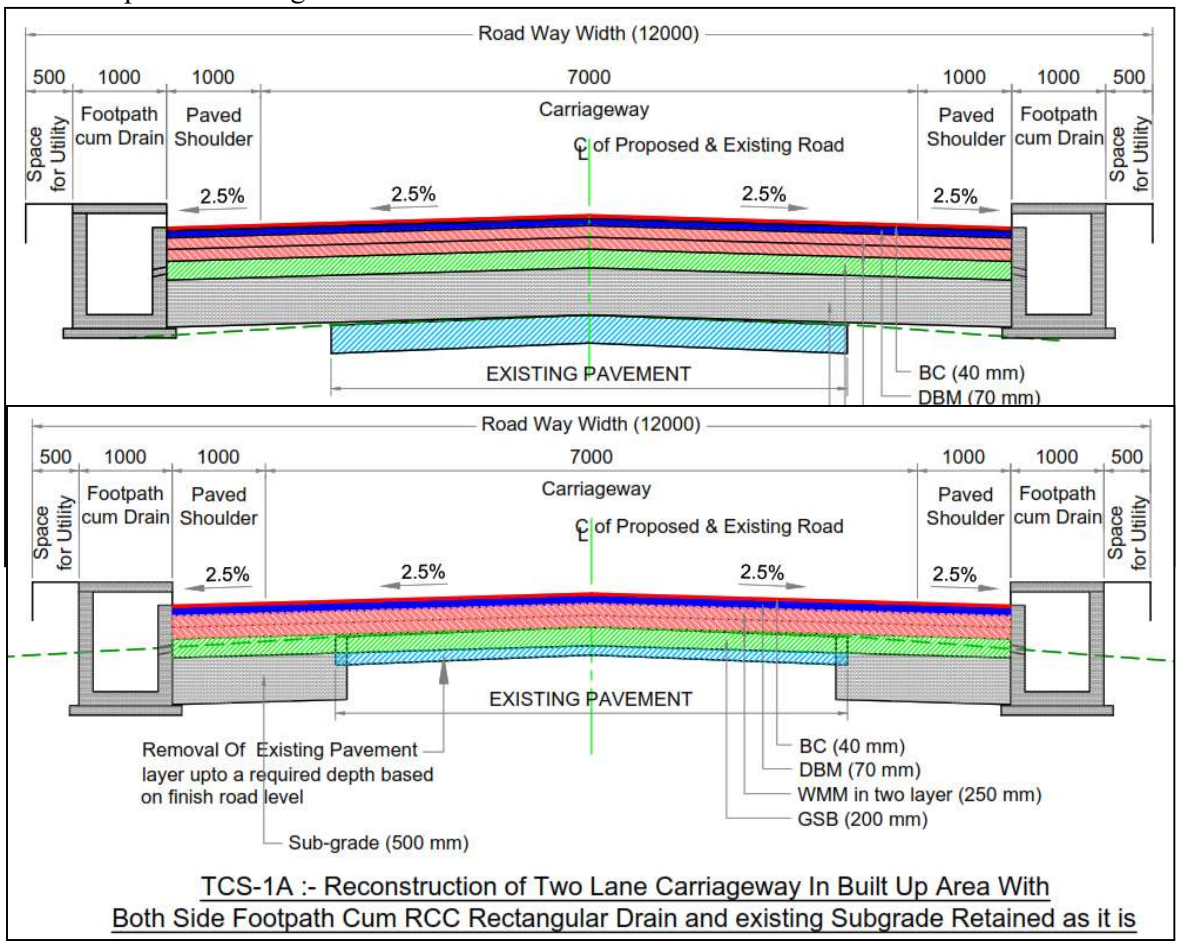
(Schedule-B)

The plan & profile and GAD of structures of the project highway are provided along with bid documents.

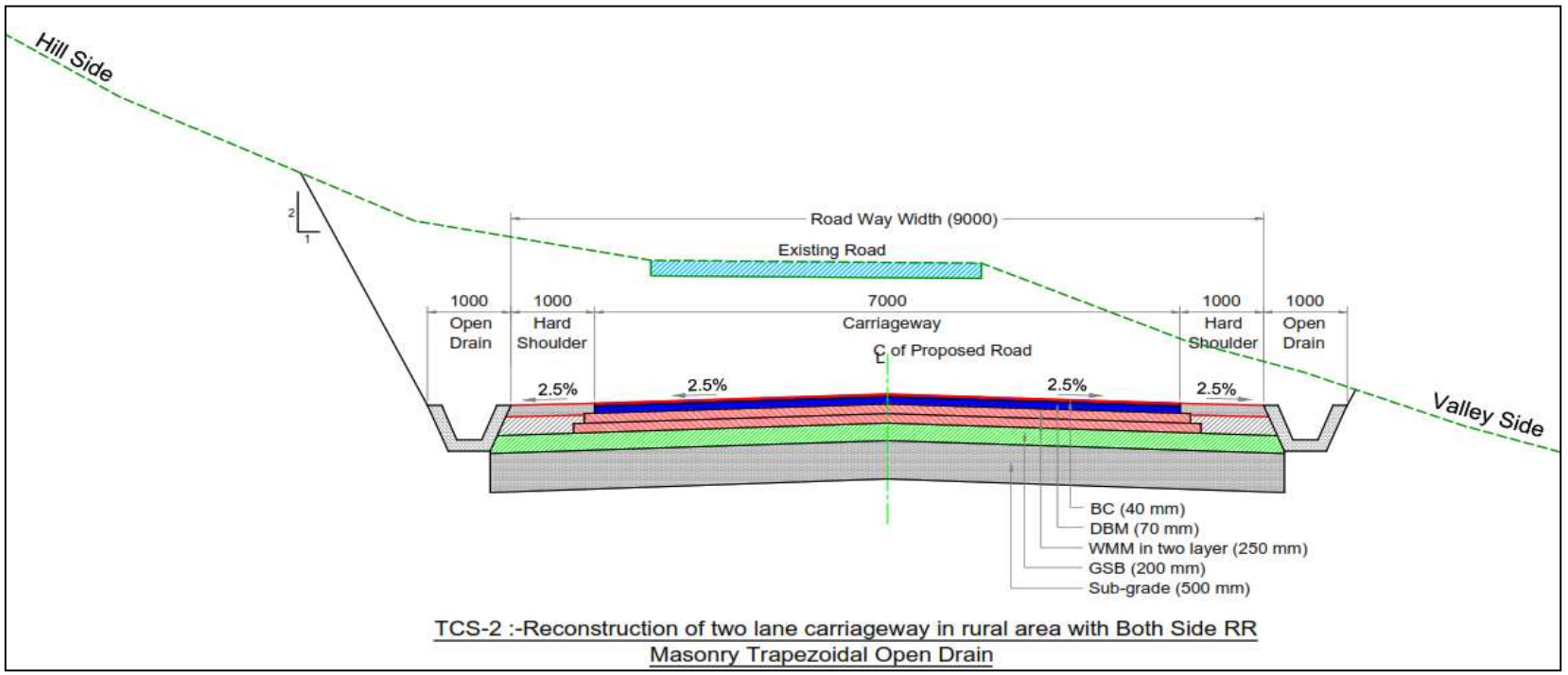
Annex – III of Schedule-B

(Schedule-B)

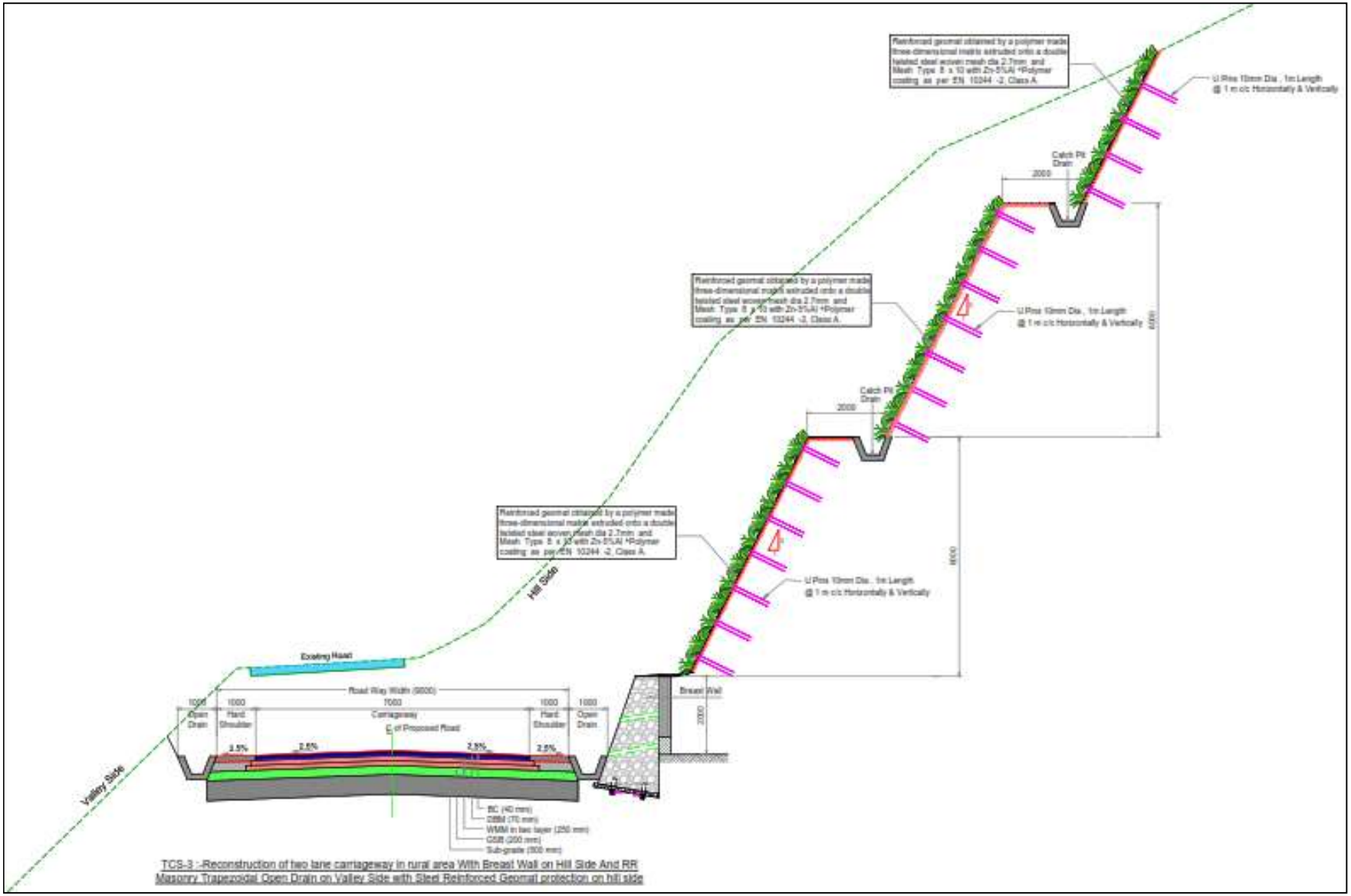
Typical Cross Section details are provided along with bid documents.



