National Highways & Infrastructure Development Corporation Limited

BUILDING INFRASTRUCTURE - BUILDING THE NATION

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

SCHEDULES

For

"Construction Four laning of N. Kawnpui (N. Mualvum) –Mualkhang via Khamrang Village section (Package-7) of NH-6 from Existing Chainage km 127+200 to km 142+000 (Design Chainage km 111+850 to km 123+400) on Silchar - Vairengte - Sairang road in the State of Mizoram on EPC mode."

2023

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

New Delhi – 110001

Schedule-A

Schedule - A

(See Clauses 2.1 and 8.1)

Site of the Project

1. The Site

(i) The Site of the Two-Lane (proposed 4-lane divided carriageway) Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this **Schedule-A**

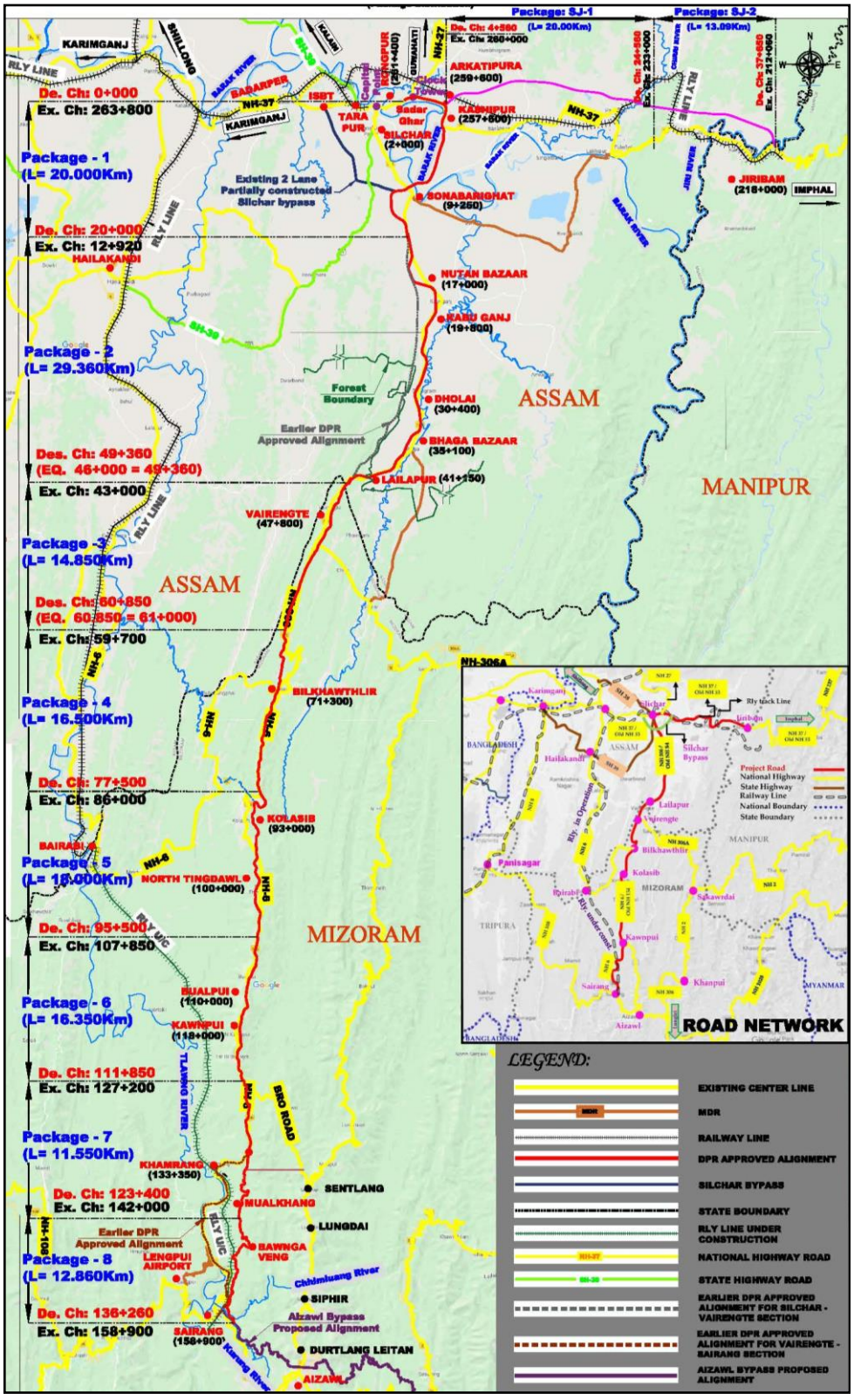
(ii) The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.

(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 environmental clearances obtained or awaited is given in Annex IV.

KEY PLAN



*** EQ (km 49+360 = km 46+000) ** EQ (km 60+850 = km 61+000)**

Annex - I

(Schedule-A)

Site for the Project

1. Site

The Site of the two-lane (proposed 4-lane divided carriageway) Project Highway starts from N. Kawnpui (N. Mualvum) and ends at Mualkhang (Package-7) of NH-6 from Existing Chainage km 127+200 to km 142+000 (Design Chainage km 111+850 to km 123+400) on Silchar - Vairengte – Sairang road in the state of Mizoram. The land, carriageway and structures comprising the Site are described below.

2. Land

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

SL No.	Chainage (km)		Length (m)	Right of Way (m)	Remarks
	From	To			
1	127+200	131+300	4300	24	
2	131+300	142+000	10700	NA	New Greenfield Alignment

3. Carriageway

The present carriageway of the Project Highway is 7.0 m wide. The type of the existing pavement is flexible. The details are given below.

SL No.	Chainage (km)		Length (m)	Carriageway width (m)	Remarks
	From	To			
1	127+200	131+300	4300	7	
2	131+300	142+000	10700	NA	New Greenfield Alignment

4. Major Bridges

The Site includes the following Major Bridges:

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

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

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

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

6. Grade separators

The Site includes the following grade separators:

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

7. Minor bridges

The Site includes the following Minor bridges:

Sl. No.	Existing Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structures	Superstructure		
1	128+150	-	-	Box girder	1 x 41	7.2
Km 131+300 to Km 142+00 follows New Greenfield Alignment						

8. Railway level crossings

The Site includes the following railway level crossings:

Sl. No.	Chainage (km)	Name of the crossing	Leads to		Remarks
			On LHS	On RHS	
Nil					

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

Sl. 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.	Existing Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
1	127+250	Pipe	1 x 1.2	12.50
2	127+300	RCC Slab	1 x 2	12.00
3	127+400	RCC Slab	1 x 3	13.00
4	127+500	Pipe	1 x 1.2	13.00
5	127+700	Pipe	1 x 1.2	13.00
6	128+300	Pipe	1 x 1.2	13.00
7	128+400	Pipe	1 x 1.2	13.00
8	129+150	Pipe	1 x 1.2	13.00
9	129+450	Pipe	2 x 1.2	12.00
10	129+550	Pipe	2 x 1.2	12.00
11	129+650	Pipe	1 x 1.2	13.00

S. No.	Existing Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
12	129+800	Pipe	1 x 1.2	13.00
13	129+950	Pipe	1 x 1.2	13.00
14	130+050	Pipe	1 x 1.2	13.00
15	130+250	Pipe	1 x 1.2	13.00
16	130+300	Pipe	1 x 1.2	13.00
17	130+450	Pipe	1 x 1.2	12.00
18	130+650	Pipe	1 x 1.2	12.00
19	130+750	Pipe	1 x 1.2	12.00
20	130+850	Pipe	1 x 0.9	12.00
21	131+050	Pipe	1 x 0.9	12.00
22	131+150	Pipe	1 x 0.9	12.00
23	131+250	Pipe	1 x 0.9	12.00
Km 131+300 to Km 142+00 follows New Greenfield Alignment				

11. Bus bays

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

Sl. 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:

Sl. No.	Chainage (km)	Length (m)	Left Hand Side	Right Hand side
NIL				

13. Roadside drains

The details of the roadside drains are as follows:

Sl. No.	Chainage (km)		Type	
	From km	to km	Masonry/cc (Pucca)	Earthen (Kutcha)
NIL				

14. Major Junctions

The details of major junctions are as follows.

Sl. No.	Chainage (km)	To-wards	At Grade	Side	Category of crossroad
NIL					

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

15. Minor Junctions

The details of the minor junctions are as follows:

Sl. No.	Chainage (km)	Type of Carriageway	Type of Junctions (T, Y, +)	Side	Type of Road (SH/ MDR/ PMGSY/ VR)
1	128+551	BT Road	T	LHS	Village Road
2	129+392	BT Road	Y	LHS	Village Road
Km 131+300 to Km 142+00 follows New Greenfield Alignment					

16. Bypasses

The details of the bypasses are as follows:

Sl. No.	Name of bypass (town)	Existing Chainage (km)	Design Length (Km)	Carriageway	
				Width (m)	Type
NIL					

17. Details of Existing Utilities Schedule

The existing utilities schedules as below,

17.1 Electrical Utilities

The Site includes the following Electrical Utilities: -

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

Sl. No.	Chainage (km)		Length of line (km)				Nos. of Crossings				Remarks
	From	To	765 KV SC	400 KV DC	220 KV DC/SC	132 KV DC	765 KV SC	400 KV DC	220 KV DC/SC	132 KV DC	
1	112+000	112+500				0.250				1	P&E Departme
2	113+500	114+000				0.200(1)				1	P&E Departme nt
3	114+450	114+700		0.200		0.450(3)		1			PGCIL P&E Department

*Note: (1) denotes Number **of pole/towers***

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

Sl. No	Chainage (km)		Length of line (km)				Nos. of Crossings				Transformer	
	From	To	HT 33KV	LT 33KV	LT 11KV	LT 440V	HT 33 KV	LT 33KV	LT 11KV	LT 440V	Nos.	Capacity KVA
1	111+850	112+000		0.100 (1)	0.100 (1)							
2	112+000	113+000		0.300 (3)	0.200 (2)				0.050 (1)			
3	122+600					0.120 (8)				0.150		

*Note: (1) denotes Number **of pole/towers***

17.2 Public Health Utilities (Water/Sewage Pipelines)

(a) The Site includes the following Public Health Utilities: -

Sl. No	Chainage (km)		Length (in km)				Crossings				Remarks
	From	To	Water Supply Line		Sewage Line		Water Supply Line		Sewage Line		
			With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	
1	111+850	112+500		0.600				2			
2	114+000	114+500	0.695	0.075			1	1			
3	122+600		0.550				1	3			

(b) Bore well/Hand Pump within RoW

Sl. No.	Bore Well**		Private House Connection	
	Chainage	Nos	Chainage	Nos
1			122+600	45

(c) Water Tank within RoW

Sl. No.	Chainage (km)	Nos	Remarks
1	122+600	2	

17.3 Any Other Lines

No.

18. Other Structures: NIL

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

(i) Full Right of Way (full width)

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(i) Full Right of Way (full width)	112+555	22.50	111+850	55.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	112+630	45.00	111+920	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	112+740	27.50	111+970	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	112+740	17.50	112+010	25.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	112+890	17.50	112+060	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	112+890	22.50	112+060	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	112+915	22.50	112+170	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	112+985	37.50	112+210	30.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	113+040	22.50	112+240	47.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	113+040	20.00	112+280	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	113+160	20.00	112+330	35.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	113+160	22.50	112+370	25.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	113+380	22.50	112+450	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	113+440	37.50	112+450	47.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	113+510	32.50	112+495	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	114+200	50.00	112+540	35.00	Within 30 Days of Appointed Date

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(i) Full Right of Way (full width)	114+200	22.50	112+630	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	114+440	22.50	112+690	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	114+440	20.00	112+740	17.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	114+570	20.00	112+740	17.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	114+570	22.50	112+890	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	114+665	37.50	112+890	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	115+530	22.50	113+050	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	115+575	37.50	113+050	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	115+650	22.50	113+230	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	115+750	22.50	113+230	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	115+855	40.00	113+310	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	115+950	22.50	113+310	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+085	22.50	113+455	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+105	45.00	113+455	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+160	57.50	113+490	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+220	47.50	113+520	42.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+325	40.00	113+610	42.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+430	75.00	113+640	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+460	60.00	114+630	42.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+480	32.50	114+690	35.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+530	22.50	114+800	22.50	Within 30 Days of Appointed Date

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(i) Full Right of Way (full width)	116+575	37.50	114+900	35.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+610	22.50	114+990	35.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+650	22.50	115+050	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+710	47.50	115+110	45.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+710	50.00	115+135	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+790	50.00	115+160	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+790	47.50	115+250	35.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+870	37.50	115+250	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+940	25.00	115+330	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	116+940	17.50	115+425	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	117+530	17.50	115+450	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	117+530	22.50	115+530	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	117+800	22.50	115+530	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	117+800	30.00	115+860	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	117+860	30.00	115+860	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	117+860	22.50	115+910	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	117+920	22.50	115+910	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	117+920	30.00	116+040	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	118+200	30.00	116+040	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	118+200	22.50	116+080	27.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	118+550	22.50	116+115	27.50	Within 30 Days of Appointed Date

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(i) Full Right of Way (full width)	118+550	25.00	116+140	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	118+720	25.00	116+140	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	118+720	22.50	116+180	25.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	118+770	22.50	116+200	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	118+770	27.50	116+220	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+120	27.50	116+270	35.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+120	25.00	116+320	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+210	25.00	116+360	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+210	30.00	116+360	20.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+260	30.00	116+470	25.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+260	25.00	116+470	25.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+300	25.00	116+670	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+300	30.00	116+670	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+540	30.00	116+940	17.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+540	22.50	116+940	17.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+640	22.50	117+530	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+640	30.00	117+530	50.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+770	30.00	117+570	50.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	119+770	22.50	117+590	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+150	22.50	117+610	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+150	27.50	117+690	25.00	Within 30 Days of Appointed Date

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(i) Full Right of Way (full width)	120+230	27.50	117+690	25.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+265	32.50	117+720	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+300	30.00	117+750	25.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+330	32.50	117+845	57.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+350	32.50	117+895	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+350	22.50	117+955	57.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+380	22.50	118+000	57.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+380	30.00	118+040	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+400	32.50	118+120	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+420	30.00	118+160	52.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+460	22.50	118+240	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+700	22.50	118+295	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+745	45.00	118+330	60.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+790	45.00	118+385	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	120+850	22.50	118+450	65.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+090	22.50	118+500	65.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+120	37.50	118+585	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+210	37.50	118+620	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+210	32.50	118+740	62.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+330	32.50	118+840	62.50	Within 30 Days of Appointed Date

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(i) Full Right of Way (full width)	121+330	40.00	118+915	27.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+410	40.00	118+990	27.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+410	22.50	119+130	55.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+510	22.50	119+185	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+510	30.00	119+270	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+600	30.00	119+360	60.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+600	25.00	119+440	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+690	25.00	119+490	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+690	32.50	119+540	55.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+770	32.50	119+585	55.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+770	22.50	119+635	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+800	22.50	119+690	70.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+800	27.50	119+745	27.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+845	27.50	119+830	27.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+875	22.50	119+950	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+925	40.00	119+950	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	121+965	37.50	119+995	37.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+010	22.50	120+025	37.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+085	22.50	120+110	50.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+125	45.00	120+110	50.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+180	35.00	120+160	22.50	Within 30 Days of Appointed Date

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(i) Full Right of Way (full width)	122+255	25.00	120+185	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+340	32.50	120+310	37.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+340	37.50	120+380	50.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+420	37.50	120+460	65.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+420	32.50	120+550	62.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+580	55.00	120+610	30.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+710	55.00	120+655	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+790	60.00	120+690	55.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+815	27.50	120+690	57.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+940	27.50	120+820	27.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	122+940	22.50	120+930	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	123+150	22.50	120+985	25.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	123+180	30.00	121+015	25.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	123+180	47.50	121+120	57.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	123+250	60.00	121+165	57.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	123+295	60.00	121+200	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	123+360	32.50	121+240	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	123+360	37.50	121+280	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)	123+400	37.50	121+315	25.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			121+370	40.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			121+430	22.50	Within 30 Days of Appointed Date

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(i) Full Right of Way (full width)			121+460	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			121+595	47.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			121+640	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			121+690	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			121+760	42.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			121+800	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			121+875	52.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			121+970	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			122+040	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			122+200	27.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			122+200	27.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			122+300	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			122+300	22.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			122+620	57.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			122+645	61.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			122+790	32.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			122+820	32.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			123+035	57.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			123+070	53.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			123+100	70.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			123+160	69.50	Within 30 Days of Appointed Date

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(i) Full Right of Way (full width)			123+175	63.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			123+185	51.00	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			123+200	27.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			123+200	27.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			123+250	32.50	Within 30 Days of Appointed Date
(i) Full Right of Way (full width)			123+400	32.50	Within 30 Days of Appointed Date

(ii) Part Right of Way (part width)

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(ii) Part Right of Way (part width)	111+850	18.00	111+850	6.20	On Appointed Date
(ii) Part Right of Way (part width)	112+110	24.00	111+865	3.00	On Appointed Date
(ii) Part Right of Way (part width)	112+110	24.00	113+555	22.50	On Appointed Date
(ii) Part Right of Way (part width)	112+160	24.00	113+590	22.50	On Appointed Date
(ii) Part Right of Way (part width)	112+160	24.00	113+670	5.00	On Appointed Date
(ii) Part Right of Way (part width)	112+440	24.00	114+730	6.00	On Appointed Date
(ii) Part Right of Way (part width)	112+440	24.00	114+780	7.00	On Appointed Date
(ii) Part Right of Way (part width)	113+530	22.50	114+900	9.00	On Appointed Date
(ii) Part Right of Way (part width)	113+850	22.50	114+990	5.00	On Appointed Date
(ii) Part Right of Way (part width)	113+850	22.50	115+330	5.00	On Appointed Date
(ii) Part Right of Way (part width)	114+635	8.00			On Appointed Date
(ii) Part Right of Way (part width)	114+700	3.00			On Appointed Date

(iii) Balance Right of Way (width)

Sl. No.	LHS		RHS		Date of Providing ROW
	Design Chainage (km)	Width (m)	Design Chainage (km)	Width (m)	
(iii) Balance Right of Way (width)	111+850	32.50	111+850	22.50	Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	112+110	32.50	111+865	22.50	Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	112+110	55.00	113+555	22.50	Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	112+160	55.00	113+590	22.50	Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	112+160	32.50	113+670	22.50	Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	112+440	32.50	114+730	22.50	Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	112+440	22.50	114+780	22.50	Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	113+530	22.50	114+900	35.00	Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	113+850	22.50	114+990	22.50	Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	113+850	50.00	115+330	35.00	Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	114+635	22.50			Within 60 Days of Appointed Date
(iii) Balance Right of Way (width)	114+700	22.50			Within 60 Days of Appointed Date

Annex - III

(Schedule-A)

Alignment Plans

The alignment plan of the Project Highway is available on E - Tendering portal of NHIDCL.

