राष्ट्रीय राजमार्ग एवं अवसंरचना विकास निगम लिमिटेड
सड़क परिवहन और राजमार्ग मंत्रालय, भारत सरकार
तीसरी मंजिल, पीटीआई बिल्डिंग, 4–संसद मार्ग, नई दिल्ली–110001

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BHARATMALA
ROAD TO PROSPERITY

BUILDING INFRASTRUCTURE - BUILDING THE NATION
CIN: U45400DL2014GOI269062

(भारत सरकार का उद्यम) (A Government of India Enterprise)

Addendum-1

NHIDCL/Nagaland/D-K/BW/PKG3/2021-2 **Dated: 24.06.2021**

To,

All Prospective Bidders

Subject: Balance work for Four-laning of NH-39 Dimapur- Kohima Road from Design Km 152.490 to Km 166.700 (Existing Km 156.000 to Km 172.900), in the state of Nagaland.

Sir,

1. The bid for the subject work was invited on 10.06.2021 with bid due date being 30.06.2021 (1500 Hours).

2. In this regard the changes made in the bidding documents are as follows:

S. No	Clause	As Existing	As Modified (To be read as)
1	DCA and Schedules	-	Schedule as attached in Annexure -1
2	DCA Clause 4.1 (xiv)	-	Certain works like Culverts, Breast walls, Retaining walls, Pavement etc which are incomplete or partially completed by M/s Gayatri Projects Ltd, shall have to be completed by the new Contractor. The new contractor shall also be fully responsible for these works, partially carried out by M/s Gayatri Projects Limited including but not limited to roads, bridges, culverts, any other structure like retaining wall, breast wall and other slope protection measures.
3	DCA Clause 4.1 (xv)	-	There are certain sinking & sliding areas and slopes which are prone to slides in the project stretch. The stabilization of such slopes, Geo - technical investigation and engineering solution of such areas and locations within the given ROW, this being an EPC Contract,

			shall be the responsibility of the new contractor, to whom this balance work is awarded based on this bid. It is informed that, no Change of Scope (COS) shall be given nor additional ROW shall be acquired on this account
4	DCA Clause 14.1.(v)	-	The new contractor shall also be responsible to maintain all the works which were, fully executed by the earlier contractor M/s Gayatri Projects Limited during the DLP period and also rectify the defects arising if any in these works

3. All bidders are requested to follow Addendum -1 for the subject project.

(AK Jha)
General Manager (T)

Schedule :A

SCHEDULE -A
(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1. The Site

1.1 Site of the Four Laning divided Project Highway of Existing Dimapur- Kohima Road on EPC basis starts from design km. 152.490 to km 166.700 (Design Length 14.21 Kms) (Existing km. 156.000 to km. 172.900, Length 16.900 Kms) of NH 39 (New No. is NH-29) in the state of Nagaland. Project Highway shall include the land, buildings, structures and road works as described in Annex-1 of this Schedule-A.

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

1.3 An inventory of the Site including the land, structures, road works 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.

1.4 The proposed alignment plans of the Project Highway are specified in Annex-III which has to be followed by the Contractor as a minimum. The Contractor may, however, improve upon the alignment plans and profile and raise the finished roadway level (FRL) with approval from the Authority's Engineer within the available Right of Way.

1.5 The status of the environment clearances obtained or awaited is given in Annex IV.

Annex-1
(Schedule-A)

Note: Through suitable drawings and description in words, the land, buildings, structures and road works comprising the Site shall be specified briefly but precisely in this Annex-1. All the chainages/location referred to in Annex- I to Schedule-A shall be Design chainages.

1. Site

The site of the four lane Project Highway comprises the section of Dimapur- Kohima road commencing from Km 156.000 to Km 172.900 (Existing, Length= 16.90 Kms) and from Design Km 152.490 to Km 166.700 (Design, Length = 14.21 Kms) i.e. Dimapur – Kohima Section in the State of Nagaland. The land, carriageway and structures comprising the Site are described below.

2. Current Status of Project Chainages: The following work has been completed.

Sl. No.	Activity	Chainage		Side	Length (M)	Remarks
		From	To			
1	Earthwork upto Subgrade Top	152+490	155+650	LHS	3160	
		155+710	155+840	LHS	130	
		156+100	157+250	LHS	1150	
		157+480	158+030	LHS	550	
		158+100	162+920	LHS	480	
		162+960	166+600	LHS	3640	
		166+640	166+670	LHS	30	
		152+490	153+180	RHS	690	
		153+250	154+960	RHS	1710	
		155+000	155+650	RHS	650	
		155+710	155+840	RHS	130	
		156+100	156+300	RHS	200	
		156+390	157+250	RHS	860	
		157+450	161+280	RHS	3830	
		161+325	162+900	RHS	1575	
		162+960	165+450	RHS	2490	
		165+500	166+600	RHS	1100	
		Total			**26715**	
Sl. No.	**Activity**	**Chainage**		**Side**	**Length (M)**	**Remarks**
		From	**To**			
2	Subgrade Preparation	152+490	153+250	LHS	760	
		153+425	154+890	LHS	1465	
		156+420	157+130	LHS	710	
		158+240	158+400	LHS	160	
		158+610	160+625	LHS	2015	
		160+650	161+180	LHS	530	
		161+270	162+600	LHS	1330	
		162+960	164+000	LHS	1040	
		164+080	164+123	LHS	43	
		164+300	165+120	LHS	820	
		165+250	165+400	LHS	150	
		165+425	166+090	LHS	665	
		166+265	166+600	LHS	335	
		152+490	153+180	RHS	690	

		153+250	153+880	RHS	630	
		153+940	154+880	RHS	940	
		156+418	157+000	RHS	582	
		158+240	158+390	RHS	150	
		158+610	158+780	RHS	170	
		158+820	159+140	RHS	320	
		159+370	161+200	RHS	1830	
		161+400	162+600	RHS	1200	
		162+960	165+100	RHS	2140	
		165+250	165+450	RHS	200	
		165+630	166+090	RHS	460	
		166+290	166+400	RHS	110	
		Total			**19445**	

