Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1. The Site

(i) Site of the "**Construction of Intermediate Lane of Pango to Jorging Road from Design Km 0+000 to Design Km 40+000 (Design Length: 40 Km, Package-I, Greenfield Alignment) in the State of Arunachal Pradesh on EPC mode.**" Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

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

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

(iv) The alignment plans of the Project Highway are specified in Annex-III.

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

Annex – I

(Schedule-A)

Site for the Project

1. Site

The Site of the **"Construction of Intermediate Lane of Pango to Jorging Road from Design Km 0+000 to Design Km 40+000 (Design Length: 40 Km, Pkg-I, Greenfield Alignment) in the State of Arunachal Pradesh on EPC mode."**. The land, carriageway and structures comprising the Site are described below.

2. Land

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

S. No.	Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)
	From	To		
1	0	17+240	Nil	24 m
2	17+240	17+475		34 m
3	17+475	29+460		24m
4	29+460	29+590		34 m
5	29+590	40+000		24 m

3. Carriageway

There is no existing Carriageway.

4. Major Bridges

The Site includes the following Major Bridges:

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

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

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

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

6. Grade separators

The Site includes the following grade separators:

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

7. Minor bridges

The Site includes the following minor bridges:

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

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location (km)	Remarks
Nil*		

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

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

10. Culverts

The Site has the following culverts:

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

11. Bus bays

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

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

12. Truck Lay byes

The details of truck lay byes are as follows:

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

13. Road side drains

The details of the roadside drains are as follows:

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

14. Major junctions

The details of major junctions are as follows:

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

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

15. Minor junctions

The details of the minor junctions are as follows:

S. No.	Location	Type	
		T -junction	Cross road
1	0.000	Y-junction	BRO & PMGSY Road

16. Bypasses

The details of the bypasses are as follows:

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

17. Details of Existing utilities Schedule

The existing utilities schedules are as below

17.1 Electrical utilities

The site includes the following electrical utilities: -

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

SL.	Chainage		Length (in Km)				Crossings			
	From	To	400KV	220KV	110KV	66KV	400KV	220KV	110KV	66KV
Nil										

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

SL.	Chainage		No of poles affected			Transformers	
	From	To	33KV	11KV	LT	No	Capacity
Nil							

17.2 Public Health utilities (Water/Sewage Pipelines)

S. No	Chainage		Length (in Km)
	From	To	Water Supply line
Nil			

18. Other Structures

NIL

[Note: * = Greenfield)

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:

S. No.	Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)	Date of Providing proposed ROW
	From	To			
1	0	17+240	Nil	24 m	90% of ROW At Appointment Date. Balance Right of way Within 150 days after the Appointed Date
2	17+240	17+475		34 m	
3	17+475	29+460		24m	
4	29+460	29+590		34 m	
5	29+590	40+000		24 m	

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 EPC contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement within proposed ROW.

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

Annex – IV

(Schedule-A)

Environment Clearances

The proposed project does not require Environmental clearance as per the MoEF&CC Notification No S.O. 3194(E) dated 14th July, 2022 which states that ***"All Highway projects are exempted upto 100 km from line of control or border subject to compliance of Standard Operating Procedure notified in this regard from time to time".***

Forest clearance: The project road does not fall under any Reserved Forest (RF) / Permanent Reserve Forest (PRF) / Variable retention forestry (VRF) / Wildlife Sanctuary / National Park or any other forest plantation land. As per discussion with DFO, Yingkiong the whole part of the project road falls under unreserved forest land therefore forest clearance is applicable for the cutting of trees in the proposed ROW of the project and in muck dumping locations. Forest Proposal is under process.

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. Intermediate Lane with Earthen Shoulder

Intermediate laning shall include constriction of the Intermediate Lane with earthen shoulder highway as described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

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

Annex – I

(Schedule-B)

Description of Intermediate Lane with Earthen Shoulder

The Site of the Intermediate Lane with earthen shoulder Project Highway "Pango - Jorging section" starts from junction of BRO road and PMGSY road which is leading to Pango and ends at Design chainage 40+000 (The total project road design length for Package -1 is 40.000 km) in Upper Siang District of Arunachal Pradesh".

Coordinates of Start and End of Project Stretch

Location		UTM Co-ordinate	
Description	**Design Chainage**	**Easting (m)**	**Northing (m)**
Start of Project Road	0+000	671634.043	3196774.238
End of Project Road	40+000	654004.070	3197758.841

1. Widening of the Existing Highway

(i) The Project Highway shall follow 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) Intermediate lane with earthen shoulders shall be undertaken. The earthen carriageway shall be in accordance with the typical cross sections drawings in the manual "Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill road manual IRC: SP 48 -1998 and IRC – SP 73-2018". The typical drawings attached in schedules.

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

Sl. No.	Built-up stretch (Township)	Location (km to km)	Width (m) of carriageway	Typical cross section (Ref. to Manual)	Remarks
Nil					

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

2. Geometric Design and General Features

(i) General

Geometric design and general features of the Project Highway shall be in accordance with "Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill Road manual IRC: SP 48 -1998 and IRC – SP 73-2018".

(ii) Design speed

The design speed shall be as per IRC: 52-2019 and IRC: SP 48 -1998.

(iii) Improvement of the existing road geometrics

In the following sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided as per IRC: SP:73-2018:

S. No.	Stretch Design Chainage (from km to Km)	Length (Km)	Remarks
Nil			

(iv) Right of Way

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

(v) Type of shoulders

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

Sl. No.	Stretch (from km to km)	Fully paved shoulders/ footpaths	Reference to cross section
Nil			

(b) Width of Shoulder in open country shall be as per following Table:

Type of Section	Side	Width of Shoulder (m)		
		Hard	Earthen	Total
Open Country with isolated built-up area	Hill Side	-	1.45	1.45
	Valley Side	-	1.45	1.45

[Earthen shoulders shall be covered with 150mm thick compacted layer of granular material].

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

(vi) Lateral and vertical clearances at underpasses

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

(b) Lateral clearance: The width of the opening at the underpasses shall be as per provision of relevant manual:

Sl. No.	Location (Design Chainage Km)	Span/ opening (m)	Remarks
Nil			

(vii) Lateral and vertical clearances at overpasses

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

(b) Lateral & Vertical clearances at overpasses shall be as follows:

(viii) Service roads

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

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

(ix) Grade separated structures

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

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

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

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

(x) Cattle and pedestrian underpass /overpass

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

Sl. No.	Location	Type of crossing
NIL		

(xi) Typical cross-sections of the Project Highway is as per attached Drawings

TCS Number	TCS Description	Length (m)
TCS-1	Intermediate lane carriageway with retaining wall on one side & breast wall on other side	8955
TCS-2	Intermediate lane carriageway with breast wall on one side	820
TCS-3	Intermediate lane carriageway with one side retaining wall and other side Trapezoidal Open Drain	14692
TCS-4	Intermediate lane carriageway with both side Trapezoidal Open Drain	1727
TCS-5	Intermediate lane carriageway with both side breast wall	5346
TCS-6	Intermediate lane carriageway with one side breast wall and other side Trapezoidal Open Drain	5521
TCS-7	Intermediate lane carriageway with one side retaining wall	221
TCS-8	Intermediate lane carriageway with both sides retaining wall	748
TCS-9	Intermediate lane carriageway with earthen shoulder	40
TCS-10	Intermediate lane carriageway with earthen shoulder valley side & other side trapezoidal open drain	870
	Structures	1060
	Total length	**40000**

Details of applicable TCS:

From	To	Length	TCS Type
0	30	30	TCS-9
40	50	10	TCS-2
70	100	30	TCS-6
110	120	10	TCS-10
160	180	20	TCS-3
210	250	40	TCS-3
270	280	10	TCS-7
320	330	10	TCS-4
360	370	10	TCS-5
390	400	10	TCS-1
410	430	20	TCS-8
440	450	10	TCS-3
460	530	70	TCS-5
550	560	10	TCS-4
570	580	10	TCS-7
670	680	10	TCS-9
740	790	50	TCS-6
840	1040	200	TCS-5
1050	1060	10	TCS-5
1130	1150	20	TCS-1
1170	1220	50	TCS-8
1230	1240	10	TCS-6
1380	1400	20	TCS-6
1450	1480	30	TCS-6
1540	1560	20	TCS-6

From	To	Length	TCS Type
30	40	10	TCS-4
50	70	20	TCS-1
100	110	10	TCS-2
120	160	40	TCS-4
180	210	30	TCS-4
250	270	20	TCS-8
280	320	40	TCS-3
330	360	30	TCS-6
370	390	20	TCS-6
400	410	10	TCS-3
430	440	10	TCS-7
450	460	10	TCS-6
530	550	20	TCS-6
560	570	10	TCS-3
580	670	90	TCS-8
680	740	60	TCS-4
790	840	50	TCS-4
1040	1050	10	TCS-6
1060	1130	70	TCS-6
1150	1170	20	TCS-3
1220	1230	10	TCS-4
1240	1380	140	TCS-5
1400	1450	50	TCS-5
1480	1540	60	TCS-5
1560	1590	30	TCS-4

From	To	Length	TCS Type
1590	1610	20	TCS-6
1730	1750	20	TCS-6
1760	1770	10	TCS-1
1780	1790	10	TCS-4
1800	1850	50	TCS-4
1860	1900	40	TCS-4
1940	1950	10	TCS-4
1960	1970	10	TCS-4
1980	1990	10	TCS-3
2000	2130	130	TCS-5
2170	2180	10	TCS-4
2190	2200	10	TCS-4
2210	2220	10	TCS-6
2230	2330	100	TCS-6
2360	2380	20	TCS-6
2390	2430	40	TCS-3
2450	2480	30	TCS-6
2500	2530	30	TCS-10
2540	2550	10	TCS-7
2690	2700	10	TCS-10
2740	2750	10	TCS-10
2830	2840	10	TCS-10
2870	2890	20	TCS-10
2900	2910	10	TCS-7
3010	3030	20	TCS-3
3070	3090	20	TCS-6

From	To	Length	TCS Type
1610	1730	120	TCS-5
1750	1760	10	TCS-2
1770	1780	10	TCS-3
1790	1800	10	TCS-10
1850	1860	10	TCS-6
1900	1940	40	TCS-6
1950	1960	10	TCS-3
1970	1980	10	TCS-10
1990	2000	10	TCS-4
2130	2170	40	TCS-6
2180	2190	10	TCS-10
2200	2210	10	TCS-10
2220	2230	10	TCS-1
2330	2360	30	TCS-5
2380	2390	10	TCS-4
2430	2450	20	TCS-4
2480	2500	20	TCS-3
2530	2540	10	TCS-3
2550	2690	140	TCS-3
2700	2740	40	TCS-4
2750	2830	80	TCS-3
2840	2870	30	TCS-4
2890	2900	10	TCS-3
2910	3010	100	TCS-8
3030	3070	40	TCS-1
3090	3380	290	TCS-5

From	To	Length	TCS Type
3380	3420	40	TCS-6
3510	3520	10	TCS-10
3590	3620	30	TCS-5
3630	3660	30	TCS-4
3670	3678	8	TCS-8
3738	3750	12	TCS-7
3760	3830	70	TCS-4
3993	4073	80	Bridge
4090	4110	20	TCS-10
4170	4180	10	TCS-7
4440	4450	10	TCS-1
4570	4590	20	TCS-4
4620	4770	150	TCS-3
4930	5120	190	TCS-3
5150	5190	40	TCS-3
5220	5260	40	TCS-6
5270	5320	50	TCS-3
5330	5340	10	TCS-3
5350	5410	60	TCS-3
5480	5560	80	TCS-3
5700	5720	20	TCS-3
5740	5840	100	Bridge
5850	5870	20	TCS-4
5880	5890	10	TCS-2
5920	5950	30	TCS-5
6010	6020	10	TCS-10

From	To	Length	TCS Type
3420	3510	90	TCS-3
3520	3590	70	TCS-6
3620	3630	10	TCS-6
3660	3670	10	TCS-3
3678	3738	60	Bridge
3750	3760	10	TCS-10
3830	3993	163	TCS-3
4073	4090	17	TCS-8
4110	4170	60	TCS-3
4180	4440	260	TCS-3
4450	4570	120	TCS-3
4590	4620	30	TCS-1
4770	4930	160	TCS-1
5120	5150	30	TCS-1
5190	5220	30	TCS-4
5260	5270	10	TCS-2
5320	5330	10	TCS-10
5340	5350	10	TCS-1
5410	5480	70	TCS-1
5560	5700	140	TCS-1
5720	5740	20	TCS-1
5840	5850	10	TCS-8
5870	5880	10	TCS-6
5890	5920	30	TCS-6
5950	6010	60	TCS-6
6020	6190	170	TCS-3

From	To	Length	TCS Type
6190	6290	100	TCS-1
6780	6800	20	TCS-10
6810	6840	30	TCS-1
7030	7050	20	TCS-4
7060	7070	10	TCS-1
7210	7250	40	TCS-4
7260	7330	70	TCS-4
7360	7370	10	TCS-3
7400	7600	200	TCS-3
7640	7650	10	TCS-3
7660	7850	190	TCS-3
7880	7910	30	TCS-6
7920	7960	40	TCS-6
7970	8060	90	TCS-1
8070	8090	20	TCS-1
8160	8230	70	TCS-1
8250	8380	130	TCS-1
8450	8510	60	TCS-1
8570	8580	10	TCS-1
8610	8620	10	TCS-1
8660	8770	110	TCS-1
8840	8850	10	TCS-1
8860	8870	10	TCS-4
8930	8980	50	TCS-1
9130	9140	10	TCS-1
9160	9200	40	TCS-1