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

i. The alignment of the Project Highway is enclosed in the alignment plan. The finished road level indicated in the alignment plan shall be treated as an approximate assessment. The contractor shall design the road profile of the project highway in accordance with Schedule-D.

ii. Traffic Signages of the Project Highway showing numbers & location of traffic signs are 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

As per MOEF notification F. No. 21-270/2008-1A.III (dated 22 August 2013), Environmental Clearance is not required for Mizoram ..

Schedule-B

Schedule - B

(See Clause 2.1)

Development of the Project Highway

1 Development of the Project Highway

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

2 4-Laning with Paved Shoulder

Four Laning shall include construction of the Four Lane Project highway as described in Annex-I of this Schedule-B and in Schedule C.

3 Specifications and Standards

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

Annex - I

(Schedule-B)

Description of Project Road (4-Laning)

Site of the Four-lane divided Project Highway comprises the section of National Highway No. 6 from N. Kawnpui (N. Mualvum) to Mualkhang (Package-7) from Existing Chainage km 127+200 to km 142+000 (Design Chainage km 111+850 to km 123+400) on Silchar - Vairengte - Sairang road in the State of Mizoram. The coordinates of start and end point of project road are given below.

Co-ordinates of Start and End of Project Stretch

Location		**UTM Co-Ordinate**	
Description	**Design Chainage**	**Easting (m)**	**Northing (m)**
Start of Project Road	111+850	467800.454	2651473.990
End of Project Road	123+400	466965.954	2641701.958

1 Widening of the Existing Highway

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

(ii) **Width of carriageway**

(a) Four-Laning with paved shoulders shall be undertaken. The paved carriageway shall be in accordance with the typical cross-sections' drawings given in 'APPENDIX B-I" of Sch. B.

Provided that in the built-up areas [refer to paragraphs 2.1 (ii) (a) of the Manual and provide necessary details]: the width of the carriageway shall be as specified in the following table:

Sl. No.	**Built-up stretch (Township)**	**Chainage (Km to Km)**	**Width (m)**	**Typical cross section (Ref. to Manual)**
NIL				

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

(c) The entire cross-sectional elements shall be accommodated in the proposed ROW. If required, suitable retaining structures shall be provided to accommodate the highway cross section within the proposed ROW and the same 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 of the EPC Contract Agreement.

2 Geometric Design and General Features

(i) General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual (IRC: SP: 84-2019) for hilly terrain and as specified in Annex-I of Schedule D.

(ii) Design Speed

The contractor shall adopt minimum design speed for designing the project highway as specified in Plan and Profile drawings of Annexure-III of Schedule-A and in Annex-I of Schedule D.

(iii) Improvements of the existing road geometrics

Improvement of the existing road geometrics shall be carryout to the extent possible within the given right of way and proper road signs and safety measures shall be provided. It shall follow the alignment plans shown in the Annex-III of Schedule-A, unless otherwise specified by the Authority.

a) Details of Proposed Bypasses/new greenfield alignment

Sl. No	Location	Existing Chainage (km)		Existing Length (m)	Design Chainage (km)		Design Length (m)
		Start	End		Start	End	
1	Khamrang to Sairang	131+300	142+000	10700	115+400	123+400	8000
	Total			**10700**			**8000**

b) Realignments and Geometric Improvement locations

Sl. No	Location	Exist. Chainage (km)		Exist. Length (m)	Design Chainage (km)		Type of Deficiency	Design Length (m)
		Start	End		Start	End		
1	-	126+340	126+440	100	111+890	111+950	Geometric Improvement	60
2	-	126+700	126+840	140	112+210	112+330	Geometric Improvement	120
3	-	126+940	128+390	1450	112+450	113+530	Realignment	1080
4	-	128+750	129+740	990	113+850	114+710	Geometric Improvement	860

Apart from above, 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.

(iv) Right of Way

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

(v) Type of shoulders

a) In the built-up section, footpaths are to be provided in the following stretches and as specified in Schedule-D.

-NIL-

b) In open country, the shoulders on valley side shall be 1.5m wide paved + 2.0m earthen shoulders. The shoulders shall be in accordance with the Typical cross sections given in Appendix B-I.

c) The design and specifications of shoulders shall conform to the requirements of Section 5 as specified in paragraphs 5.10 and 5.11 of the Manual. The Earthen Shoulder shall be compacted with 150mm thick granular sub-base quality material at the top duly stabilized with cement/suitable admixtures to prevent erosion.

(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 paragraph 2.10 of IRC SP 84-2019.

b) Lateral clearance: The size of the opening at the Underpasses shall be as follows.

Sl. No.	Chainage (km)	Span /opening (m)	Vertical Clearance	Remarks
1	116+080	2 x 30m	5.5m	VUP cum MNB

(vii) Lateral and Vertical Clearances at overpasses

(a) Lateral and vertical clearance at over passes shall be as per paragraph 2.11 of the manual and as specified at Schedule-D.

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

Sl. No.	Chainage (km)	Span /opening (m)	Vertical Clearance	Remarks
1	122+630	2 x 30m	5.5m (Minimum)	Overpass
2	123+190	2 x 30m	5.5m (Minimum)	Overpass

(viii)Service roads / Slip Roads/Connecting Roads

(a) Service roads / Slip Roads shall be constructed at the locations and for the lengths indicated below:

Sl. No.	Chainage (km)		Right Hand side (RHS)/ Left Hand side (LHS)/ Both side	Length (km) of Service Road
	From km	To km		
NIL				

(b) Connecting Roads shall be constructed at the locations and for the lengths indicated below:

S. No.	Chainage (km)		Right Hand side (RHS)/Left Hand side (LHS)/Both side	Length (m)	C/Way Width (m)
	From km	To km			
1	115+410	116+010	RHS	600	7.5
2	116+090	116+480	LHS	390	7.5
3	122+570	122+830	LHS	260	7.5
4	122+630	122+830	RHS	200	7.5
5	Cross Road at 116+080		RHS	370	7.5
6	Cross Road at 123+190		RHS	380	7.5

Note:

(i) The above length excludes the tapering length/merging length of acceleration/deceleration lane. The entry and exit shall be constructed as per IRC: SP: 84: 2019.

(ii) Length of service road and connecting road given in above table excludes length across the Project Highway for proper connectivity of crossroad on either side of Project Highway as given in the alignment plan enclosed at **Annex-III, Schedule-A** which shall be deemed to be included in the scope of work.

(iii) The length of service road / connecting road shown in above table is minimum and may increase as per actual site conditions and No Change of Scope shall be admissible on this account.

(iv) In addition to the above, construction of temporary roads of required length and width for the maintenance of traffic during execution shall be deemed to be part the project and will not attract any change of scope.

(viii) Grade Separated Structures

(a) Grade separated structures shall be provided as per paragraph 2.13 of the IRC SP 84-2019. The requisite particulars are given below:

Sl. No	Location of Structure	Width (m)	Number and length of Spans (m)	Remarks if Any
1	116+080	2x12.5	2 x 30	VUP Cum MNB
2	122+630	1x12	2 x 30	VOP
3	123+190	1x12	2 x 30	VOP

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

Sl. No.	Location (Design Chainage)	Type of Structure	Cross road at			Remarks, if any
			Existing level	Raised Level	Lowered Level	
1	116+080	PSC I Girder	*	*	*	VUP Cum MNB
2	122+630	PSC I Girder	*	*	*	VOP
3	123+190	PSC I Girder	*	*	*	VOP

*Cross road levels shall be decided in accordance with the manual as per the requirement of main carriageway geometrics and the same shall be finalized in consultation with Authority's Engineer. It is clarified that, any raising or lowering of crossroad levels and development of approaches along crossroad is also covered under scope of this work and same will not attract change of scope.

(ix) Cattle and pedestrian underpass / overpass

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

Sl. No.	Chainage (km)	Type of Crossing
NIL		

(x) Typical cross-sections of the Project Highway

a. Types of cross-sections required to be developed in different segments of the project road are indicated in Appendix B-I.

b. TCS schedule as given in Appendix B-I shall be treated as an approximate assessment. Actual length of the TCS schedule shall be prepared by the contractor based on detailed investigations and site requirements. Any variation in length of respective TCS specified in 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 Article13of EPC Contract agreement.

3 Intersections and Grade Separators

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

Draft layout of major junctions is shown in Plan & Profile drawings for reference. Properly designed intersections shall be developed at the location given below:

(i) At-grade intersections

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Junctions (T, Y, +)	Side	Type of Road (SH/ MDR/ ODR/ VR)	Remarks
1	-	113+510	T	LHS	Exist. NH-6	Major Junction Mega Food Park

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Junctions (T, Y, +)	Side	Type of Road (SH/ MDR/ ODR/ VR)	Remarks
2	-	115+420	T	RHS	Exist. NH-6	Major Junction Khamrang
3	-	116+450	T	LHS	KS OD Road	Major Junction Khamrang
4	-	122+800	+	BHS	VR	Major Junction Mualkhang

Note: *It is clarified that if any other junction is identified during development of the project highway in addition to those mentioned above shall also be improved with proper drainage facilities as per standards. The length of development along the crossroads shall be decided as per site condition in accordance with manual. It shall be covered within the scope of work. The Number, location & type of junction shown in above table are minimum and it may increase as per actual site condition and increase in number will not attract change of Scope on this account.*

Junctions shall be improved as per IRC: SP: 84-2019 and MOST type design for intersection on National Highways, 1992.

(ii) Grade separated intersection with/without ramps.

Sl. No.	Chainage (km)	Type of Structure	Width (m)	Number and length of clear Spans (m)	Type of Grade Separator
1	116+080	PSC I Girder	2x12.5	2 x 30 x 5.5	VUP Cum MNB
2	122+630	PSC I Girder	1x12	2 x 30 x 5.5	VOP
3	123+190	PSC I Girder	1x12	2 x 30 x 5.5	VOP

Note: The layout of these intersections is shown in alignment plans specified in Annex III of Schedule-A. Development of all ramps/slip roads as shown in alignment plans is included in the scope of work and any modification of layout or increase in length of ramps/slip roads will not attract change of Scope.

4 Road Embankment and Cut Section

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in section 4 of the manual and the specified cross-sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

(ii) Raising of the existing road

The existing road shall be raised at the required locations as per proposed plan and profile or further raised to meet requisite specifications.

(iii) Surplus cut earth.

All of surplus cutting soil shall be transported and be disposed to the Spoil Banks in accordance with Schedule D.

5 Pavement Design

(i) Pavement design shall be carried out in accordance with Section 5 of the manual, IRC SP 37-2018 and IRC SP: 59-2019.

(ii) Type of pavement

Flexible pavement shall be provided including Bus Bay, Rest Area, Truck Lay Bye, and Intersections.

(iii) Design requirements

Notwithstanding anything to the contrary contained in this agreement or the manual, the contractor shall design the pavement of the main carriageway for design traffic of 30 MSA with a minimum design period of 20 years. CBR value as obtained at site shall be taken for design if less than 6%. The maximum value of CBR to be taken for design shall not exceed 6%.

PMB / CRMB shall be used for BC.

a) Design Period and strategy

A) Main carriageway:

Flexible pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

B) Service road/Slip Road:

Flexible pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

C) Strengthening of Existing pavement:

Nil

b) Design Traffic

A) Main carriageway:

Notwithstanding anything to the contrary contained in this Agreement or the IRC manual, the contractor shall design the pavement for design traffic of not less than 30 million standard axles (MSA) for Main carriageway.

B) Service Road

As per manual, service road, slip road and connecting road shall be designed for minimum 10 MSA.

C) Strengthening of Existing pavement

Nil

(iv) Reconstruction of stretches

The existing flexible pavement shall be dismantled and reconstructed as Flexible pavement.

6 Roadside Drainage

Drainage system including surface and subsurface drains for the Project Highway shall be constructed in entire length including drains and culverts required along the crossroads at junctions/ interchanges/other locations as per Section 6 of manual and as per TCS schedule provided as Appendix B-I to this schedule.

In the cutting sections, lined drain shall be provided at the top of cut slope and at every bench provided for drainage system adequacy and effectiveness. All measures shall be taken to prevent ingress of countryside runoff entering into road formation width.

Any repair/ reconstruction required for the existing culverts along project highway/along crossroads at junctions shall be carried out. This will not attract any change of scope.

i) RCC cover drain:

RCC cover drain shall be provided at the following locations.

LHS				RHS		
Sl. No	Chainage (km)		Length (m)	Chainage (km)		Length (m)
	From	To		From	To	
Nil						

Note: The above locations are minimum. Additional locations, if any required as per site condition shall be provided as per manual. It shall not be treated as a change in scope of work.

ii) PCC open drain on hill side:

PCC open drain shall be provided on hill side at following locations.

LHS				RHS		
Sl. No	Chainage (km)		Length (m)	Chainage (km)		Length (m)
	From	To		From	To	
1	112+450	112+750	300	111+850	112+750	900
2	112+880	113+500	620	113+400	115+430	2030
3	115+470	116+040	570	117+530	122+060	4530
4	116+100	116+980	880	122+580	123+250	670
5	121+080	121+240	160			
6	121+780	123+400	5040			
7	CR at 113+500		100			

LHS				RHS		
Sl. No	Chainage (km)		Length (m)	Chainage (km)		Length (m)
	From	To		From	To	
8	CR at 116+080		200			
9	CR at 122+800		200			
10	CR at 123+190		250			
Total Length=			**4900**			**8130**

Note: The above locations are minimum. Additional locations, if any required as per site condition shall be provided as per manual. It shall not be treated as a change in scope of work.

iii) PCC open drain on valley side:

PCC open drain shall be provided on valley side at following locations.

LHS				RHS		
Sl No	Chainage (km)		Length (m)	Chainage (km)		Length (m)
	From	To		From	To	
1	112+230	112+450	220	112+880	113+340	460
2	113+510	115+430	1920	115+530	116+040	510
3	117+540	121+080	3540	116+270	116+980	710
4	121+240	121+780	540			
Total Length=			**6220**			**1680**

Note: The above locations are minimum. Additional locations, if any required as per site condition shall be provided as per manual. It shall not be treated as a change in scope of work.