Sl. No.	**Activity**	**Chainage**		**Side**	**Length (M)**	**Remarks**
		From	**To**			
3	GSB	152+490	153+250	LHS	760	
		153+425	154+890	LHS	1465	
		156+420	157+130	LHS	710	
		158+240	158+400	LHS	160	
		158+610	160+625	LHS	2015	
		160+650	161+180	LHS	530	
		161+300	162+600	LHS	1300	
		162+960	164+000	LHS	1040	
		164+300	165+120	LHS	820	
		165+250	165+400	LHS	150	
		165+425	165+450	LHS	25	
		165+630	166+090	LHS	460	
		166+265	166+600	LHS	335	
		152+490	153+180	RHS	690	
		153+250	153+880	RHS	630	
		153+940	154+810	RHS	870	
		156+418	156+850	RHS	432	
		158+240	158+390	RHS	150	
		158+610	158+780	RHS	170	
		158+900	159+140	RHS	240	
		159+370	161+200	RHS	1830	
		161+460	162+600	RHS	1140	
		162+960	165+100	RHS	2140	
		165+250	165+450	RHS	200	
		165+630	166+090	RHS	460	
		166+290	166+400	RHS	110	
		Total			**18832**	

Sl. No.	**Activity**	**Chainage**		**Side**	**Length (M)**	**Remarks**
		From	**To**			
4	WMM	152+490	152+960	LHS	470	
		152+975	153+070	LHS	95	
		153+500	154+800	LHS	1300	

		156+420	157+130	LHS	710	
		158+660	159+450	LHS	790	
		160+040	160+600	LHS	560	
		160+650	161+180	LHS	530	
		161+530	162+540	LHS	1010	
		162+960	164+000	LHS	1040	
		164+315	165+120	LHS	805	
		166+265	166+560	LHS	295	
		152+490	153+115	RHS	625	
		153+450	153+800	RHS	350	
		153+950	154+780	RHS	830	
		156+500	156+850	RHS	350	
		158+900	159+100	RHS	200	
		159+400	160+690	RHS	1290	
		160+815	161+200	RHS	385	
		166+550	162+530	RHS	980	
		163+100	163+340	RHS	240	
		165+650	166+090	RHS	440	
		Total			**13295**	
Sl. No.	**Activity**	**Chainage**		**Side**	**Length (M)**	**Remarks**
		From	**To**			
5	DBM	152+490	152+830	LHS	340	
		152+990	153+050	LHS	60	
		153+550	154+775	LHS	1225	
		156+420	157+130	LHS	710	
		158+660	159+440	LHS	780	
		160+040	160+500	LHS	460	
		160+650	161+160	LHS	510	
		161+560	162+540	LHS	980	
		162+960	164+000	LHS	1040	
		164+315	165+100	LHS	785	
		166+265	166+550	LHS	285	
		152+490	153+115	RHS	625	
		153+470	153+570	RHS	100	
		154+000	154+760	RHS	760	
		156+610	156+830	RHS	220	
		159+430	160+690	RHS	1260	
		160+820	161+195	RHS	375	
		161+690	162+070	RHS	380	
		165+650	166+090	RHS	440	
		Total			**11335**	

3. Rectification/Reconstruction of damaged stretches :

The new Contractor shall be fully responsible for the rectification of defects and maintenance for such works including the portion or part of the work done earlier by M/s Gayatri Projects Ltd.

3.1 Rectification / Reconstruction of Damaged DBM stretch :

SL. NO.	CHAINAGE			LENGTH IN Mtrs
	From	To	Side	
1	152+490	152+830	LHS	340
2	152+990	153+050	LHS	60
3	153+610	154+300	LHS	690
4	154+340	154+775	LHS	435
5	156+420	156+540	LHS	120
6	156+630	156+730	LHS	100
7	156+745	156+900	LHS	155
8	156+945	157+000	LHS	55
9	157+030	157+046	LHS	16
10	157+100	157+110	LHS	10
11	158+660	159+420	LHS	760
12	160+040	160+500	LHS	460
13	160+650	160+810	LHS	160
14	161+560	161+580	LHS	20
15	162+175	162+540	LHS	365
16	162+960	163+000	LHS	40
17	163+015	163+030	LHS	15
18	163+060	163+580	LHS	520
19	163+690	164+000	LHS	310
20	164+315	164+785	LHS	470
21	166+265	166+295	LHS	30
22	166+420	166+470	LHS	50
23	152+490	153+090	RHS	600
24	159+430	160+065	RHS	635
25	160+200	160+210	RHS	10
26	160+230	160+520	RHS	290
27	160+535	160+665	RHS	130
28	160+890	161+000	RHS	110
29	161+690	162+070	RHS	380
30	165+650	166+090	RHS	440
	Total Length (2 Lane)			**7776**
	Total Length (4 Lane)			**3888**

3.2 Rectification / Reconstruction of WMM stretch:

Sl No	Chainage		Length	Side
	From	To		
1	152+490	152+960	470	LHS
2	152+975	153+000	25	LHS
3	153+050	153+070	20	LHS
4	153+500	153+550	50	LHS
5	153+640	153+690	50	LHS

6	153+930	154+050	120	LHS
7	154+170	154+185	15	LHS
8	154+775	154+800	25	LHS
9	156+630	156+655	25	LHS
10	156+945	156+960	15	LHS
11	157+030	157+046	16	LHS
12	157+100	157+110	10	LHS
13	158+820	158+830	10	LHS
14	158+910	159+420	510	LHS
15	159+440	159+450	10	LHS
16	160+520	160+600	80	LHS
17	160+800	160+810	10	LHS
18	161+160	161+180	20	LHS
19	161+530	161+560	30	LHS
20	162+240	162+280	40	LHS
21	162+315	162+326	11	LHS
22	162+395	162+410	15	LHS
23	162+960	162+980	20	LHS
24	163+495	163+515	20	LHS
25	163+690	163+745	55	LHS
26	163+990	164+000	10	LHS
27	165+100	165+120	20	LHS
28	165+550	165+560	10	LHS
29	166+430	166+450	20	LHS
30	152+905	153+090	185	RHS
31	153+950	153+985	35	RHS
32	156+500	156+610	110	RHS
33	156+830	156+850	20	RHS
34	158+900	159+100	200	RHS
35	159+430	159+990	560	RHS
36	160+037	160+055	18	RHS
37	160+200	160+210	10	RHS
38	160+280	160+300	20	RHS
39	160+465	160+520	55	RHS
40	160+535	160+655	120	RHS
41	161+690	161+720	30	RHS
42	161+960	161+975	15	RHS
43	162+035	162+530	495	RHS
44	163+330	163+340	10	RHS
45	166+020	166+090	70	RHS
	Total Length(2 Lane)		**3685**	
	Total Length(4 Lane)		**1842.5**	