From	To	Length	TCS Type
6290	6780	490	TCS-3
6800	6810	10	TCS-2
6840	7030	190	TCS-3
7050	7060	10	TCS-2
7070	7210	140	TCS-3
7250	7260	10	TCS-10
7330	7360	30	TCS-10
7370	7400	30	TCS-10
7600	7640	40	TCS-10
7650	7660	10	TCS-10
7850	7880	30	TCS-1
7910	7920	10	TCS-2
7960	7970	10	TCS-2
8060	8070	10	TCS-3
8090	8160	70	TCS-3
8230	8250	20	TCS-2
8380	8450	70	TCS-3
8510	8570	60	TCS-3
8580	8610	30	TCS-3
8620	8660	40	TCS-3
8770	8840	70	TCS-3
8850	8860	10	TCS-6
8870	8930	60	TCS-3
8980	9130	150	TCS-3
9140	9160	20	TCS-3
9200	9216	16	TCS-3

From	To	Length	TCS Type
9216	9316	100	Bridge
9330	9340	10	TCS-4
9350	9380	30	TCS-6
9400	9420	20	TCS-6
9450	9640	190	TCS-3
9650	9670	20	TCS-4
9750	9760	10	TCS-4
9820	9940	120	TCS-1
9970	10050	80	TCS-1
10100	10110	10	TCS-1
10220	10240	20	TCS-4
10270	10280	10	TCS-2
10290	10300	10	TCS-1
10310	10320	10	TCS-1
10340	10370	30	TCS-3
10450	10460	10	TCS-6
10470	10480	10	TCS-10
10630	10670	40	TCS-4
10680	11180	500	TCS-3
11220	11250	30	TCS-3
11280	11330	50	TCS-3
11350	11360	10	TCS-6
11390	11400	10	TCS-6
11433	11513	80	Bridge
11520	11530	10	TCS-3
11540	11550	10	TCS-6

From	To	Length	TCS Type
9316	9330	14	TCS-3
9340	9350	10	TCS-10
9380	9400	20	TCS-5
9420	9450	30	TCS-1
9640	9650	10	TCS-10
9670	9750	80	TCS-3
9760	9820	60	TCS-6
9940	9970	30	TCS-3
10050	10100	50	TCS-3
10110	10220	110	TCS-3
10240	10270	30	TCS-6
10280	10290	10	TCS-6
10300	10310	10	TCS-2
10320	10340	20	TCS-2
10370	10450	80	TCS-4
10460	10470	10	TCS-4
10480	10630	150	TCS-3
10670	10680	10	TCS-10
11180	11220	40	TCS-1
11250	11280	30	TCS-1
11330	11350	20	TCS-1
11360	11390	30	TCS-5
11400	11433	33	TCS-4
11513	11520	7	TCS-8
11530	11540	10	TCS-4
11550	11570	20	TCS-5

From	To	Length	TCS Type
11570	11590	20	TCS-6
11610	11630	20	TCS-10
11640	11650	10	TCS-6
11750	11760	10	TCS-6
11770	11790	20	TCS-8
11800	11810	10	TCS-10
11840	11880	40	TCS-1
11890	11900	10	TCS-1
11930	11940	10	TCS-1
11950	11960	10	TCS-2
12010	12030	20	TCS-10
12190	12200	10	TCS-10
12210	12250	40	TCS-6
12350	12360	10	TCS-6
12371	12451	80	Bridge
12460	12480	20	TCS-4
12490	12500	10	TCS-5
12540	12550	10	TCS-2
12610	12700	90	TCS-3
12710	12740	30	TCS-4
12750	12770	20	TCS-5
12780	12810	30	TCS-1
13010	13110	100	TCS-1
13120	13170	50	TCS-1
13200	13210	10	TCS-1
13230	13310	80	TCS-1

From	To	Length	TCS Type
11590	11610	20	TCS-4
11630	11640	10	TCS-4
11650	11750	100	TCS-5
11760	11770	10	TCS-1
11790	11800	10	TCS-3
11810	11840	30	TCS-6
11880	11890	10	TCS-3
11900	11930	30	TCS-3
11940	11950	10	TCS-6
11960	12010	50	TCS-3
12030	12190	160	TCS-3
12200	12210	10	TCS-4
12250	12350	100	TCS-5
12360	12371	11	TCS-1
12451	12460	9	TCS-7
12480	12490	10	TCS-6
12500	12540	40	TCS-6
12550	12610	60	TCS-1
12700	12710	10	TCS-10
12740	12750	10	TCS-6
12770	12780	10	TCS-2
12810	13010	200	TCS-3
13110	13120	10	TCS-3
13170	13200	30	TCS-3
13210	13230	20	TCS-3
13310	13350	40	TCS-3

From	To	Length	TCS Type
13350	13360	10	TCS-1
13470	13480	10	TCS-8
13500	13520	20	TCS-4
13540	13550	10	TCS-2
13600	13710	110	TCS-3
13760	13960	200	TCS-3
14050	14120	70	TCS-3
14150	14180	30	TCS-3
14190	14200	10	TCS-6
14290	14300	10	TCS-1
14350	14360	10	TCS-1
14370	14380	10	TCS-6
14390	14450	60	TCS-3
14490	14560	70	TCS-3
14580	14590	10	TCS-6
14600	14610	10	TCS-1
14620	14680	60	TCS-1
14690	14740	50	TCS-1
14800	14820	20	TCS-10
14860	14870	10	TCS-10
14880	14890	10	TCS-10
14900	14910	10	TCS-3
14920	14990	70	TCS-4
15000	15030	30	TCS-3
15040	15140	100	TCS-5
15150	15160	10	TCS-2

From	To	Length	TCS Type
13360	13470	110	TCS-3
13480	13500	20	TCS-3
13520	13540	20	TCS-6
13550	13600	50	TCS-1
13710	13760	50	TCS-1
13960	14050	90	TCS-1
14120	14150	30	TCS-1
14180	14190	10	TCS-1
14200	14290	90	TCS-3
14300	14350	50	TCS-3
14360	14370	10	TCS-2
14380	14390	10	TCS-1
14450	14490	40	TCS-1
14560	14580	20	TCS-1
14590	14600	10	TCS-2
14610	14620	10	TCS-6
14680	14690	10	TCS-2
14740	14800	60	TCS-3
14820	14860	40	TCS-3
14870	14880	10	TCS-4
14890	14900	10	TCS-2
14910	14920	10	TCS-10
14990	15000	10	TCS-10
15030	15040	10	TCS-4
15140	15150	10	TCS-6
15160	15170	10	TCS-10

From	To	Length	TCS Type
15170	15180	10	TCS-4
15320	15330	10	TCS-1
15370	15390	20	TCS-1
15400	15550	150	TCS-3
15560	15620	60	TCS-6
15680	15700	20	TCS-3
15730	15760	30	TCS-3
15820	15830	10	TCS-6
15860	15870	10	TCS-2
15880	15890	10	TCS-4
15920	16130	210	TCS-1
16330	16350	20	TCS-1
16450	16540	90	TCS-1
16580	16590	10	TCS-1
16600	16660	60	TCS-1
16700	16710	10	TCS-1
16720	16780	60	TCS-5
16800	16830	30	TCS-1
16840	16890	50	TCS-5
16909	17009	100	Bridge
17020	17060	40	TCS-6
17080	17320	240	TCS-3
17400	17410	10	TCS-3
17450	17460	10	TCS-6
17470	17480	10	TCS-1
17580	17590	10	TCS-4

From	To	Length	TCS Type
15180	15320	140	TCS-3
15330	15370	40	TCS-3
15390	15400	10	TCS-2
15550	15560	10	TCS-10
15620	15680	60	Bridge
15700	15730	30	TCS-1
15760	15820	60	TCS-1
15830	15860	30	TCS-1
15870	15880	10	TCS-6
15890	15920	30	TCS-6
16130	16330	200	TCS-3
16350	16450	100	TCS-3
16540	16580	40	TCS-3
16590	16600	10	TCS-3
16660	16700	40	TCS-3
16710	16720	10	TCS-6
16780	16800	20	TCS-6
16830	16840	10	TCS-6
16890	16909	19	TCS-6
17009	17020	11	TCS-3
17060	17080	20	TCS-1
17320	17400	80	TCS-1
17410	17450	40	TCS-1
17460	17470	10	TCS-3
17480	17580	100	TCS-3
17590	17620	30	TCS-6

From	To	Length	TCS Type
17620	17630	10	TCS-2
17650	17730	80	TCS-3
17800	17810	10	TCS-2
17850	17880	30	TCS-6
17900	17910	10	TCS-6
17920	18120	200	TCS-3
18210	18240	30	TCS-6
18260	18320	60	TCS-1
18330	18360	30	TCS-1
18370	18380	10	TCS-5
18390	18450	60	TCS-3
18560	18570	10	TCS-2
18600	18620	20	TCS-5
18640	18650	10	TCS-3
18670	18680	10	TCS-7
18710	18720	10	TCS-7
18730	18740	10	TCS-7
18750	18840	90	TCS-5
18960	18968	8	TCS-3
19068	19080	12	TCS-8
19090	19160	70	TCS-5
19170	19190	20	TCS-1
19210	19220	10	TCS-7
19350	19390	40	TCS-1
19410	19440	30	TCS-6
19550	19600	50	TCS-1

From	To	Length	TCS Type
17630	17650	20	TCS-1
17730	17800	70	TCS-1
17810	17850	40	TCS-1
17880	17900	20	TCS-2
17910	17920	10	TCS-1
18120	18210	90	TCS-1
18240	18260	20	TCS-2
18320	18330	10	TCS-3
18360	18370	10	TCS-6
18380	18390	10	TCS-6
18450	18560	110	TCS-1
18570	18600	30	TCS-6
18620	18640	20	TCS-6
18650	18670	20	TCS-8
18680	18710	30	TCS-3
18720	18730	10	TCS-8
18740	18750	10	TCS-4
18840	18960	120	TCS-6
18968	19068	100	Bridge
19080	19090	10	TCS-6
19160	19170	10	TCS-6
19190	19210	20	TCS-8
19220	19350	130	TCS-3
19390	19410	20	TCS-2
19440	19550	110	TCS-3
19600	19610	10	TCS-2

From	To	Length	TCS Type
19610	19650	40	TCS-6
19660	19720	60	TCS-3
19730	19790	60	TCS-8
19800	19820	20	TCS-1
19840	20060	220	TCS-5
20230	20240	10	TCS-2
20270	20280	10	TCS-3
20300	20320	20	TCS-6
20480	20600	120	TCS-6
20610	20640	30	TCS-6
20670	20700	30	TCS-10
20980	21050	70	TCS-1
21090	21160	70	TCS-1
21180	21940	760	TCS-1
21950	21970	20	TCS-6
22072	22172	100	Bridge
22180	22190	10	TCS-6
22270	22290	20	TCS-6
22300	22310	10	TCS-2
22360	22410	50	TCS-3
22414	22426	12	TCS-6
22470	22500	30	TCS-6
22610	22620	10	TCS-10
22730	22740	10	TCS-10
22810	22940	130	TCS-6
22960	23020	60	TCS-1

From	To	Length	TCS Type
19650	19660	10	TCS-1
19720	19730	10	TCS-7
19790	19800	10	TCS-3
19820	19840	20	TCS-6
20060	20230	170	TCS-6
20240	20270	30	TCS-1
20280	20300	20	TCS-4
20320	20480	160	TCS-5
20600	20610	10	TCS-2
20640	20670	30	TCS-4
20700	20980	280	TCS-3
21050	21090	40	TCS-3
21160	21180	20	TCS-3
21940	21950	10	TCS-2
21970	22072	102	TCS-5
22172	22180	8	TCS-8
22190	22270	80	TCS-5
22290	22300	10	TCS-1
22310	22360	50	TCS-1
22410	22414	4	TCS-4
22426	22470	44	TCS-5
22500	22610	110	TCS-4
22620	22730	110	TCS-3
22740	22810	70	TCS-4
22940	22960	20	TCS-2
23020	23030	10	TCS-3

From	To	Length	TCS Type
23030	23050	20	TCS-10
23140	23150	10	TCS-10
23170	23180	10	TCS-10
23360	23370	10	TCS-1
23450	23590	140	TCS-5
23630	23640	10	TCS-2
23860	23870	10	TCS-2
23900	24150	250	TCS-3
24350	24370	20	TCS-3
24630	24640	10	TCS-3
24770	24780	10	TCS-2
24840	24850	10	TCS-2
25020	25050	30	TCS-3
25090	25100	10	TCS-3
25350	25360	10	TCS-6
25430	25460	30	TCS-2
26440	26490	50	TCS-3
26530	26560	30	TCS-3
26580	26620	40	TCS-3
26630	26650	20	TCS-3
26710	26720	10	TCS-2
26740	26790	50	TCS-1
26860	26980	120	TCS-1
26990	27060	70	TCS-6
27070	27101	31	TCS-8
27201	27210	9	TCS-8

From	To	Length	TCS Type
23050	23140	90	TCS-3
23150	23170	20	TCS-4
23180	23360	180	TCS-3
23370	23450	80	TCS-6
23590	23630	40	TCS-6
23640	23860	220	TCS-3
23870	23900	30	TCS-6
24150	24350	200	TCS-1
24370	24630	260	TCS-1
24640	24770	130	TCS-1
24780	24840	60	TCS-6
24850	25020	170	TCS-1
25050	25090	40	TCS-1
25100	25350	250	TCS-1
25360	25430	70	TCS-1
25460	26440	980	TCS-1
26490	26530	40	TCS-1
26560	26580	20	TCS-7
26620	26630	10	TCS-1
26650	26710	60	TCS-1
26720	26740	20	TCS-6
26790	26860	70	TCS-3
26980	26990	10	TCS-2
27060	27070	10	TCS-3
27101	27201	100	Bridge
27210	27220	10	TCS-4