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 84-2019 and shall conform to the cross- sectional features and other details specified in this schedule. Floor protection works shall be as specified in the relevant IRC Codes and Specifications.

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

Refer to paragraph 7.3 (ii) of the IRC SP 84-2019 and specified width of carriageway of all new four lane bridges shall have footpaths on either side. The cross-sectional features shall be as per Fig.7.6 of the IRC SP 84-2019.

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

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

(e) 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. Extra widening shall be provided for all Culverts/Bridges/Other structures in curved sections as per manual.

(f) IRC Class Special Vehicle loading shall be taken into account in the design of all structures.

(ii) Culverts

7.2.1 Overall width of all culverts shall be equal to the roadway width of the approaches. All culverts shall be constructed as per Schedule-D.

(a) Reconstruction of existing culverts:

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

S. No.	Existing Chainage (km)	Design Chainage (km)	Existing Type	Existing Span	Proposed Type	Proposed Span	Remarks
1	127+250	111+965	Pipe	1 x 1.2	BOX	1x2x2	
2	129+150	113+570	Pipe	1 x 1.2	BOX	1x2x2	
3	129+450	113+680	Pipe	2 x 1.2	BOX	1x2x2	
4	129+550	113+810	Pipe	2 x 1.2	BOX	1x2x2	
5	129+950	114+100	Pipe	1 x 1.2	BOX	1x2x2	
6	130+050	114+230	Pipe	1 x 1.2	BOX	1x2x2	
7	130+250	114+310	Pipe	1 x 1.2	BOX	1x2x2	
8	130+450	114+590	Pipe	1 x 1.2	BOX	1x3x3	
9	130+650	114+750	Pipe	1 x 1.2	BOX	1x3x3	
10	130+750	114+915	Pipe	1 x 1.2	BOX	1x2x2	
11	130+850	114+975	Pipe	1 x 0.9	BOX	1x3x3	
12	131+050	115+165	Pipe	1 x 0.9	BOX	1x3x3	
13	131+150	115+310	Pipe	1 x 0.9	BOX	1x2x2	

(b) Widening of existing culverts

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in section 7.3 (i), (iii) and Fig. 7.1 to Fig. 7.5 of the IRC SP 84-2019. Repairs and

strengthening of existing structures where required shall be carried out.

S. No	Chainage (km)	Span / Opening	Remarks, if any
NIL			

(c) Additional new culverts

New culverts shall be constructed for a width equal to the roadway width of the Project Highway & as per typical cross-section given in this Schedule-B and alignment plan. The particulars are given in the table below:

S. No.	Existing Chainage (km)	Design Chainage (km)	Proposed Type	Proposed Span	Remarks
1	-	112+055	BOX	1x2x2	
2	-	112+245	BOX	1x2x2	
3	-	112+335	BOX	1x3x2	
4	-	112+455	BOX	1x3x2	
5	-	113+030	BOX	1x2x2	
6	-	113+146	BOX	1x2x2	
7	-	113+250	BOX	1x2x2	
8	-	113+350	BOX	1x2x2	
9	-	114+420	BOX	1x2x2	
10	-	115+110	BOX	1x2x2	
11	-	115+690	BOX	1x2x2	
12	-	115+735	BOX	1x3x2	
13	-	115+975	BOX	1x3x2	
14	-	116+200	BOX	1x2x2	
15	-	116+370	BOX	1x2x2	
16	-	117+620	BOX	1x2x2	
17	-	117+700	BOX	1x2x2	
18	-	117+840	BOX	1x2x2	
19	-	117+960	BOX	1x3x2	
20	-	118+145	BOX	1x3x2	

S. No.	Existing Chainage (km)	Design Chainage (km)	Proposed Type	Proposed Span	Remarks
21	-	118+310	BOX	1x3x2	
22	-	118+450	BOX	1x4x3	
23	-	118+540	BOX	1x2x2	
24	-	118+715	BOX	1x2x2	
25	-	118+995	BOX	1x3x2	
26	-	119+205	BOX	1x2x2	
27	-	119+520	BOX	1x3x2	
28	-	119+680	BOX	1x3x2	
29	-	119+860	BOX	1x2x2	
30	-	119+970	BOX	1x3x2	
31	-	120+080	BOX	1x2x2	
32	-	120+330	BOX	1x2x2	
33	-	120+520	BOX	1x2x2	
34	-	120+650	BOX	1x2x2	
35	-	120+930	BOX	1x2x2	
36	-	121+085	BOX	1x3x2	
37	-	121+260	BOX	1x3x2	
38	-	121+370	BOX	1x2x2	
39	-	121+475	BOX	1x2x2	
40	-	121+575	BOX	1x2x2	
41	-	121+725	BOX	1x2x2	
42	-	121+865	BOX	1x2x2	
43	-	122+210	BOX	1x2x2	
44	-	122+450	BOX	1x2x2	
45	-	122+555	BOX	1x2x2	
46	-	122+655	BOX	1x2x2	
47	-	122+765	BOX	1x2x2	

S. No.	Existing Chainage (km)	Design Chainage (km)	Proposed Type	Proposed Span	Remarks
48	-	122+840	BOX	1x2x2	
49	-	123+010	BOX	1x2x2	
50	-	123+125	BOX	1x2x2	
51	-	123+280	BOX	1x2x2	

(d) Additional Culverts at Junction and Connecting Road

The contractor shall construct the culverts at Connecting Road and junctions as per the list below:

Sl. No.	Design Chainage (Km)	Proposed Type	Proposed Span	Remarks
1	116+200	BOX	1x2x2	Connecting Road
2	116+370	BOX	1x2x2	Connecting Road
3	122+655	BOX	1x2x2	Connecting Road
4	122+655	BOX	1x2x2	Connecting Road
5	122+765	BOX	1x2x2	Connecting Road
6	122+765	BOX	1x2x2	Connecting Road

Note:

- *The overall width of culverts shall be equal to Roadway width including the gap between main carriageway & service road/slip/connecting road, in case there is any service road/slip/connecting road. Any additional Barrel length required as per site conditions shall not constitute a Change of Scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13 of EPC Contract Agreement.*
- *Location of culverts are indicative and span arrangement is minimum specified. Exact location of these culverts may be decided in consultation with Authority Engineer. The actual location/vent way/span arrangements of culverts shall be determined on the basis of detailed investigations by the Contractor in accordance with the Specifications and Standards. Any variations in number of culverts/vent way/span arrangements 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 of EPC Contract Agreement.*

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

Sl. No.	Chainage (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/retain.

(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 @

(b) New bridges

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

Sl. No	Chainage	Type of Structure	Name of Nala/stream	Square Span (m)	Skew (deg.)	Width of Structure (m)
a)	b) Major Bridge					
1	112+815	Pre-Cast Concrete Girder/ UHPC U-Girder	Tuitun Lui	2 x 60	-	2x12.5
2	117+260	Pre-Cast Concrete Girder/ UHPC U-Girder	Khuai Lui	9 x 60	-	2x12.5
c)	d) Minor Bridge					
3	115+452	Box Type	-	2 x 10	-	1x12.5 + 1x19.5
4	116+080 (Along	RCC Girder	-	2 x 15	-	1x12

Sl. No	Chainage	Type of Structure	Name of Nala/stream	Square Span (m)	Skew (deg.)	Width of Structure (m)
	Cross Road)					
5	122+060	Box Type	-	1 x 10	-	2x12.5

Note: Proposed length of structures is minimum and the same shall be finalized as per site condition in accordance with the Manual in consent with the concerned authority. Any increase in length/span/height shall not be treated as change in scope of work.

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

S. No.	Chainage (km)	Remarks
NIL		

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

S. No.	Chainage (km)	Remarks
NIL		

(e) Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.21 of the manual.

(f) Structures in marine environment

S. No.	Chainage (km)	Remarks
Nil		

(iv) Rail-road bridges

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

(b) Road over-bridges

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

S. No.	Chainage (km)	Length of bridge (m)
Nil		

Note:

- The proposed span arrangement of ROBs are minimum. It may be subject to change as per availability of railway boundaries/ requirement of the

railways. Any increase in the cost due to a change in the span arrangement and total length shall not be treated as a change of scope of work.

- ROBs shall be designed, constructed, and maintained as per the requirements of Railway authorities. The construction plans shall be prepared in consultation with the concerned railway authority.
- The ROBs shall be constructed and maintained by the Contractor under supervision of the Railways.
- All expenditure related to construction, maintenance, and supervision of ROBs (except plan and estimate (P&E) charges) shall be borne by the Contractor.
- During construction, at the location of the existing level crossing, a diversion road with level crossing if any shall be suitably provided by the Contractor.

(c) Road under-bridges

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

S. No.	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.	Chainage (km)	Nature and extent of repairs / strengthening to be carried out
NIL		

(b) ROB/ RUB

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

(c) Overpasses/Underpasses and other structures

Sl. No.	Chainage (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
1	Design Ch. 112+815
2	Design Ch. 117+260

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 Manual. Any requirements in the traffic control devices; road safety works 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 of EPC Contract agreement.

(a) Traffic Signs:

Traffic signs include roadside signs, overhead signs and curb mounted, shall be provided all along the entire Project Highway as per schedule D. All advance direction/destination, reassurance, place identification signs along main road shall be overhead mounted on gantry. The exact location and number of overhead gantry signs to be decided by the Contractor in accordance with manual with prior approval from AE and authority. Any increase shall not be constituted as change of Scope. The letter size and siting of all signs along the main road shall be designed for the minimum design speed. A minimum number of full overhead gantry sign and cantilever overhead gantry sign shall be provided in accordance with manual.

(b) Pavement Marking:

Pavement markings shall cover road marking for the entire Project Highway as per manual.

(c) Safety Barrier:

Thrie-beam crash barriers shall be provided all along the project highway on either side of main carriageway as per provision in the manual and TCS given in Appendix B-I. Minimum length of Thrie-beam crash barrier and RCC crash barrier shall be provided as per schedule.

(ii) Reflective Pavement Markers (Road Studs)

Reflective Pavement markers (RRPM) i.e., road studs shall be provided in of entire project highway at the locations as per provision of clause 9.5 of Section 9 in the manual (IRC: SP-84-2019).

(iii) Specifications of the reflective sheeting

Retro reflective sheeting shall be of high intensity grade with encapsulated lens or with micro prismatic retro reflective element in accordance with ASTM Standard D 4956-09 and as per provision of 9.2 of section 9 in the manual (IRC: SP-84-2019).

9 Roadside Furniture

(i) Roadside furniture including boundary pillar, pedestrian guard rail, pedestrian crossing, delineators, MS Railing etc. shall be provided in accordance with the provisions of Section 9 and 12 of manual and Schedule D.

LED traffic blinkers are to be provided at all junctions, pedestrian crossings, exits and at other locations as per manual.

Noise barriers: shall be provided in accordance with manual; Locations shall be decided as per site condition in consent with Authority.

(ii) Overhead traffic signs: Minimum 01 number each in Full width overhear signs and Cantilever signs shall be provided as per manual (IRC SP: 84-2019).

10 Compulsory Afforestation

Compensatory afforestation should be as per the Forest Conservation Act.

11 Hazardous Locations

Roadside safety barriers shall be provided at all locations of hazards such as high embankment, roadside obstacles, sharp curves, Flyover and bridge approaches, overpasses, ROB and any other locations identified in consultation with Authority Engineer during the execution of the project highway.

12 Special Requirement for Hill Roads

As the project involves cutting existing hill slopes, it is imperative that slopes are to be stabilized for insuring longevity of the slopes and the roads. Slope stability, erosion control and landslide correction shall be accomplished in accordance with IRC: SP 48:1998, IRC: 56-2011 and manual. The contractor shall be responsible for accurate assessment of the actual requirement & prepare design for slope protection & stabilization as per manual.

Any increase in length over the above will not be considered as a change of scope. Therefore, the contractor should carry out thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features at his own before submission of bid.

Disposal of Debris: - As per Manual under clause "13.13" of section 13 (Special

Requirement for Hill Road)

RETAINING WALL/REINFORCE SOIL WALL (RS WALL) /BREAST WALL

Protection wall in the form of Breast/Retaining wall/Reinforced soil wall shall be constructed at following locations.

a) BREAST WALL

Sl. No	LHS				RHS			
	Design Chainage (km)		Length (m)	Height (m) from FRL	Design Chainage (km)		Length (m)	Height (m) from FRL
	From	To			From	To		
1	112+560	112+740	180	6	111+870	112+700	830	4
2	112+900	113+030	130	2	113+450	113+550	100	2
3	113+370	113+500	130	2	113+590	113+670	80	2
4	115+530	115+650	120	4	114+140	114+180	40	4
5	115+730	116+040	310	4	114+620	114+730	110	2
6	116+110	116+500	390	2	114+780	114+900	120	2
7	116+660	116+930	270	2	114+990	115+420	430	2
8	120+700	120+830	130	2	117+540	117+670	130	2
9	121+100	121+240	140	2	117+710	117+960	250	2
10	121+880	122+020	140	2	117+960	118+430	470	4
11	122+080	122+740	660	2	118+460	119+040	580	4
12	123+160	123+400	240	2	119+120	119+270	150	4
13					119+270	119+360	90	2
14					119+360	119+490	130	4
15					119+540	120+230	690	4
16					120+300	121+070	770	2
17					121+110	121+250	140	4
18					121+280	121+540	260	2
19					121+590	122+050	460	4
20					122+580	122+750	170	2
21					122+880	123+220	340	2
Total Length=			**2840**				**6340**	

Note: *The proposed locations are minimum and any change in length/height shall not be treated as a change in scope of work.*

b) Retaining wall

Retaining walls shall be constructed at the following locations.

Sl. No	LHS			RHS		
	Design Chainage (km)		Length (m)	Design Chainage (km)		Length (m)
	From	To		From	To	
1	114+720	115+000	280	113+100	113+180	80
2	115+110	115+210	100	115+490	115+510	20
3	118+290	118+320	30	115+620	115+770	150
4	118+510	118+530	20	115+980	116+040	60
5	119+830	119+920	90	116+410	116+470	60
6	119+950	120+000	50			
7	120+630	120+680	50			
8	120+900	120+960	60			
Total Length=			**680**			**370**

Note: *The proposed locations are minimum and any change in location, length and height shall not be treated as a change in scope of work.*

c) Reinforced Soil Slope

Reinforced Soil slope (RS slope) shall be constructed at following locations.

Sl No	LHS			
	Design Chainage (km)		Length (m)	Area (sqm)
	From	To		
1	111+850	112+320	470	10433
2	112+320	112+440	120	3348
3	116+170	116+230	60	2386
4	116+280	116+350	70	1148
5	116+470	116+670	200	3229
6	116+530	116+610	80	1938
7	117+800	117+860	60	1012
8	117+920	117+990	70	1046
9	119+300	119+360	60	1279
10	121+530	121+590	60	1661
11	121+700	121+770	70	1575
Total Length=			**1320**	**29055**

Note: *The proposed locations are minimum and any change in length, location and area shall not be treated as a change in scope of work.*

d) Reinforced Soil wall (RS Wall)

A reinforced Soil wall shall be constructed at the following locations.

Sl No	LHS			
	Design Chainage (km)		Length (m)	Area (sqm)
	From	To		
1	117+630	117+710	80	1355
2	118+100	118+200	100	2224
3	118+420	118+480	60	883
4	118+550	118+700	150	2766
5	118+770	118+870	100	1858
6	119+000	119+120	120	2304
7	119+470	119+540	70	1708
8	119+640	119+770	130	2669
9	120+150	120+350	200	3340
10	120+470	120+540	70	1184
Total Length=			**1080**	**20291**

Note: *The proposed locations are minimum and any change in length, location and area shall not be treated as a change in scope of work.*

e) Other Protection Works

i. Drainage Pipes on cut slopes – Perforated PVC rigid pipes of 5m length with internal dia. of 38 mm to 50mm shall be provided at a spacing of 5m c/c.

ii. Cut Slope treatment by Vetiver Grass: Area 48052 sqm.

iii. Cut Slope treatment by Seeding and Mulching: 10800 Sqm

iv. Cut Slope treatment by non-woven coir erosion control blanket/DT Mesh for Face 2.7/3.7mm dia. wire, ZN+PVC: Area 43189 Sqm

v. Cut Slope treatment by Soil Nailing with/without shotcrete: Area 55370 sqm.

vi. Fill Slope treatment with erosion control blankets - Embankment fill slope protection shall be provided as per requirement of the site as per Manual, however minimum 10000sqm Turfing and 5064sqm Erosion control (using geo-green) shall be provided, keeping in view sustainability, the geogreen blanket should have minimum 7.5 kn/m MD and should be certified by atleast Central Government Organization and product has minimum 5-7 years product performance certificate by MORT&H and its agencies.

vii. Deep Trench drain below longitudinal drain with perforated drain pipe wrapped with geotextile, shall be provided for sub surface drainage as per fig 11.13 and 11.14 of IRC: SP-48.