3.3 Rectification / Reconstruction of GSB stretch:

Sl. No.	Chainage		Length	Side
	From	To		
1	152+960	152+975	15	LHS
2	153+070	153+250	180	LHS
3	153+425	153+450	25	LHS
4	153+930	154+050	120	LHS
5	158+910	159+420	510	LHS
6	159+450	160+040	590	LHS
7	161+300	161+530	230	LHS
8	164+300	164+315	15	LHS
9	166+430	166+450	20	LHS
10	152+905	153+090	185	RHS
11	153+800	153+880	80	RHS
12	153+940	153+950	10	RHS
13	154+780	154+810	30	RHS
14	156+418	156+500	82	RHS
15	158+240	158+390	150	RHS
16	158+610	158+780	170	RHS
17	159+100	159+140	40	RHS
18	159+370	159+400	30	RHS
19	161+460	161+550	90	RHS
20	161+825	161+830	5	RHS
21	162+035	162+070	35	RHS
22	162+530	162+600	70	RHS
23	162+960	163+100	140	RHS
24	163+340	164+000	660	RHS
25	164+100	164+140	40	RHS
26	164+667	164+780	113	RHS
27	165+250	165+450	200	RHS
28	165+630	165+650	20	RHS
29	166+290	166+400	110	RHS
	Total Length(2 Lane)		**3965**	
	Total Length(4 Lane)		**1982.5**	

3.4 Bidders are requested to visit the site/stretch to understand the requirement of rectification as per their own assessment. The locations and length given above are tentative. The distressed locations should be identified with their exact chainages. The distresses should then be marked up in a grid pattern covering the distressed portion and also beyond the distressed portion. Then the entire DBM layer within the identified grid must be scrapped off thoroughly. After scrapping of DBM layer, the top WMM surface must be thoroughly checked with respect to degree of compaction and plasticity (within the grid) randomly by doing the test pits at few locations. Further it should be extended for GSB and subgrade layer with extraction of layer material to observe CBR value. If result does not comply in any of the layers then in that grid all the material including subgrade should be excavated and reconstructed freshly. If subgrade soil is complying with the physical properties while GSB does not, then excavation should be made upto GSB layer

and reconstruction should be done from GSB layer. The same should be done for WMM also.

4. Land

The Site of the Project Highway as described below:

Sl. No.	Existing Chainage		Design Chainage		Length (m)	Available ROW (m)	Remarks
	From	To	From	To			
1	156.000	172.900	152.490	166.700	14210	45	

5. Carriageway

The Proposed Project section is completed partly 4-lane and partly 2-Lane bituminous carriageway with variable width of Earthen Shoulders as per proposed cross section. The Project stretch runs through hilly terrain.

6. Major Bridge -The Site includes the following Major Bridges:

Sl. No.	Design (Km)	Type of Structure			Span Length (m)	HFL (m)	Width (m)	Remarks (River/Nala Name)
		Foundation	Sub-Structure	Super Structure				
1	155.245	Steel Girder			1 x 81.0	-	7.80 m Carriage plus 1.5 footpath on either side	Dzozaru constructed in year 2013 (LHS)
2	155.245	Steel Girder			1 x 81.0	-	7.80 m Carriage plus 1.5 footpath on either side	Upto Sub-Structure completed. (RHS)

Balance Bridge work also shall be fully undertaken for completion in all respects by the new Contractor.

7. Road over-bridges (ROB)

The Site includes the following ROB (road over railway line)

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

8. 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					

9. Minor bridges

The Site includes the following minor bridges:

Sl. No	Design (Km)	Type of Structure			Span Length (m)	HFL (m)	Width (m)	Remarks (River/Nala Name)
		Foundation	Sub-Structure	Super Structure				
1	158.817	RCCSlab			1 x 9.80	967.980	7.9	Diaru, Completed
2	161.255	RCC T-Beam			1 x 14.50	961.440	8.4	Kharu, LHS, Existing
2A	161.255	RCC T-Beam			1 x 14.50	961.440	8.4	Kharu, RHS, Completed.
3	165.158	RCC T-Beam			1 x 24.5	981.146	8.6	Dzuza, LHS, Existing
3A	165.158	RCC T-Beam			1 x 24.5	981.146	8.6	Dzuza, RHS, To be constructed
4	165.585	RCC Box			1 x 9.80	967.980	7.9	Dzuza, LHS, Completed and RHS only foundation completed

Balance Bridge work also shall be fully undertaken for completion in all respects by the new Contractor.

10. Railway level crossings/Railway Track

The Site includes the following railway level crossings/Track:

Sl. No.	Location (km)	Remarks
NIL		

11. 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				

12. Culverts: The Site has the following culvert:

SL.No.	Design Ch.	Span Arrangement	Type of Culvert	Completed	Remarks
1	152+515	(1X1.5X1.5)	Box culvert	1.00	Completed
2	152+577	(1X1.5X1.5)	Box culvert	1.00	Completed
3	152+826	(1X1.5X1.5)	Box culvert	1.00	Completed