From	To	Length	TCS Type
27220	27270	50	TCS-5
27290	27310	20	TCS-2
27340	27370	30	TCS-1
27450	27480	30	TCS-1
27510	27550	40	TCS-1
27580	27600	20	TCS-1
27630	27650	20	TCS-1
27660	27670	10	TCS-6
27690	27700	10	TCS-3
27730	27890	160	TCS-6
27900	27920	20	TCS-1
28040	28050	10	TCS-10
28070	28090	20	TCS-2
28120	28160	40	TCS-3
28250	28340	90	TCS-3
28360	28390	30	TCS-3
28410	28450	40	TCS-6
28510	28610	100	TCS-3
28620	28680	60	TCS-6
28730	28830	100	TCS-6
28840	28880	40	TCS-3
28910	28920	10	TCS-3
28930	28940	10	TCS-6
29180	29230	50	TCS-6
29240	29280	40	TCS-1
29290	29320	30	TCS-1

From	To	Length	TCS Type
27270	27290	20	TCS-6
27310	27340	30	TCS-6
27370	27450	80	TCS-3
27480	27510	30	TCS-3
27550	27580	30	TCS-6
27600	27630	30	TCS-3
27650	27660	10	TCS-2
27670	27690	20	TCS-4
27700	27730	30	TCS-1
27890	27900	10	TCS-2
27920	28040	120	TCS-3
28050	28070	20	TCS-4
28090	28120	30	TCS-1
28160	28250	90	TCS-1
28340	28360	20	TCS-1
28390	28410	20	TCS-1
28450	28510	60	TCS-1
28610	28620	10	TCS-1
28680	28730	50	TCS-5
28830	28840	10	TCS-1
28880	28910	30	TCS-8
28920	28930	10	TCS-2
28940	29180	240	TCS-5
29230	29240	10	TCS-2
29280	29290	10	TCS-3
29320	29350	30	TCS-3

From	To	Length	TCS Type
29350	29380	30	TCS-1
29420	29430	10	TCS-7
29440	29450	10	TCS-6
29480	29550	70	TCS-6
29730	29880	150	TCS-6
29960	29990	30	TCS-6
30000	30050	50	TCS-3
30060	30070	10	TCS-6
30080	30110	30	TCS-1
30120	30190	70	TCS-6
30200	30220	20	TCS-1
30340	30350	10	TCS-1
30520	30530	10	TCS-2
30600	30660	60	TCS-3
30750	30780	30	TCS-3
30790	30830	40	TCS-3
30840	30900	60	TCS-3
30910	30970	60	TCS-3
30990	31050	60	TCS-1
31070	31320	250	TCS-1
31330	31620	290	TCS-3
31630	31660	30	TCS-3
31680	31690	10	TCS-2
31810	31820	10	TCS-2
31870	32070	200	TCS-3
32080	32340	260	TCS-3

From	To	Length	TCS Type
29380	29420	40	TCS-3
29430	29440	10	TCS-3
29450	29480	30	TCS-5
29550	29730	180	TCS-5
29880	29960	80	TCS-5
29990	30000	10	TCS-1
30050	30060	10	TCS-1
30070	30080	10	TCS-2
30110	30120	10	TCS-2
30190	30200	10	TCS-2
30220	30340	120	TCS-3
30350	30520	170	TCS-6
30530	30600	70	TCS-1
30660	30750	90	TCS-1
30780	30790	10	TCS-10
30830	30840	10	TCS-10
30900	30910	10	TCS-1
30970	30990	20	TCS-2
31050	31070	20	TCS-3
31320	31330	10	TCS-2
31620	31630	10	TCS-7
31660	31680	20	TCS-1
31690	31810	120	TCS-6
31820	31870	50	TCS-1
32070	32080	10	TCS-1
32340	32350	10	TCS-10

From	To	Length	TCS Type
32350	32360	10	TCS-6
32410	32460	50	TCS-6
32890	33110	220	TCS-6
33120	33210	90	TCS-1
33270	33340	70	TCS-8
33350	33360	10	TCS-1
33370	33710	340	TCS-5
33750	33830	80	TCS-5
33850	33890	40	TCS-4
34260	34270	10	TCS-4
34300	34450	150	TCS-5
34510	34530	20	TCS-1
34570	34660	90	TCS-5
34680	34990	310	TCS-5
35060	35100	40	TCS-5
35170	35180	10	TCS-4
35200	35360	160	TCS-3
35380	35430	50	TCS-3
35440	35490	50	TCS-3
35510	35520	10	TCS-2
35530	35624	94	TCS-1
35724	35730	6	TCS-8
35820	35840	20	TCS-10
35860	35870	10	TCS-10
35940	36000	60	TCS-1
36010	36020	10	TCS-1

From	To	Length	TCS Type
32360	32410	50	TCS-5
32460	32890	430	TCS-5
33110	33120	10	TCS-2
33210	33270	60	TCS-3
33340	33350	10	TCS-3
33360	33370	10	TCS-6
33710	33750	40	TCS-6
33830	33850	20	TCS-6
33890	34260	370	TCS-3
34270	34300	30	TCS-6
34450	34510	60	TCS-6
34530	34570	40	TCS-6
34660	34680	20	TCS-6
34990	35060	70	TCS-6
35100	35170	70	TCS-6
35180	35200	20	TCS-10
35360	35380	20	TCS-1
35430	35440	10	TCS-1
35490	35510	20	TCS-1
35520	35530	10	TCS-6
35624	35724	100	Bridge
35730	35820	90	TCS-3
35840	35860	20	TCS-4
35870	35940	70	TCS-3
36000	36010	10	TCS-3
36020	36030	10	TCS-6

From	To	Length	TCS Type
36030	36060	30	TCS-1
36200	36210	10	TCS-1
36420	36440	20	TCS-10
36710	36770	60	TCS-10
36900	36910	10	TCS-10
36920	36950	30	TCS-6
36970	37210	240	TCS-3
37220	37300	80	TCS-6
37310	37330	20	TCS-10
37340	37350	10	TCS-2
37400	37410	10	TCS-7
37440	37450	10	TCS-7
37460	37480	20	TCS-6
37620	37700	80	TCS-6
37710	37760	50	TCS-6
37800	38030	230	TCS-3
38040	38050	10	TCS-8
38060	38070	10	TCS-10
38080	38190	110	TCS-5
38220	38230	10	TCS-2
38240	38330	90	TCS-6
38340	38380	40	TCS-1
38390	38440	50	TCS-6
38450	38700	250	TCS-3
38710	38750	40	TCS-8
38760	38780	20	TCS-6

From	To	Length	TCS Type
36060	36200	140	TCS-3
36210	36420	210	TCS-3
36440	36710	270	TCS-3
36770	36900	130	TCS-3
36910	36920	10	TCS-4
36950	36970	20	TCS-2
37210	37220	10	TCS-1
37300	37310	10	TCS-4
37330	37340	10	TCS-6
37350	37400	50	TCS-3
37410	37440	30	TCS-8
37450	37460	10	TCS-3
37480	37620	140	TCS-5
37700	37710	10	TCS-5
37760	37800	40	TCS-2
38030	38040	10	TCS-7
38050	38060	10	TCS-3
38070	38080	10	TCS-6
38190	38220	30	TCS-6
38230	38240	10	TCS-3
38330	38340	10	TCS-2
38380	38390	10	TCS-10
38440	38450	10	TCS-10
38700	38710	10	TCS-7
38750	38760	10	TCS-3
38780	38910	130	TCS-5

From	To	Length	TCS Type
38910	39000	90	TCS-6
39100	39180	80	TCS-6
39220	39280	60	TCS-3
39290	39330	40	TCS-8
39340	39360	20	TCS-6
39480	39600	120	TCS-6
39610	39630	20	TCS-3
39640	39680	40	TCS-4
39690	39700	10	TCS-2
39720	39960	240	TCS-3
39970	39980	10	TCS-2

From	To	Length	TCS Type
39000	39100	100	TCS-5
39180	39220	40	TCS-1
39280	39290	10	TCS-7
39330	39340	10	TCS-3
39360	39480	120	TCS-5
39600	39610	10	TCS-2
39630	39640	10	TCS-10
39680	39690	10	TCS-6
39700	39720	20	TCS-10
39960	39970	10	TCS-1
39980	40000	20	TCS-6

3. Intersections and Grade Separators

All intersections and grade separators shall be as per Section 3 of the IRC SP 73-2018. Existing intersections which are deficient shall be improved to the prescribed standards.

All intersections as per the site requirement shall be designed and constructed in accordance with the manual. List of minor intersections is given in below table.

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

(i) At-grade intersections Major Intersections

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

Minor Intersections

Sl. No.	Location of Intersection (km)	Type of intersection	Other features
1	0.000	Y-Type	BRO Road
2	2.300	Y-Type	PMGSY Road

(ii) Grade separated intersection with/without ramps

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

4. Road Embankment and Cut Section

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in IRC: 52-2019 and IRC: SP 48 -1998 and the specified typical cross section. Deficiencies in the plan and profile of the existing road shall be corrected.

(ii) Raising of the existing road

The existing road shall be raised in the following sections:

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

5. Pavement Design

(i) Pavement with following composition shall be adopted for the project road: 20 mm- MSS, 50 mm -DBM, 150 mm- WMM, 100 mm- GSB as drainage layer.

(ii) Type of payment

Flexible Pavement shall be adopted for the project road.

(iii) Design requirements

Deleted.

(a) ***Design Period and strategy***

Deleted.

(b) Design Traffic

Deleted.

(iv) Reconstruction of stretches

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

Sl. No.	Stretch From km to km	Remarks	TCS Type
Nil			

6. Roadside Drainage

(i) Drainage system including surface and subsurface drains for the Project Highway shall be provided as per IRC: 52-2019 and IRC: SP 48 -1998 and IRC SP 73-2018.

Drain Type	Side	Total Length (m)
Stone masonry with cement mortar Open Drain	Both/One side	24537m
Catch water Drain	Both/One side	12800m
Total =		**37337m**

7. Design of Structures

(i) General

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

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

Sl. No.	Bridge at km	Width of carriageway and cross-sectional features
1	3+708	Deck width of bridge: 12.0m, Footpath: 1.5 m on both sides, Safety crash barriers: 450 mm RCC on both sides, Railing: 300mm RCC on both side
2	4+033	
3	5+790	
4	9+266	
5	11+473	
6	12+411	

Sl. No.	Bridge at km	Width of carriageway and cross-sectional features
7	15+659	
8	16+959	
9	19+018	
10	22+122	
11	27+151	
12	35+674	

(c) The following structures shall be provided with footpaths

Sl. No.	Bridge at km	Footpath
1	3+708	Footpath: 1.5 m on both sides
2	4+033	
3	5+790	
4	9+266	
5	11+473	
6	12+411	
7	15+659	
8	16+959	
9	19+018	
10	22+122	
11	27+151	
12	35+674	

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

(e) The structures shall be designed to carry utility services like electric cable, water pipeline, OFC etc. as per the requirement of site.

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

(f) Cross-section of the new culverts and bridges at deck level shall conform to the typical cross-sections given in Section 7 of the Manual.

(ii) Culverts

(a) Overall width of all culverts shall be minimum 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:

Sl. No.	Design Chainage (km)	Size (m)
Nil		

(c) Widening of existing culverts:

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway.

Sl. No.	Culvert location	Span/ Opening	Remarks, if any
Nil			

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

S no	Design CH	Nos.	Length	Height	Size
1	0+180	1	2.0	2.0	1 X 2.0 X 2.0
2	0+245	1	2.0	2.0	1 X 2.0 X 2.0
3	0+410	1	2.0	2.0	1 X 2.0 X 2.0
4	0+525	1	2.0	2.0	1 X 2.0 X 2.0
5	0+595	1	2.0	2.0	1 X 2.0 X 2.0
6	0+650	1	2.0	2.0	1 X 2.0 X 2.0
7	0+800	1	2.0	2.0	1 X 2.0 X 2.0
8	1+170	1	2.0	2.0	1 X 2.0 X 2.0
9	1+765	1	2.0	2.0	1 X 2.0 X 2.0
10	2+005	1	2.0	2.0	1 X 2.0 X 2.0
11	2+550	1	2.0	2.0	1 X 2.0 X 2.0
12	2+890	1	3.0	3.0	1 X 3.0 X 3.0
13	2+990	1	2.0	2.0	1 X 2.0 X 2.0
14	3+555	1	2.0	2.0	1 X 2.0 X 2.0
15	3+945	1	2.0	2.0	1 X 2.0 X 2.0
16	4+140	1	2.0	2.0	1 X 2.0 X 2.0
17	4+935	1	2.0	2.0	1 X 2.0 X 2.0
18	5+000	1	2.0	2.0	1 X 2.0 X 2.0
19	5+535	1	2.0	2.0	1 X 2.0 X 2.0
20	6+405	1	2.0	2.0	1 X 2.0 X 2.0
21	6+745	1	2.0	2.0	1 X 2.0 X 2.0
22	7+180	1	2.0	2.0	1 X 2.0 X 2.0
23	7+680	1	2.0	2.0	1 X 2.0 X 2.0
24	8+140	1	2.0	2.0	1 X 2.0 X 2.0
25	8+395	1	2.0	2.0	1 X 2.0 X 2.0