Note:

- *The locations and quantity of various protection works specified in this above clause (e) of schedule B is tentative and minimum specified. The contractor shall be responsible for accurate assessment of slope protection & stabilization measures as per schedule D. Any change in location, increase in quantity, change in specifications or change in type of protection work shall not constitute a Change of Scope. Therefore, contractor should carry out thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features on his own before submission of bid.*
- *Before placement of support system at site, the slopes shall be stripped to remove the excess debris / hanging boulders, stones, muck, shrubs etc. and site specific best possible smooth surface shall be prepared. The support system shall be laced on this smooth surface.*

f) RAINWATER HARVESTING

(i) 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.

(ii) Rainwater harvesting structures shall be provided at every 1000m on either side.

(iii) Rainwater harvesting structure shall be provided as per IRC: SP:42-2014 (Guideline for road drainage) and IRC: SP:50-2013 (Guidelines on Urban Drainage)

(iv) For this Package rainwater harvesting is not required. However, Water collection pit (2x2x2) shall be provided minimum of 10no's along the Main carriageway on hillside at suitable location as per site condition and in consultation with Authority engineer.

13 Utility Shifting

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

Note-I:

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

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

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

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

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

Note II: - Copy of Utility shifting plan enclosed.

13.1 Details of proposed Utilities Schedules

Utilities details are given below under specific items.

13.2 Electrical Utilities

The Site includes the following Electrical Utilities:

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

Extra High-Tension Lines (EHT LINES 132 & 400KV)												
S. No	Chainage (km)		Circuit (TC/DC /SC)	Type	Crossing (Nos.)		Poles		Conductor (Line Length)		Size of Cable	Remarks
	From	To			Over-Head	Under-Ground	Tower/ Truss/ Uni-pole	No.	KM	Size		
1	112+000	112+500	SC	HT132KV	1		Tower	2	0.250	N/A	N/A	Owned by P&E
2	113+500	114+000	SC	HT132KV	1		Tower	2	0.200	N/A	N/A	Owned by P&E
3	114+450	114+700	SC	HT400KV HT132KV	2		Tower	5	0.600	N/A	N/A	Owned by P&E PGCIL

Note: TC-Triple Circuit, DC-Double Circuit, SC-Single Circuit, U/G-Underground

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

Low Tension Lines (LT11 KV & LT 440V LINES)												
Sl No.	Types OF Line	Chainage (km)		Circuit (TC/DC/ SC)	Poles		Conductor (Length of Line)		Cable		Crossings (Nos.)	
		From	To		Type	Nos.	*Km	Size	*Km	Size	Over-Head	Under-Ground
1	LT 11 KV	111+850	112+000		Jose Pole	2	0.15	N/A	0.15	N/A		
2		112+000	113+000			3	0.50	N/A	0.50	N/A		
3	LT33 KV	111+850	112+000			1	0.10	N/A	0.10	N/A		
4		112+000	113+000			3	0.30	N/A	0.30	N/A		
5	LT 400 KV	122+600				8	0.12	N/A	0.12	N/A	1	

13.3 Public Health Utilities (Water/Sewage Pipelines)

(a) The Site includes the following Public Health Utilities: -

Sl. No	Chainage (km)		Type of Lines, Pressure/ under Gravity	Pipe			Sluice Valves	Crossings		Remarks
	From	To		Type	No.	Size	Nos.	Nos.	Length	
1	111+850	122+500		G.I Pipe	2	100 & 150mm		2	0.060m	
2	114+000	114+500		G.I Pipe	3	40 & 50(2) mm		2	0.150m	
3	122+600			G.I Pipe	4	65(2) & 40(2)mm		2	0.550m	

(b) **Bore well/Hand Pump within ROW**

Sl. No.	Bore Well		Private House connection	
	Chainage (km)	Nos	Chainage (km)	Nos
1			122+600	45

(c) **Water Tank**

Sl. No.	Chainage (km)	Nos	Capacity
1	122+600	2	

13.4 Any Other Lines-No.

14 Utility Duct: 11nos. (NP-4 class) of 1.0m dia. to be provided across the project highway. 300 dia utility pipe shall be provided on valley side along with inspection chamber at an interval of 500 m.

15 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.

APPENDIX B-I

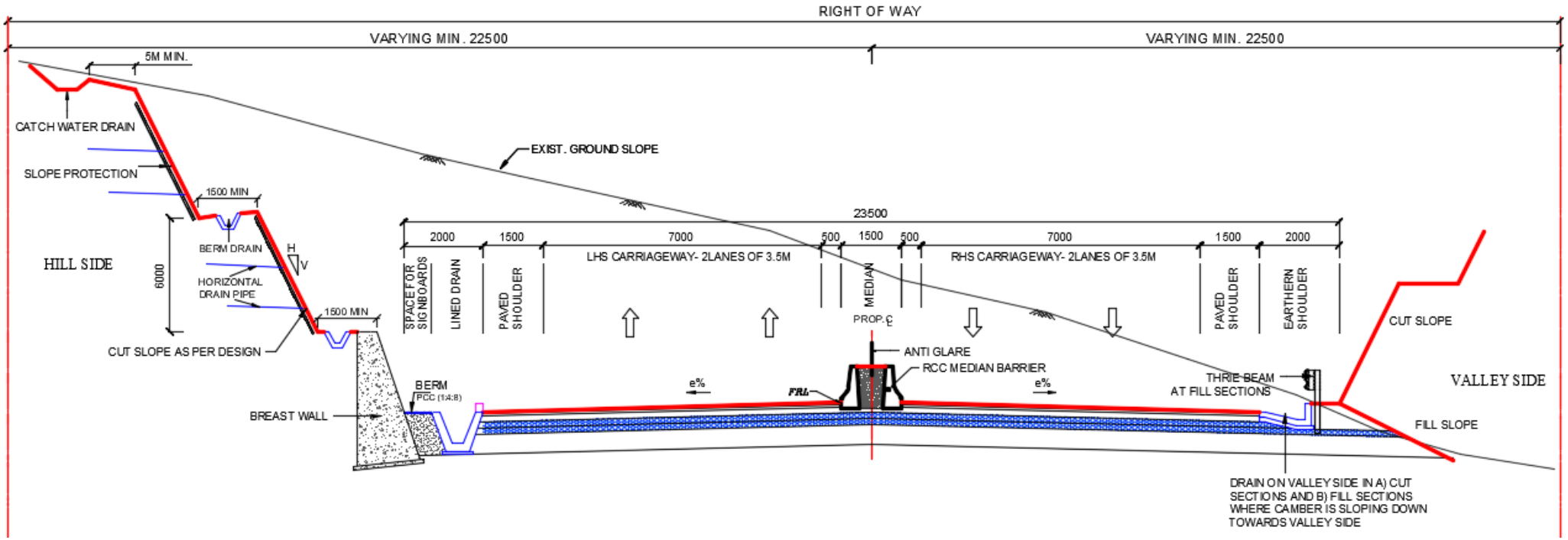
Typical Cross Section Schedule

Chainage (km)		Length (m)	TCS Type
From	To		
111+850	111+950	100	TCS-4
111+950	112+210	260	TCS-4
112+210	112+330	120	TCS-4
112+330	112+440	110	TCS-4
112+440	113+100	660	TCS-1
113+100	113+180	80	TCS-2
113+180	113+550	370	TCS-1
113+550	113+850	300	TCS-1
113+850	113+950	100	TCS-1
113+950	113+990	40	TCS-1
113+990	114+130	140	TCS-1
114+130	114+180	50	TCS-1
114+180	114+310	130	TCS-1
114+310	114+400	90	TCS-1
114+400	114+710	310	TCS-1
114+710	115+000	290	TCS2
115+000	115+040	40	TCS-1
115+040	115+110	70	TCS-1
115+110	115+210	100	TCS-2
115+210	115+410	200	TCS-1
115+410	115+480	70	TCS-1
115+480	115+520	40	TCS 2
115+520	115+620	100	TCS 1
115+620	115+770	150	TCS 2
115+770	115+980	210	TCS 1
115+980	116+050	70	TCS 2
116+050	116+100	50	TCS 1
116+100	116+470	370	TCS 6
116+470	116+530	60	TCS 4
116+530	116+610	80	TCS 5
116+610	116+670	60	TCS 4
116+670	117+630	960	TCS 1
117+630	117+710	80	TCS 3

Chainage (km)		Length (m)	TCS Type
From	To		
117+710	117+800	90	TCS 1
117+800	117+860	60	TCS 4
117+860	117+920	60	TCS 1
117+920	117+990	70	TCS 4
117+990	118+100	110	TCS 1
118+100	118+200	100	TCS 3
118+200	118+290	90	TCS 1
118+290	118+320	30	TCS 2
118+320	118+420	100	TCS 1
118+420	118+480	60	TCS 3
118+480	118+510	30	TCS 1
118+510	118+550	40	TCS 2
118+550	118+700	150	TCS 3
118+700	118+770	70	TCS 1
118+770	118+870	100	TCS 3
118+870	119+000	130	TCS 1
119+000	119+120	120	TCS 3
119+120	119+300	180	TCS 1
119+300	119+360	60	TCS 4
119+360	119+470	110	TCS 1
119+470	119+540	70	TCS 3
119+540	119+640	100	TCS 1
119+640	119+770	130	TCS 3
119+770	119+830	60	TCS 1
119+830	119+920	90	TCS 2
119+920	119+950	30	TCS 1
119+950	120+000	50	TCS 2
120+000	120+150	150	TCS 1
120+150	120+350	200	TCS 3
120+350	120+470	120	TCS 1
120+470	120+540	70	TCS 3
120+540	120+630	90	TCS 1
120+630	120+680	50	TCS 2
120+680	120+900	220	TCS 1
120+900	120+960	60	TCS 2

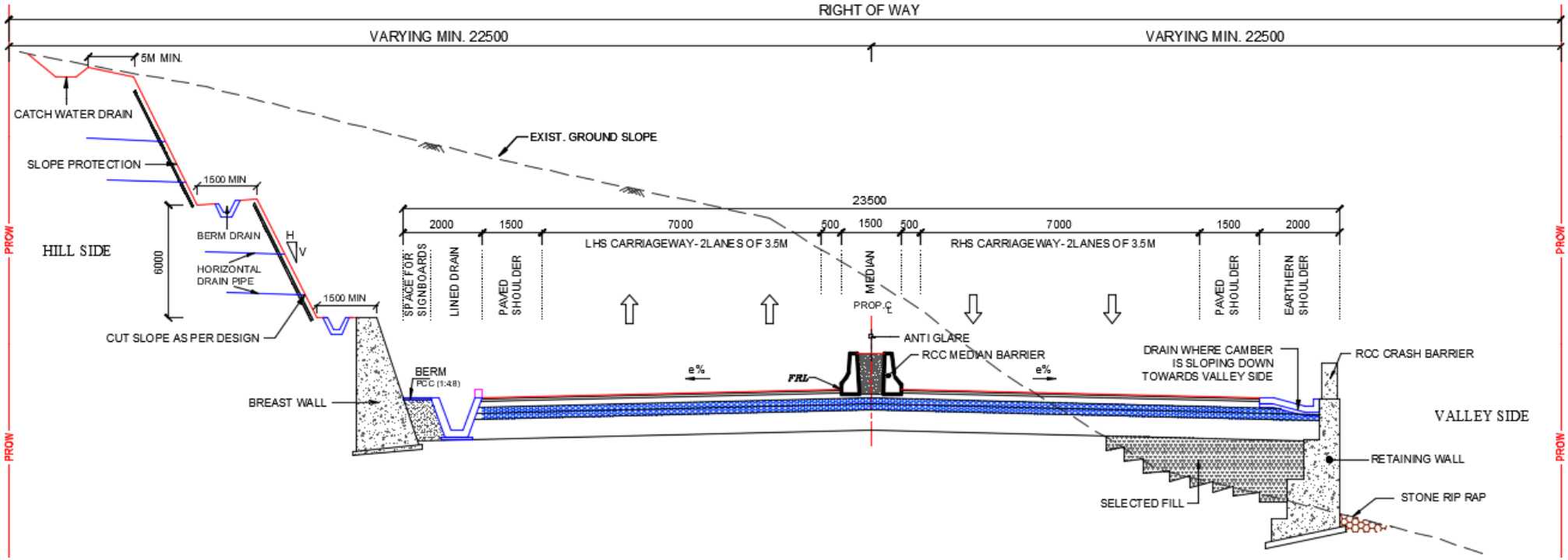
Chainage (km)		Length (m)	TCS Type
From	To		
120+960	121+530	570	TCS 1
121+530	121+590	60	TCS 4
121+590	121+700	110	TCS 1
121+700	121+770	70	TCS 4
121+770	123+400	1630	TCS 1

Typical Cross-section along the Project Highway



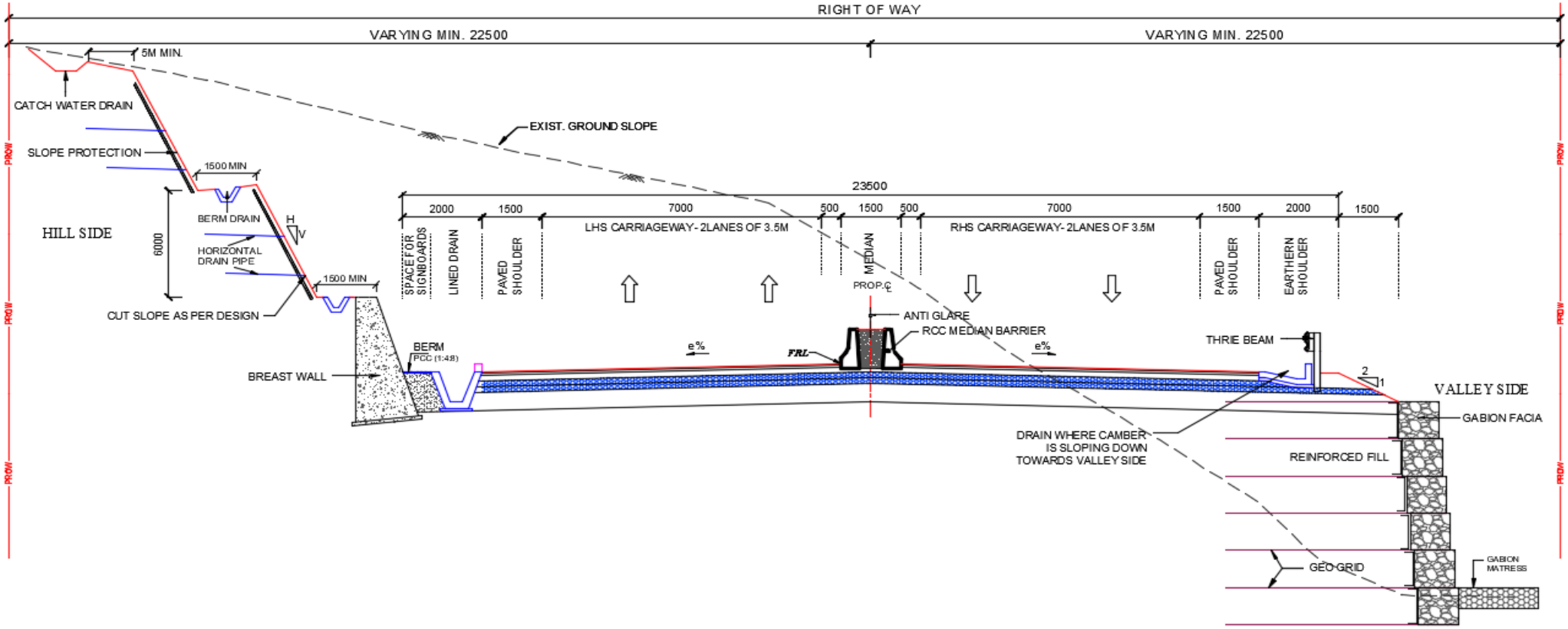
- Cut slope = Maximum 1H:1.5V

4-lane divided highway with Breast Wall on Hill Side and Cut/Fill on Valley Side (TCS-1)