4	152+858	(1X1.5X1.5)	Box culvert	1.00	Completed
5	152+900	(1X1.5X1.5)	Box culvert	1.00	Completed
6	152+965	(1X1.5X1.5)	Box culvert	1.00	Completed
7	153+104	(1X1.5X1.5)	Box culvert	1.00	Completed
8	153+422	(1X1.5X1.5)	Box culvert	1.00	Completed
9	153+450	(1X1.5X1.5)	Box culvert	1.00	Completed
10	153+610	(1X1.5X1.5)	Box culvert	1.00	Completed
11	153+652	(1X1.5X1.5)	Box culvert	1.00	Completed
12	153+820	(1X1.5X1.5)	Box culvert	1.00	Completed
13	153+881	(1X1.5X1.5)	Box culvert	1.00	Completed
14	153+980	(1X1.5X1.5)	Box culvert	1.00	Completed
15	154+022	(1X1.5X1.5)	Box culvert	1.00	Completed
16	154+133	(1X1.5X1.5)	Box culvert	1.00	Completed
17	154+243	(1X1.5X1.5)	Box culvert	1.00	Completed
18	154+340	(1X1.5X1.5)	Box culvert	1.00	Completed
19	154+388	(1X1.5X1.5)	Box culvert	1.00	Completed
20	154+450	(1X1.5X1.5)	Box culvert	1.00	Completed
21	154+495	(1X1.5X1.5)	Box culvert	1.00	Completed
22	154+612	(1X1.5X1.5)	Box culvert	1.00	Completed
23	154+808	(1X1.5X1.5)	Box culvert	1.00	Completed
24	154+834	(1X1.5X1.5)	Box culvert	1.00	Completed
25	154+908	(1X1.5X1.5)	Box culvert	0.50	Partially Completed
26	154+989	(1X1.5X1.5)	Box culvert	0.00	To be constructed
27	155+039	(1X1.5X1.5)	Box culvert	0.00	To be constructed
28	155+130	(1X1.5X1.5)	Box culvert	0.00	To be constructed
29	155+445	(1X1.5X1.5)	Box culvert	0.00	To be constructed
30	155+555	(1X1.5X1.5)	Box culvert	0.00	To be constructed
31	155+680	(1X1.5X1.5)	Box culvert	0.00	To be constructed
32	155+707	(1X1.5X1.5)	Box culvert	0.00	To be constructed
33	155+820	(1X1.5X1.5)	Box culvert	0.00	To be constructed
34	155+867	(1X1.5X1.5)	Box culvert	0.00	To be constructed
35	156+087	(1X1.5X1.5)	Box culvert	0.00	To be constructed
36	156+230	(1X1.5X1.5)	Box culvert	0.50	Partially Completed
37	156+418	(1X1.5X1.5)	Box culvert	1.00	Completed
38	156+485	(1X1.5X1.5)	Box culvert	1.00	Completed
39	156+543	**(1x4.0X3.0)**	Box culvert	1.00	Completed
40	156+595	(1X1.5X1.5)	Box culvert	1.00	Completed
41	156+786	(1X1.5X1.5)	Box culvert	1.00	Completed
42	156+847	(1X1.5X1.5)	Box culvert	1.00	Completed
43	157+003	(1X1.5X1.5)	Box culvert	1.00	Completed
44	157+074	**(1x3.0x3.0)**	Box culvert	1.00	Completed
45	157+750	(1X1.5X1.5)	Box culvert	1.00	Completed
46	157+800	(1X1.5X1.5)	Box culvert	1.00	Completed
47	157+475	**(1X4.0X3.0)**	Box culvert	0.00	To be constructed
48	158+045	**(1x3.0x3.0)**	Box culvert	0.00	To be constructed

49	158+140	(1X1.5X1.5)	Box culvert	0.50	Partially Completed
50	158+254	(1X1.5X1.5)	Box culvert	1.00	Completed
51	158+296	(1X1.5X1.5)	Box culvert	1.00	Completed
52	158+754	(1X1.5X1.5)	Box culvert	1.00	Completed
53	158+896	(1X1.5X1.5)	Box culvert	1.00	Completed
54	159+445	(1X1.5X1.5)	Box culvert	1.00	Completed
55	159+567	(1X1.5X1.5)	Box culvert	1.00	Completed
56	159+656	(1X1.5X1.5)	Box culvert	1.00	Completed
57	159+701	(1X1.5X1.5)	Box culvert	1.00	Completed
58	159+860	(1X1.5X1.5)	Box culvert	1.00	Completed
59	159+891	(1X1.5X1.5)	Box culvert	1.00	Completed
60	159+978	(1X1.5X1.5)	Box culvert	1.00	Completed
61	160+037	(1X1.5X1.5)	Box culvert	1.00	Completed
62	160+279	(1X1.5X1.5)	Box culvert	1.00	Completed
63	160+385	(1X1.5X1.5)	Box culvert	1.00	Completed
64	160+541	(1X1.5X1.5)	Box culvert	1.00	Completed
65	160+640	**(1x3.0x3.0)**	Box culvert	1.00	Completed
66	160+822	(1X1.5X1.5)	Box culvert	1.00	Completed
67	160+876	(1X1.5X1.5)	Box culvert	1.00	Completed
68	160+990	(1X1.5X1.5)	Box culvert	1.00	Completed
69	161+057	(1X1.5X1.5)	Box culvert	1.00	Completed
70	161+205	(1X1.5X1.5)	Box culvert	0.50	Partially Completed
71	161+300	(1X1.5X1.5)	Box culvert	0.00	To be constructed
72	161+556	(1X1.5X1.5)	Box culvert	1.00	Completed
73	161+640	(1X1.5X1.5)	Box culvert	1.00	Completed
74	161+715	(1X1.5X1.5)	Box culvert	1.00	Completed
75	161+758	(1X1.5X1.5)	Box culvert	1.00	Completed
76	161+820	**(1x6.0x3.0)**	Box culvert	1.00	Completed
77	161+918	(1X1.5X1.5)	Box culvert	1.00	Completed
78	162+030	(1X1.5X1.5)	Box culvert	1.00	Completed
79	162+085	(1X1.5X1.5)	Box culvert	1.00	Completed
80	162+175	(1X1.5X1.5)	Box culvert	1.00	Completed
81	162+222	(1X1.5X1.5)	Box culvert	1.00	Completed
82	162+299	(1X1.5X1.5)	Box culvert	1.00	Completed
83	162+326	(1X1.5X1.5)	Box culvert	1.00	Completed
84	162+364	(1X1.5X1.5)	Box culvert	1.00	Completed
85	162+392	(1X1.5X1.5)	Box culvert	1.00	Completed
86	162+428	(1X1.5X1.5)	Box culvert	1.00	Completed
87	162+457	(1X1.5X1.5)	Box culvert	1.00	Completed
88	162+497	(1X1.5X1.5)	Box culvert	1.00	Completed
89	162+551	(1X1.5X1.5)	Box culvert	1.00	Completed
90	162+730	(1X1.5X1.5)	Box culvert	1.00	Completed
91	162+820	(1X1.5X1.5)	Box culvert	0.50	Partially Completed
92	162+980	(1X1.5X1.5)	Box culvert	1.00	Completed
93	163+065	(1X1.5X1.5)	Box culvert	1.00	Completed