S no	Design CH	Nos.	Length	Height	Size
26	8+800	1	2.0	2.0	1 X 2.0 X 2.0
27	9+580	1	2.0	2.0	1 X 2.0 X 2.0
28	9+685	1	2.0	2.0	1 X 2.0 X 2.0
29	9+725	1	2.0	2.0	1 X 2.0 X 2.0
30	10+045	1	2.0	2.0	1 X 2.0 X 2.0
31	10+360	1	2.0	2.0	1 X 2.0 X 2.0
32	10+550	1	2.0	2.0	1 X 2.0 X 2.0
33	11+085	1	2.0	2.0	1 X 2.0 X 2.0
34	11+140	1	2.0	2.0	1 X 2.0 X 2.0
35	11+760	1	2.0	2.0	1 X 2.0 X 2.0
36	11+910	1	2.0	2.0	1 X 2.0 X 2.0
37	12+675	1	2.0	2.0	1 X 2.0 X 2.0
38	12+810	1	2.0	2.0	1 X 2.0 X 2.0
39	12+920	1	2.0	2.0	1 X 2.0 X 2.0
40	13+155	1	2.0	2.0	1 X 2.0 X 2.0
41	13+320	1	2.0	2.0	1 X 2.0 X 2.0
42	13+360	1	2.0	2.0	1 X 2.0 X 2.0
43	13+460	1	2.0	2.0	1 X 2.0 X 2.0
44	13+760	1	2.0	2.0	1 X 2.0 X 2.0
45	14+085	1	2.0	2.0	1 X 2.0 X 2.0
46	14+240	1	3.0	3.0	1 X 3.0 X 3.0
47	14+415	1	2.0	2.0	1 X 2.0 X 2.0
48	14+580	1	2.0	2.0	1 X 2.0 X 2.0
49	15+215	1	2.0	2.0	1 X 2.0 X 2.0
50	15+290	1	2.0	2.0	1 X 2.0 X 2.0
51	15+345	1	2.0	2.0	1 X 2.0 X 2.0
52	15+720	1	2.0	2.0	1 X 2.0 X 2.0
53	15+870	1	2.0	2.0	1 X 2.0 X 2.0
54	15+945	1	2.0	2.0	1 X 2.0 X 2.0
55	16+065	1	2.0	2.0	1 X 2.0 X 2.0
56	16+090	1	2.0	2.0	1 X 2.0 X 2.0
57	16+300	1	2.0	2.0	1 X 2.0 X 2.0
58	16+485	1	2.0	2.0	1 X 2.0 X 2.0
59	16+615	1	2.0	2.0	1 X 2.0 X 2.0
60	16+750	1	2.0	2.0	1 X 2.0 X 2.0
61	16+860	1	2.0	2.0	1 X 2.0 X 2.0
62	17+255	1	2.0	2.0	1 X 2.0 X 2.0
63	17+420	1	2.0	2.0	1 X 2.0 X 2.0
64	17+470	1	2.0	2.0	1 X 2.0 X 2.0

S no	Design CH	Nos.	Length	Height	Size
65	17+700	1	2.0	2.0	1 X 2.0 X 2.0
66	17+750	1	2.0	2.0	1 X 2.0 X 2.0
67	17+835	1	2.0	2.0	1 X 2.0 X 2.0
68	18+005	1	2.0	2.0	1 X 2.0 X 2.0
69	18+075	1	2.0	2.0	1 X 2.0 X 2.0
70	18+570	1	3.0	3.0	1 X 3.0 X 3.0
71	19+480	1	2.0	2.0	1 X 2.0 X 2.0
72	19+765	1	3.0	3.0	1 X 3.0 X 3.0
73	19+880	1	2.0	2.0	1 X 2.0 X 2.0
74	20+150	1	2.0	2.0	1 X 2.0 X 2.0
75	20+575	1	2.0	2.0	1 X 2.0 X 2.0
76	20+735	1	2.0	2.0	1 X 2.0 X 2.0
77	20+930	1	2.0	2.0	1 X 2.0 X 2.0
78	21+075	1	2.0	2.0	1 X 2.0 X 2.0
79	21+175	1	2.0	2.0	1 X 2.0 X 2.0
80	21+595	1	2.0	2.0	1 X 2.0 X 2.0
81	22+360	1	2.0	2.0	1 X 2.0 X 2.0
82	22+400	1	2.0	2.0	1 X 2.0 X 2.0
83	22+700	1	2.0	2.0	1 X 2.0 X 2.0
84	23+320	1	2.0	2.0	1 X 2.0 X 2.0
85	23+670	1	2.0	2.0	1 X 2.0 X 2.0
86	23+830	1	2.0	2.0	1 X 2.0 X 2.0
87	24+060	1	2.0	2.0	1 X 2.0 X 2.0
88	24+350	1	2.0	2.0	1 X 2.0 X 2.0
89	24+630	1	2.0	2.0	1 X 2.0 X 2.0
90	24+680	1	2.0	2.0	1 X 2.0 X 2.0
91	24+940	1	2.0	2.0	1 X 2.0 X 2.0
92	25+030	1	2.0	2.0	1 X 2.0 X 2.0
93	25+245	1	2.0	2.0	1 X 2.0 X 2.0
94	25+545	1	2.0	2.0	1 X 2.0 X 2.0
95	25+615	1	2.0	2.0	1 X 2.0 X 2.0
96	25+825	1	2.0	2.0	1 X 2.0 X 2.0
97	26+175	1	2.0	2.0	1 X 2.0 X 2.0
98	26+265	1	2.0	2.0	1 X 2.0 X 2.0
99	26+570	1	2.0	2.0	1 X 2.0 X 2.0
100	26+650	1	2.0	2.0	1 X 2.0 X 2.0
101	26+950	1	2.0	2.0	1 X 2.0 X 2.0
102	27+375	1	2.0	2.0	1 X 2.0 X 2.0
103	27+485	1	2.0	2.0	1 X 2.0 X 2.0

S no	Design CH	Nos.	Length	Height	Size
104	28+000	1	2.0	2.0	1 X 2.0 X 2.0
105	28+125	1	2.0	2.0	1 X 2.0 X 2.0
106	28+390	1	2.0	2.0	1 X 2.0 X 2.0
107	28+580	1	2.0	2.0	1 X 2.0 X 2.0
108	28+880	1	2.0	2.0	1 X 2.0 X 2.0
109	29+340	1	2.0	2.0	1 X 2.0 X 2.0
110	29+440	1	3.0	3.0	1 X 3.0 X 3.0
111	29+480	1	2.0	2.0	1 X 2.0 X 2.0
112	29+580	1	2.0	2.0	1 X 2.0 X 2.0
113	30+120	1	2.0	2.0	1 X 2.0 X 2.0
114	30+555	1	2.0	2.0	1 X 2.0 X 2.0
115	30+735	1	2.0	2.0	1 X 2.0 X 2.0
116	31+050	1	2.0	2.0	1 X 2.0 X 2.0
117	31+625	1	2.0	2.0	1 X 2.0 X 2.0
118	31+830	1	2.0	2.0	1 X 2.0 X 2.0
119	32+125	1	2.0	2.0	1 X 2.0 X 2.0
120	32+250	1	2.0	2.0	1 X 2.0 X 2.0
121	32+315	1	2.0	2.0	1 X 2.0 X 2.0
122	32+345	1	2.0	2.0	1 X 2.0 X 2.0
123	32+485	1	2.0	2.0	1 X 2.0 X 2.0
124	32+615	1	2.0	2.0	1 X 2.0 X 2.0
125	32+900	1	2.0	2.0	1 X 2.0 X 2.0
126	33+120	1	2.0	2.0	1 X 2.0 X 2.0
127	33+250	1	2.0	2.0	1 X 2.0 X 2.0
128	33+600	1	2.0	2.0	1 X 2.0 X 2.0
129	33+835	1	2.0	2.0	1 X 2.0 X 2.0
130	34+145	1	2.0	2.0	1 X 2.0 X 2.0
131	34+250	1	2.0	2.0	1 X 2.0 X 2.0
132	34+335	1	3.0	3.0	1 X 3.0 X 3.0
133	34+755	1	2.0	2.0	1 X 2.0 X 2.0
134	34+800	1	2.0	2.0	1 X 2.0 X 2.0
135	35+005	1	2.0	2.0	1 X 2.0 X 2.0
136	35+200	1	2.0	2.0	1 X 2.0 X 2.0
137	35+370	1	2.0	2.0	1 X 2.0 X 2.0
138	36+200	1	2.0	2.0	1 X 2.0 X 2.0
139	36+500	1	2.0	2.0	1 X 2.0 X 2.0
140	36+645	1	2.0	2.0	1 X 2.0 X 2.0
141	36+830	1	2.0	2.0	1 X 2.0 X 2.0
142	36+910	1	2.0	2.0	1 X 2.0 X 2.0

S no	Design CH	Nos.	Length	Height	Size
143	37+060	1	2.0	2.0	1 X 2.0 X 2.0
144	37+420	1	3.0	3.0	1 X 3.0 X 3.0
145	37+525	1	2.0	2.0	1 X 2.0 X 2.0
146	37+875	1	2.0	2.0	1 X 2.0 X 2.0
147	38+040	1	2.0	2.0	1 X 2.0 X 2.0
148	38+110	1	2.0	2.0	1 X 2.0 X 2.0
149	38+275	1	2.0	2.0	1 X 2.0 X 2.0
150	38+715	1	3.0	3.0	1 X 3.0 X 3.0
151	38+830	1	2.0	2.0	1 X 2.0 X 2.0
152	39+270	1	2.0	2.0	1 X 2.0 X 2.0
153	39+435	1	2.0	2.0	1 X 2.0 X 2.0
154	39+855	1	2.0	2.0	1 X 2.0 X 2.0

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

[Refer to the provision of 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.

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

(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

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

S. No.	Chainage	Proposal	Span (No. X Length in m)	Total Length (m)	Width CW (m)	Deck Width (m)	Super structure
1	3+708	New	3 X 20	60	7.5	12	RCC Girder
2	4+033	New	1 X 80	80	7.5	12	Steel Truss
3	5+790	New	1 X 100	100	7.5	12	Steel Truss
4	9+266	New	1 X 100	100	7.5	12	Steel Truss
5	11+473	New	1 X 80	80	7.5	12	Steel Truss
6	12+411	New	1 X 80	80	7.5	12	Steel Girder
7	15+659	New	3 X 20	60	7.5	12	RCC Girder
8	16+959	New	1 X 100	100	7.5	12	Steel Truss
9	19+018	New	1 X 100	100	7.5	12	Steel Truss
10	22+122	New	1 X 100	100	7.5	12	Steel Truss
11	27+151	New	1 X 100	100	7.5	12	Steel Truss
12	35+674	New	1 X 100	100	7.5	12	Steel Truss

(c) The railings of existing bridges shall be replaced by crash barriers at the following locations: [Refer to the provision of relevant Manual and provide details:]

Sl. No.	Location at km	Remarks
Nil		

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

Sl. No.	Location at km	Remarks
Nil		

(e) Drainage system for bridge decks

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

(f) Structures in marine environment

Sl. No.	Location at km	Remarks
Nil		

(iv) Rail-road bridges

(a) Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the IRC SP 73 2018.

(b) Road over-bridges

Road over-bridges (road over rail) shall be provided at the following level crossings:

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:

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

(v) Grade separated structures

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

(vi) Repairs and strengthening of bridges and structures

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

(a) Bridges

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

(b) ROB / RUB

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

(c) Overpasses/Underpasses and other structures

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

(vii) List of Major Bridges and Structures

The following is the list of the 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 Section 9 of the IRC SP 73-2018. The minimum requirement may be taken as below:

(ii) Specifications of the reflecting sheeting

Retro reflective sheeting should be of high intensity grade with encapsulated lens or with micro prismatic retro reflective element in accordance with ASTM Standard D 4956-04 in accordance with Clause 9.2.3 of the Manual.

9. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provisions of the Manual.

(ii) Overhead traffic signs:

Sl. No.	Design Chainage	Remarks
1	0+000	
2	40+000	

10. Compulsory Afforestation

Compensatory afforestation shall be in accordance with section 11 of IRC SP 73-2018.

11. Hazardous Locations

11.1 Parapet walls of minimum length 2949 m and crash barrier length 1991 m should be provided as per manual. Increase in length if any as per site

requirement will not constitute change of scope.

12. Special Requirement for Hill Roads

Retaining wall / Breast wall

12.1 As per manual, the minimum quantity of protection work may be taken as below:

Type of Protection Work		
Protection Work	**Unit**	**Quantity**
Breast wall, 2.0m height	Running Meter	16037
Breast wall, 3.0m height	Running Meter	9961
Retaining wall, 1m height	Running Meter	958
Retaining wall, 2m height	Running Meter	4331
Retaining wall, 3m height	Running Meter	4745
Retaining wall, 4m height	Running Meter	4490
Retaining wall, 5m height	Running Meter	3246 + (500m for Muck Disposal)
Retaining wall, 6m height	Running Meter	2459
Retaining wall, 7m height	Running Meter	1770
Retaining wall, 8m height	Running Meter	1336
Retaining wall, 9m height	Running Meter	739
Retaining wall, 10m height	Running Meter	560
Retaining wall, 11m height	Running Meter	410
Retaining wall, 12m height	Running Meter	320
Hydro seeding	Sqm	338625
Seeding & Mulching	Sqm	67239
Soil Nailing	Sqm	1490
Chute for Culvert	No.	At every culvert location

13. Change of Scope

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

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:

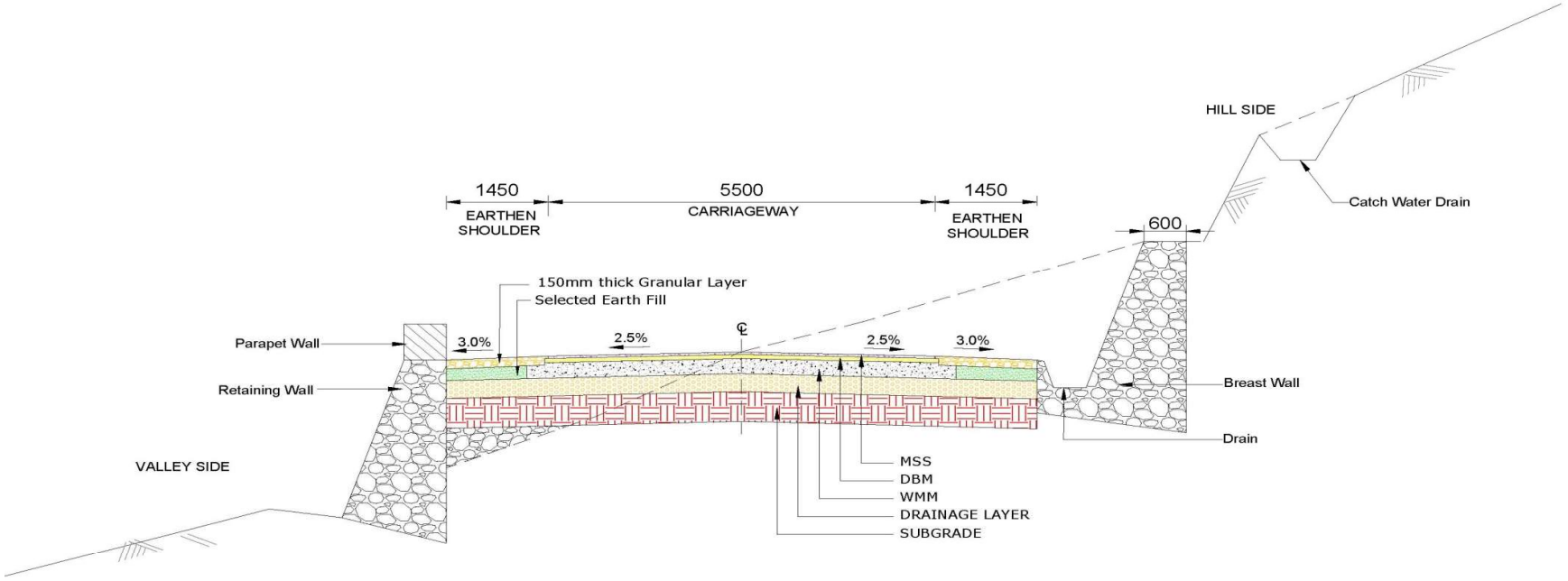
a) The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work shall be as per the guidelines of utility owning department and it is to be agreed solely between the contractor/Concessionaire and the utility owning department. No change of scope shall be admissible and 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.