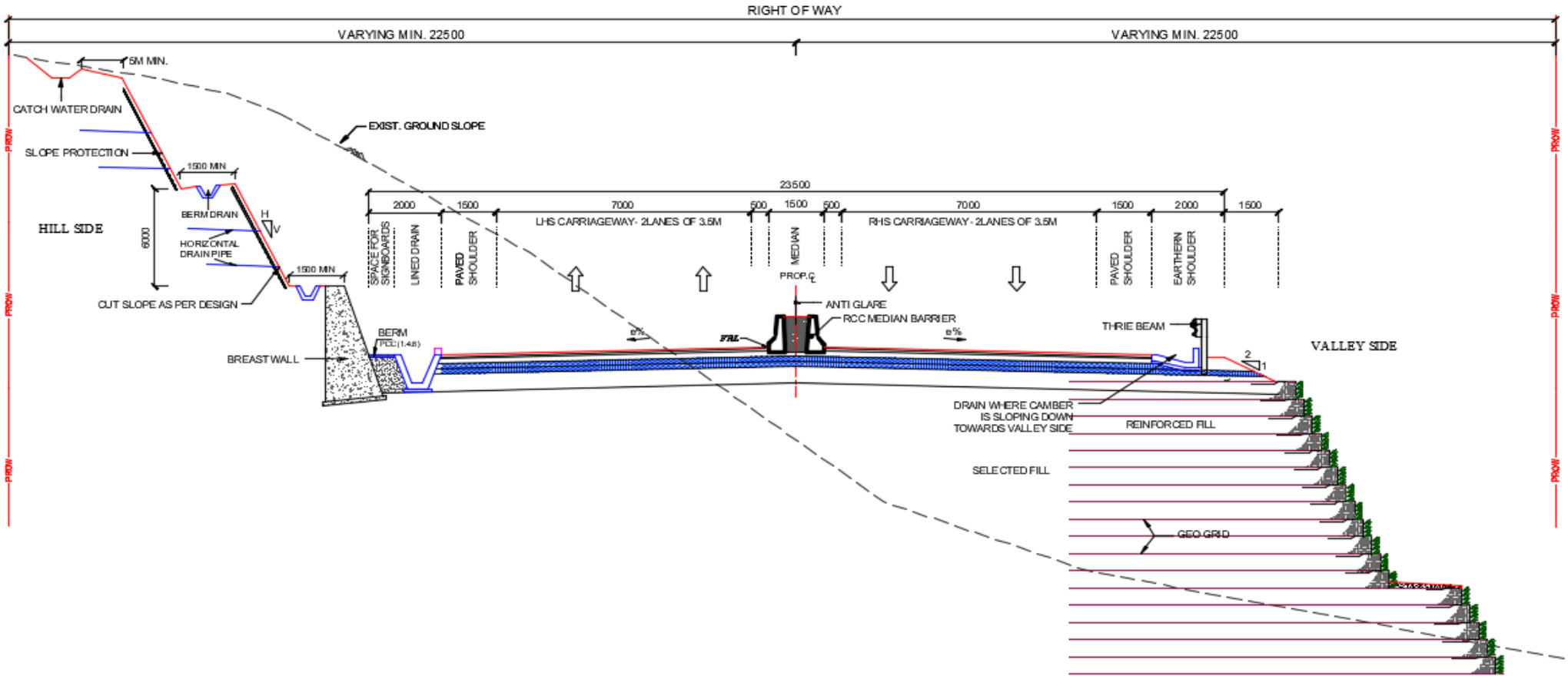
- Cut slope = Maximum 1H:1.5V

4-lane divided highway with Breast Wall on Hill Side and Retaining Wall on Valley Side (TCS-2)



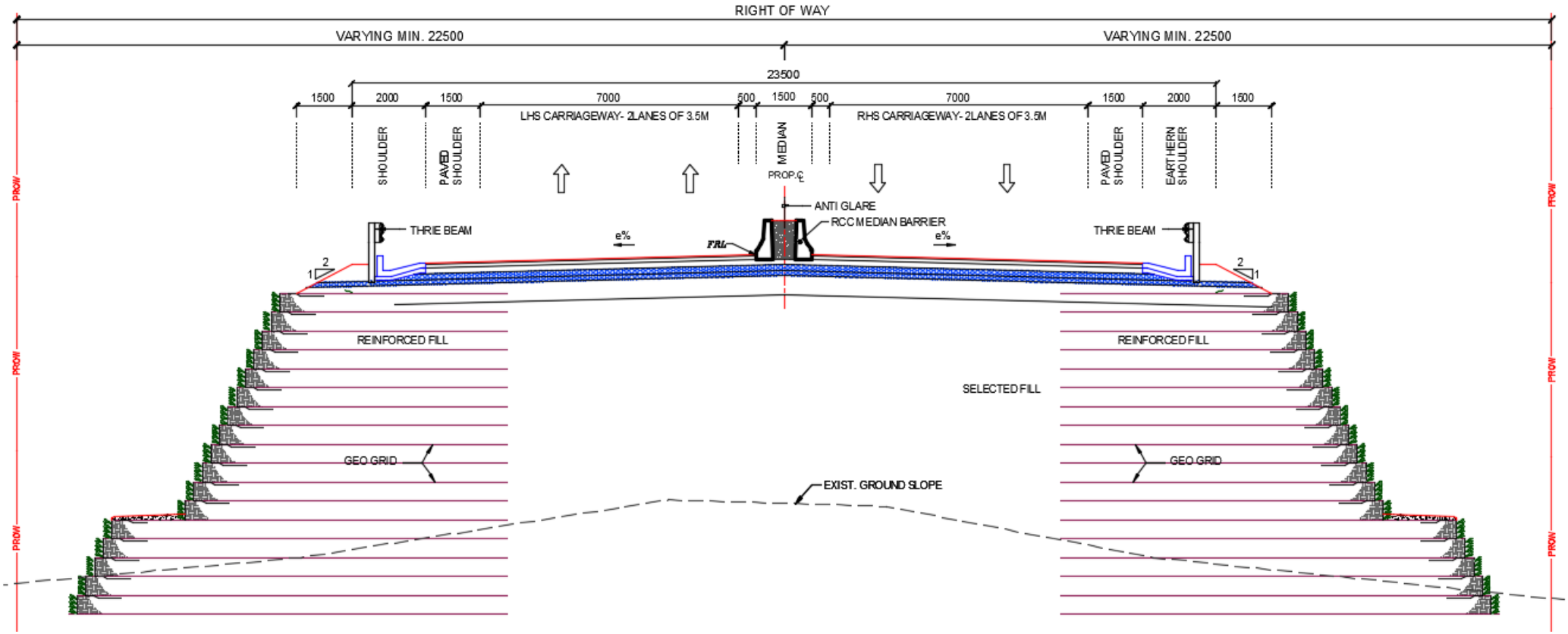
- Cut slope = Maximum 1H:1.5V

4-lane divided highway with Breast Wall on Hill Side and Reinforced Soil Wall on Valley Side (TCS-3)



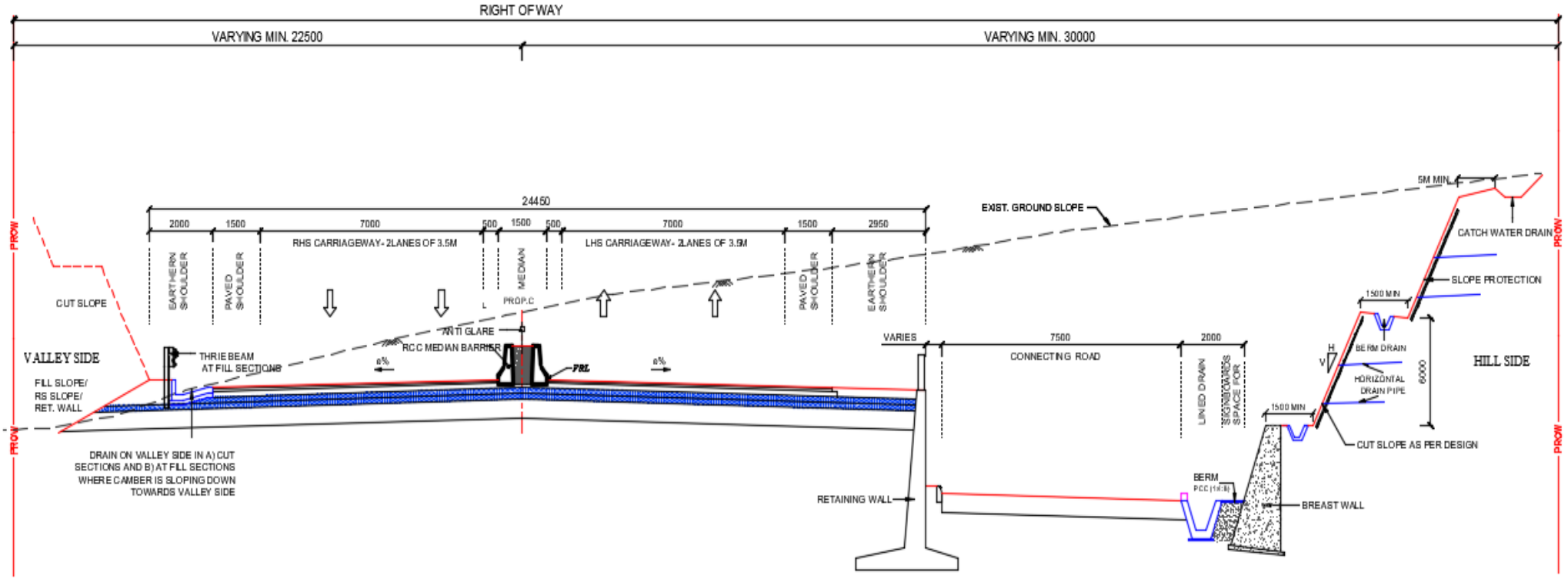
- Cut slope = Maximum 1H:1.5V

4-lane divided highway with Breast Wall on Hill Side and Reinforced Soil Slope on Valley Side (TCS-4)



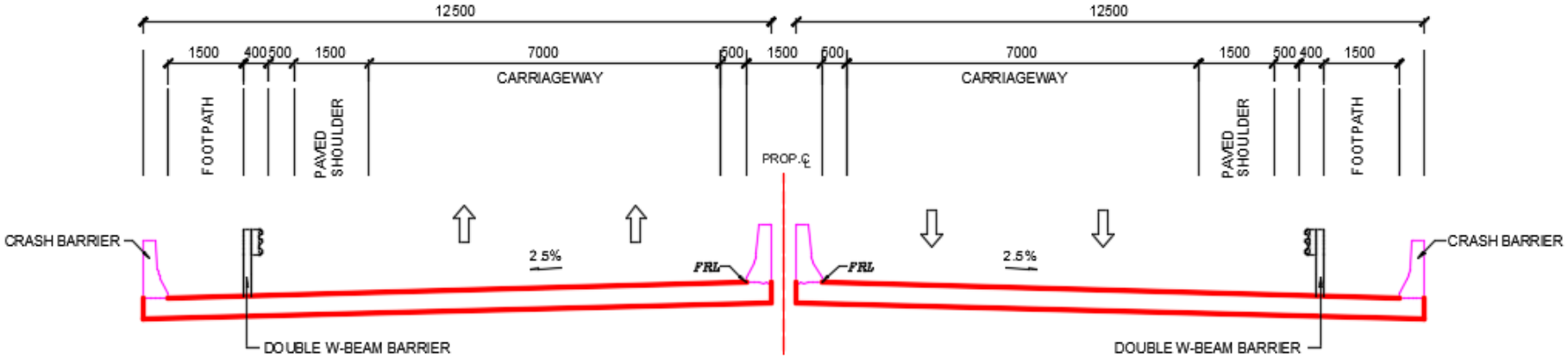
- Cut slope = Maximum 1H:1.5V

4-lane divided highway with Reinforced Soil Slope on Both Sides (TCS-5)

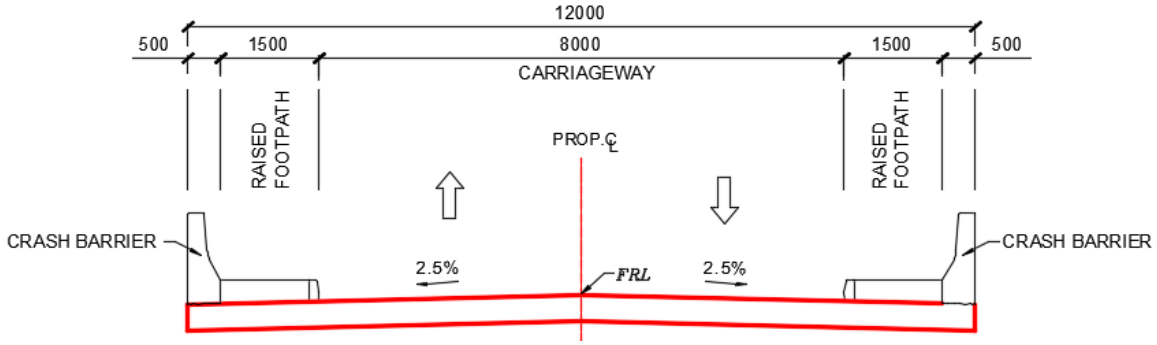


- Cut slope = Maximum 1H:1.5V

4-lane divided highway with Breast Wall and Connecting Road on LHS (TCS-6)



4-lane divided highway at deck Level of Bridges/ VUP (TCS-A)



Cross Section of VOP at deck Level (TCS-B)

Schedule-C

Schedule - C

(See Clause 2.1)

Project Facilities

1 Project Facilities

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

(a) Toll plazas.
(b) Traffic Control Device/Road Safety Device/Roadside furniture.
(c) Pedestrian facilities.
(d) Land Scaping and Tree Plantation.
(e) Truck lay-byes.
(f) Bus-bays and Passenger shelters.
(g) Wayside amenities.
(h) Rest areas
(i) Water collection Pit (2x2x2)
(j) Foot over Bridges
(k) Building for traffic aid post
(l) Building for medical aid post and emergency medical services
(m) Highway Lighting
(n) High Patrolling
(o) Environmental monitoring services

2 Description of Project Facilities

Each of the Project Facilities is described below:

(a) Toll Plaza location

Toll Plaza location is mentioned below – Toll Plaza shall be provided as per as stipulated in section 10 of IRC Manual viz IRC-SP-84, 2019. The minimum lane requirements in the opening year are as follows.

S. No.	Chainage (km)			Lanes
	From (km)	To (km)	Length (m)	
NIL				

Note:

- All toll plaza premises shall be fenced with boundary wall with minimum 6ft height from OGL.
- Entry approach to each toll plaza shall be having Weigh in Motion equipment for connecting toll booths and toll office for collection of toll fees as per as per Schedule D.
- Based on the minimum toll lane requirement as given above, toll booths, toll plaza complex, weigh bridges, electrical systems, toll plaza and all other facilities required/mentioned in manual shall be provided as per Schedule D. All the structures shall be RCC framed structure as per Schedule D.
- No. of toll lanes specified above are minimum indicative. The Concessionaire shall design and provide toll lane as per IRC: SP: 87-2019 subject to minimum specified above. Any increase in no. of toll lane shall not be treated as 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 16.
- Solar panels shall be erected over the Toll Plaza Canopy to generate the green energy. Same shall be utilized for toll plaza lighting and other energy requirement within toll plaza area along with conventional lighting.

(b) Roadside furniture

Traffic Control Device/Road Safety Device/Roadside furniture as per provisions of manual shall be provided. Yellow flashing lights using solar power with full alternative power back-up shall be provided at all junctions/pedestrian crossings/hazardous locations etc

i. **Traffic Signs -** Road Signs include roadside signs; chevron signs; overhead signs and kerb mounted signs along the entire Project Highway and Slip/Connecting Road. All road signs shall be of Prismatic Grade Sheeting corresponding to Class „C" Sheeting described in IRC: 67 and any of the types VIII; IX or XI as per ASTM D-4956-09. The road signs and overhead signs erected on the Project highway and Slip/Connecting Road with regard to requirement of number of signs, type and size of sign, size of letter, color of sign, layout of sign; etc. including signs installations shall conform to Section-9 of "Manual" and IRC: 67, Code of Practice for Road Signs. Chevron signs shall be installed on curves and intersections. In addition to signs prescribed in "Manual" other signs such as signs showing safety slogans, toll free numbers, nearby hospital and police station facilities, lane discipline signs on gantry, headway etc. will also be provided as directed by Authority/Independent Engineer. The overhead signs shall be placed on a structurally sound gantry or cantilever structure made of tubular structure or steel structure. The final locations shall be

finalized in consultation with the Authority Engineer. The height, lateral clearance and installation of the sign structures shall be as per the MoRT&H/IRC guidelines. Design and location of overhead gantry sign, route marker signs for Project Highway shall be as per the IRC: 67.

ii. **Pavement Marking -** Pavement markings shall cover the entire Project Highway and shall be as per section- 9 of the "Manual" and IRC: 35. These markings shall be applied to road center lines; edge lines; continuity line; stop lines; give-way lines; diagonal/chevron markings; zebra crossing and at parking areas etc. by means of an approved self-propelled machine which has a satisfactory cut-off valve capable of applying broken lines automatically.