94	163+138	(1X1.5X1.5)	Box culvert	1.00	Completed
95	163+177	(1X1.5X1.5)	Box culvert	1.00	Completed
96	163+280	(1X1.5X1.5)	Box culvert	1.00	Completed
97	163+309	(1x2.0X2.0)	Box culvert	1.00	Completed
98	163+380	(1X1.5X1.5)	Box culvert	1.00	Completed
99	163+514	(1X1.5X1.5)	Box culvert	1.00	Completed
100	163+579	(1X1.5X1.5)	Box culvert	1.00	Completed
101	163+694	(1X1.5X1.5)	Box culvert	1.00	Completed
102	163+892	(1X1.5X1.5)	Box culvert	1.00	Completed
103	164+018	(1x2.0X2.0)	Box culvert	1.00	Completed
104	164+123	(1X1.5X1.5)	Box culvert	1.00	0.50(Extension of culvert due to alignment change)
105	164+314	(1X1.5X1.5)	Box culvert	1.00	Completed
106	164+431	(1X1.5X1.5)	Box culvert	1.00	Completed
107	164+507	(1X1.5X1.5)	Box culvert	1.00	Completed
108	164+596	(1X1.5X1.5)	Box culvert	1.00	Completed
109	164+667	(1X1.5X1.5)	Box culvert	1.00	Completed
110	164+782	(1x2.0X2.0)	Box culvert	1.00	Completed
111	164+907	(1X1.5X1.5)	Box culvert	1.00	Completed
112	165+014	(1X1.5X1.5)	Box culvert	1.00	Completed
113	165+290	(1X1.5X1.5)	Box culvert	1.00	Completed
114	165+390	(1X1.5X1.5)	Box culvert	0.00	To be constructed
115	165+418	(1X1.5X1.5)	Box culvert	0.50	Partially Completed
116	165+691	(1X1.5X1.5)	Box culvert	0.00	To be constructed
117	166+247	(1X1.5X1.5)	Box culvert	0.00	To be constructed
118	165+762	(1X1.5X1.5)	Box culvert	1.00	Completed
119	165+837	(1X1.5X1.5)	Box culvert	1.00	Completed
120	165+974	(1X1.5X1.5)	Box culvert	1.00	Completed
121	166+092	(1X1.5X1.5)	Box culvert	0.50	Partially Completed
122	166+191	(1X1.5X1.5)	Box culvert	0.50	Partially Completed
123	166+210	(1X1.5X1.5)	Box culvert	0.50	Partially Completed
124	166+340	(1X1.5X1.5)	Box culvert	1.00	Completed
125	166+450	(1X1.5X1.5)	Box culvert	1.00	Completed

Protection work to be constructed for balance culverts and other pending culverts already constructed earlier by M/s Gayatri Projects Ltd. as per site condition. The new Contractor shall be fully responsible for the rectification of defects and maintenance for such works including the portion or part of the work done earlier by M/s Gayatri Projects Ltd.

13. Bus Bays

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

SI. No.	Design Chainage	LHS	RHS	Village Name	Remarks
				Nil	

14. 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				

15. Road Side Drains

The details of completed PCC roadside drains are as follows:

SL. NO.	Design Chainage		LENGTH in Mtrs	SIDE
	From	To		
1	152+520	152+570	50	RHS
2	152+580	152+820	240	RHS
3	152+830	152+853	23	RHS
4	152+863	152+895	33	RHS
5	152+904	152+962	58	RHS
6	152+968	153+100	13	RHS
7	153+465	153+606	141	RHS
8	153+613	153+648	35	RHS
9	153+738	153+790	52	RHS
10	153+985	154+015	30	RHS
11	154+027	154+129	102	RHS
12	154+136	154+240	104	RHS
13	154+255	154+325	70	RHS
14	154+328	154+384	56	RHS
15	154+390	154+449	59	RHS
16	154+451	154+494	43	RHS
17	154+496	154+550	54	RHS
18	154+613	154+680	67	RHS
19	156+600	156+625	25	RHS
20	156+647	156+780	133	RHS
21	156+790	156+840	50	RHS
22	159+456	159+570	114	RHS
23	159+578	159+650	72	RHS
24	159+660	159+698	38	RHS

25	159+705	159+720	15	RHS
25	159+725	159+858	133	RHS
27	159+865	159+885	20	RHS
28	159+965	159+975	10	RHS
29	159+981	160+035	54	RHS
30	160+038	160+075	37	RHS
31	160+185	160+250	65	RHS
32	160+302	160+360	58	RHS
33	160+470	160+535	65	RHS
34	161+830	161+915	85	RHS
35	161+930	162+020	90	RHS
36	162+100	162+220	120	RHS
37	162+223	162+293	70	RHS
38	162+305	162+320	15	RHS
39	162+335	162+360	25	RHS
40	162+393	162+424	31	RHS
41	162+430	162+473	43	RHS
42	163+100	163+134	34	RHS
43	163+143	163+172	29	RHS
44	163+180	163+270	88	RHS
		Total	**2868**	

The new Contractor shall be fully responsible for the rectification of defects and maintenance for such works including the portion or part of the work done earlier by M/s Gayatri Projects Ltd.

16. Major Junctions

Sl. No.	Location		At Grade	Separated	Category of Cross Road			
	Existing Ch.	Design Ch.			NH	SH	MDR	Others
NIL								

The details of major junctions are as follows, (NH: National Highway, SH: State Highway, MDR: Major District Road)

17. Minor Junctions

The details of the minor junctions are as follows:

Sl. No.	Design Ch. (m)	Side	Type of Junction	Remarks
1	156556	RHS	Minor	To Village

2	166600	RHS	Minor	To Jotsoma

18. Bypass

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

Sl. No.	Name of Bypass to Town	Chainage (km) from km to km
NIL		

19. Other Structure/Details

The locations of other structure/Land Slide are as follows:

Sl. No.	Existing Chainage (m)		Design Chainage (m)		Length in m (Design)	Remarks
	From	To	From	To		
NIL						

The Following location Breast wall, Gabion wall and Retaining wall already constructed.