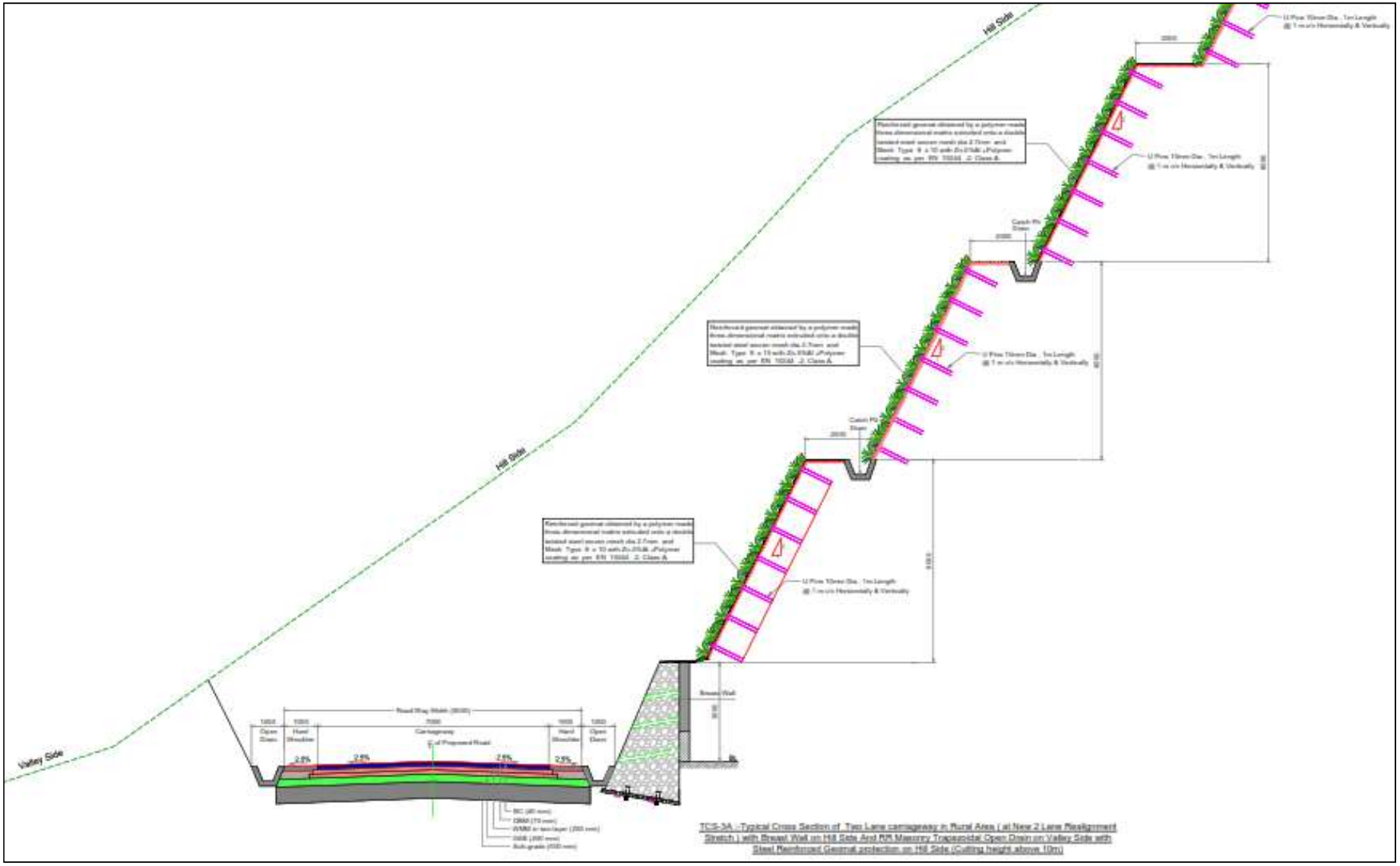
TCS-1A :- Reconstruction of Two Lane Carriageway In Built Up Area With Both Side Footpath Cum RCC Rectangular Drain and existing Subgrade Retained as it is



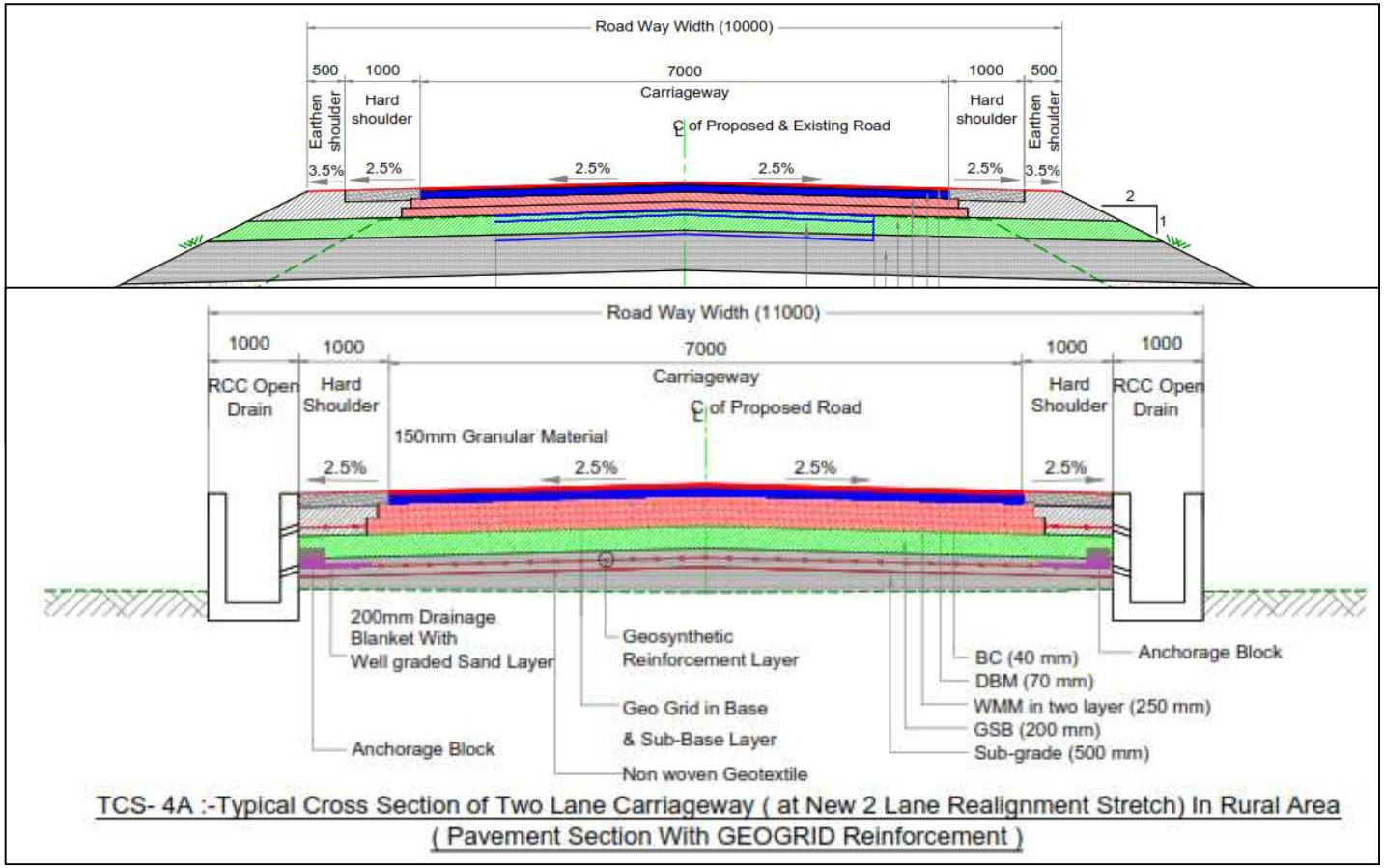
TCS-2 :-Reconstruction of two lane carriageway in rural area with Both Side RR Masonry Trapezoidal Open Drain



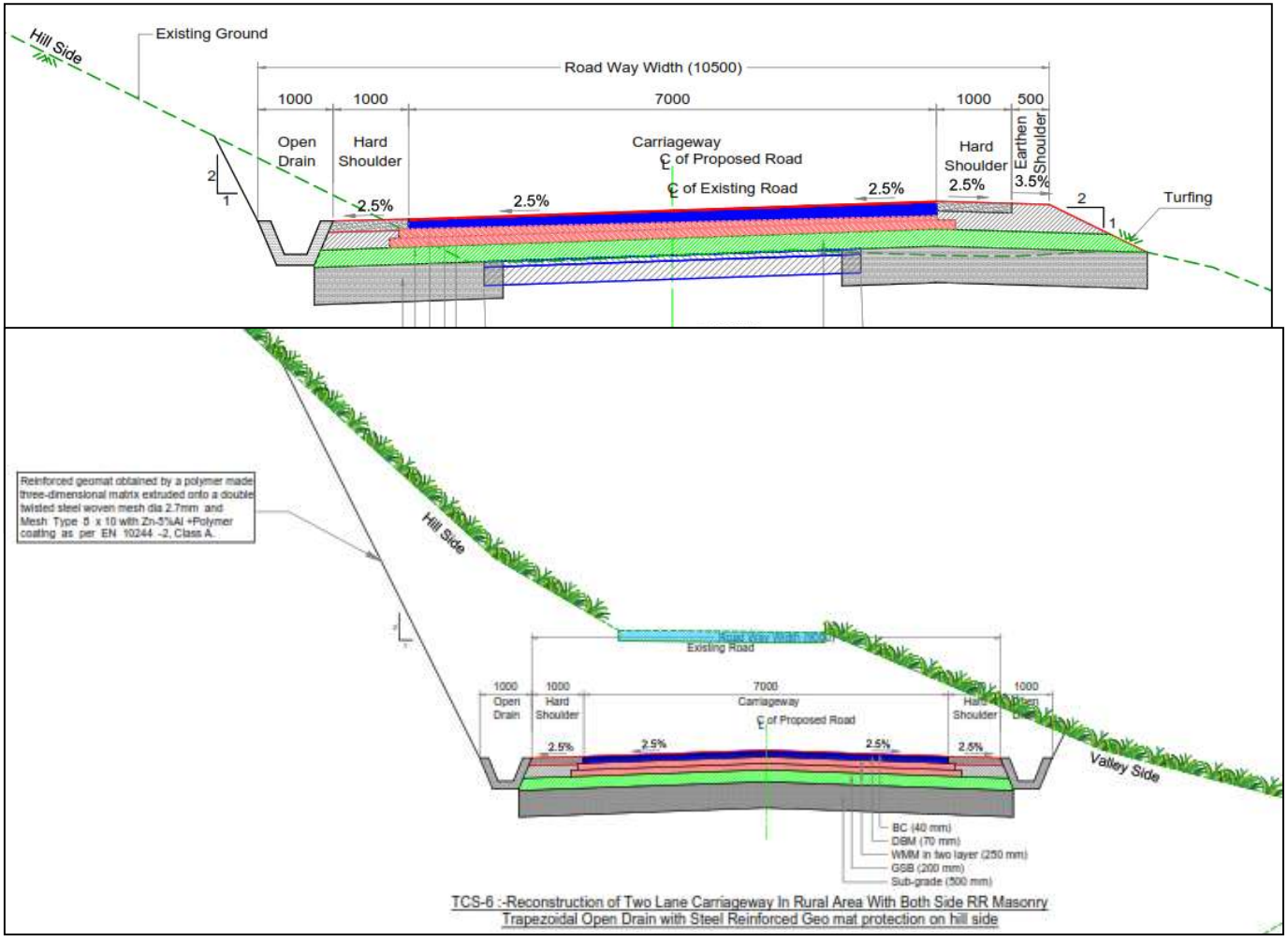
TCS-3 :-Reconstruction of two lane carriageway in rural area With Breast Wall on Hill Side And RR Masonry Trapezoidal Open Drain on Valley Side with Steel Reinforced Geomat protection on hill side