Typical Cross-section along the Project Highway

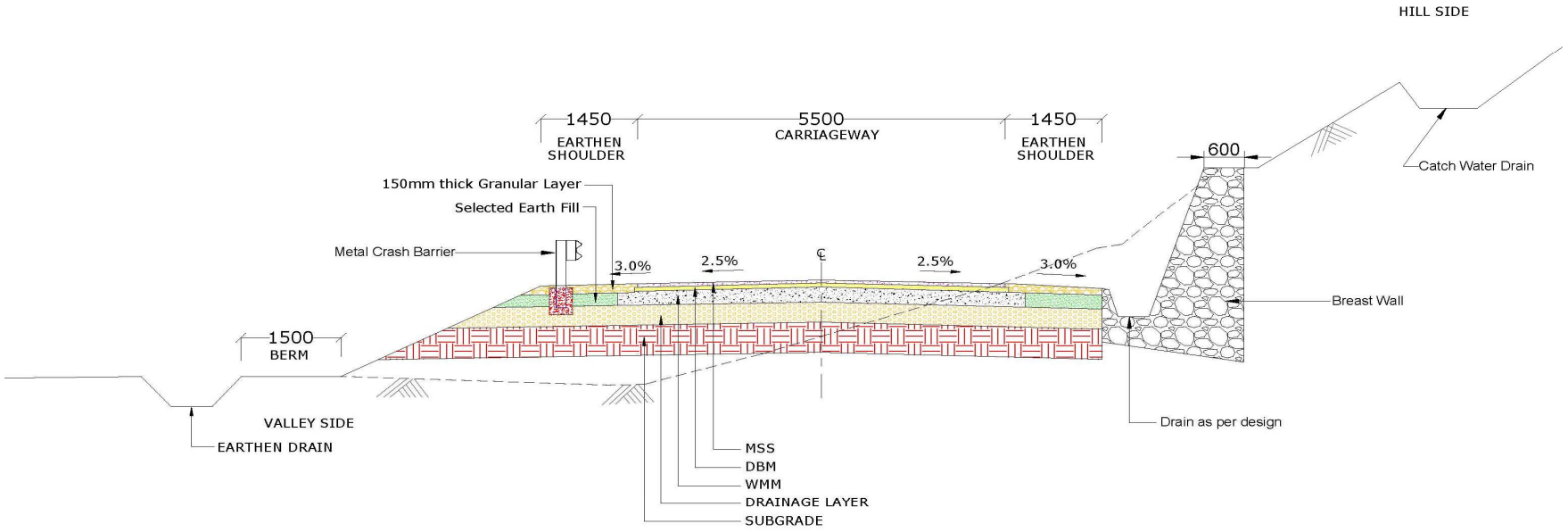


TCS-1, INTERMEDIATE LANE CARRIAGEWAY WITH RETAINING WALL ON ONE SIDE & BREAST WALL ON OTHER SIDE

NOTES:-

1. ALL DIMENSIONS ARE IN MM FOLLOW WRITTEN DIMENSIONS NOT TO BE SCALED.
2. CROSS SLOPE /SUPER ELEVATION TO BE AS PER HIGHWAY DESIGN.
3. CRUST TO BE AS PER PAVEMENT DESIGN.

TCS-1: Intermediate Lane Carriageway with Retaining Wall on One side & Breast Wall on Other side

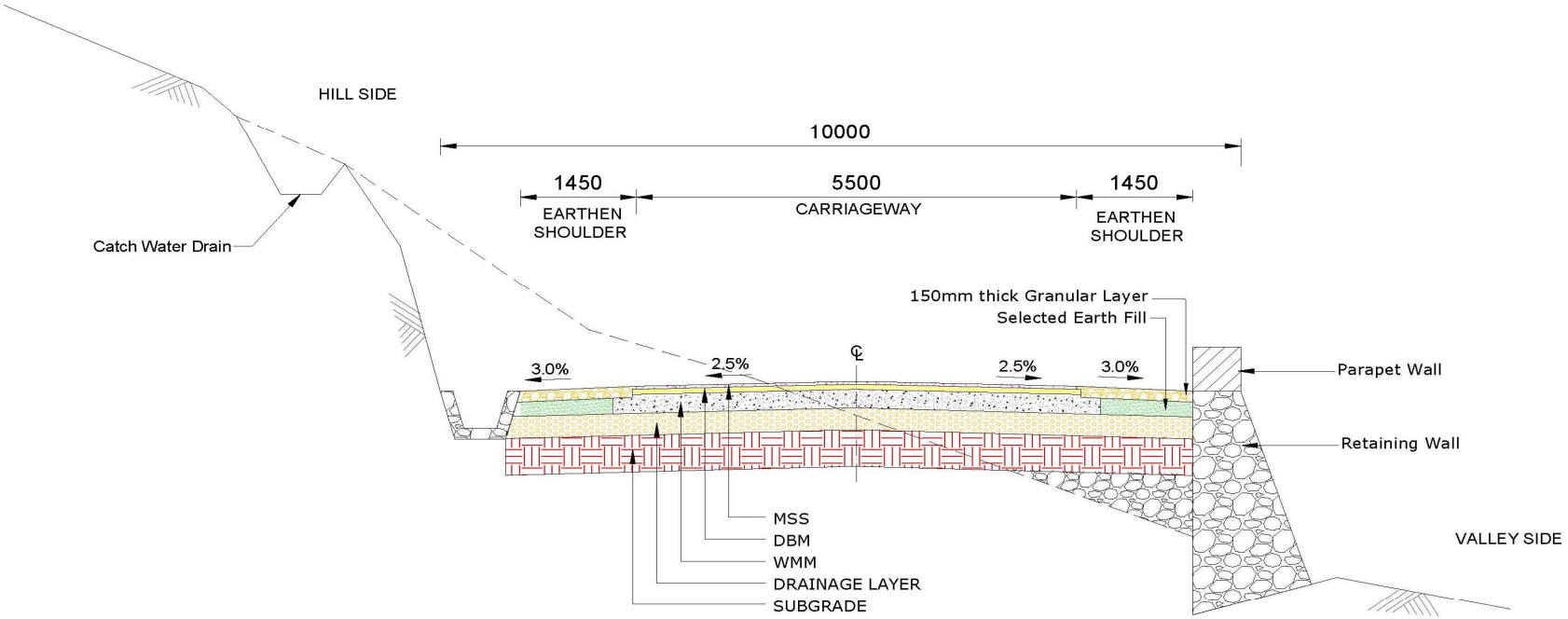


TCS-2, INTERMEDIATE LANE CARRIAGEWAY WITH BREAST WALL ON ONE SIDE

NOTES:-

1. ALL DIMENSIONS ARE IN MM FOLLOW WRITTEN DIMENSIONS NOT TO BE SCALED.
2. CROSS SLOPE /SUPER ELEVATION TO BE AS PER HIGHWAY DESIGN.
3. CRUST TO BE AS PER PAVEMENT DESIGN.

TCS-2: Intermediate Lane Carriageway with Breast Wall on One side

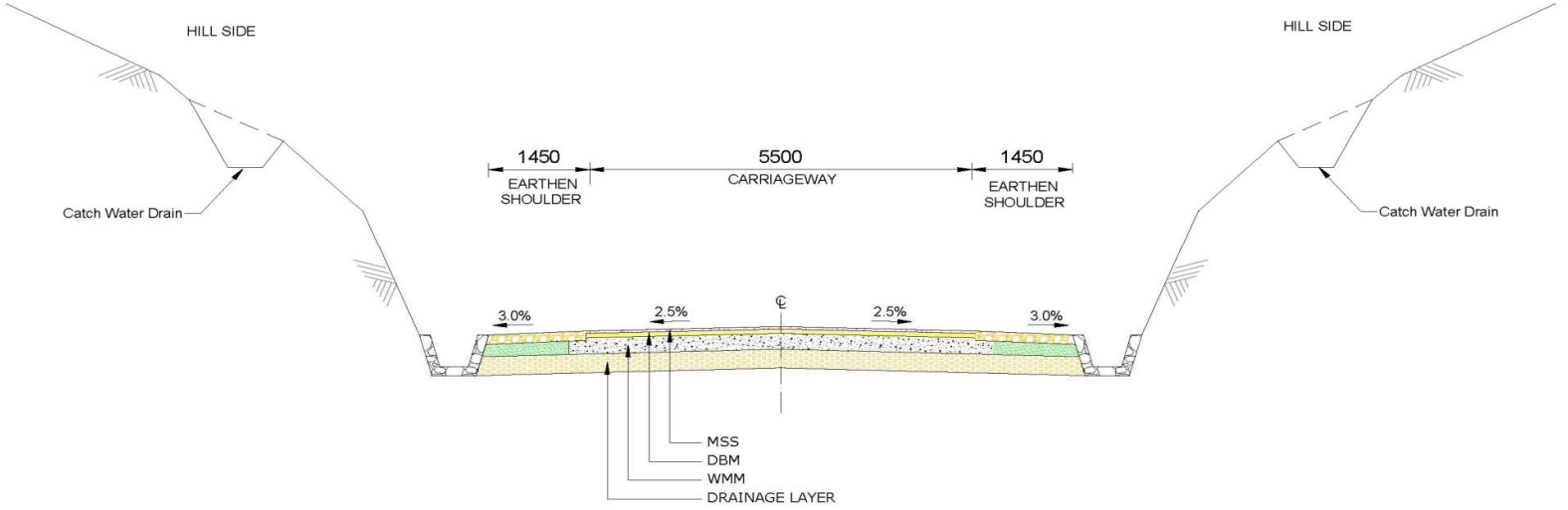


TCS-3, INTERMEDIATE LANE CARRIAGEWAY WITH ONE SIDE RETAINING WALL & OTHER SIDE TRAPEZOIDAL OPEN DRAIN

NOTES:-

1. ALL DIMENSIONS ARE IN MM FOLLOW WRITTEN DIMENSIONS NOT TO BE SCALED.
2. CROSS SLOPE /SUPER ELEVATION TO BE AS PER HIGHWAY DESIGN.
3. CRUST TO BE AS PER PAVEMENT DESIGN.

TCS-3: Intermediate Lane Carriageway with One side Retaining Wall & Other Side Trapezoidal Open Drain

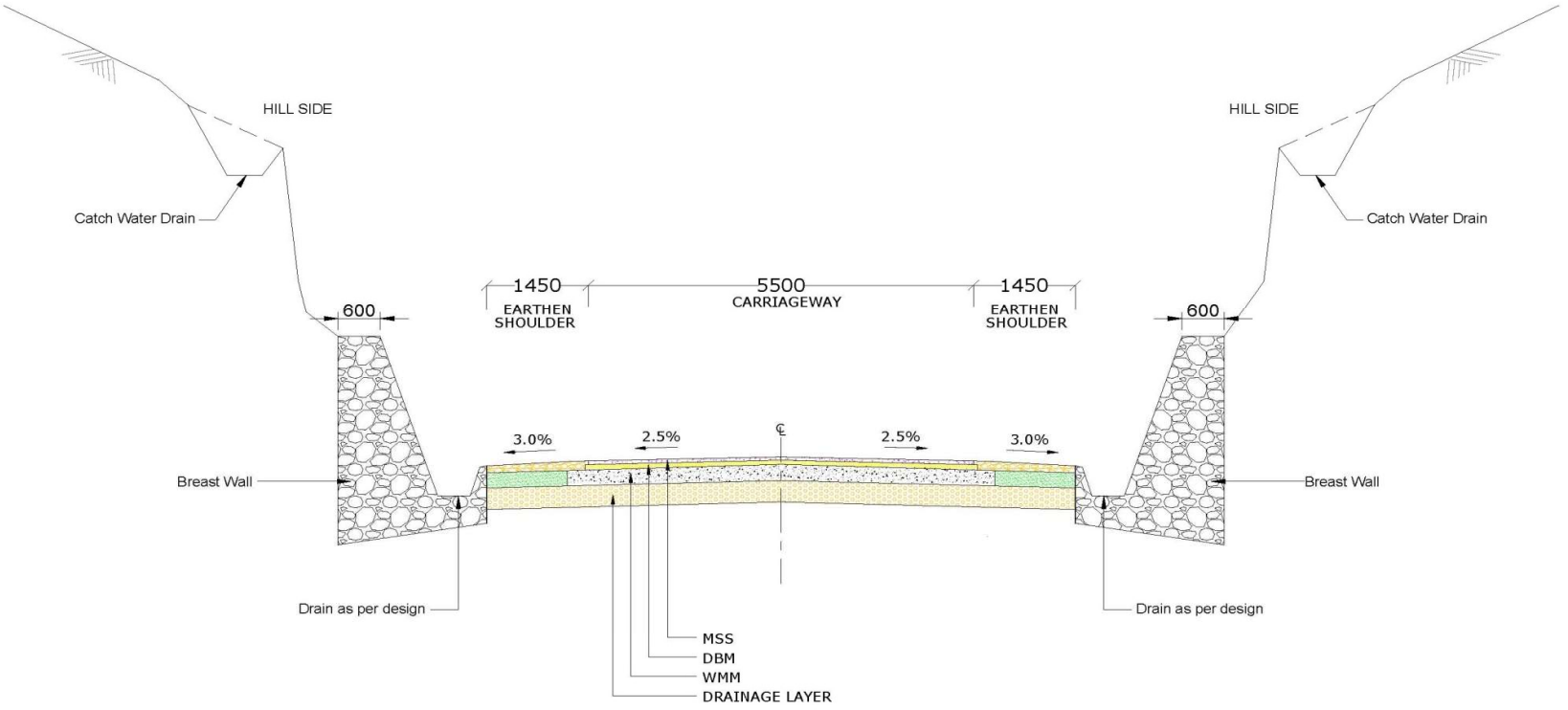


TCS-4, INTERMEDIATE LANE CARRIAGEWAY WITH BOTH SIDE TRAPEZOIDAL OPEN DRAIN

NOTES:-

1. ALL DIMENSIONS ARE IN MM FOLLOW WRITTEN DIMENSIONS NOT TO BE SCALED
2. CROSS SLOPE /SUPER ELEVATION TO BE AS PER HIGHWAY DESIGN.
3. CRUST TO BE AS PER PAVEMENT DESIGN.