Sl. No.	Design Chainage		Length (m)	Structure	Remarks
	From	To			
1	152+490	152+510	20	Breast wall	
2	152+520	152+570	50	Breast wall	
3	152+770	152+820	50	Breast wall	Rectification 152+790 to 810
4	152+833	152+850	17	Breast wall	
5	152+862	152+885	23	Breast wall	Rectification required
6	152+910	152+960	50	Breast wall	
7	153+060	153+090	30	Breast wall	
8	153+460	153+580	120	Breast wall	
9	153+615	153+730	115	Breast wall	
10	153+740	153+810	70	Breast wall	Rectification 153+800 to 810
11	153+820	153+875	55	Breast wall	Rectification 153+820 to 830 & 153+860 to 870
12	153+890	153+920	30	Breast wall	
13	153+940	153+970	30	Breast wall	
14	153+980	154+015	35	Breast wall	
15	154+030	154+130	100	Breast wall	
16	154+137	154+230	93	Breast wall	
17	154+250	154+300	50	Breast wall	
18	154+470	154+490	20	Breast wall	
19	154+500	154+560	60	Breast wall	
20	154+630	154+680	50	Retaining wall	
21	154+840	154+870	30	Breast wall	Rectification required
22	155+740	155+760	20	Breast wall	

23	155+740	155+750	10	Gabion wall	
24	155+750	155+840	90	Gabion wall	Rectification required
25	156+390	156+400	10	Breast wall	
26	156+410	156+480	70	Breast wall	156+420 to 152+430 Rectification required
27	156+600	156+625	25	Breast wall	
28	156+700	156+710	10	Breast wall	
29	156+730	156+780	50	Breast wall	
30	156+790	156+840	50	Breast wall	
31	156+850	156+995	145	Gabion wall	156+860 to 156+990 Rectification required
32	157+010	157+065	55	Breast wall	157+060 to 157+065 Rectification required
33	157+470	157+480	10	Gabion wall	
34	157+780	157+830	50	Breast wall	Rectification required
35	157+955	157+965	10	Breast wall	
36	157+980	158+000	20	Breast wall	Rectification required
37	158+530	158+540	10	Breast wall	
38	158+640	158+740	100	Breast wall	158+650 to 158+690 Rectification required
39	158+760	158+780	20	Breast wall	
40	158+840	158+890	50	Breast wall	
41	158+900	159+070	170	Breast wall	158+900 to 158+950 Rectification required
42	158+265	158+280	15	Gabion wall	
43	159+070	159+130	60	Breast wall	Rectification required
44	159+350	159+440	90	Breast wall	159+350 to 159+390 Rectification required
45	159+460	159+550	90	Breast wall	
46	159+570	159+650	80	Breast wall	159+570 to 159+590 Rectification required
47	159+660	159+680	20	Breast wall	
48	159+695	159+725	30	Breast wall	
49	159+840	159+870	30	Breast wall	
50	159+875	159+895	20	Breast wall	
51	159+930	159+960	30	Breast wall	
52	160+490	160+535	45	Breast wall	
53	160+550	160+635	85	Breast wall	
54	161+100	161+150	50	Breast wall	
55	161+880	161+900	20	Breast wall	
56	161+930	161+960	30	Breast wall	
57	161+970	162+010	40	Breast wall	
58	162+020	162+030	10	Breast wall	
59	162+040	162+080	40	Breast wall	162+060 to162+080 Rectification required
60	162+090	162+160	70	Breast wall	162+090 to 162+120 Rectification required
61	162+165	162+170	5	Breast wall	

62	162+180	162+185	5	Breast wall	
63	162+190	162+295	105	Breast wall	
64	162+305	162+322	17	Breast wall	
65	162+330	162+360	30	Breast wall	
66	162+370	162+417	47	Breast wall	
67	162+430	162+450	20	Breast wall	
68	162+462	162+469	7	Breast wall	
69	162+470	162+490	20	Breast wall	162+475 to 162+485 Rectification required
70	162+500	162+507	7	Breast wall	
71	162+510	162+527	17	Breast wall	
72	162+550	162+570	20	Breast wall	
73	162+730	162+770	40	Breast wall	
74	162+990	163+060	70	Breast wall	163+040 to 163+050 Rectification required
75	163+070	163+080	10	Breast wall	Rectification required
76	163+110	163+170	60	Breast wall	
77	163+185	163+245	60	Breast wall	
78	163+490	163+500	10	Breast wall	Rectification required
79	163+520	163+530	10	Breast wall	Rectification required
80	163+930	163+940	10	Breast wall	
81	163+970	164+010	40	Breast wall	
82	164+105	164+145	40	Breast wall	
83	163+940	163+970	30	Breast wall	
84	164+320	164+425	105	Breast wall	164+325 to 164+375 Rectification required
85	164+435	164+495	60	Breast wall	164+440 to 164+500 Rectification required
86	164+510	164+530	20	Breast wall	
87	164+690	164+740	50	Breast wall	
88	164+910	164+940	30	Breast wall	
89	165+045	165+110	65	Retaining wall	
90	165+280	165+310	30	Breast wall	
91	166+000	166+060	60	Breast wall	
Total Length in Meters			**4028**		

The new Contractor shall be fully responsible for the rectification of defects and maintenance for such works including the portion or part of the work done earlier by M/s Gayatri Projects Ltd.

20. There are certain sinking, sliding areas and slopes prone to slides in the project stretch which is mentioned in Schedule-B. The Geotechnical investigation and engineering solution of such areas and locations within ROW, this being an EPC Contract, shall be the responsibility of the new contractor. It is mentioned that, no Change of Scope (COS) shall be given nor additional ROW shall be acquired on this account

Annex-Ill
(Schedule-A)

Alignment Plans

The existing alignment of the Project Highway may be modified in some sections as per the site condition.

Annex-IV
(Schedule-A)

Environment Clearances

Environment Clearance for the Project Road Section has been obtained on 22.10.2007.

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. Upgradation to 4 lane highway

Upgradation shall include Four-Lanning of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

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

Annex – I

(SCHEDULE-B)

Description of Four-Lanning

1. WIDENING OF THE EXISTING HIGHWAY

1.1 The Project Highway shall follow the existing alignment as 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.

1.2 WIDTH OF CARRIAGEWAY

1.2.1 Construction of Four-Lane pavement with paved shoulders shall be undertaken. The paved carriageway on both side of median shall be 7m wide with paved shoulders and 1.5 m wide median in accordance with the typical cross sections drawings as per four lane manual 2014

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

2. GEOMETRIC DESIGN AND GENERAL FEATURES

2.1 General

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

2.2 Design speed

The design speed shall be the minimum design speed of 40 km/hr and ruling design speed of 60 km/hr for mountainous and steep terrain.