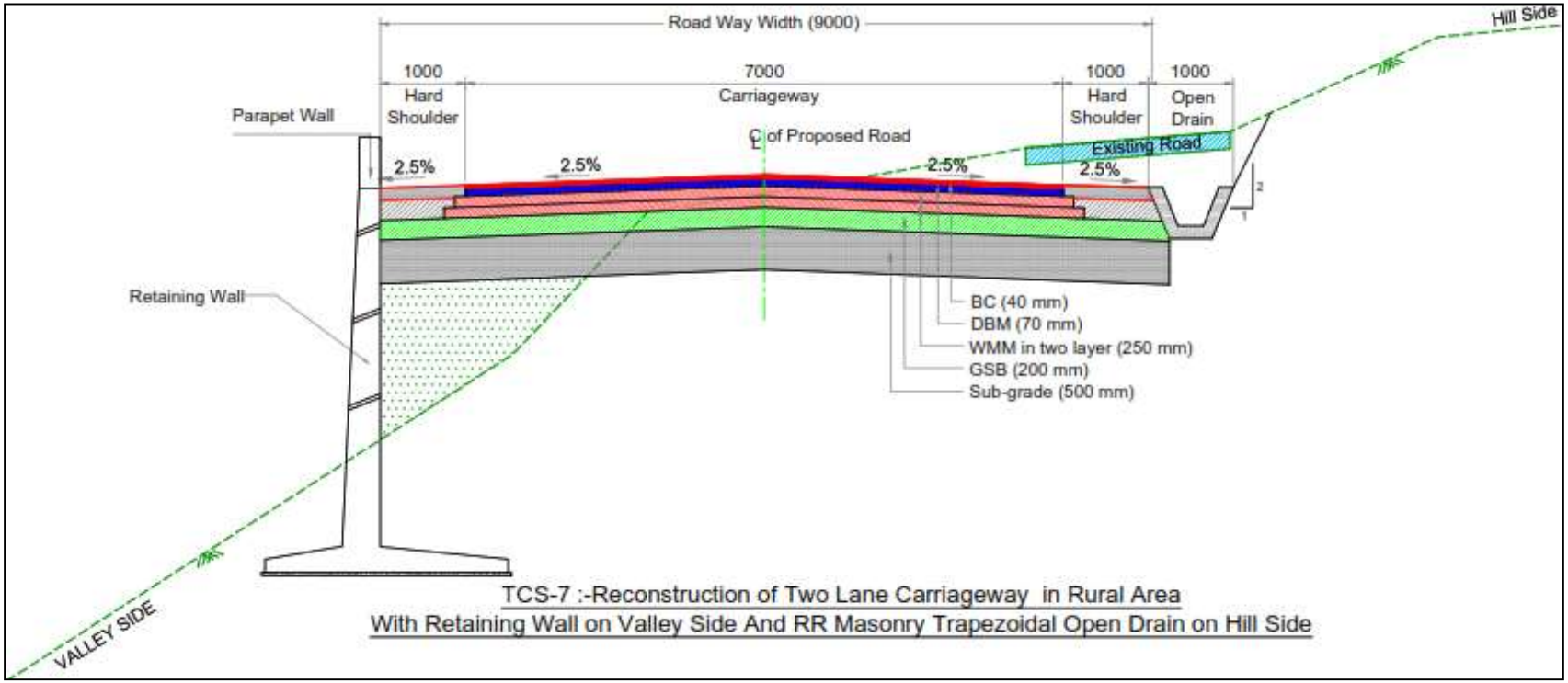
TCS-3A :-Typical Cross Section of Two Lane carriageway in Rural Area (at New 2 Lane Realignment Stretch) with Breast Wall on Hill Side And RR Masonry Trapezoidal Open Drain on Valley Side with Steel Reinforced Geomat protection on Hill Side (Cutting height above 10m)

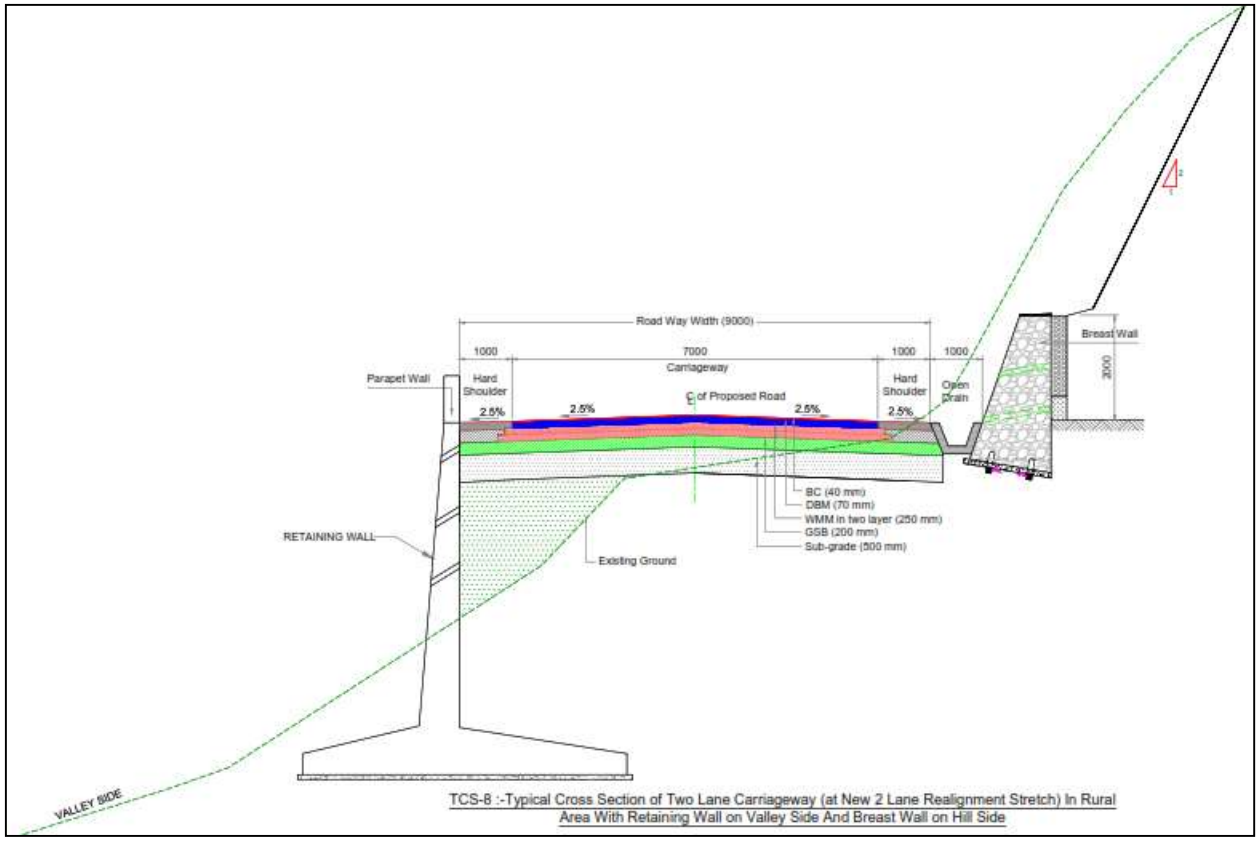


TCS- 4A :-Typical Cross Section of Two Lane Carriageway (at New 2 Lane Realignment Stretch) In Rural Area
(Pavement Section With GEOGRID Reinforcement)