TCS-4: Intermediate Lane Carriageway with Both Side Trapezoidal Open Drain

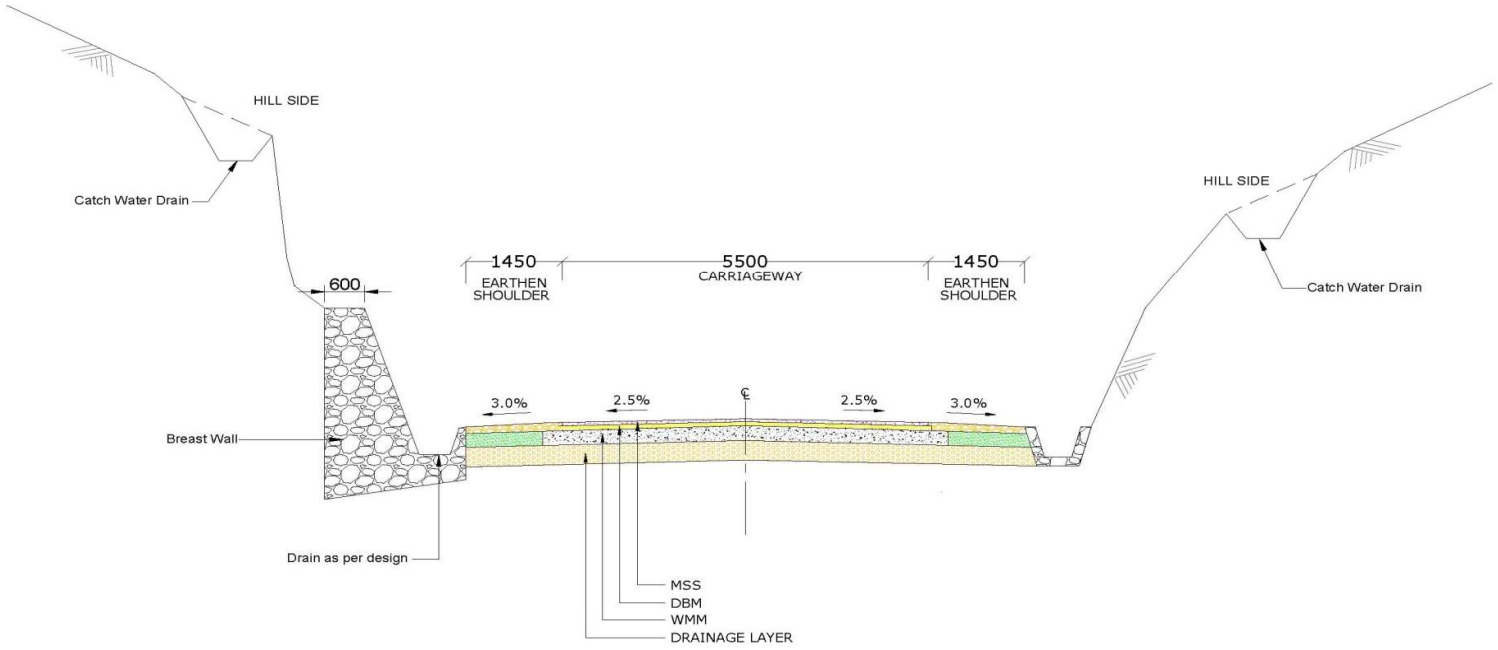


TCS-5, INTERMEDIATE LANE CARRIAGEWAY WITH BOTH SIDE BREAST WALL

NOTES:-

1. ALL DIMENSIONS ARE IN MM FOLLOW WRITTEN DIMENSIONS NOT TO BE SCALED.
2. CROSS SLOPE /SUPER ELEVATION TO BE AS PER HIGHWAY DESIGN.
3. CRUST TO BE AS PER PAVEMENT DESIGN.

TCS-5: Intermediate Lane Carriageway with Both Side Breast Wall

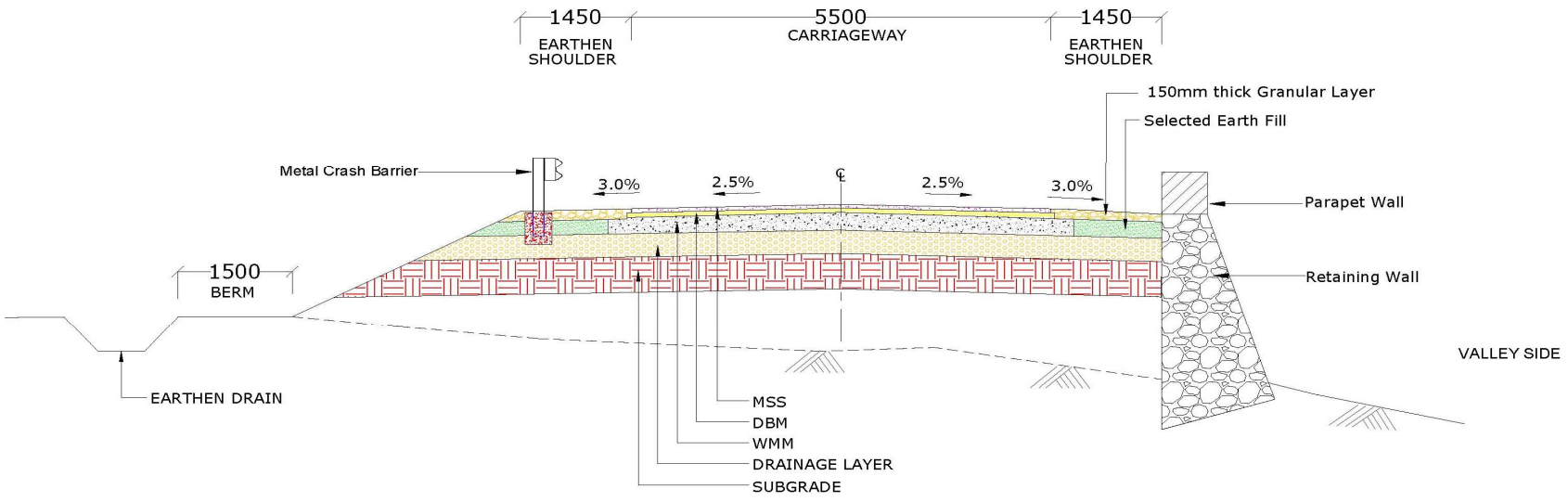


TCS-6, INTERMEDIATE LANE CARRIAGEWAY WITH ONE SIDE BREAST WALL & OTHER SIDE TRAPEZOIDAL OPEN DRAIN

NOTES:-

1. ALL DIMENSIONS ARE IN MM FOLLOW WRITTEN DIMENSIONS NOT TO BE SCALED.
2. CROSS SLOPE /SUPER ELEVATION TO BE AS PER HIGHWAY DESIGN.
3. CRUST TO BE AS PER PAVEMENT DESIGN.

TCS-6: Intermediate Lane Carriageway with One Side Breast Wall & Other Side Trapezoidal Open Drain

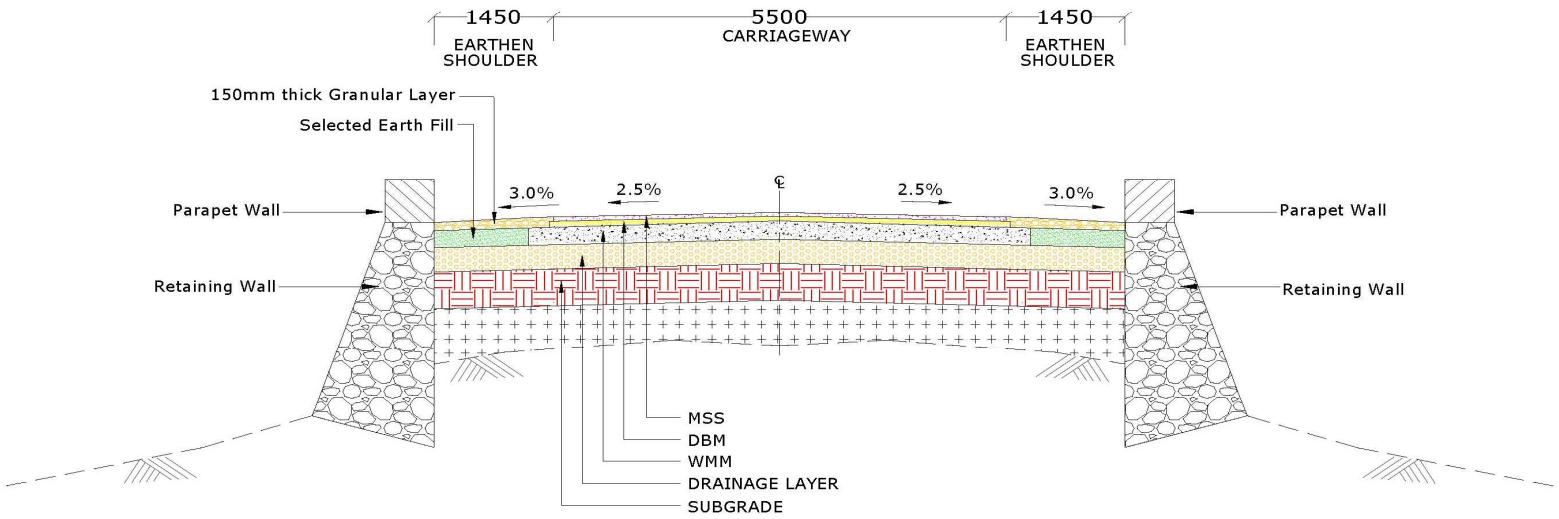


TCS-7, INTERMEDIATE LANE CARRIAGEWAY WITH ONE SIDE RETAINING WALL

NOTES:-

1. ALL DIMENSIONS ARE IN MM FOLLOW WRITTEN DIMENSIONS NOT TO BE SCALED.
2. CROSS SLOPE /SUPER ELEVATION TO BE AS PER HIGHWAY DESIGN.
3. CRUST TO BE AS PER PAVEMENT DESIGN.

TCS-7: Intermediate Lane Carriageway with One Side Retaining Wall

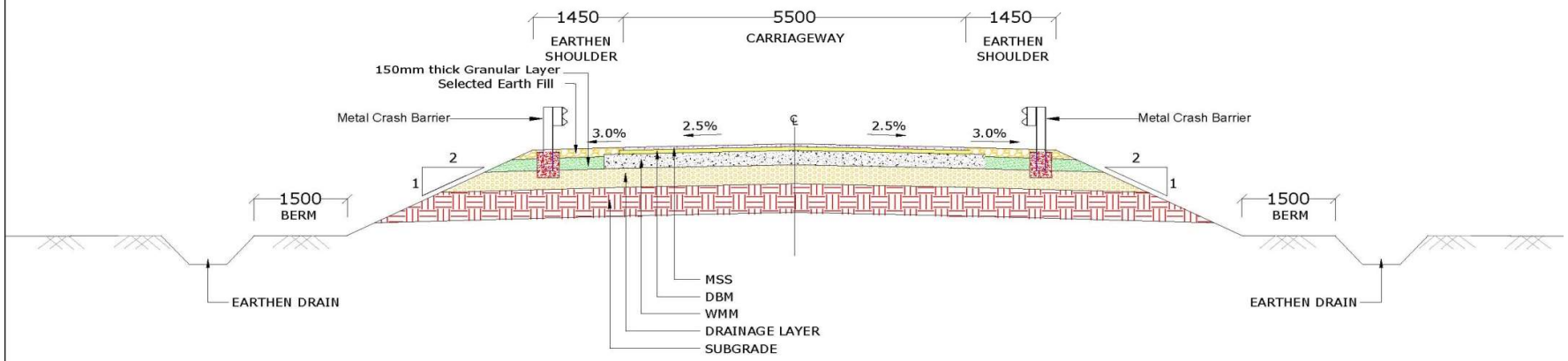


TCS-8, INTERMEDIATE LANE CARRIAGEWAY WITH BOTH SIDE RETAINING WALL

NOTES:-

1. ALL DIMENSIONS ARE IN MM FOLLOW WRITTEN DIMENSIONS NOT TO BE SCALED.
2. CROSS SLOPE /SUPER ELEVATION TO BE AS PER HIGHWAY DESIGN.
3. CRUST TO BE AS PER PAVEMENT DESIGN.