Road markings other than on main carriageway edges (both shoulder and median side) shall be of hot applied thermoplastic materials with glass reflectorizing beads as per relevant sub clauses of MoRT&H specifications; Raised profile edge lines as per Clause 7.7 of IRC 35 shall be provided on main carriageway (both sides i.e., shoulder and median side/right lane).

iii. **Raised Pavement Markers, Reflection pavement markers and Solar Studs -** Shall be provided along entire Project Highway as per requirements of Section -9 of the IRC: SP:84-2019 & Section 8 of IRC:SP:84-2019and relevant IRC Manual specified in Schedule D.

iv. **Hectometer & Kilometer Distance marker -** Shall be provided along entire Project Highway as per requirements of Section -12 of IRC: SP:84-2019 and relevant IRC Manual specified in Schedule D

v. **LED Traffic Blinkers:** LED Traffic Blinkers shall be provided at all major & minor junctions, Pedestrian Crossings, Built-up areas and any other locations as specified in Schedule D.

vi. **Crash barrier -** Thrie-Beam metal crash barrier shall be provided along the project highway as indicated in TCS given in Schedule B and IRC: SP-91-2019. The minimum length of the crash barrier is 7990m.

LHS				RHS		
Sl No	Chainage (km)		Length (m)	Chainage (km)		Length (m)
	From	To		From	To	
1	111+850	112+490	640	112+880	113+410	530
2	113+520	115+430	1910	115+510	115+620	110
3	116+530	116+620	90	115+770	115+790	20
4	116+940	116+990	50	116+610	116+990	380
5	117+530	117+990	460	119+040	119+120	80

LHS				RHS		
Sl No	Chainage (km)		Length (m)	Chainage (km)		Length (m)
	From	To		From	To	
6	118+100	118+870	770	122+050	122+580	530
7	118+980	119+140	160	123+240	123+400	160
8	119+270	119+380	110			
9	119+460	120+630	1170			
10	120+880	121+090	210			
11	121+240	121+790	550			
12	122+020	122+080	60			
Total Length=			**6180**			**1810**

Note: The above proposed locations are minimum. Any change in length shall not be treated as change in scope of work.

vii. **Median barrier-** RCC crash barrier on both sides at median as indicated in Fig-4(a) of IRC:05 shall be provided along the project highway.

Sl.no.	Design Chainage		Length (m)	Remarks
	From	To		
1	111+850	123+400	11550	LHS and RHS except bridges location

Note: The above proposed locations are minimum. Any change in length shall not be treated as change in scope of work.

viii. **Bamboo Crash barrier-** Bamboo crash barrier shall be provided along the project highway at below locations;

Sl.no.	Design Chainage		Length (m)	Remarks
	From	To		
1	111+850	123+400	2500	LHS and RHS except bridges location

Note: The above proposed locations are minimum. Any change in length shall not be treated as change in scope of work.

ix. **MS Railing - MS Railing along the Project highway shall be provided as** per Schedule D.

x. **Delineators -** Shall be provided as per requirements & specifications as per Schedule D.

xi. **Boundary Stones -** For Entire Project highway at 200m interval.

xii. KM Stones and Hectometer Stone - For Entire Project highway.

(c) Location of Pedestrian facilities:

i. P Pedestrian Guard rails shall be provided at junctions, Truck lay byes, bus bays and near schools and hospitals as per provisions in section 12.2 of the Manual

ii. Pedestrian guardrail shall be provided at each bus stop location and at other locations as per manual.

iii. Pedestrian Crossings: Pedestrian crossing facilities shall be provided on locations as recommended in Schedule D.

(d) Landscaping & Tree Plantation

Landscaping and Tree plantation shall be done at Toll Plaza, Major Intersection etc.

(e) Location of Truck lay-bye:

Truck Lay bye shall be provided at the following locations in accordance with section 12.4 of the manual. Truck Lay bye shall be provided at below mentioned locations.

Sl. No	Existing Chainage (km)	Design Chainage (km)	Side (Left/Right)
Nil			

(f) Bus-bays and Bus shelters table is given below:

As stipulated in section 12.5 of the Manual, Bus shelters shall be provided at below indicative locations.

Sl. No.	Design Chainage (km)	Side	Name Of Village
1	115+350	RHS	Khamrang
2	116+370	LHS	Khamrang & KS-4
3	122+800	LHS	Mualkhang
4	122+800	RHS	Mualkhang

Note: Above shown number of locations are minimum, however, the location of bus bays and passenger shelters shall be finalized as per location and site requirement in consultation with Authority. Any change in location shall not be treated as a change of scope.

(g) Way-Side Amenities

Wayside amenities shall be a part of the Highway and shall be constructed with the minimum facilities such as Parking areas (Truck, Buses, Cars, Minibuses),

and garage for minor repair, Hotel/ Motel, Trauma Center, Rest Areas, Fast Food Centre, Travel Information Facilities, Toilets and Bath Facilities, space for Maintenance staff & Vehicle Service Station, Dormitory etc.

Wayside amenities shall be developed in accordance with Schedule -D & MoRT&H circular No. RW/NH-33044/14/2003-S& R(R)·Pt. dated 11th Feb. 2021.

(h) Rest areas

The rest area is 300 x 75 m (2.25 hectare) in size and is proposed at the following location.

Chainage (Km)	Side (Left/Right)
114+020	LHS

(a) Water Collection Pit (2x2x2)

Water collection Pit shall be provided at every kilometer on hill side along main the carriageway suitable places.

A minimum of 10 numbers of pit shall be constructed as per site condition and in consultation with AE.

(b) Foot Over Bridges:

Foot Over Bridges shall be provided at the following locations:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Road (SH/ MDR/ ODR/ VR)
Nil.			

(c) Buildings for Traffic Aid Posts

The Contractor shall, in accordance with the type designs prescribed for such police outpost buildings by the State Government or a substitute thereof, construct buildings not exceeding 25 (twenty-five) square meters of plinth area, for each of the Traffic Aid Posts, and hand them over to the Authority no later than 30 (thirty) days prior to the Scheduled Completion Date. The Traffic Aid Post(s) shall be deemed to be part of the Site and shall vest in the Client.

(d) Building for Medical Aid Post

The Contractor shall, at its cost and in accordance with the type designs prescribed for such buildings by the State Medical Department (or a substitute thereof to be designated by the Authority), construct an aid post building and hand it over to the Authority, no later than 30 (thirty) days prior to Scheduled Completion Date. The Medical Aid Post(s) shall be deemed to be part of the Site and shall vest in the Client.

(e) Highway Lighting.

i) Highway Lighting:

Lighting shall be provided at Junctions, median openings, built up areas, toll plaza, Bus stops, truck Lay-byes, service road/connecting roads and rest areas.

On all grade separated structures Lightings will be provided on Top & Underside as per clause 3.3.4 & 12.3 of IRC SP 84.

High Mast Lighting shall be provided at all Major Junctions, Toll Plaza / rest area locations or any other location as per clause 12.3.3 of IRC SP 84.

ii) 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. A minimum of 1 number per 5 km has to be provided throughout the project length.

- **Not required in this package.**

Schedule-D

Schedule - D

(See Clause 2.1)

Specifications and standards

1 Construction

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

2 Design Standards

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

Manual of Standards and Specifications for Four Laning of Highways published by the Indian Roads Congress IRC: SP: 84-2019; referred to herein as the Manual and all the other latest IRC Codes, Specifications and Circulars issued by Ministry of Road Transport & Highways (MoRT&H).

The provision of manual shall be considered as modified/ deviated to the extents of changes/ modification as mentioned / incorporated under schedule B & C with respect to manual.

All Utilities shifting works for development of National Highways shall be carried out as per the Standard Operating Procedure (SOP) dated 11 February 2021 issued by Ministry of Road Transport & Highways.

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 Four-Laning of Highways (IRC: SP: 84-2019) with all amendments till date published by IRC (referred to as "Manual" in this Schedule) and MORT&H Specifications for Road and Bridge Works (5th revision). Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority Engineer for construction of the project highway.

As regards, the work of utility shifting, the relevant specifications, relevant rules regulations and acts of Utility Owning Department/ Agencies shall be applicable.

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.

(i) 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:

Schedule-E

Schedule – E

(See Clause 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

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

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

(iii) All Materials, works and construction operations shall conform to the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (FIFTH REVISION, April 2013)", including latest corrections slips, issued by the Ministry of Surface Transport & Highways, Government of India and published by the Indian Roads Congress.

Where the specifications for a work are not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

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 a 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: SP:35. The 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 torrential rains, floods, earthquake or other natural disasters shall be undertaken by the Contractor at its own cost and/or out of the proceeds of insurance.

Annex -I

(Schedule-E)

Annex –I Repair/rectification of Defects and deficiencies

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

Table -1: Maintenance Criteria for Pavements:

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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
	Pavement Condition Index	3	2.1	Bi-Annually	(Sideway-force Coefficient Routine Investigation Machine or equivalent)	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
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 -94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles **Minimum SN** / **Traffic Speed (Km/h)** 36 / 50 33 / 65 32 / 80 31 / 95 31 / 110		Bi-Annually	SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	IRC:SP:83-2008	180 days	IRC:SP:83-2008
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 /cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe side slope	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially	NA		7-15 days	MORT&H Specification

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

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

Table -2: Maintenance Criteria for Rigid Pavements:

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
CRACKING						
1	**Single Discrete Cracks Not intersecting with any joint**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if L > lm. Within 7days
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	
			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	

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

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
	Concrete Pavement (CRCP) only)		2	either w > 0.5 mm or L < 3 m/m^2	depth	secure broken parts. Within 15days
			3	w > 1.5 mm and L < 3 m/m^2		
			4	w > 3 mm, L < 3 m/m^2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m^2 and deformation		
	Surface Defects					
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting. Within 30 days	
			4	r = 25 - 50 %		
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. 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 %		
			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		

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	**Popout (Small Hole), Pothole Refer Para 8.4**	n = number/m^2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m^2	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m^2		
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m^2	Partial depth repair 110mm i.e.10 mm more than the depth of the hole. Within 30 days	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m^2		
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	
Joint Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total joint length	0	Difficult to discern.	**Short Term** No action.	**Long Term** Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	**Spalling of Joints**	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion. Within 7 days	
			2	w = 10 - 20 mm, L < 25%		
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair.	

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
					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 Buckling**	h = vertical displacement from normal profile	0	Nil, not discernible	**Short Term**	**Long Term**
					No Action	
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic within 7 days	
			3	h = 12 - 25 mm		
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			4	h > 50 mm or > 20% joints	Strengthen sub-grade. Reinstate pavement at normal level if L < 20 m. Within 30 days	
			5	h > 100 mm		
16	**Heave**	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	**Short Term**	**Long Term**
					No action.	scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
17	**Bump**	h = vertical displacement from normal profile	0	h < 4 mm	No action	
			1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term**	**Long Term**
					No action.	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder within 7 days	
			4	f = 50 - 75 mm		For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			5	f > 75 mm		

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
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>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td>Highway</td><td>Availability of Safe Sight Distance</td><td>As per IRC SP: 84-2014, a minimum of safe stopping sight distance shall be available throughout.
<table><tr><th>Design Speed, kmph</th><th>Desirable Minimum Sight Distance (m)</th><th>Safe Stopping Sight Distance (m)</th></tr><tr><td>100</td><td>360</td><td>180</td></tr><tr><td>80</td><td>260</td><td>130</td></tr></table></td><td>Monthly</td><td>Manual Measurements with Odometer along with video/ image backup</td><td colspan="2">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.
In case of permanent structure or design deficiency:
Removal of obstruction/improvement of deficiency at the earliest
Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td>IRC:SP 84-2014</td></tr>
<tr><td rowspan="3">Pavement Marking</td><td>Wear</td><td><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m^2/lux
Bituminous Road - 100mcd/m^2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td>Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>
<table><tr><th>Design Speed</th><th colspan="2">(RL) Retro Reflectivity (mcd/m^2/lux)</th></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></table></td><td>Bi-Annually</td><td>As per Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Above 100 | 350 | 150 Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity): Initial 7 days Retro reflectivity: 100 mcd/m²/lux Minimum Threshold Level: 50 mcd/m²/lux					
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	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 signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	hange of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs)	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
						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 Traffic Safety Barriers	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	Attenuators	Functionality: Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119-2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with 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
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	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	line and road structures						
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus- shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

Table 4: Maintenance Criteria for Structures and Culverts:

Pipe/box/ slab culverts	Free waterway/ unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Structurally sound	Spalling of concrete not more than 0.25 sqm Delamination of concrete not more than 0.25 sq.m. Cracks wider than 0.3 mm not more than 1m aggregate length	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC: SP: 40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause 2800
	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.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Rusted reinforcement	Not more than 0.25 sqm	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out 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 sqm					
	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 live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
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	30 days	IRC SP: 40-1993 and MORTH specification 2800.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
					and micro concreting depending on type of defect noticed		
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.

Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

Nature of Defect or deficiency		Time limit for repair/ rectification
(b)	**Granular earth shoulders, side slopes, drains and culverts**	
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drops 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)	**Roadside furniture including road sign and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro- reflectivity	48 (forty-eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road lighting**	
(i)	Any major failure of the system	24 (twenty-four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty-four) hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f)	**Rest area**	
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty-four) hours
(g)	**[Toll Plaza]**	
(h)	**Other Project Facilities and Approach roads**	

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a)	**Superstructure**	
(i)	Any damage, cracks, spalling/ scaling Temporary measures	within 48 (forty-eight) hours
	Permanent measures	within15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(iii)	Snow requiring clearance	24 (twenty-four) hours

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

Schedule-F

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 Panchayat and Pollution Control Board for installation of crushers.

(c) License for use of explosives.

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

(e) License from 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, clearances or approvals required under Applicable Laws.

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

Schedule-G

Schedule-G

(See Clauses 7.1 and 19.2)

Annex-I: Form of Bank Guarantee

(See Clause 7.1)

[Performance Security /Additional Performance Security]

To

_____ [name of Authority]

_____ [address of Authority]

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

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

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

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

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

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

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

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 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 letter of issuing branch.

Annex - II

(Schedule - G)

(See Clause 19.2)

Annex – II: Form for Guarantee for Advance Payment

To

_____ [name of Authority]

_____ [address of Authority]

WHEREAS:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 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.

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.