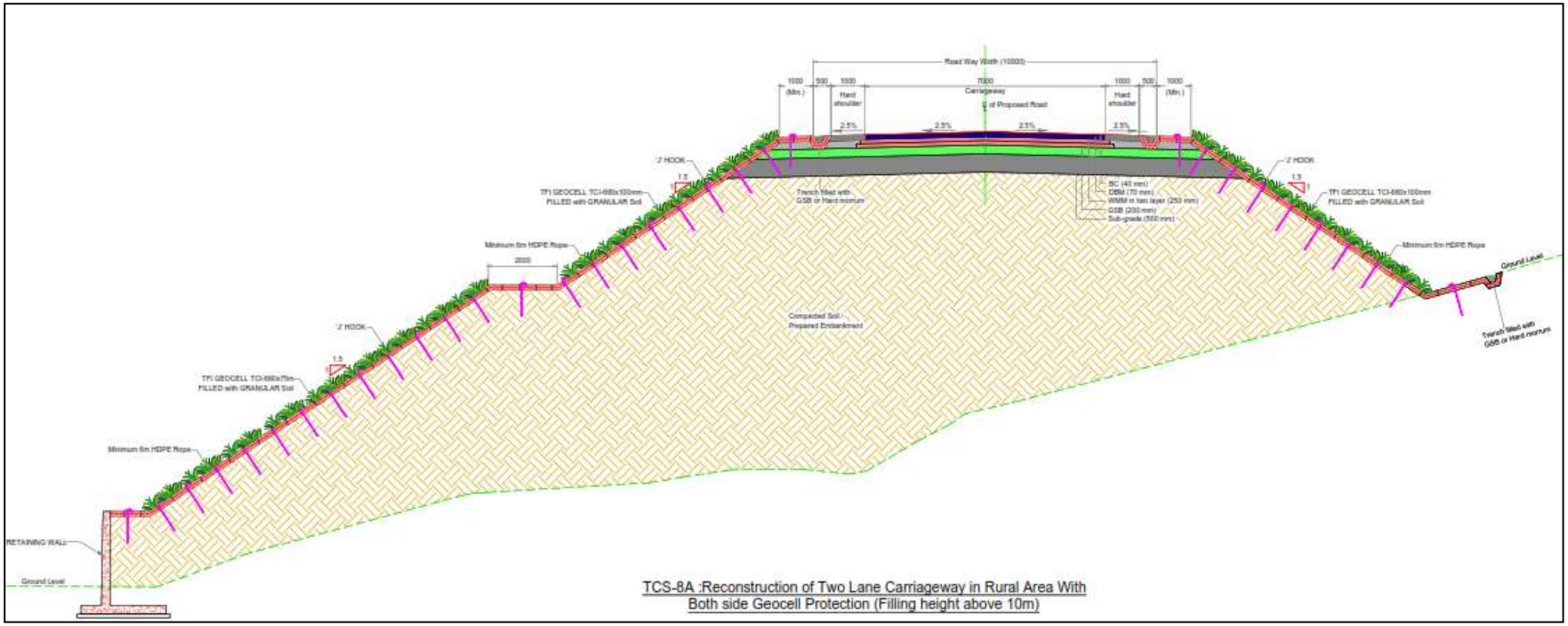
TCS-6 :-Reconstruction of Two Lane Carriageway In Rural Area With Both Side RR Masonry Trapezoidal Open Drain with Steel Reinforced Geo mat protection on hill side


Road Way Width (9000)
1000
Hard Shoulder
7000
Carriageway
1000
Hard Shoulder
1000
Open Drain
Hill Side
Parapet Wall
℄ of Proposed Road
Existing Road
2.5%
2.5%
2.5%
2.5%
Retaining Wall
BC (40 mm)
DBM (70 mm)
WMM in two layer (250 mm)
GSB (200 mm)
Sub-grade (500 mm)
VALLEY SIDE
TCS-7 :-Reconstruction of Two Lane Carriageway in Rural Area
With Retaining Wall on Valley Side And RR Masonry Trapezoidal Open Drain on Hill Side

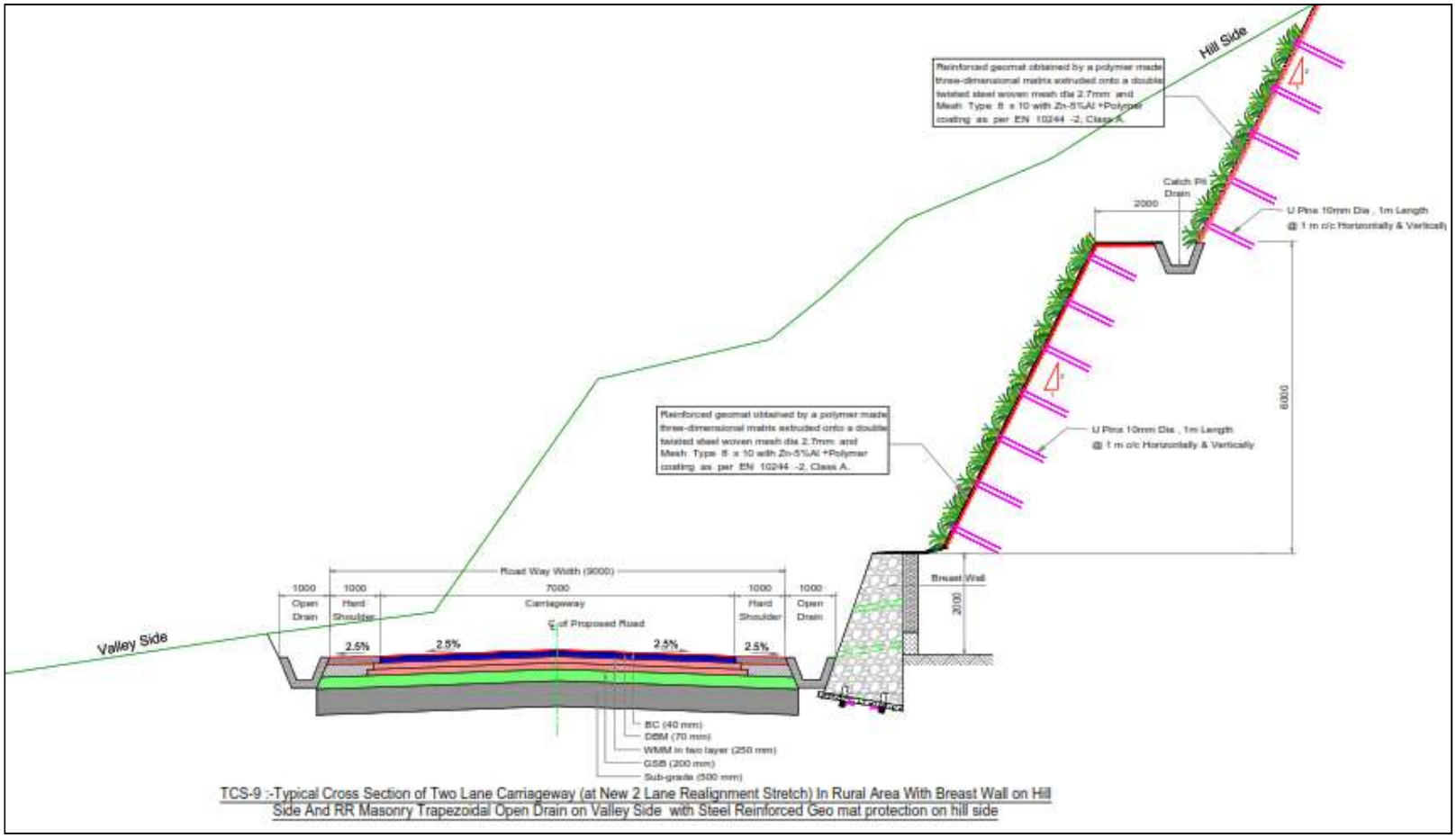


TCS-8 :-Typical Cross Section of Two Lane Carriageway (at New 2 Lane Realignment Stretch) In Rural Area With Retaining Wall on Valley Side And Breast Wall on Hill Side

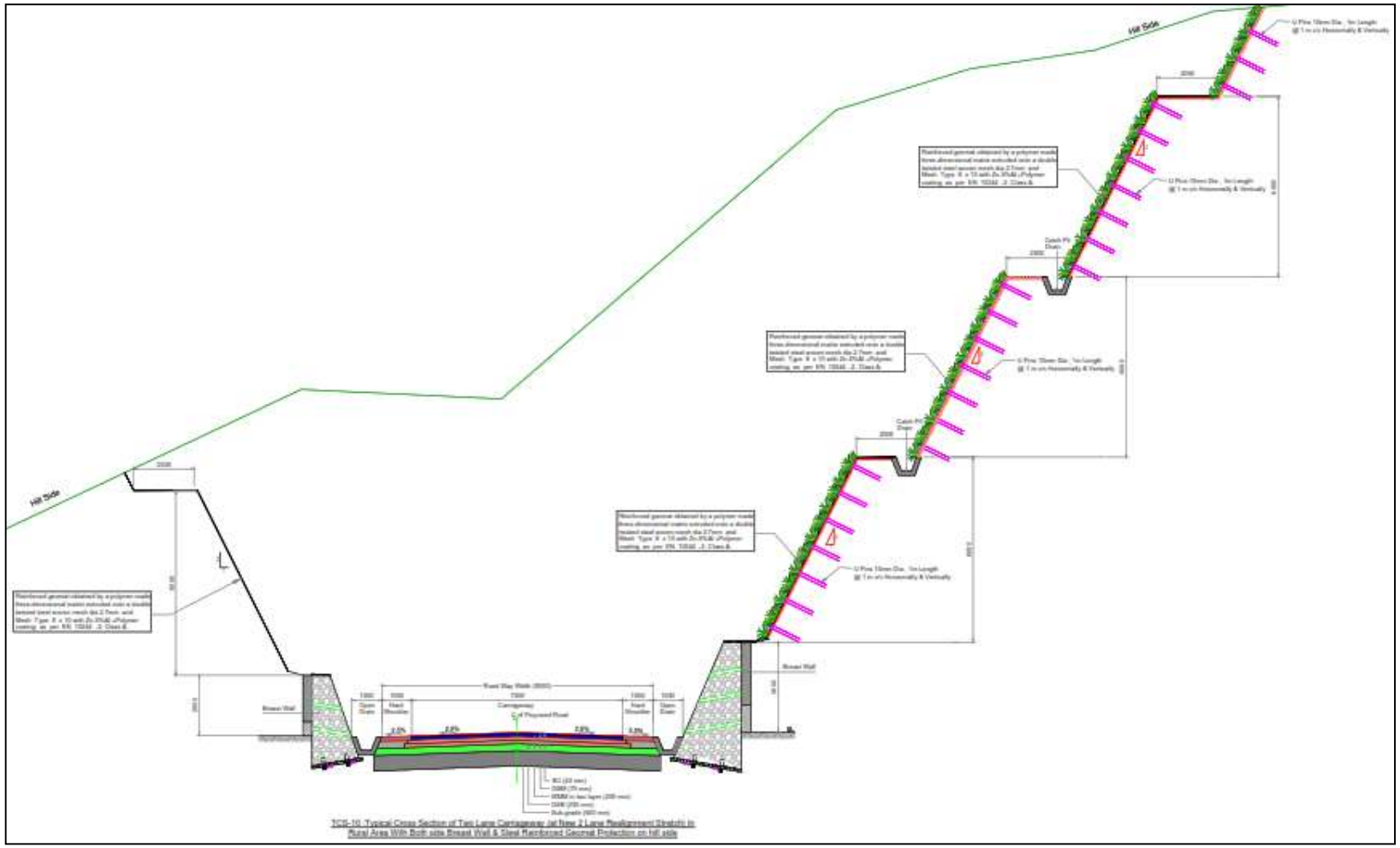
Construction of 2-laning with Hard shoulder of Peren-Dimapur section of NH-129A from Design Km 173.850 to Km 190.850 (Length – 17.000 Km) in the State of Nagaland on EPC mode (Package-V) under NH (O)-TSP