TCS-8: Intermediate Lane Carriageway with Both Side Retaining Wall

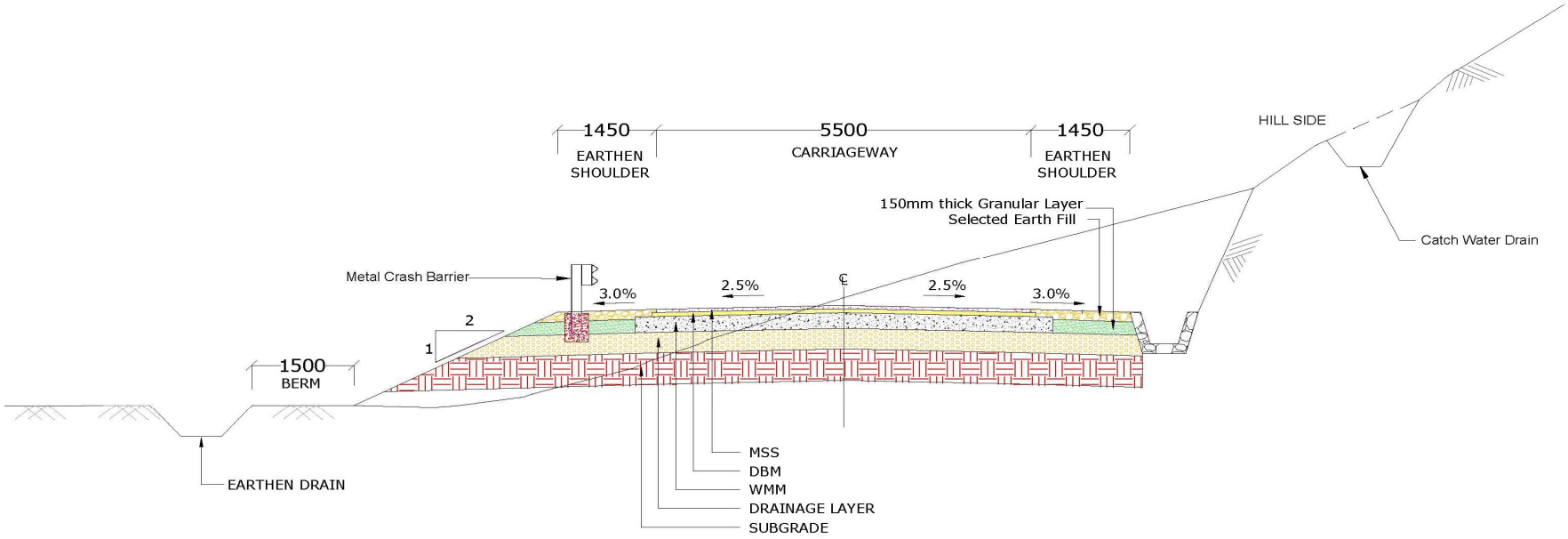


TCS-9, FOR INTERMEDIATE LANE CARRIAGEWAY WITH EARTHEN SHOULDER

NOTES:-

1. ALL DIMENSIONS ARE IN MM FOLLOW WRITTEN DIMENSIONS NOT TO BE SCALED.
2. CROSS SLOPE /SUPER ELEVATION TO BE AS PER HIGHWAY DESIGN.
3. CRUST TO BE AS PER PAVEMENT DESIGN.

TCS-9: Intermediate Lane Carriageway with Earthen Shoulder



TCS-10 FOR INTERMEDIATE LANE CARRIAGEWAY WITH EARTHEN SHOULDER
VALLEY SIDE & OTHER SIDE TRAPEZOIDAL OPEN DRAIN

NOTES:-

1. ALL DIMENSIONS ARE IN MM FOLLOW WRITTEN DIMENSIONS NOT TO BE SCALED.
2. CROSS SLOPE /SUPER ELEVATION TO BE AS PER HIGHWAY DESIGN.
3. CRUST TO BE AS PER PAVEMENT DESIGN.

TCS-10: For Intermediate Lane Carriageway with Earthen Shoulder Valley Side & Other Side Trapezoidal Open Drain

Schedule - C

(See Clause 2.1)

Project Facilities

1. Project Facilities

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

(a) Toll plazas.
(b) Traffic Control Device/Road Safety Device/Roadside furniture.
(c) Pedestrian facilities.
(d) Landscaping and Tree plantation
(e) Truck lay-byes.
(f) Bus-bays and Passenger shelters
(g) Rest areas
(h) Others

2. Description of Project Facilities

Each of the Project Facilities is described below:

(a) Toll Plaza: Nil

(b) Roadside Furniture:

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

Sl.No.	Project Facility	Location	Design Standard	Other essential details
1	Traffic Sign & Pavement marking	Entire Length (As per Schedule B)	As per manual	
2	Km stone, Hectometer Stone, 5th kilometer stone, boundary stone	Entire Length	As per manual	
3	Roadside Delineator, marker & Road Stud	As per Schedule B	As per manual	
4	Metal beam crash barrier	As per Schedule B	As per manual	
5	Traffic safety devises	Where ever required	As per manual	

(c) Location of Pedestrian Facilities:

Pedestrian facilities in the form of footpath cum drain shall be provided in the built up area (refer typical cross-section drawing). Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with Authority.

(d) Landscaping & Tree plantation:

Landscaping and Tree plantation shall be done at Major intersection, Muck disposal sites and in van panchayat/nap land of the adjoining villages.

(e) Location of Truck Lay Byes:

Sl. No.	Proposed Chainage (km)
Nil	

(f) Bus –bays and Bus shelters:

As stipulated in section 12.5 of the Manual, Passenger shelters shall be provided. There are total 2 numbers of passenger shelters should be provided on whole stretches.

Note: Above shown numbers of passenger shelter are minimum, however, the location of passenger shelters shall be finalized as per suitability of location and site requirement in consultation with Client. Any change in location or numbers shall not treat as change of scope.

(g) Rest areas: Nil

(h) Others:

Street Lighting

Street lighting shall be providing in the built-up area

Rainwater Harvesting

As per Ministry of Environment and Forests Notification, New Delhi dated 14.01.1997 (as amended on 13.01.1998, 05.01.1999 & 6.11.2000), the construction of Rainwater, harvesting structure is mandatory in and around Water Crisis area, notified by the Central Ground Water Board. Minimum 1 number per 5 km has to be provided throughout the project length.

Schedule - D

(See Clause 2.1)

Specifications and Standards

1. Construction

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

2. Design Standards

The Project Highway including Project Facilities shall conform to design requirements set out in the Manual of Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill Road manual IRC: SP 48 - 1998 and IRC SP 73-2018 referred to as the Manual, and MORTH Specifications for Road and Bridge Works 5th Revision 2013 or latest version. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

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 [Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill Road manual IRC: SP 48 -1998 and 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 "Contractor", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer" and "Agreement" respectively.

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

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

Item	Provision as per Manual	Modified Provision
Applicable cross section	Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill Road manual IRC: SP 48 -1998 and IRC SP 73-2018	Intermediate lane with earthen shoulders. As per TCS in schedule B (with carriageway width of 5.5m, 1.45m shoulder on hillside and 1.45m shoulder on valley side)
Cross section of bridge	Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill Road manual IRC: SP 48 -1998 and IRC SP 73-2018	7.5 m carriageway including shyness, 1.5 m footpath on both sides, 0.45m crash barriers and 0.3m Railings

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.

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / post-monsoon inspection

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

8. Repairs on account of natural calamities

All damages occurring to the Project Highway on account of a Force Majeure Event or 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.

Asset Types of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	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					
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any50 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 andShoving	Nil	< 0.1 % of area	Daily	Length Measurementt Unit like		2-7 days	IRC:82-2015

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					
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted	Daily			7- 15 days	IRC:82-2015

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**					
			to 30 cm from the edge					
	RoughnessBI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway- force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer: ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015

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**					
	Other Pavement Distresses			Bi-Annuallyy			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement	RoughnessBI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 -94: 2000	180 days	IRC:SP:83-2008
(Pavement of MCW,Service Road, Grade structure,	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC: SP:83-2008	180 days	IRC: SP:83-2008

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
approaches of connecting roads, slip roads, lay byes etc. as applicable)		**Minimum SN**	**Traffic Speed (Km/h)**		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

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

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**					
			side slope					
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

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

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
CRACKING						
1	**Single Discrete Cracks Not intersecting with any joint**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if L > lm.
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		Within 7days

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			4	w = 1.5 - 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	

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

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
			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 -

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**
						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		

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**
				into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		
			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	ree or four corners broken		Reinstate sub-base, and reconstruct the

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**
						slab as per norms and specifications within 30days
6	**Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w = width of crack L = length (m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/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		

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
Surface Defects						
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting.	
			4	r = 25 - 50 %		

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	
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	**Scaling**	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	r < **2 %**	Local repair of areas damaged and liable to be damaged. Within 7days	
			2	r = 2 - 10 %		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	r = 10 - 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		

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	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	**Popout (Small Hole), Pothole Refer Para 8.4**	n = number/m² d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m²	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m²	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m²		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m^2	Partial depth repair 110mm	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m^2	i.e.10 mm more than the depth of the hole. Within 30 days	
			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	Clean, widen and reseal the joint. Within 7 days	

				and trapping incompressible material.		
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.	
			2	w = 10 - 20 mm, L < 25%	Within 7 days	
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	**Faulting (or stepping) in Cracks or Joints**	f = difference of level	0	not discernible, < 1 mm	No action.	No action.

			1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	
14	**Blowup or uckling**	h = vertical displacement from normal profile	0	Nil, not discernible	**Short Term**	**Long Term**
			1	h < 6 mm	No Action	
			2	h = 6 - 12 mm	Install Signs to Warn Traffic	

			3	h = 12 - 25 mm	within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical 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	

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

		displacement from normal profile	1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term** No action.	**Long Term**
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder	

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

20	**Ponding**	Ponding on slabs 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 colspan="3">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="5">Highway</td><td rowspan="5">Availability of Safe Sight Distance</td><td colspan="3">As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.</td><td rowspan="5">Monthly</td><td rowspan="5">Manual Measurements with Odometer along with video/ image backup</td><td colspan="2" rowspan="5">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.

In case of permanent structure or design deficiency:
Removal of obstruction/improvement of deficiency at the earliest
Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td rowspan="5">IRC:SP 84-2014</td></tr>
<tr><td>Design Speed, kmph</td><td>Desirable Minimum Sight Distance (m)</td><td>Safe Stopping Sight Distance (m)</td></tr>
<tr><td>100</td><td>360</td><td>180</td></tr>
<tr><td>80</td><td>260</td><td>130</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td colspan="3"><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
</table>

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="3">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="10"></td><td>Day time Visibility</td><td colspan="3">During expected life Service Time
Cement Road - 130mcd/m²/lux
Bituminous Road - 100mcd/m²/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td rowspan="9">Night Time Visibility</td><td colspan="3"><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u></td><td rowspan="9">Bi-Annually</td><td rowspan="9">As per Annexure-E of IRC:35-2015</td><td rowspan="9">Re - painting</td><td rowspan="9">Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td rowspan="9">IRC:35-2015</td></tr>
<tr><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m²/lux)</td></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<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>
<tr><td colspan="3"><u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u></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
		Initial 7 days Retro reflectivity: 100 mcd/m^2/lux Minimum Threshold Level: 50 mcd/m^2/lux					
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	hange of ignboard	48 hours in case of Mandatory	RC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.		Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilever Sign boards	
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84-2014,

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Traffic Safety Barriers			backup			IRC:119-2015
	Attenuators	Functionality: Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119-2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pipe/box/slab culverts	Free waterway/ unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause 2800
		Delamination of concrete not more than 0.25 sq.m.					
		Cracks wider than 0.3 mm not more than 1m aggregate length					

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

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

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

	expansion joint	gap.		Mobile Bridge Inspection Unit			IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
Bridge-substructure	Cracks/spalling of concrete/ rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.

	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2	IRC: SP 40-1993 and IRC:SP:13-2004.

		sq.m, damage to solid apron (concrete apron) not more than 1 sq.m				weeks before onset of rainy season whichever is earlier.	
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

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

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours

Nature of Defect or deficiency		Time limit for repair/ rectification
(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 theapproval of the competent authority.]

Schedule - F

(See Clause 4.1 (vii)(a))

Applicable Permits

1. Applicable Permits

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

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

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

(c) Licence for use of explosives;

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

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

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

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

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

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

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

Schedule - G

(See Clauses 7.1 and 19.2)

Annex-I: Form of Bank Guarantee

(See Clause 7.1)

[Performance Security /Additional Performance Security]

To

_____[name of Authority]

_____ [address of Authority]

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

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

crore) (the **"Guarantee Amount"**[1]).

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

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees andaffirms 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.