2.3 Improvement of the existing road geometrics

Improvement of the existing road geometrics shall be carried out as per section 2 of the Manual (IRC: 84-2014).

2.4 Right of Way

Details of the Right of Way are given below.

Design ch. (from)	Design ch. (to)	Design Length	PROW width (m)	EROW width (m)
152+490	166+700	14210	45	45

2.5 Type of shoulders

The shoulder shall be paved shoulder on hill and valley in open areas along with divided carriageway and 1.75m wide raised footpath in Built-up locations as per typical cross section of Four lane manual 2014.

2.5.1 In built-up sections. Raised footpaths shall be provided in the following stretches:

Sl. No.	Stretch (from Km to Km)	Raised footpaths	Reference to cross section
1	Length of 555m	2 X 1.75 m width Footpath	TCS-II

(b) Paved shoulders of 1.5 m width shall be provided with selected earth wherever applicable as per TCS drawing.

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

2.6 Lateral and vertical clearances at underpasses

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

2.6.2 Lateral clearance: The width of the opening at the under passes shall be as follows:

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

2.7 Lateral and vertical clearances at overpasses

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

2.7.2 Lateral clearance: The width of the opening at the overpasses shall be as follows:

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

2.8 Service roads

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

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

2.9 Grade separated structures

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

[Refer to requirements specified in the relevant Manual]

Sl. No.	Location of Structure (VUP)	Length (m)	Number andlengthofspans	Approach gradient	Remarks. if any
Nil					

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

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

2.10 Cattle and pedestrian underpass /overpass

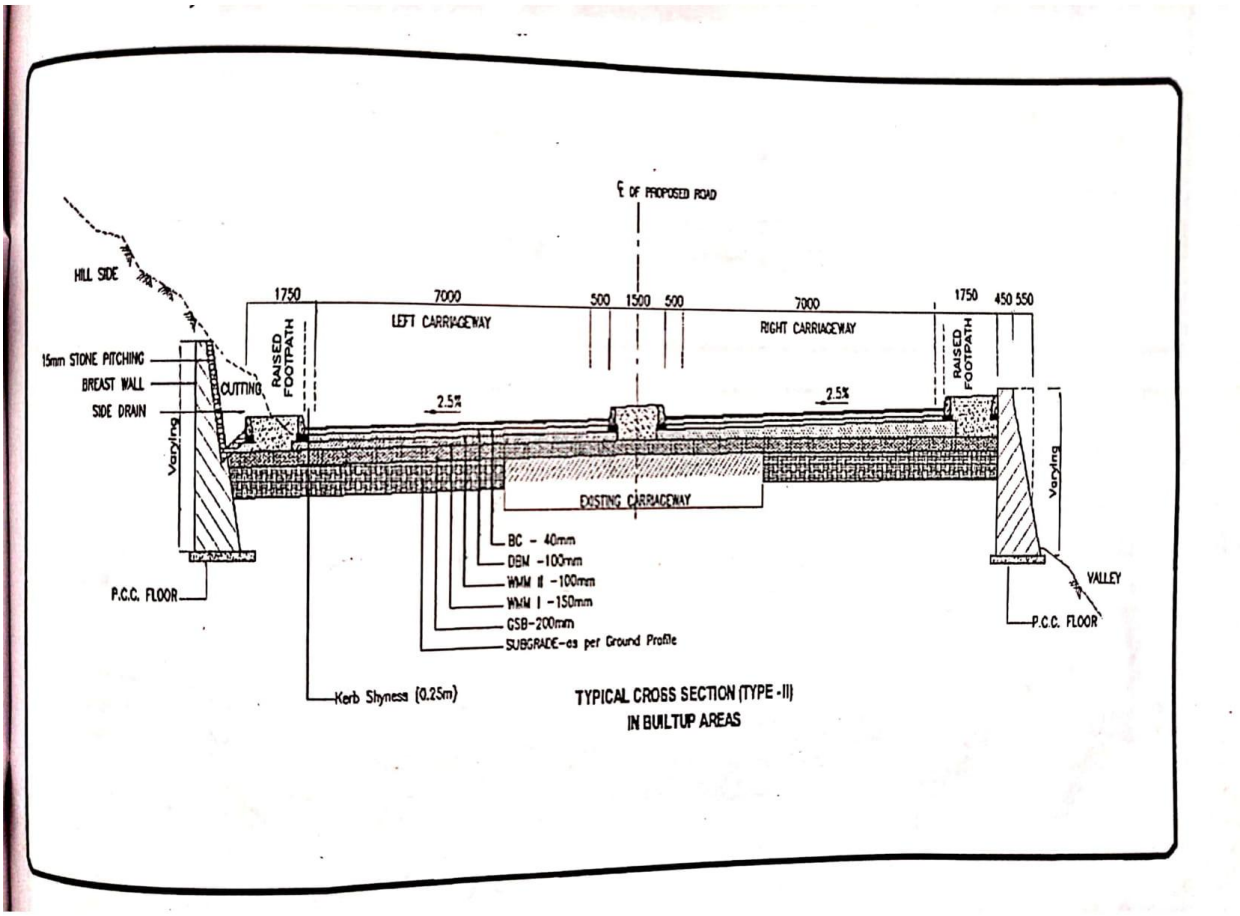
Cattle and pedestrian underpass/overpass shall be constructed as follows: [Refer to provision of the relevant Manual and specify the requirements of cattle and pedestrian underpass/overpass]