TCS-8A :Reconstruction of Two Lane Carriageway in Rural Area With Both side Geocell Protection (Filling height above 10m)



TCS-9 :-Typical Cross Section of Two Lane Carriageway (at New 2 Lane Realignment Stretch) In Rural Area With Breast Wall on Hill Side And RR Masonry Trapezoidal Open Drain on Valley Side with Steel Reinforced Geo mat protection on hill side



TCS-10: Typical Cross Section of Two Lane Carriageway (at New 2 Lane Realignment Stretch) in Rural Area With Both side Breast Wall & Steel Reinforced Geomat Protection on hill side

(Schedule-B1)

1. The shifting of utilities and felling of trees shall be carried out by the Contractor. The cost of the same shall be borne by the Authority. The details of proposed utilities are as follows:

The details of proposed electrical utility is given below(From Chumukedima A Village to 7th Mile Junction)

Sl. No	Description	Unit	Quantity
1	11KV Line(Galvanised Steel Tubular Pole SP-45)	Nos.	181
2	DTs(Galvanised Steel Tubular Pole SP-45)	Nos.	10
3	LT Line(Galvanised Steel Tubular Pole SP-35)	Nos.	51

The details of proposed PHE utility is given below(From Khopanala Bridge Point to 7th Mile Gate Point)

Sl. No	Description	Unit	Quantity
1	50mm Dia GI Line	Rm	2360
2	32mm Dia GI Line	Rm	2440
3	25mm Dia GI Line	Rm	2655
4	15mm Dia GI Line	Rm	995
5	Waste Collector Bin	No.	1
6	7800Litres GPS Tank With RCC Foundation	No.	1
7	Public Fountain	No.	1

Schedule - C

Schedule - C

(See Clause 2.1)

Project Facilities

1. Project Facilities

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

(a) Toll plaza[s]

(b) Roadside furniture;

(c) Pedestrian facilities;

(d) Truck Lay byes;

(e) Bus-bays and passenger shelters;

(f) Rest areas; and

(g) Others to be specified

2. Description of Project Facilities

Each of the Project Facilities is described below:

a) Toll Plaza: -

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

b) Road side furniture: -

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

C) Pedestrian Facility:-

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

d) Truck Lay bye:-

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

e) Bus Bay & Passenger shelter: -

Sl. No.	Project Facility	Location (km)	Other Essential Details
1	Bus Bay & Passenger Shelter	184.470(Both side)	Start Taper-22 m, Straight-15 m, End Taper-22 m
2	Passenger Shelter	190.200(Left hand side)	6m(Length)X2m(Width)
3	Passenger Shelter	190.260(Right hand side)	6m(Length)X2m(Width)

f) Rest Areas

Sl. No.	Rest Area Chainage	Name of the Place
Nil		

g) Others to be specified

Street Lighting:

Total 374 Nos. street lighting shall be provided in built-up section, bus bay & passenger shelter and bridge locations.

Landscaping and Tree Plantation:

Landscaping and Tree Plantation of the Project Highway shall be in accordance with Section 11 of the Manual. The construction Contractor should plant at least 5750 nos. of tress beside the project road.

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

Schedule- D

Schedule - D

(See Clause 2.1)

Specifications and Standards

1. Construction

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

2. Design Standards

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

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

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

Annex – I

(Schedule-D)

Specifications and Standards for Construction

1. Specifications and Standards

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

2. Deviations from the Specifications and Standards

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

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

<table>
<tr><th>Item</th><th>Manual Clause Reference</th><th>Provision as per Manual</th><th>Modified Provision</th></tr>
<tr><td rowspan="2">Design Speed</td><td rowspan="2">2.2</td><td>Mountainous or Steep Terrain:</td><td>Mountainous or Steep Terrain:</td></tr>
<tr><td>As per IRC SP 73: 2018
Ruling: 60 km/ hr
Minimum: 40 km/ hr
As per IRC SP 48: 1998/IRC 52: 2019
Ruling: 40 km/ hr
Minimum: 30 km/ hr</td><td>Minimum design speed of 30 km/hr has been taken as per IRC SP 48: 1998/IRC 52: 2019 in steep terrain and at some locations, design speed has been reduced to 20 km/ hr at hair pin bend. (Refer Horizontal Alignment Drawing and Table 1.1 below)</td></tr>
<tr><td rowspan="6">Extra Widening</td><td rowspan="6">2.7</td><td>Extra Widening has been proposed as per IRC: SP: 73-2018
<table><tr><th></th><th>Radius</th><th>Extra Widening</th></tr><tr><td></td><td>75-100 m</td><td>0.9 m</td></tr><tr><td></td><td>101-300 m</td><td>0.6 m</td></tr></table></td><td>Extra Widening has been proposed as per IRC: 52-2019 (Table 6.10) of Hill Road Manual.
<table><tr><th>Radius</th><th>Extra Widening</th></tr><tr><td>Up to 20</td><td>1.5 m</td></tr><tr><td>20-40</td><td>1.5 m</td></tr><tr><td>41-60</td><td>1.2 m</td></tr><tr><td>61-100</td><td>0.9 m</td></tr><tr><td>101-300</td><td>0.6 m</td></tr><tr><td>>300</td><td>NIL</td></tr></table></td></tr>
</table>

<table>
<tr><th>Item</th><th>Manual Clause Reference</th><th colspan="4">Provision as per Manual</th><th colspan="4">Modified Provision</th></tr>
<tr><td rowspan="11">Width of Shoulder</td><td rowspan="11">2.6</td><td colspan="4">As per IRC: SP: 73-2018</td><td colspan="4">As per Circular No. RW/NH-33044/22/2020-S&R (P&B) date 4th June 2024</td></tr>
<tr><td colspan="4">Open Country with isolated Built up area (2-Lane)</td><td colspan="4">Open Country with isolated Built up area (2-Lane)</td></tr>
<tr><td></td><td>Paved</td><td>Earthen</td><td>Total</td><td></td><td>Hard</td><td>Earthen</td><td>Total</td></tr>
<tr><td>Hill Side</td><td>1.5m</td><td>-</td><td>1.5m</td><td>Hill Side</td><td>1.0m</td><td>-</td><td>1.0m</td></tr>
<tr><td>ValleySide</td><td>1.0m</td><td>1.5m</td><td>2.5m</td><td>Valley Side</td><td>1.0m</td><td>0.5m</td><td>1.5m</td></tr>
<tr><td colspan="4">Built up area (2-Lane section)</td><td colspan="4">Built up area (2-Lane section)</td></tr>
<tr><td></td><td>Paved</td><td>Earthen</td><td>Total</td><td></td><td>Paved</td><td>Earthen</td><td>Total</td></tr>
<tr><td>Hill Side</td><td>0.25m+ 1.5m (Raised)</td><td>-</td><td>1.75 m</td><td>Hill Side</td><td>1.0m</td><td>-</td><td>1.0m</td></tr>
<tr><td>ValleySide</td><td>0.25m+ 1.5m (Raised)</td><td>-</td><td>1.75 m</td><td>Valley Side</td><td>1.0m</td><td>-</td><td>1.0m</td></tr>
<tr><td>Radii of Horizontal Curve</td><td>2.9.4</td><td colspan="4"><u>Mountainous Terrain:</u>
Desirable Minimum Radius: 150 m
Absolute Minimum Radius: 75 m</td><td colspan="4">Absolute Minimum Radius: 30 m Radius below 30 m has been provided in the location listed in table 1.2</td></tr>
</table>

Table 1.1: Locations where Design Speed is less than 30 kmphs

Sl. No.	Stretch (from km to km)	Remarks
1	174.488 to 174.540	Design Speed = 20 Kmph
2	174.617 to 174.636	Design Speed = 20 Kmph
3	174.673 to 174.695	Design Speed = 20 Kmph
4	175.171 to 175.215	Design Speed = 20 Kmph
5	176.625 to 176.658	Design Speed = 20 Kmph
6	176.659 to 176.700	Design Speed = 20 Kmph
7	176.928 to 176.966	Design Speed = 20 Kmph
8	176.966 to 177.003	Design Speed = 20 Kmph
9	177.517 to 177.569	Design Speed = 20 Kmph
10	178.210 to 178.247	Design Speed = 20 Kmph
11	178.829 to 178.842	Design Speed = 20 Kmph
12	179.833 to 179.867	Design Speed = 25 Kmph
13	179.868 to 179.830	Design Speed = 20 Kmph
14	180.372 to 180.393	Design Speed = 25 Kmph
15	180.440 to 180.470	Design Speed = 25 Kmph
16	180.802 to 180.816	Design Speed = 20 Kmph
17	180.895 to 180.935	Design Speed = 20 Kmph

Table 1.2: Locations where Radii of Horizontal Curve is less than 30 m

Sl. No.	HIP NO.	CHAINAGE (M)		RADIUS(M)
		From	To	
1	5	174488.001	174540.221	25
2	7	174673.414	174694.705	25

Sl. No.	HIP NO.	CHAINAGE (M)		RADIUS(M)
		From	To	
3	13	175171.434	175215.475	22
4	29	176624.506	176657.531	20
5	30	176659.473	176699.916	20
6	34	176928.001	176965.865	20
7	35	176966.148	177002.681	20
8	42	177516.667	177568.984	25
9	49	178209.629	178246.958	20
10	56	178829.282	178841.929	25
11	69	179832.831	179867.088	20
12	70	179867.781	179829.839	20
13	77	180371.762	180393.390	20
14	78	180439.866	180470.181	20
15	82	180802.334	180816.309	20
16	84	180895.101	180934.802	20

(iii) [Note1: Deviations from the aforesaid Specifications and Standards shall be listed out here. Such deviations shall be specified only if they are considered essential in view of project-specific requirements.]