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager of National Highways & Infrastructure Development Corporation Limited], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Contract shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is

in default in due and faithful performance of its obligations during and under the Contract and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

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

Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

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

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and

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

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

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

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

13. This guarantee shall also be operatable at our .... Branch at New Delhi, from whom,

confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

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

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

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

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

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

NOTES:

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

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

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

Annex – II: Form for Guarantee for Advance Payment

To

_____ [name of Authority]

_____ [address of Authority]

WHEREAS:

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

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

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

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

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

   A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance

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

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

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

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

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

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

7. The Guarantee shall cease to be in force and effect on ****3 Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.

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

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

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

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

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

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

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

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

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

NOTES:

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

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

Schedule - H

(See Clauses10.1 (iv) and 19.3)

Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs……

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road Works including Culverts, widening and repair of culverts.	15.57%	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-Base Course	0.00%
		(3) Non Bituminous Base course	0.00%
		(4) Bituminous Base course	0.00%
		(5) Wearing Coat	0.00%
		(6) Widening and repair of culverts	0.00%
		B.1-Reconstruction/New Intermediate Lane Realignment /Bypass	
		(Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	29.01%
		(2) Sub Base Course	11.27%
		(3) Non Bituminous Base course	9.03%
		(4) Bituminous Base course	16.90%
		(5) Wearing Coat	5.50%
		B.2-Reconstruction/New Intermediate Lane Realignment/Bypass (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub Base Course	0.00%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) Course	0.00%
		C.1-Reconstruction/ New Service Road (Flexible Pavement)	0.00%
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Non Bituminous Base course	0.00%
		(4) Bituminous Base course	0.00%
		(5) Wearing Coat	0.00%
		C.2- Reconstruction/New Service Road (Rigid Pavement)	0.00%
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) Course	0.00%
		D- Reconstruction and New culverts on existing road, realignments, bypasses: Culverts (length <6m)	28.29%
Minor Bridges/ Underpasses/ Overpasses		**A.1-Widening and Repair of Minor bridges (length >6 m and<60m).**	
		Minor Bridges	0.00%
		A.2- New Minor bridges (length >6 m and<60m)	
		(1) Foundation + Sub Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(2) 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.	
		(3) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use	
		(4) Guide Bunds & River Training Works: On completion of Guide Bunds and river Training Works complete in all respects	0.00%
		B.1- Widening and Repair of underpasses/overpasses	0.00%
		Underpasses/ Overpasses	0.00%
		B.2-New underpasses/overpasses	0.00%
		(1) Foundation + Sub Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	0.00%
		(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	0.00%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		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.	0.00%
Major bridge (length>60 m) works and ROB/RUB/ elevated sections/ flyovers including viaducts ,if any	19.25%	**A.1- Widening and repairs of Major Bridges**	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Guide Bunds, River Training works etc.	0.00%
		(8) Approaches(including Retaining walls, stone pitching and protection works)	0.00%
		A.2-New Major Bridges	
		(1) Foundation	7.93%
		(2) Sub-structure	9.45%
		(3) Super-structure (including bearings)	78.06%
		(4) Wearing Coat including	2.05%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		expansion joints	
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	1.97%
		(6) Wing walls/return walls	0.00%
		(7) Guide Bunds, River Training works etc.	0.00%
		(8) Approaches (including Retaining walls, stone pitching and protection works)	0.54%
		B.1-Widening and repair of **(a) ROB** **(b) RUB**	
		(1) Foundation	0.00%
		(2) Sub-Structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat: (a)in case of ROB- wearing coat including expansion 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	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		B.2-New ROB/RUB (a) ROB (b) RUB	
		(1) Foundation	0.00%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(2) Sub-Structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(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	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	0.00%
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4)Wearing Coat including expansion joints	0.00%
		(5) Miscellaneous Items like handrails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	0.00%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		C.2- New Elevated Section/Flyovers/Grade Separators	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4)Wearing Coat including expansion joints	0.00%
		(5) Miscellaneous Items like handrails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	0.00%
Other Works	65.18%	(i) Toll Plaza	0.00%
		(ii) Road side covered drains	0.00%
		(iii) Road side open drains	2.32%
		(iv) Road signs, markings, km stones, safety Devices, etc.	0.79%
		(v) Project facilities	
		a) Bus Bays/ Passenger Shelter	0.01%
		b)Truck Lay-Byes	0.00%
		c) Junctions (Major & Minor)	0.01%
		d) Rest areas	0.00%
		e) Diversion work	0.00%
		f) Others (Footpath,)	0.00%
		(v) Road side plantation	0.00%
		(vi) Repair of protection works other than approaches to the bridges, elevated sections/ flyovers/ grade separators and ROBs/ RUBs	0.00%
		(vii) Safety and traffic management during construction	0.07%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(viii) Protection Works	
		(a) Retaining wall	66.91%
		(b) Breast wall	24.50%
		(c) Parapet	0.44%
		(d) Seeding Mulching with jute net, Hydro seeding, W-Beam Crash Barrier and Soil Nailing	4.83%
		(ix) Site clearance	0.12%
Electrical utilities and Public Health Utilities (Water pipe lines and Sewage lines)		i) EHT line	0.00%
		ii) EHT Crossing	0.00%
		iii) HT / LT line	0.00%
		iv) HT / LT line crossings	0.00%
		v) Water pipeline	0.00%

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		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.
(1) Earthwork up to top of the sub- grade	0.00%	
(2) Sub-Base Course	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing Coat	0.00%	
(6) Widening and repair of culverts	0.00%	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

Stage of Payment	Percentage weightage	Payment Procedure
		culverts.
B.1- Reconstruction/New Intermediate Lane realignment/ bypass (Flexible pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 3 (three) km. length, whichever is less.
(1) Earthwork up to top of the sub- grade	29.01%	
(2) Sub Base Course	11.27%	
(3) Non Bituminous Base course	9.03%	
(4) Bituminous Base course	16.90%	
(5) Wearing Coat	5.50%	
B.2- Reconstruction/New Intermediate Lane realignment / bypass (Rigid pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5(five) km. length, whichever is less.
(1) Earthwork up to top of the sub- grade	0.00%	
(2) Sub Base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	
C.1- Reconstruction/ New service r o a d (Flexible pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5(five) km. length, whichever is less.
(1) Earthwork up to top of the sub- grade	0.00%	
(2) Sub Base Course	0.00%	
(3) Non-Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing Coat	0.00%	
C.2- Reconstruction/ New service road (Rigid pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full
(1) Earthwork up to top of the sub- grade	0.00%	

Stage of Payment	Percentage weightage	Payment Procedure
(2) Sub Base Course	0.00%	length or 5(five) km. length, whichever is less.
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	
D- Re-Construction and New culverts on existing road, realignments, 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 five culverts.
(1) Culverts (length <6m)	28.29%	

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

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

Where,

P = Contract Price

L = Total length in km

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

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

1.3.2 Minor Bridges and Underpasses/Overpasses.

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

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
1	2	3
A.1-Widening and repair of minor bridges **(length > 6m and < 60m)**	0.00%	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of widening & repair works of a minor bridge.
A.2- New minor bridges **(i) Foundation +Sub- Structure:** On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.		(i) Foundation +Sub- Structure: Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation + sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation +sub- structure of each bridge subject to completion of atleast two foundations along with sub-structure upto abutment/pier cap level of each bridge.
		In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified

(ii) Super-structure: On completion of the super- structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect. **(iii) Approaches:** On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use. **(iv) Guide Bunds and River Training Works:** On completion of Guide Bunds and river Training Works complete in all respects	0.00%	**(ii) Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub-clause. **(iii) Approaches:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause. **(iv) Guide Bunds and River Training Works:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training Works in all respects as specified.
B.1-Widening and repair of underpasses/overpasses	0.00%	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/overpasses. Payment shall be made on the completion of widening & repair works of a underpass/ overpass.
B.2- New Underpasses/ Overpasses:		
(i) Foundation +Sub- Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	0.00%	(i) **Foundation +Sub- Structure:** Cost of each Underpass/Overpass shall be determined on pro rata basis with respect to the total linear length (m) of the Underpasses/Overpasses. Payment against foundation + sub-structure shall be made on pro-rata basis on completion of a stage i.e.

		not less than 25 of the scope of foundation +sub- structure of each Underpasses/Overpasses subject to completion of atleast two foundations along with sub-structure upto abutment/ pier cap level each underpass/ overpass. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Super-structure: On completion of the super- structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs &markings, 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 as specified.	0.00%	(ii) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(iii) Approaches: On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use	0.00%	**(iii) Approaches:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified.

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	0.00%	**(i) Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major 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 for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	0.00%	**(ii) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on 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)	0.00%	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	**(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	0.00%	**(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	0.00%	**(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) Guide Bunds, River Training works etc.	0.00%	**(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)	0.00%	**(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	7.93%	**(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 for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	9.45%	**(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)	78.06%	**(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	2.05%	**(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	1.97%	**(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	0.00%	**(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.	0.00%	**(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)	0.54%	**(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	0.00%	**i) Foundation:** Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the 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	0.00%	**(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)	0.00%	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of at-least one span in all respects as specified.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified.	0.00%	**(iv) Wearing Coat:** Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion 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.	0.00%	**(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	0.00%	**(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)	0.00%	**(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	0.00%	**i) Foundation**: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the 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	0.00%	**(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)	0.00%	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all 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.	0.00%	**(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.	0.00%	**(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	0.00%	**(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)	0.00%	**(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	0.00%	**(i) Foundation:** Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on pro- rata basis on 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	0.00%	**(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

Stage of Payment	Weightage	Payment Procedure
1	2	3
		to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the structure.
(iii)Super-structure (including bearings)	0.00%	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	**(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.	0.00%	**(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	0.00%	**(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)	0.00%	**(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	0.00%	**(i) Foundation:** Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on pro- rata basis on 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.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(ii) Sub-structure	0.00%	**(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)	0.00%	**(iii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	**(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.	0.00%	**(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	0.00%	**(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)	0.00%	**(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	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(ii) Road side Covered drains	0.00%	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 10 (ten per cent) of the total length.
(iii) Road side open drains	2.32%	
(iii) Road signs, markings, km stones, safety devices, …	0.79%	
(iv) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus bays/Passenger shelter	0.01%	
b) Truck lay-byes	0.00%	
c) Junctions (Major & Minor)	0.01%	
d) Rest areas	0.00%	
e) Diversion work	0.00%	
f) others (Footpath)	0.00%	
(v) Roadside plantation	0.00%	Unit of measurement is linear length.
(vi) Repair of protection works other than approaches to the bridges, elevated sections/ flyovers/grade separators and ROBs/RUBs.	0.00%	Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten per cent) of the total length.
(vii) Safety and traffic management during construction	0.07%	Payment shall be made on pro rata basis every six months.

Stage of Payment	Weightage	Payment Procedure
(viii) Protection Works		Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m of length.
A) Retaining wall with parapet	66.91%	
B) Breast wall	24.50%	
C) Parapet Wall	0.44%	
D) Seeding Mulching with jute net, Hydr W-Beam Crash Barrier and Nailing	4.83%	
(ix)Site clearance & Dismantling	0.12%	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.

1.3.5 Electrical utilities and public Health Utilities (Water pipelines and sewage lines)

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

Table1.3.5

Stage of Payment	Weightage	Payment Procedure
Utility Shifting		
i) EHT line	0.00%	Unit of measurement is as per completed activities. Cost per activity 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)-15 and (iv) Charging of line including dismantling and site clearance-35 (with DTR) and 50 (without DTR)

Stage of Payment	Weightage	Payment Procedure
ii) EHT Crossing	0.00%	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 I LT line (including transformers if any)	0.00%	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 I 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 I LT line Crossing	0.00%	Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25 of the crossings subject to a minimum of 10 crossings.

Stage of Payment	Weightage	Payment Procedure
(v) Water pipeline	0.00%	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 and site clearance-50)
(vi) Water pipeline crossings		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.

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

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

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the 320th days **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 548th **days from the Appointed Date (the "Project Milestone- II")** (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 776th **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 913th day from the Appointed Date.

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

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

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

2. Tests

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

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

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

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

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

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

Sr. No.	Key metrics of Asset	Equipment to be used	Frequency of condition survey
1	Surface defects of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per surveymonths defined for the state basis rainy season)
2	Roughness of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per surveymonths 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 surveymonths defined for the state basis rainy season)
5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basis rainy season)

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

Schedule - L

(See Clause 12.2)

Completion Certificate

1 I, …… (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated (the "**Agreement**"), for **Construction of Intermediate Lane of Pango to Jorging Road from Design Km 0+000 to Design Km 40+000 (Design Length: 40.00 Km, Pkg-I, Greenfield Alignment) in the State of Arunachal Pradesh on EPC mode (**the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through(Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Authority's Engineer by:
(Signature)
(Name)(Designation) (Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

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

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

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

2. Percentage reductions in lump sum payments on monthly basis

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

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

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

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

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

Where,

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

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

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

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

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

Terms of Reference for Authority's Engineer

1. Scope

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the **National Highways & Infrastructure Development Corporation Ltd., Third Floor, PTI Building, 4 Sansad Marg, New Delhi-110001** (the "**Authority**") and (the "**Contractor**") for **Construction of Intermediate Lane of Pango to Jorging Road from Design Km 0+000 to Design Km 40+000 (Design Length: 40 Km, Pkg-I, Greenfield Alignment) in the State of Arunachal Pradesh 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 assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

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

(xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and

independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

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

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

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

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

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

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

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

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

5. Maintenance Period

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

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

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

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

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

6. Determination of costs and time

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

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

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

7. Payments

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

(ii) Authority's Engineer shall -

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

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

Contractor, after adjustments in accordance with the provisions of Clause 19.10.

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

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

8. Other duties and functions

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

9. Miscellaneous

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

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

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

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

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

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

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

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

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

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

(f) Deductions:

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

   ii. Any amount towards deduction of taxes; and

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

(g) Net claim: (e) – (f) (iii);

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

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

   ii. For Change of Scope Orders, and

   iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause 20.1)

Insurance

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

The insurance cover shall be not less than the value of the contract price

(ii) The insurance shall be extended to cover liability for all loss and damage to the

Authority's property arising out of the Contractor's performance of this Agreement excluding:

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, …… (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …… (the "**Agreement**"), for " **Construction of Intermediate Lane of Pango to Jorging Road from Design Km 0+000 to Design Km 40+000 (Design Length: 40 Km, Pkg-I, Greenfield Alignment) in the State of Arunachal Pradesh on EPC mode"** the **"Project Highway"** on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature) (Name and designation of Authority's Representative)

(Address)

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