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

Schedule-H

Schedule-H

(See Clauses10.1 (iv) and 19.3)

1 Contract Price Weightages

1.1 The Contract Price for this Agreement **is Rs. 485.57 Cr.**

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

S. no.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	2	3	4
1	Road works including culverts, widening and repair of culverts.	32.60%	**A - Widening and strengthening of existing road**	
			(1) Earthwork upto Subgrade top	0.00%
			(2) Subbase course (GSB)	0.00%
			(3) Non bituminous base course (WMM)	0.00%
			(4) Bituminous base (Prime and DBM)	0.00%
			(5) Wearing coat (Tack coat, BC)	0.00%
			(6) widening and repair of culverts	0.00%
			B.1 - Reconstruction/ New / realignment/ bypass (Flexible pavement)	
			(1) Earthwork upto Subgrade top	49.13%
			(2) Subbase course (GSB)	9.60%
			(3) Non bituminous base course (WMM)	6.56%
			(4) Bituminous base (Prime and DBM)	10.09%
			(5) Wearing coat (Tack coat, BC)	7.06%
			B.2 - Reconstruction/ New 2/4-lane realignment/bypass (Rigid Pavement)	
			(1) Earthwork upto Subgrade top	0.00%
			(2) Subbase course (GSB)	0.00%
			(3) Dry lean concrete (DLC)	0.00%
			(4) Pavement quality concrete (PQC) course	0.00%
			C.1 - Reconstruction/ New Service Road (flexible Pavement)	
			(1) Earthwork upto Subgrade top	0.00%
			(2) Subbase course (GSB)	0.00%

S. no.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	2	3	4
			(3) Non bituminous base course (WMM)	0.00%
			(4) Bituminous base (Prime and DBM)	0.00%
			(5) wearing coat (Tack coat, BC)	0.00%
			C.2 - Reconstruction/ New Service road (Rigid Pavement)	
			(1) Earthwork upto Subgrade top	0.00%
			(2) Subbase course (GSB)	0.00%
			(3) Dry lean concrete (DLC)	0.00%
			(4) Pavement quality concrete (PQC) course	0.00%
			D. - Reconstruction/ New culverts on existing road and realignments, bypasses	17.56%
2	Minor Bridges/ Underpasses/ Overpasses	3.95%	**A.1 - Widening and repairs of Minor Bridges**	
			Widening of existing bridges	0.00%
			Rehabilitation of existing bridges	0.00%
			A.2 - New of Minor Bridges	
			(1) Foundation: (on completion of the foundation work including foundation for wing wall, return wall, abutments, piers.	8.91%
	Minor Bridges/ Underpasses/ Overpasses		(2) Sub-structure: (on completion of abutments, piers upto abutment/pier cap.)	20.92%
			(3) Super-structure (on completion of the ssuper structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barrier road sign, & marking, tests on completion etc. completion in all respect)	11.72%
			(4) Approaches (on completion of approaches including retaining walls, stone pitching, protection works complete in all respect and fit for use.	12.44%
			(5) Guide Bunds and River Training works: (On completion of Guide Bunds and river training works complete in all respects.)	0.00%
			B.1 - Widening and repairs of Underpasses/Overpasses	
			B.2 - New Underpasses/Overpasses	

S. no.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	2	3	4
			(1) Foundation: on completion of the foundation work including foundation for wing wall, return wall, abutments, piers.	13.14%
			(2) Sub-structure: on completion of abutments, piers upto the abutment/pier cap	14.15%
			(3) Super-structure: on completion of the ssuper structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barrier road sign, & marking, tests on completion etc. completion in all respect.	17.72%
			(4) Approaches: on completion of approaches including RE wall, retaining walls stone pitching, protection works complete in all respect and fit for use.	1.00%
3	Major Bridge works and ROB/RUB/elevated sections/flyovers including viaducts, if any	41.26%	**A.1 - Widening and repairs of existing major bridges**	
			(1) Foundation	0.00%
			(2) Sub structure	0.00%
			(3) Superstructure (including bearing)	0.00%
			(4) wearing coat (including expansion joint)	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, protection works).	0.00%
			A.2 - New/ Reconstruction major bridges	
			(1) Foundation: On completion of the foundation work including foundations for wing walls, return walls, abutments and piers.	17.25%
			(2) Sub-structure: On completion of abutments, piers upto the abutment/ pier cap	13.43%
			(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, Bearings	
			(a) casting of girder	25.49%
			(b) casting of segments	0.00%
			(C) erection of girder	38.24%

S. no.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	2	3	4
			(4) Other ancillary works: wearing coat, including expansion joint, hand rails, carsh barriers, tests on completion in all respect.	1.25%
			(5) Miscellaneous works: stone pitching, protection works excluding retaining/ reinforced earth wall etc.	0.90%
	Major Bridge works and ROB/RUB/elevated sections/flyovers including viaducts, if any		(6) wing walls/return walls upto full height	0.00%
			(7) Guide bunds, River Training works etc.	0.89%
			(8) Retaining wall/ Reinforced earth wall etc.	
			(8.a) Panel casting	0.00%
			(8.b) Erection of panel/ construction of retaining wall	0.00%
			B.1 - Widening and repairs of (a) ROB and (b) RUB	
			(1) Foundation	0.00%
			(2) Sub structure	0.00%
			(3) Superstructure (including bearing)	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 respect 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, protection works).	0.00%
			B.2 - New ROB / RUB	
			(1) Foundation	0.00%
			(2) Sub structure	0.00%
			(3) Superstructure (including bearing)	
			(a) casting of girder	0.00%
			(b) casting of segments	0.00%
			(C) erection of girder	0.00%

S. no.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	2	3	4
			(4) Other ancillary works: wearing coat, expansion joint, hand railing, crash barriers tests on completion etc. completion in all respect.	0.00%
			(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.00%
			(6) wing walls/return walls upto full height	0.00%
			(7) Retaining wall/ Reinforced earth wall etc.	
			(7.a) Panel casting	0.00%
			(7.b) Erection of panel/ construction of retaining wall	0.00%
			C.1 - Widening and repairs of Elevated section/Flyover/Grade Separators	
			(1) Foundation	0.00%
			(2) Sub structure	0.00%
			(3) Superstructure (including bearing)	0.00%
			(4) wearing coat including expansion joint	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 walls, stone pitching, protection works).	0.00%
			C.2 - New Elevated section/Flyover/Grade Separators	
			(1) Foundation	0.57%
			(2) Sub structure	0.62%
	Major Bridge works and ROB/RUB/elevated sections/flyovers including viaducts, if any		(3) Superstructure: including girder, deck slab, bearing (excluding wearing coat and expansion joints)	
			(a) casting of girder	0.43%
			(b) casting of segments	0.00%
			(C) errection of girder	0.64%
			(4) Other ancillary works: wearing coat, expansion joint, hand railing, crash barriers tests on completion etc. completion in all respect.	0.10%
			(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.19%

S. no.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	2	3	4
			(6) wing walls/return walls upto full height	0.00%
			(7) Retaining wall/ Reinforced earth wall etc.	0.00%
			(7.a) Panel casting	0.00%
			(7.b) Erection of panel/ construction of retaining wall	0.00%
4	Other works	21.51%	(i) Toll plaza including it's approach	0.00%
			(ii) Road side drains	5.80%
			(iii) Road signs, markings, km stones, safety devices etc.	12.92%
			(iv) Crash Barrier	5.22%
			(v) Project facilities	
			(a) Bus Shelter	0.06%
			(b) Truck laybyes	0.00%
			(c) Rest area	5.58%
			(d) others to specified	
			- Street light	1.51%
			- RCC ROW Boundary wall	0.00%
			- Rainwater harvesting	0.00%
			- Advance Traffic management system	0.00%
			- Medical aid post	0.24%
			-Traffic aid post	0.19%
			- Utility ducts	0.00%
			(vi) Road side plantation	0.00%
			(vii) Repair of Protection works other than approaches to the bridges, elevated sections, flyovers/ grade separators and ROBs/RUBs.	0.00%
			(viii) Protection works - - retaining wall / toe wall, breast wall etc.	
			(a) RE wall other than approach of structures	0.00%
			(b) Breast Wall	13.23%
			(c) Retaining Wall	9.04%

S. no.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	2	3	4
			(ix) Safety and traffic management during construction	0.11%
			(x) Junction Improvements & Junctions under Grade separator	1.10%
			(xi) Side slope protection with turfing/ geo blanketing etc.	45.00%
5	Electrical utilities and public Health Utilities (Water pipe lines and sewage lines)	0.68%	(i) EHT line / (ii) EHT crossings	40.00%
			(iii) HT/ LT line/ Transformer (iv) HT/ LT crossings	15.00%
			(v) Water pipeline / (vii) Water pipeline crossings	45.00%
			(vii) Sewage lines / (viii) Sewage line crossings	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 and strengthening of existing road		
(1) Earthwork upto top of the Subgrade including excavation in Soil, soft rock and hard rock, removal of unserviceable soil etc.	0.00%	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 500m. In case of Hill cutting, the payment procedure will be as under: Hill Cutting : 40% of weightage of A(1) Preparation of Sub-Grade: 60% of weightage of A(1)
(2) Subbase course (GSB)	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non bituminous base course (WMM)	0.00%	
(4) Bituminous base (Prime and DBM)	0.00%	
(5) wearing coat (Tack coat, BC)	0.00%	

Stage of Payment	Percentage -weightage	Payment Procedure
(6) widening and repair of culverts	0.00%	Cost of ten completed culverts shall be determined pro rata with respect to the total number of culverts. Payment shall be made on the completion of at least five culverts.
B.1 - Reconstruction/ New/ realignment/bypass (Flexible pavement)		
(1) Earthwork upto top of the Subgrade including excavation in Soil, soft rock and hard rock, removal of unserviceable soil etc.	49.13%	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 500m. In case of Hill cutting, the payment procedure will be as under: Hill Cutting : 40% of weightage of A(1) Preparation of Sub-Grade: 60% of weightage of A(1)
(2) Subbase course (GSB)	9.60%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non bituminous base course (WMM)	6.56%	
(4) Bituminous base (Prime and DBM)	10.09%	
(5) wearing coat (Tack coat, BC)	7.06%	
B.2 - Reconstruction/ New / realignment/bypass (Rigid Pavement)		
(1) Earthwork upto top of the Subgrade including excavation in Soil, soft rock and hard rock, removal of unserviceable soil etc.	0.00%	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 500m. In case of Hill cutting, the payment procedure will be as under: Hill Cutting : 40% of weightage of A(1) Preparation of Sub-Grade: 60% of weightage of A(1)
(2) Subbase course (GSB)	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Dry lean concrete (DLC)	0.00%	
(4) Pavement quality concrete (PQC) course	0.00%	
C.1 - Reconstruction/ New Service road/ Slip Road (flexible Pavement)		

Stage of Payment	Percentage -weightage	Payment Procedure
(1) Earthwork upto top of the Subgrade including Shoulder	0.00%	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 500m. In case of Hill cutting, the payment procedure will be as under: Hill Cutting : 40% of weightage of A(1) Preparation of Sub-Grade: 60% of weightage of A(1)
(2) Subbase course (GSB)	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non bituminous base course (WMM)	0.00%	
(4) Bituminous base (Prime and DBM)	0.00%	
(5) wearing coat (Tack coat, BC)	0.00%	
C.2 - Reconstruction/ New Service road/ Slip road (Rigid Pavement)		
(1) Earthwork upto top of the Subgrade	0.00%	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 500m. In case of Hill cutting, the payment procedure will be as under: Hill Cutting : 40% of weightage of A(1) Preparation of Sub-Grade: 60% of weightage of A(1)
(2) Subbase course (GSB)	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Dry lean concrete (DLC)	0.00%	
(4) Pavement quality concrete (PQC) course	0.00%	
D. - Reconstruction/ New culverts on existing road, Realignments, bypasses:	17.56%	Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least one culvert.

@. 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. And L = Total length in km.

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

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

1.3.2 Minor Bridges and Underpasses/Overpasses.

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

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
A.1 - Widening and repairs of Minor Bridges		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.
Widening of existing bridges	0.00%	
rehabilitation of existing bridges	0.00%	
A.2 - New of Minor Bridges		
(1) Foundation: on completion of the foundation work including foundation for wing wall, return wall, abutments, piers.	8.91%	(1) Foundation: Payment against foundation shall be made on prorata basis on comletion of at least two foundations. In case where load testing is required for foundation, trigger of fisrt payment shall include load testing also where specified.
(2) Sub-structure: on completion of abutments, piers upto abutment/pier cap.	20.92%	(2) Substructure: Payment against substructure shall be made on prorata basis on comletion of at least two substructures upto abutment/pier cap level of each bridges.
(3) Super-structure: on completion of the ssuper structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barrier road sign, & marking, tests on completion etc. completion in all respect.	11.72%	(3) Super structure: Payment shall be made on prorata basis on completion of a stage i.e. completion of super structure of at least one span in all respects as specified in the column of Stage payment in this sub clause.
(4) Approaches: on completion of approaches including retaining walls, stone pitching, protection works complete in all respect and fit for use.	12.44%	(4) Approaches: Payment shall be made on prorata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "stage Payment" in this sub clause.

Stage of Payment	Weightage	Payment Procedure
(5) Guide Bunds and River Training works: On completion of Guide Bunds and river training works complete in all respects.	0.00%	(5) Guide bunds and river training works: Payment shall be made on prorata basis on completion of a stage i.e. completion of guide bunds and river training works in all respect as specified.
B.1 - Widening and repairs 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 underpass/overpasses. Payment shall be made on the completion of widening & repair works of an underpass/overpasses.
B.2 - New Underpasses/Overpasses		
(1) Foundation: on completion of the foundation work including foundation for wing wall, return wall, abutments, and piers.	13.14%	(1) Foundation: Payment against foundation shall be made on prorata basis on comletion of at least two foundations. In case where load testing is required for foundation, trigger of fisrt payment shall include load testing also where specified.
(2) Sub-structure: on completion of abutments, piers upto the abutment/pier cap	14.15%	(2) Substructure: Payment against substructure shall be made on prorata basis on comletion of at least two substructures upto abutment/pier cap level of each underpass/overpass.
(3) Super-structure: on completion of the ssuper structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barrier road sign, & marking, tests on completion etc. completion in all respect)	17.72%	(3) Super structure: Payment shall be made on prorata basis on completion of a stage i.e. completion of super structure of at least one span in all respects as specified in the column of Stage payment in this sub clause.
(4) Approaches: on completion of approaches including RE wall, retaining walls/ Reinforced earth wall, stone pitching, protection works complete in all respect and fit for use.	1.00%	(4) Approaches: Payment shall be made on prorata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "stage Payment" in this sub clause.

1.3.3 Major Bridge works, ROB/RUB and Structures

Procedure for estimating the value of major Bridge works, ROB/RUB and structure work shall be as stated in table 1.3.3

Table 1.3.3

Stage of payment	Weightage	Payment procedure
A.1 - Widening and repairs of existing major bridges		
(1) Foundation	0.00%	(1) Foundation: Cost of each major bridge shall be determined on pro rata basis with respect to the total linear length (m) of the major bridges. Payment against foundation shall be made on prorata 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 at least two foundations of the major bridge. In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.
(2) Sub structure	0.00%	(2) Sub structure: Payment against sub-structure shall be made on prorata 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 at least two substructures of abutment/piers upto abutment/piers cap level of the major bridge.
(3) Superstructure (including bearing)	0.00%	(3) Suer structure: Payment shall be made on prorata basis on completion of a stage i.e. completion of super structure including bearings of at least one span in all respects as specified.
(4) wearing coat (including expansion joint)	0.00%	(4) Wearing coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.00%	(5) Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rail, crash barrier, road markings, etc. complete in all respects as specified.
(6) wing walls/return walls upto top	0.00%	(6) Wing wall/ return wall: Payment shall be made on completion of wing wall/return wall complete in all respects as specified.
(7) Guide bunds, river training works etc.	0.00%	(7) Guide bund, River training works: Payment shall be made on completion of all guide bunds/ river training works etc.complete in all respect as specified.

Stage of payment	Weightage	Payment procedure
A.1 - Widening and repairs of existing major bridges		
(8) Approaches (including retaining walls, stone pitching, protection works).	0.00%	(8) Approaches: Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.
A.2 - New/ Reconstruction major bridges		Cost of each structure shall be ddetermined on prorata basis with respect to the total linear length (m) of all the structures. Payments shall be made on completion of each stage of strucutres as per weightage given in this table.
(1) Foundation: foundation of abutment/piers	17.25%	(1) Foundation: 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 a bridge as per weightage given in this table, subject to completion of at least two foundations in all respect. In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.
(2) Sub structure: Substructure for abutment, piers upto the abutment/pier cap level.	13.43%	(2) Substructure: Payment against sub structure shall be made on prorata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of a bridge as per weightage given in this table,subject to completion of at least two substructure of abutment/piers upto abutment/piers cap level of a bridge.
(3) Superstructure: including girder, deck slab, bearings (excluding wearing coat and expansion joints)		
(3.a) Super Structure: Casting of girder/ fabrication of girders (steel)	25.49%	(a) Super structure (casting of girder): Unit of measurement is number. Payment against casting of girder shall be made on prorata basis with respect to total number of girders required in the structure on completion of a stage i.e. not less than completion of casting of at least five girders of the structure.

Stage of payment	Weightage	Payment procedure
A.1 - Widening and repairs of existing major bridges		
(3.b) Super structure: casting of segments	0.00%	(b) Super structure (casting of segment): Unit of measurement is number. Payment against casting of segments shall be made on prorata basis with respect to total number of segments required in the structure on completion of a stage i.e. not less than completion of casting of at least 10 (ten) segments of the structure.
(3.c) Super structure: erection of girder, deck dlab and bearings	38.24%	(c) Super structure (errection of girders, deck slab and bearing): Payment shall be made on prorata basis on completion of a stage i.e. completion of super structure including bearings at least one span in all respect as specified.
(4) Other ancillary works: wearing coat, including expansion joint, hand rails, carsh barriers, tests on completion in all respect.	1.25%	(4) Other ancillary work: Payment shall be made on prorata basis on completion of the stage in all respect as specified, for each structure.
(5) Miscellaneous works: stone pitching, protection works excluding retaining/ reinforced earth wall etc.	0.90%	(5) Miscellaneous works: Payment shall be made on prorata basis on completion of the stage in all respects as specified, for each structure.
(6) wing walls/return walls upto full height	0.00%	(6) Wing wall/ return wall: Payment shall be made on completion of wing wall/return walls for a bridge as per weightage given in this table complete in all respects as specified.
(7) Guide bunds, river training works etc. - for the protection of existing bank of Barak River	0.89%	(7) Guid bund, rever training works: Payment shall be made on on prorata basis on completion of the stages in all respect as specified.
(8) Retaining wall/ Reinforced earth wall etc.		Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.