Schedule - E

(See Clauses 2.1 and 14.2)

Maintenance Requirements

1. Maintenance Requirements

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

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

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

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex – I

(Schedule-E)

Annex-Repair/rectification of Defects and deficiencies

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

Table -1: Maintenance Criteria for Pavements:

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

<table>
<tr><th rowspan="2">Asset Type</th><th rowspan="2">Performance Parameter</th><th colspan="2">Level of Service (LOS)</th><th>Frequency of Inspection</th><th>Tools/Equipment</th><th>Standards and References for Inspection and Data Analysis</th><th>Time limit for Rectification/Repair</th><th>Maintenance Specifications</th></tr>
<tr><th>Desirable</th><th>Acceptable</th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><td rowspan="3"></td><td>Pavement Condition Index</td><td>3</td><td>2.1</td><td>Bi-Annually</td><td rowspan="2">(Sideway-force Coefficient Routine Investigation Machine or equivalent)</td><td>Surfaces with Accelerometer Established Inertial Profiling Reference
ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment</td><td>180 days</td><td>IRC:82-2015</td></tr>
<tr><td>Other Pavement Distresses</td><td></td><td></td><td>Bi-Annually</td><td>2-7 days</td><td>IRC:82-2015</td></tr>
<tr><td>Deflection/ Remaining Life</td><td></td><td></td><td>Annually</td><td>Falling Weight Deflecto meter</td><td>IRC 115: 2014</td><td>180 days</td><td>IRC:115-2014</td></tr>
<tr><td rowspan="2">Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)</td><td>Roughness BI</td><td>2200mm/km</td><td>2400mm/km</td><td>Bi-Annually</td><td>Class I Profilometer</td><td>ASTM E950 (98) :2004 and ASTM E1656 -94: 2000</td><td>180 days</td><td>IRC:SP:83-2008</td></tr>
<tr><td>Skid</td><td colspan="2">Skid Resistance no. at different speed of vehicles
<table><tr><th>Minimum SN</th><th>Traffic Speed (Km/h)</th></tr><tr><td>36</td><td>50</td></tr><tr><td>33</td><td>65</td></tr><tr><td>32</td><td>80</td></tr><tr><td>31</td><td>95</td></tr><tr><td>31</td><td>110</td></tr></table></td><td>Bi-Annually</td><td>SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)</td><td>IRC:SP:83-2008</td><td>180 days</td><td>IRC:SP:83-2008</td></tr>
<tr><td rowspan="3">Embankment/ Slope</td><td>Edge drop at shoulders</td><td>Nil</td><td>40mm</td><td>Daily</td><td rowspan="3">Length Measurement Unit like Scale, Tape, odometer etc.</td><td rowspan="3">IRC SP:73-2018, IRC 36-2010 & IRC 56-2011</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Slope of camber/cross fall</td><td>Nil</td><td><2% variation in prescribed slope of camber /cross fall</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Embankment Slopes</td><td>Nil</td><td><15 % variation in prescribe side slope</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

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

Table -2: **Maintenance Criteria for Rigid Pavements:**

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 > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected.

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 > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
3	**Single Longitudinal Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > l m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15 days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 15 days
4	**Multiple Cracks intersecting with one or more joints**	**w = width of crack**	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > 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**		0	Nil, not discernible	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
		w = width of crack L = length of crack	1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	three or four corners broken		Reinstate sub-base, and reconstruct the slab as per norms and specifications within 30days
6	**Punch-out (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w = width of crack L = length (m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m^2	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3 m/m^2		
			3	w > 1.5 mm and L < 3 m/m^2		
			4	w > 3 mm, L < 3 m/m^2 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/m^2 and deformation		
Surface Defects						
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term**	**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 %		
			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.	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
					Within 30 days	
8	**Scaling**	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term** No action.	**Long Term**
			1	r < **2 %**	Local repair of areas damaged 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 if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	**Pop out (Small Hole), Pothole Refer Para 8.4**	n = number/m^2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m^2	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m^2		
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m^2	Partial depth repair 110mm i.e.10 mm more than the depth of the hole. Within 30 days	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m^2		
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	

Joint Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total joint length	0	Difficult to discern.	**Short Term** No action.	**Long Term** Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in Selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	**Spalling of Joints**	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion. Within 7 days	
			2	w = 10 - 20 mm, L < 25%		
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of	

Joint Defects						
					w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	**Faulting (or Stepping) in Cracks or Joints**	f = difference of level	0	not discernible, < 1 mm	No action.	No action.
			1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	
14	**Blow-up or Buckling**	h = vertical displacement from normal profile	0	Nil, not discernible	**Short Term**	**Long Term**
					No Action	
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic within 7 days	
			3	h = 12 - 25 mm		
			4	h > 25 mm	Full Depth Repair. Within 30 days	

Joint Defects						
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstate pavement at normal level if L < 20 m. Within 30 days	
			5	h > 100 mm		
16	**Heave**	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	**Short Term** No action.	**Long Term** Scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
17	**Bump**		0	h < 4 mm	No action	

Joint Defects						
		h = vertical displacement from normal profile	1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Drop-off**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term**	**Long Term**
					No action.	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder within 7 dayss	
			4	f = 50 - 75 mm		For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			5	f > 75 mm		
Drainage						
19	**Pumping**	quantity of fines and water expelled	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at

Joint Defects						
		through open joints and cracks Nos	3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	distressed sections and upstream.
		Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	
20	**Ponding**	Ponding on slabs 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:

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td>Highway</td><td>Availability of Safe Sight Distance</td><td>As per IRC: 52-2019, a minimum of safe stopping sight distance shall be available throughout.
<table><tr><th>Design Speed, kmph</th><th>Desirable Minimum Sight Distance (m)</th><th>Safe Stopping Sight Distance (m)</th></tr><tr><td>50</td><td>120</td><td>60</td></tr><tr><td>40</td><td>90</td><td>45</td></tr></table></td><td>Monthly</td><td>Manual Measurements with Odometer along with video/ image backup</td><td colspan="2">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.
In case of permanent structure or design deficiency:
Removal of obstruction/improvement of deficiency at the earliest
Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td>IRC : 52-2019</td></tr>
<tr><td rowspan="3">Pavement Marking</td><td>Wear</td><td><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m^2/lux
Bituminous Road - 100mcd/m^2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td>Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u></td><td>Bi-Annually</td><td>As per Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours</td><td>IRC:35-2015</td></tr>
</table>

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m²/lux)</td></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<tr><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td>65 - 100</td><td>250</td><td>120</td></tr>
<tr><td>Above 100</td><td>350</td><td>150</td></tr>
</table>
Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):
Initial 7 days Retro reflectivity: 100 mcd/m²/lux
Minimum Threshold Level: 50 mcd/m²/lux</td><td></td><td></td><td></td><td>Cat-2 Defect – within 2 months</td><td></td></tr>
<tr><td></td><td>Skid Resistance</td><td>Initial and Minimum performance for Skid Resistance:
Initial (7days): 55BPN
Min. Threshold: 44BPN
*Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc</td><td>Bi-Annually</td><td>As per Annexure-G of IRC:35-2015</td><td></td><td>Within 24 hours</td><td>IRC:35-2015</td></tr>
<tr><td>Road Signs</td><td>Shape and Position</td><td>Shape and Position as per IRC:67-2022. Signboard should be clearly visible for the design speed of the section.</td><td>Daily</td><td>Visual with video/image backup</td><td>Improvement of shape, in case if shape is damaged.</td><td>48 hours in case of Mandatory Signs, Cautionary and Informatory Signs</td><td>IRC:67-2022</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
					Relocation as per requirement	(Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	
	Retro reflectivity	As per specifications in IRC:67-2022	Bi-Annually	Testing of each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/ Cantilever Sign boards	IRC:67-2022
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP 73-2018 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:73-2018, IRC:35-2022
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:73-2018,
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:73-2018, IRC:119-2015

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	End Treatment of Traffic Safety Barriers	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:73-2018, IRC:119-2015
	Attenuators	Functionality: Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119-2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 – 2019
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2022
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:73-2018,
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:73-2018
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:73-2018,
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:73-2018,
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:73-2018,
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:73-2018,

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:73-2018,
	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:73-2018,
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP:73-2018,
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus- shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP:73-2018,

Table 4: Maintenance Criteria for Structures and Culverts:

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pipe/box/slab culverts	Free waterway/unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-2019 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	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.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		(concrete apron) not more than 1 sqm					
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge -Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-2015, 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					

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		rain water through expansion joint in case of buried and asphalt plug and copper strip joint.					
	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.
	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.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	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 inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-2019, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-2019 and IRC: SP:13-2022.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
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
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

Nature of Defect or deficiency		Time limit for repair/ rectification
(b)	**Granular earth shoulders, side slopes, drains and culverts**	
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side 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

Nature of Defect or deficiency		Time limit for repair/ rectification
(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], Rain water harvesting/Artificial Recharge Unit 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

	Nature of Defect or deficiency	Time limit for repair/ rectification
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(iii)	Snow requiring clearance	24 (twenty four) hours

[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

Schedule - F

(See Clause 4.1 (vii)(a))

Applicable Permits

1. Applicable Permits

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

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

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

c. Licence for use of explosives;

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

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

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

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

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

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

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

Schedule – G

(See Clauses 7.1 and 19.2)

Form of Bank Guarantee

Annex-I

(See Clause 7.1)

[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 "**Widening and Up-gradation of existing carriageway into 2-lane with paved shoulder from Lavamore to Start of Pedong Bypass along NH-717A from existing km 61.100 to km 79.520 in the State of West Bengal on EPC Mode"** (hereinafter called the "Contract").

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

AND WHEREAS we, …….. through our branch at ……. (the "Bank") have agreed to furnish this Bank Guarantee (hereinafter called the "Guarantee") by way of Performance Security.

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

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

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

2. A letter from the Authority, under the hand of an officer not below the rank of [Superintending Engineer of Ministry of Road Transport & 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 Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Contract and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

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

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

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

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

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

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

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

S. No.	Particulars	Details
1.	Name of Beneficiary	National Highways & Infrastructure Development Corporation Ltd. (NHIDCL)
2.	Name of Bank	Canara Bank
3.	Account No.	8598201005819
4.	IFSC Code	CNRB0008598

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

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

(Designation)

(Code Number)

(Address)

(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 "**Widening and Up-gradation of existing carriageway into 2-lane with paved shoulder from Lavamore to Start of Pedong Bypass along NH-717A from existing km 61.100 to km 79.520 in the State of West Bengal on EPC Mode"** (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 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.

[$]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.

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)

Annex - II

(Schedule - G)
(See Clause 19.2)

Annex-IForm for Guarantee for Advance Payment

The Managing Director,
National Highways & Infrastructure Development Corporation Limited (NHIDCL)
New Delhi
WHEREAS:

(A) ……[name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the National Highways & Infrastructure Development Corporation, 1st & 2nd Floor, Tower A, World Trade Centre, Nauroji Nagar, New Delhi – 110029, (hereinafter called the **"Authority"**) have entered (hereinafter called the "**Authority**") for **Widening and Up-gradation of existing carriageway into 2-lane with paved shoulder configuration from Lavamore (Km 61.10) to Start of Pedong Bypass (Km 79.700) along NH-717A in state of West Bengal** 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 instalments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such instalment to remain effective till the complete and full repayment of the instalment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} instalment of the Advance Payment is Rs. ------ cr. (Rupees ------ crore) and the amount of this Guarantee is Rs. ------- cr. (Rupees ------ crore) (the **"Guarantee Amount")**[$]**.**

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

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

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

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

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

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 Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

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 Advance Payment.

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 on or before the aforesaid date, 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

[$] 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).

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 up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

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

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

S. No.	Particulars	Details
1.	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited (NHIDCL)
2.	Name of Bank	Canara Bank
3.	Account No.	8598201005819
4.	IFSC Code	CNRB0008598

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

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

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Schedule - H

(See Clauses10.1 (iv) and 19.3)

Contract Price Weightages

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

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road Works including Culverts, widening and repair of culverts.	45.40%	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of the sub-grade	[Nil]
		(2) Sub-Base Course	[Nil]
		(3) Non Bituminous Base course	[Nil]
		(4) Bituminous Base course	[Nil]
		(5) Wearing Coat	[Nil]
		(6) Widening and repair of culverts	[Nil]
		B.1-Reconstruction/New 2-Lane Realignment /Bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	20.29%
		(2) Sub Base Course	16.80%
		(3) Non Bituminous Base course	20.92%
		(4) Bituminous Base course	15.58%
		(5) Wearing Coat	10.46%
		B.2-Reconstruction/New 2-Lane Realignment/ Bypass (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	[Nil]
		(2) Sub Base Course	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(3) Dry Lean Concrete (DLC) Course	[Nil]
		(4) Pavement Quality Control (PQC) Course	[Nil]
		C.1-Reconstruction/ New Service Road (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	[Nil]
		(2) Sub Base Course	[Nil]
		(3) Non Bituminous Base course	[Nil]
		(4) Bituminous Base course	[Nil]
		(5) Wearing Coat	[Nil]
		C.2- Reconstruction/New Service Road (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	[Nil]
		(2) Sub Base Course	[Nil]
		(3) Dry Lean Concrete (DLC) Course	[Nil]
		(4) Pavement Quality Control (PQC) Course	[Nil]
		D- Reconstruction and New culverts on existing road, realignments, bypasses: Culverts (length <6m)	15.95%
Minor Bridges/ Underpasses / Overpasses	8.60%	**A.1-Widening and Repair of Minor bridges (length >6 m and<60m).**	
		Minor Bridges	[Nil]
		A.2- New Minor bridges (length >6 m and<60m)	
		(1) Foundation: On completion of the foundation work including foundations for wing and return walls.	24.43%
		(2) Sub-structure: on completion of abutments, piers upto the abutment/pier cap.	12.41%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(3) Super-structure: On completion of the super-structure in all respects including wearing coat, bearing, expansion joint, hand rails, crash barrier, road signs & markings, tests on completion etc. complete in all respect.	60.68%
		(4) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use	0.98%
		(5) Guide Bunds & River Training Works: On completion of Guide Bunds and river Training Works complete in all respects	0.58%
		(6) Diversion works On completion of Diversion Work complete in all respects	0.92%
		B.1- Widening and Repair of underpasses/overpasses	
		Underpasses/ Overpasses	[Nil]
		B.2-New underpasses/overpasses	
		(1) Foundation + Sub Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	[Nil]
		(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings,	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass-rigid pavement including drainage facility complete in all respects as specified.	
		(3) Approaches: On completion of approaches including Retaining walls/Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]
Major bridge (length>60 m) works and ROB/RUB/ elevated sections/ flyovers including viaducts ,if any	[Nil]	**A.1- Widening and repairs of Major Bridges**	
		(1) Foundation	[Nil]
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4) Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Guide Bunds, River Training works etc.	[Nil]
		(8) Approaches(including Retaining walls, stone pitching and protection works)	[Nil]
		A.2-New Major Bridges	
		(1) Foundation	[Nil]
		(2) Sub-structure	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(3) Super-structure (including bearings)	[Nil]
		(4) Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Guide Bunds, River Training works etc.	[Nil]
		(8) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]
		B.1-Widening and repair of **(a) ROB** **(b) RUB**	
		(1) Foundation	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4) Wearing Coat: (a)in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	[Nil]
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		B.2-New ROB/RUB (a) ROB (b) RUB	
		(1) Foundation	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4) Wearing Coat (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	[Nil]
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	[Nil]
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	
		(1) Foundation	[Nil]
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4)Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barriers, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	[Nil]
		C.2- New Elevated Section/Flyovers/Grade Separators	
		(1) Foundation	[Nil]
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4)Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barriers, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	[Nil]
Other Works	46.00%	(i) Toll Plaza	[Nil]
		(ii) Road side drains	
		(a) PCC Trapezoidal Drain in road side including catch water drain	6.68%
		(b) RCC Covered / Open Drain	24.35%
		(iii) Road signs, marking, km stones, safety devices, lighting.....	6.01%
		(iv) Project facilities	
		(b) Junctions	0.45%
		(b) Bus Bay with passenger shelter	0.32%
		(c) Truck lay-byes	[Nil]
		(d) Rest Area	[Nil]
		(e) Others	[Nil]
		(v) Road side plantation	1.36%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(vi) Protection works other than approaches to the bridges, elevated sections/ flyovers/ grade separators and ROBs/ RUBs	[Nil]
		(a) "W" : Metal Beam Crash Barrier	0.64%
		(b) Retaining Wall	7.76%
		(c)) Breast Wall	38.48%
		(d) Geo cell protecton	1.76%
		(e) Steel Reinforced Geomat	6.80%
		(e) Protection Works (Turfing with sods,)	0.65%
		(vii) Safety and traffic management	[Nil]
		(ix) Site clearance & Dismantling	0.85%
		Utility shifting	
		a) APDCL	2.91%
		b) PHED	0.98%
		c) Others	[Nil]

1.3 Procedure of estimating the value of work done.

1.3.1 Road works.

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

Table 1.3.1

Stage of Payment	Percentage weightage	Payment Procedure
A- Widening & strengthening of existing road		
(1) Earthwork up to top of the sub- grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. n case of Hill Cutting, the payment procedure will be as under: Hill Cutting: 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub-Base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non Bituminous Base Course	[Nil]	
(4) Bituminous Base Course	[Nil]	
(5) Wearing Coat	[Nil]	
(6) Widening and repair of culverts	[Nil]	Cost of completed culverts shall be determined pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of atleast five culverts.
B.1- Reconstruction/New 2-lane realignment/ bypass (Flexible pavement)		.
(1) Earthwork up to top of the sub-grade	20.29%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on

Stage of Payment	Percentage weightage	Payment Procedure
		completion of a stage in a length of not less than 500 m. n case of Hill Cutting, the payment procedure will be as under: Hill Cutting: 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub Base Course	16.80%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non-Bituminous Base Course	20.92%	
(4) Bituminous Base Course	15.58%	
(5) Wearing Coat	10.46%	
B.2- Reconstruction/New 2-Lane realignment / bypass (Rigid pavement)		
(1) Earthwork up to top of the sub- grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. n case of Hill Cutting, the payment procedure will be as under: Hill Cutting: 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub Base Course	[Nil]	Unit of measurement is linear length. Payment of
(3) Dry Lean Concrete (DLC) Course	[Nil]	

Stage of Payment	Percentage weightage	Payment Procedure
(4) Pavement Quality Control (PQC) Course	[Nil]	each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
C.1- Reconstruction/ New service road (Flexible pavement)		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. n case of Hill Cutting, the payment procedure will be as under: Hill Cutting: 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub Base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non-Bituminous Base Course	[Nil]	
(4) Bituminous Base Course	[Nil]	
(5) Wearing Coat	[Nil]	
C.2- Reconstruction/ New service road (Rigid pavement)		
(1) Earthwork up to top of the sub- grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.

Stage of Payment	Percentage weightage	Payment Procedure
		n case of Hill Cutting, the payment procedure will be as under: Hill Cutting: 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub Base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Dry Lean Concrete (DLC) Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
D- Re-Construction and 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 01(one) culvert.
(1) Culverts (length <6m)	15.95%	

@. 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 including the length not handed over to the Contractor under clause 8.3 of this Contract Agreement due to which the Contractor is unable to execute the work, may be deducted from the total project length for payment 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 : NIL

1.3.3 Major Bridge works, ROB/RUB and Structures.

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

Table 1.3.3

Stage of Payment	Weightage	Payment Procedure
1	2	3
A.1- Widening and repairs of Major Bridges		
(i) Foundation	[Nil]	**(i) Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro- rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of atleast two foundations of the major Bridge . In case where load testing is required
(ii) Sub-structure	[Nil]	**(ii) Sub-Structure:** Payment against Sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the major bridge subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(iii)Super-structure (including bearings)	[Nil]	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.

Stage of Payment	Weightage	Payment Procedure
1	**2**	**3**
(iv) Wearing Coat including expansion joints	[Nil]	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc	[Nil]	**(v) 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.
(vi) Wing walls/return walls	[Nil]	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Guide Bunds, River Training works etc.	[Nil]	**(vii) 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.
(viii) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	**(viii) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
A.2- New Major Bridges		
(i) Foundation	[Nil]	**(i) Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro- rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of atleast two foundations of the major Bridge . In case where load testing is required

Stage of Payment	Weightage	Payment Procedure
1	2	3
		for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	[Nil]	**(ii) Sub-Structure:** Payment against Sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the major bridge subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(iii)Super-structure (including bearings)	[Nil]	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints	[Nil]	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc	[Nil]	**(v) 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.
(vi) Wing walls/return walls	[Nil]	**(vi)Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Guide Bunds, River Training works etc.	[Nil]	**(vii) Guide Bunds, River Training works**: Payments shall be made on completion of all guide bunds/river training works

Stage of Payment	Weightage	Payment Procedure
1	**2**	**3**
		etc. complete in all respects as specified.
(viii) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	**(viii) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B.1 -Widening and repairs of (a)ROB (b) RUB		
(i) Foundation	[Nil]	**i) Foundation:** Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROBs/RUBs. Payment against foundation shall be made on pro- rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB subject to completion of atleast two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	[Nil]	**(ii) Sub-Structure:** Payment against Sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the ROB/RUB subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the ROB/RUB.