Stage of payment	Weightage	Payment procedure
A.1 - Widening and repairs of existing major bridges		
(8.a) Panel casting	0.00%	(a) Panel casting: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis with respect to total area panels required for the structure on completion of a stage i.e. not less than completion of casting of 25% of the scope of RE wall panel of each bridge.
(8.b) Erection of panel/ onstruction of retaining wall	0.00%	(b) Erection of panel/ Construction of retaining wall: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis on completion of a stage i.e. completion of erection of panels/ construction of retainning wall complete in all respect for at least 25% scope of work for each structure.
B.1 - Widening and repairs of (a) ROB and (b) RUB		
(1) Foundation	0.00%	(1) Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUBs. Payment against foundation shall be made on prorata 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 at least two foundations of the ROB/RUB.In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.
(2) Sub structure	0.00%	(2) Substructure: Payment against sub-structure shall be made on prorata 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 at least two substructure of abutment/piers upto abutment/piers cap level of the ROB/RUB.
(3) Superstructure (including bearing)	0.00%	(3) Super structure: Payment shall be made on prorata 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
A.1 - Widening and repairs of existing major bridges		
(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 respect as specified.	0.00%	(4) 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 respect as specified.
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.00%	(5) Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rail, crash barrier, road markings, etc. complete in all respects as specified.
(6) wing walls/return walls	0.00%	(6) Wing wall/return wall: Payment shall be made on completion of wing wall/return wall complete in all respects as specified.
(7) Approaches (including retaining walls, stone pitching, protection works).	0.00%	(7) Approaches: Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.
B.2 - New ROB / RUB		Cost of each structure shall be determined on prorata basis with respect to the total linear length (m) of all the structures. Payments shall be made on completion of each stage of strucutres as per weightage given in this table.
(1) Foundation: foundation of abutment/piers	0.00%	(1) Foundation: Payment against foundation shall be made on prorata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB as per weightage given in this table,subject to completion of at least two foundations of the ROB/RUB in all respect.In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.

Stage of payment	Weightage	Payment procedure
A.1 - Widening and repairs of existing major bridges		
(2) Sub structure: Substructure for abutment, piers upto the abutment/pier cap level.	0.00%	(2) Substructure: Payment against sub-structure shall be made on prorata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the ROB/RUB as per weightage given in tis table, subject to completion of at least two substructures of abutment/piers upto abutment/piers cap level of the ROB/RUB.
(3) Superstructure: including girder, deck slab, bearing (excluding wearing coat and expansion joints)		
(3.a) Super Structure: Casting of girder/ fabrication of girders (steel)	0.00%	(a) Super structure (casting of girder): Unit of measurement is number. Payment against casting of girder shall be made on prorata basis with respect to total number of girders required in the structure on completion of a stage i.e. not less than completion of casting of at least five girders of the structure.
(3.b) Super structure: casting of segments	0.00%	(b) Super structure (casting of segment): Unit of measurement is number. Payment against casting of segments shall be made on prorata basis with respect to total number of segments required in the structure on completion of a stage i.e. not less than completion of casting of at least 10 (ten) segments of the structure.
(3.c) Super structure: erection of girder, deck dlab and bearings	0.00%	(c) Super structure (errection of girders, deck slab and bearing): Payment shall be made on prorata basis on completion of a stage i.e. completion of super structure including bearings at least one span in all respect as specified.
(4) Other ancillary works: wearing coat, expansion joint, hand railing, crash barriers tests on completion etc. completion in all respect.	0.00%	(4) Other ancillary works: Payment shall be made on prorata basis on completion of a stage in all respect as specified, for each structure.

Stage of payment	Weightage	Payment procedure
A.1 - Widening and repairs of existing major bridges		
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.00%	(5) Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rail, crash barrier, road markings, etc. complete in all respects as specified.
(6) wing walls/return walls upto full height	0.00%	(6) wing walls/return walls upto full height: Payment shall be made on completion of wing wall/return wall complete for rach ROB/RUB asper weightage given in the table, completion in all respects as specified.
(7) Retaining wall/ Reinforced earth wall etc.	0.00%	Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.
(7.a) Panel casting	0.00%	(a) Panel casting: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis with respect to total area panels required for the structure on completion of a stage i.e. not less than completion of casting of 25% of the scope of RE wall panel of each ROB/RUB.
(7.b) Erection of panel/ construction of retaining wall	0.00%	(b) Erection of panel/ Construction of retaining wall: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis on completion of a stage i.e. completion of erection of panels/ construction of retainning wall complete in all respect for at least 25% scope of work for each ROB/RUB.
C.1 - Widening and repairs of Elevated section/Flyover/Grade Separators		

Stage of payment	Weightage	Payment procedure
A.1 - Widening and repairs of existing major bridges		
(1) Foundation	0.00%	(1) 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 prorata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the structure subject to completion of at least two foundations of the structure. In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.
(2) Sub structure	0.00%	(2) Sub structure: Payment against sub-structure shall be made on prorata 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 at least two substructure of abutment/piers upto abutment/piers cap level of the structure.
(3) Superstructure (including bearing)	0.00%	(3) Super Structure: Payment shall be made on prorata basis on completion of a stage i.e. completion of super structure including bearings of at least one span in all respects as specified.
(4) wearing coat including expansion joint	0.00%	(4) Wearing coat including expansion joint: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.00%	(5) Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rail, crash barrier, road markings, etc. complete in all respects as specified.
(6) wing walls/return walls	0.00%	(6) Wing walls/return walls: Payment shall be made on completion of wing wall/return wall complete in all respects as specified.
(7) Approaches (including retaining walls, stone pitching, protection works).	0.00%	(7) Approaches: Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.

Stage of payment	Weightage	Payment procedure
A.1 - Widening and repairs of existing major bridges		
C.2 - New Elevated section/Flyover/Grade Separators		Cost of each structure shall be determined on prorata basis with respect to the total linear length (m) of all the structures. Payments shall be made on completion of each stage of structures as per weightage given in this table.
(1) Foundation: foundation of abutment/piers	0.57%	(1) Foundation: Payment against foundation shall be made on prorata basis on completion of a stage i.e. not less than 25% of the scope of foundation of each structure as per weightage given in this table, subject to completion of at least two foundations in all respect. In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.
(2) Sub structure: Substructure for abutment, piers upto the abutment/pier cap level.	0.62%	(2) Substructure: Payment against sub-structure shall be made on prorata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of each structure as per weightage given in tis table, subject to completion of at least two substructures of abutment/piers upto abutment/piers cap level.
(3) Superstructure: including girder, deck slab, bearing (excluding wearing coat and expansion joints)		
(3.a) Super Structure: Casting of girder/ fabrication of girders (steel)	0.43%	(a) Super structure (casting of girder): Unit of measurement is number. Payment against casting of girder shall be made on prorata basis with respect to total number of girders required in the structure on completion of a stage i.e. not less than completion of casting of at least five girders of the structure.
(3.b) Super structure: casting of segments	0.00%	(b) Super structure (casting of segment): Unit of measurement is number. Payment against casting of segments shall be made on prorata basis with respect to total number of segments required in the structure on completion of a stage i.e. not less than completion of casting of at least 10 (ten) segments of the structure.

Stage of payment	Weightage	Payment procedure
A.1 - Widening and repairs of existing major bridges		
(3.c) Super structure: erection of girder, deck dlab and bearings	0.64%	(c) Super structure (errection of girders, deck slab and bearing): Payment shall be made on prorata basis on completion of a stage i.e. completion of super structure including bearings at least one span in all respect as specified.
(4) Other ancillary works: wearing coat, expansion joint, hand railing, crash barriers tests on completion etc. completion in all respect.	0.10%	(4) Other ancillary works: Payment shall be made on prorata basis on completion of a stage in all respect as specified, for each structure.
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.19%	(5) Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rail, crash barrier, road markings, etc. complete in all respects as specified.
(6) wing walls/return walls upto full height	0.00%	(6) Wing walls/return walls upto full height: Payment shall be made on completion of wing wall/return wall complete for rach ROB/RUB asper weightage given in the table, completion in all respects as specified.
(7) Retaining wall/ Reinforced earth wall etc.	0.00%	Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.
(7.a) Panel casting	0.00%	(a) Panel casting: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis with respect to total area panels required for the structure on completion of a stage i.e. not less than completion of casting of 25% of the scope of RE wall panel of each ROB/RUB.
(7.b) Erection of panel/ onstruction of retaining wall	0.00%	(b) Erection of panel/ Construction of retaining wall: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis on completion of a stage i.e. completion of erection of panels/ construction of retainning wall complete in all respect for at least 25% scope of work for each ROB/RUB.

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 and it's approach	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis as per following completed stages: (i) Rigid pavement upto DLC (LHS) - 12.5% (ii) Rigid pavement upto DLC (RHS) - 12.5% (iii) PQC (LHS) - 25% (iv) PQC (RHS) - 25% (v) Admin Building, Maintenance Building & Misc - 10% (vi) Canopy, Toll Booth, Safety Items & Miscellaneous works - 12.5% (vii) Toll plaza Tunnel/over head bridge - 2.5%
(ii) Road side drains	5.80%	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 5 % (five per cent) of the total length.
(iii) Road signs, markings, km stones, safety devices	12.92%	
(iv) Crash Barrier	5.22%	
(v) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus shelter	0.06%	
b) Truck lay-byes	0.00%	
c) Rest areas	5.58%	
d) Others		
- Street light	1.51%	
- RCC ROW Boundary wall	0.00%	
- Rainwater harvesting	0.00%	
- Advance Traffic management system	0.00%	
- Medical aid post	0.24%	
-Traffic aid post	0.19%	
- Utility ducts	0.00%	
(vi) Roadside Plantation	0.00%	
(vii) Repair of Protection works other than approaches to the bridges, elevated sections,	0.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.

Stage of Payment	Weightage	Payment Procedure
flyovers/ grade separators and ROBs/RUBs.		
(viii) Protection works - - retaining wall / toe wall, breast wall etc.	0.00%	
(a) RE wall other than approach of structures	0.00%	
(b) Breast Wall	13.23%	
(c) Retaining Wall	9.04%	
(ix) Safety and traffic management during construction	0.11%	Payment shall be made on prorata basis every six months.
(x) Junction Improvements & Junctions under Grade separator	1.10%	Payment shall be made on pro rata basis for completed work
(xi) Side slope protection with turfing/ geo blanketing etc.	45.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.

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:

Table 1.3.5

Stage of Payment	Weightage	Payment Procedure
(i) EHT line	40.00%	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)
(ii) EHT 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 4.
(iii) HTI LT line (including transformers)	15.00%	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/ 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) HTI LT 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 10 crossings.
(v) Water pipeline	45.00%	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.

Stage of Payment	Weightage	Payment Procedure
(vii) Sewage lines	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%)
(viii) Sewage line crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for completed activity. (The average weightage of major activities in shifting work is laying pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)

2 Procedure for payment for Maintenance.

2.1 The cost for maintenance shall be as stated in Clause 14.1. (i)

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

Schedule-I

Schedule - I

(See Clause 10.2 (iv))

1 Drawings

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

1 A minimum list of the drawings of the various components/elements of the project highway and project facility required to be submitted by the Contractor is given below:

a. Drawing of horizontal alignment, vertical profile and typical cross sections.

b. Drawings of cross drainage works, i.e. Bridges/Culverts/Flyovers and Other Structures;

c. Drawings of interchanges, major intersections and underpasses.

d. Drawing of control center.

e. Drawings of road furniture items including traffic signage, marking, safety barriers, etc.;

f. Drawings of traffic diversions plans and traffic control measures.

g. Drawings of road drainage measures.

h. Drawings of typical details slope protection measures.

i. Drawings of landscaping and horticulture.

j. Drawings of pedestrian crossing.

k. Drawings of street lighting.

l. General Arrangement showing Base Camp and Administrative Block.

m. Any other drawings as per instruction of Authority Engineer.

Schedule-J

Schedule-J

(See Clause 10.3 (ii))

Project Completion Schedule

1 Project Completion Schedule

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

2 Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the 383th (Three Hundred and Eighty Three) day from the Appointed Date (the "**Project Milestone-I**").

(ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

3 Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the 658th (Six hundred and Fifty Eighth) day from the Appointed Date (the "**Project Milestone-II**").

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

4 Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the 932th (Nine hundred and Thirty Two) 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 Schedule Completion Date

(i) The Scheduled Completion Date shall occur on the 1096th (One Thousand and Ninety Six only) 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

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 all the tests specified in IRC code, manual and MORTH specifications for the road and Bridge works, 5th revision, 2013.

(ii) 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 [2,000 (two thousand)] mm for each kilometer.

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

(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 the following equipment at his own cos 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 Vehicle Survey (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
2	Roughness of pavement	Network Vehicle Survey (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
3	Strength of pavement	Falling Weight Deflectometer (FWD)	At least once a year
4	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey months defined for the state basis rainy season)
5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basis rainy season)

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

Schedule-L

Schedule-L

(See Clause 12.2)

Completion Certificate

1 I, ……..(Name of the Authority's Engineer), acting as Authority's Engineer, under and in accordance with the Agreement dated ……(the "Agreement"), for construction of the "**Construction Four laning of N. Kawnpui (N. Mualvum) – Mualkhang via Khamrang Village section (Package-7) of NH-6 from Existing Chainage km 127+200 to km 142+000 (Design Chainage km 111+850 to km 123+400) on Silchar - Vairengte - Sairang road in the State oiyojna on EPC mode.**" 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 safety 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……..

SIGNED, SEALED AND DELIVERED

For and on behalf of

The Authority's Engineer by:

(Signature)

(Name)

(Designation)

(Address)

Schedule-M

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 deduction 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

(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 crossfall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%

(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(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:

$$R=P/100 \times M \times L1/L$$

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

M = Monthly lump-sum payment in accordance with the Bid

L1 = non-complying length

L = Total length of the road,

R = Reduction (the amount to be deducted for noncompliance 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 noncompliance.

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

Schedule-N

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 or 'Guidelines for Employment of Consultants under Japanese ODA Loans' or a combination of certain provisions 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 above Paragraphs 1.1 to 1.3, 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 NHIDCL (the "**Authority**") and ..... (the "**Contractor**") for **"Four laning of N. Kawnpui (N. Mualvum – West Serawlg section (Package-7) of NH-6 from Existing Chainage km 127+200 to km 142+000 (Design Chainage km 111+850 to km 123+400) on Silchar - Vairengte - Sairang road in the State of Mizoram under Bharatmala Pariyojna 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 Clauses 1.2, 1.3 and 1.4 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) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding 0.2% of Contract Price.

(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 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 10.1.6. The Authority's Engineer shall complete such review 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 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 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 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 4.9, 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 4.9, 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 12.4.

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 measures, 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 or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 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 Program 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 10.2.4 (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

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 19.3.1 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 13.2.3 (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.

Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

(f) the monthly payment admissible in accordance with the provisions of the agreement.

(g) the deductions for maintenance work not done.

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

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

(j) amount towards deduction of taxes

4 Contractor's claim for Damages

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

Schedule-P

Schedule-P

(See Clause 20.1)

INSURANCE

1 Insurance during Construction Period

i. The Contractor shall affect and maintain at its own cost, from the Appointed Date till the date of issue of the last 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 paragraph 1.1 (a) and (b) above shall cover the authority and the Contractor against all loss or damage from whatsoever 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 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 arises from a cause occurring prior to the issue of 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 each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Paragraph l 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 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

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 2,500 (two thousand five hundred) mm for each kilometer.

2 Visual and physical test:

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

Schedule-R

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 Four laning of N. Kawnpui (N. Mualvum) –Mualkhang via Khamrang Village section (Package-7) of NH-6 from Existing Chainage km 127+200 to km 142+000 (Design Chainage km 111+850 to km 123+400) on Silchar - Vairengte - Sairang road in the State oiyojna on EPC mode."** ……. (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)