Stage of Payment	Weightage	Payment Procedure
1	**2**	**3**
(iii)Super-structure (including bearings)	[Nil]	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified.	[Nil]	**(iv) Wearing Coat:** Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]	**(v) 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.
(vi) Wing walls/return walls	[Nil]	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	**(vii) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B.2 -New **(a) ROB** **(b) RUB**		
(i) Foundation	[Nil]	**i) Foundation**: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROBs/RUBs. Payment against foundation shall be made on pro- rata basis on completion of a stage i.e. not less than 25% of the scope of

Stage of Payment	Weightage	Payment Procedure
1	2	3
		foundation of the ROB/RUB subject to completion of atleast two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	[Nil]	**(ii) Sub-Structure:** Payment against Sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the ROB/RUB subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the ROB/RUB.
(iii)Super-structure (including bearings)	[Nil]	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified.	[Nil]	**(iv) Wearing Coat:** Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]	**(v) 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.

Stage of Payment	Weightage	Payment Procedure
1	**2**	**3**
(vi) Wing walls/return walls	[Nil]	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	**(vii) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C.1- Widening and repairs of Elevated Section/Flyovers/ Grade Separators		
(i) Foundation	[Nil]	**(i) Foundation:** Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on pro- rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the structure subject to completion of atleast two foundations of the structure . In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	[Nil]	**(ii) Sub-Structure:** Payment against Sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the structure subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the structure.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(iii)Super-structure (including bearings)	[Nil]	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints	[Nil]	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]	**(v) 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.
(vi) Wing walls/return walls	[Nil]	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	**(vii) Approaches**: Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C.2- New Elevated Section/Flyovers/ Grade Separators		
(i) Foundation	[Nil]	**(i) Foundation:** Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on pro- rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the structure subject to completion of atleast two foundations of the structure .

Stage of Payment	Weightage	Payment Procedure
1	**2**	**3**
		In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	[Nil]	**(ii) Sub-Structure:** Payment against Sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the structure subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the structure.
(iii)Super-structure (including bearings)	[Nil]	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints	[Nil]	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]	**(v) 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.
(vi) Wing walls/return walls	[Nil]	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.

Stage of Payment	Weightage	Payment Procedure
1	**2**	**3**
(vii) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	**(vii) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.

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

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

1.3.4 Other works

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Toll plaza	[Nil]	Payment of each toll plaza shall be made on pro rata basis as per following completed stages (i) Rigid pavement upto DLC (LHS) -12.5 % (ii) Rigid pavement upto DLC (RHS)-12.5 % (iii) PQC (LHS)-25 % (iv) PQC (RHS)-25 % (v) Admin building, maintenance building & Misc works – 10% (vi)Canopy, Toll booth, Misc works -12.5% (vii)Till plaza Tunnel-2.5%
(ii) Road side drains a) PCC Trapezoidal Drain with catch water drain b) RCC Covered and Open	6.68% 24.35%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 05 % (five per cent) of the total length.
(iii) Road signs, markings, km stones, safety devices,lighting …	6.01%	
(iv) Project Facilities a) Junctions b) Bus bays with Passenger Shelter c) Truck lay-byes d) Rest Area e) Utility Duct	0.45% 0.32% [Nil] [Nil] [Nil]	Payment shall be made on pro rata basis for completed facilities.
(v) Roadside plantation	1.36%	

Stage of Payment	Weightage	Payment Procedure
(vi) Protection works other than approaches to bridges, elevated sections/ flyov separators and ROBs/RUBs. a) "W" : Metal Beam Crash Barri b) Retaining Wall c) Breast Wall d) Geo cell protection e) Steel Reinforced Geomat f) Protection Works (Turfing with sods)	0.64% 7.76% 38.48% 1.76% 6.80% 0.65%	Payment shall be made on pro rata basis on completion of a stage in a length of not less than 05% (five per cent) of the total length.
(vii) Safety and traffic management during construction	[Nil]	Payment shall be made on pro rata basis every six months.
(ix)Site clearance & Dismantling	0.85%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
NEW Table 1.3.5 Utility Shifting		

Stage of Payment	Weightage	Payment Procedure
(i) EHT Line	NIL	Unit of measurement is an per completed activities shall be determined on pro-rate basis as per its weightage with reference to total cost of EHT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of Poles-20% (ii) Conductor stringing including laying of cable- 30%, (iii) DTR erection (if involved)-10% and (iv) Charging of line including dismantling and site clearance -40% (with DTR and 50% without DTR)
(ii) EHT Crossing		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 4 crossings.
(iii) HT/LT Line(including Transformers if any)	2.91%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of LT/HT line. Payment shall be made for completed activity. (The average weightage of major activities only for payment purpose) in shifting work is (i) Erection of poles-20% (ii) Conductor stringing including laying of cable-30% (iii) DTR erection (if involved-10% and (iv) Charging of line including dismantling and site clearance -40% (with DTR and 50% without DTR)
(iv) HT/LT Crossing		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

Stage of Payment	Weightage	Payment Procedure
(v) Water pipeline	0.98%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling
(vi) Water pipeline crossing		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.
(vii) Sewage lines		Unit of measurement is as per completed activities cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipeline. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50% Charging of line including all miscellaneous work and dismantling and site clearance-50%)
(viii) Sewage line crossing		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for completed activity. (The average wightage of major activities in shifting work is laying pipe-50%, Charging of line

2. Procedure for payment for Maintenance

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

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

Schedule - I

(See Clause 10.2 (iv))

Drawings

1. **Drawings**

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

2. **Additional Drawings**

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

Annex – I

(Schedule - I)

List of Drawings

A minimum list of the drawings of the various components / elements of the Project Highway and project facilities required to be submitted by the Contractor is given below:

a) Detailed Drawings of Plan & Profile with Horizontal intersection Point, Vertical Intersection Points, elements of curves, and sight distances.

b) Detailed Drawings of Cross-section at 50.0m interval along the alignment.

c) Typical Cross-section with details of pavement thickness.

d) Detailed Drawings of all Junctions/intersections.

e) Detailed drawing for culverts.

f) Detailed Drawings of road drainage measures and drainage Plan.

g) Detailed Drawings of slope protection measures like Secured Drapery in Hill Side and RCC and Plum concrete retaining wall in Valley Side.

h) Drawings of road furniture items including traffic signage, markings, safety barriers (Thrie beam) etc.

i) Detailed Utility Shifting Drawings (Electrical, HT/EHT Line and Water Supply line etc.)

j) Any other drawing relevant to the Project Highway as desired by Authority/Client.

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the [255th] day from the Appointed Date (the "Project Milestone- I").
(ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

3. Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the [438th] day from the Appointed Date (the "Project Milestone- II").
(ii) Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 35% (thirty five per cent) of the Contract Price and should have started construction of all bridges

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the [621st] day from the Appointed Date (the "Project Milestone- III").
(ii) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 70% (seventy per cent) of the Contract Price and should have started construction of all project facilities.

5. Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the [730th] day from the Appointed Date.
(ii) On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

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

2. Tests

(i) Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include (to be decided in consultation with Authority's Engineer as per relevant IRC codes/manual).

(ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a Network Survey Vehicle (NSV) fitted with latest 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/viaducts: All major and minor bridges/viaducts 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 Non-destructive Testing Techniques, at two spots in every span, to be chosen at random by the Authority's Engineer. Bridges/viaducts with a span of 15 (fifteen) metres or more shall also be subjected to load testing.

(iv) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good

Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards, except tests as specified in clause 5, but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.

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

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

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

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

Schedule - L

(See Clause 12.2)

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 Rehabilitation and Upgradation to four lane configuration & strengthening of **Widening and Up-gradation of existing carriageway into 2-lane with paved shoulder configuration from Lavamore (Km 61.100) to Start of Pedong Bypass (Km 79.700) along NH-717A in state of West Bengal** on Engineering, Procurement and Construction (EPC) basis through ……. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name)

(Designation) (Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

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

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

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

2. Percentage reductions in lump sum payments on monthly basis

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

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

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

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

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

Where,

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

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

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

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

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

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

1. Scope

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into National Highways & Infrastructure Development Corporation, 1st Floor, Tower A, World Trade Centre, Nauroji Nagar, New Delhi – 110029 (the "**Authority**") and ..... (the "**Contractor**")[#] **Widening and Up-gradation of existing carriageway into 2-lane with paved shoulder configuration from Lavamore (Km 61.100) to Start of Pedong Bypass (Km 79.700) along NH-717A in state of West Bengal** on EPC mode, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

2. Definitions and interpretation

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

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

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

3. General

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

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

a). any Time Extension;

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

c). the Termination Payment; or

d). issuance of Completion Certificate or

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

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

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

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

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

4. Construction Period

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

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

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

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

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

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

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

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

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality management. For purpose of this paragraph 4(ix), the tests specified in the MoRTH Specifications for Road and Bridge works and respective Indian Roads Congress Standards/ Guidelines/ Manuals, together with any other Indian/ International Standards mentioned therein including any modifications/ substitutions thereof shall be deemed to be tests confirming to Good Industry Practice for quality management.

(x) The Authority's Engineer shall witness all the quality control tests carried out by the Contractor at its site laboratory/ main laboratory/ field/ plants. These include tests for all materials, mixes, products etc. Authority's Engineer shall also witness all tests of finished products like bearing in the manufacturer's laboratory as mandated in respective standards. Authority's Engineer will also conduct review of quality control documents in respect of factory manufactured materials/ finished products, etc. as per IRC:SP:112.

(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 MoRTH specifications for Road & Bridge works and respective Indian Roads Congress Standards/ Guidelines/ Manuals together with any other Indian/ International standards referred thereto. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

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

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

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

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

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

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

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

5. Maintenance Period

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

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

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

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

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

6. Determination of costs and time

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

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

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

7. Payments

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

(ii) Authority's Engineer shall -

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

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

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

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

8. Other duties and functions

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

9. Miscellaneous

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

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

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

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

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

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

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

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

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

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

f) Deductions:

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

ii. Any amount towards deduction of taxes; and

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

g) Net claim: (e) – (f) (iii);

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

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

v. For Change of Scope Orders, and

vi. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

b) The deductions for maintenance work not done;

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

d) Amounts reflecting adjustments in price under Clause 19.12; and

e) Amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause 20.1)

Insurance

1. Insurance during Construction Period

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

a). insurance of Works, Plant and Materials and an additional sum of 15 (fifteen) 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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

(ii) The insurance cover shall be not less than: Rs. 2,00,00,000/- (Rupees Two Crore only), and it shall be contractor's responsibility for any liability beyond the amount specified in the agreement.

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. **Riding Quality test:**

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

2. **Visual and physical test:**

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, …… (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated…… (the "Agreement"), for **Widening and Up-gradation of existing carriageway into 2-lane with paved shoulder configuration from Lavamore (Km 61.100) to Start of Pedong Bypass (Km 79.700) along NH-717A in state of West Bengal** on EPC basis through ……. (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

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.

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