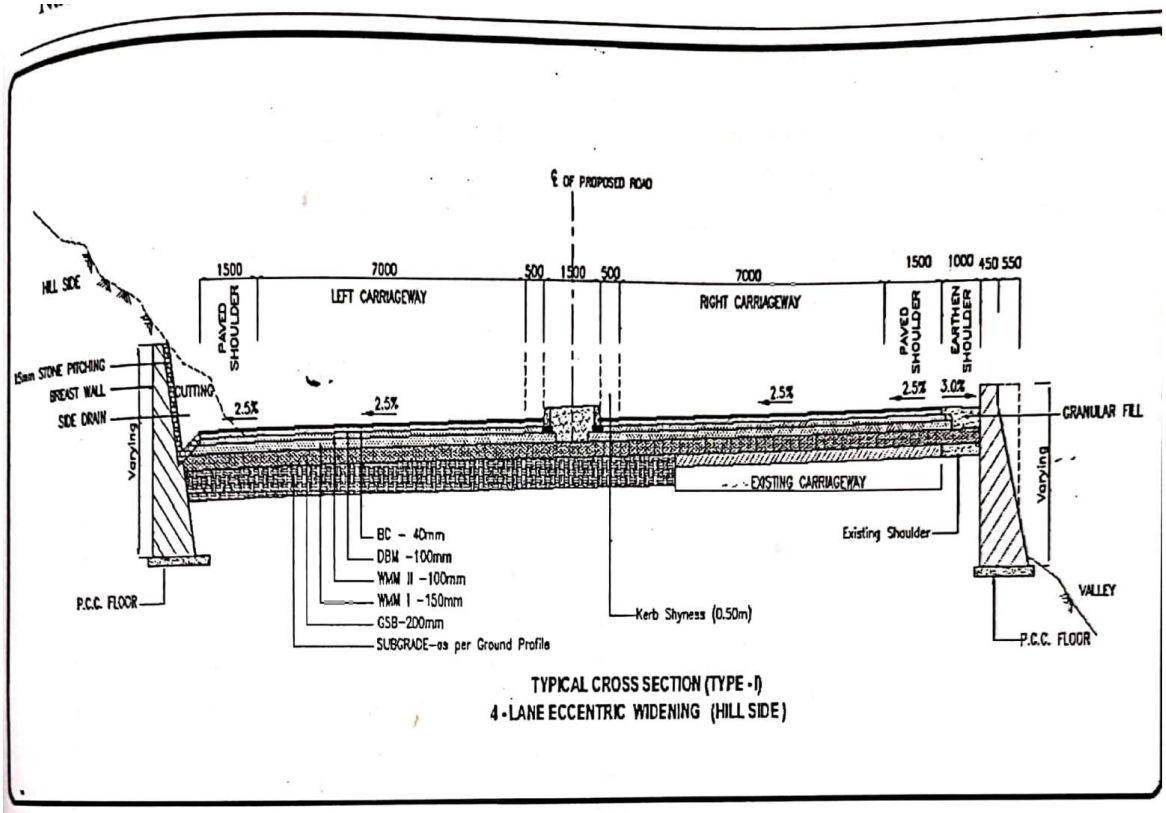
Sl.No.	Location	Type of crossing
Nil		

2.11 Typical cross-sections of the Project Highway

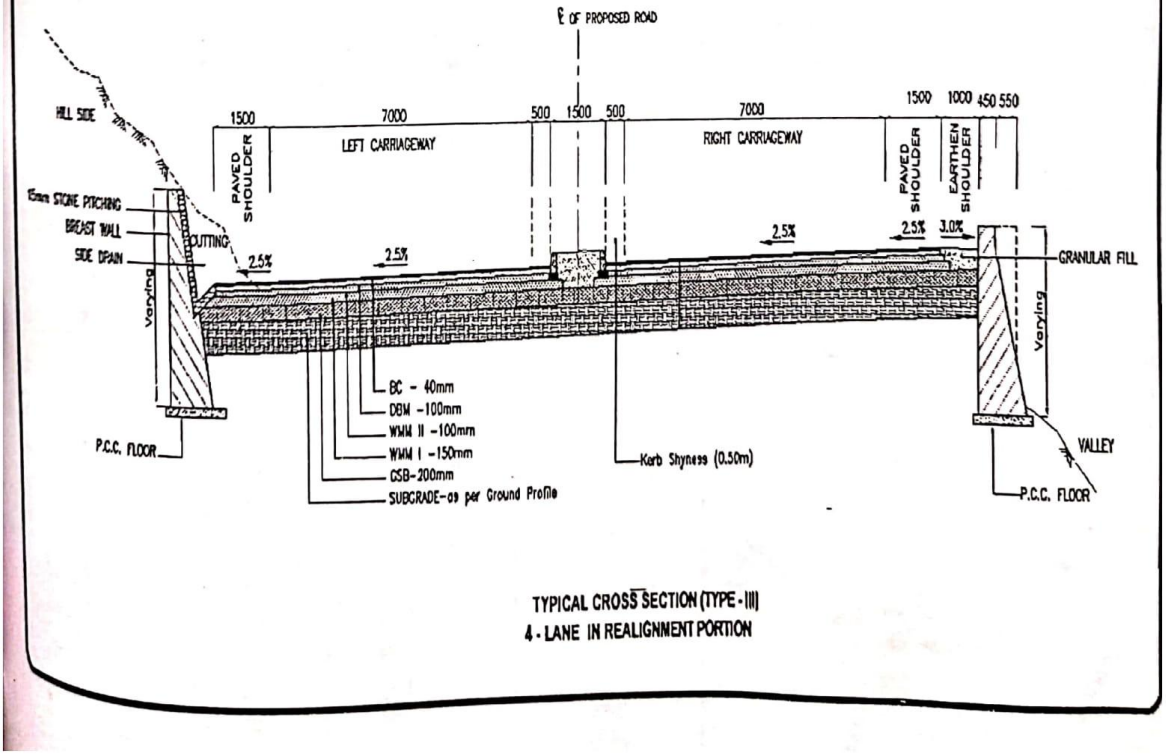
TCS TYPE	DESCRIPTION
TCS-II	In Built Up section
TCS-I	Widening on Hill side
TCS-II	Re-alignment section

The following TCS is based on the work done by M/s Gayatri Projects Ltd.





TYPICAL CROSS SECTION (TYPE - I)
4 - LANE ECCENTRIC WIDENING (HILL SIDE)



TYPICAL CROSS SECTION (TYPE - III)
4 - LANE IN REALIGNMENT PORTION

The EPC Contractor may modify the TCS according to the Pavement design mentioned in Clause 5.2.2 of Schedule-B. In addition to that subsurface drainage system to be incorporated in this cross-section as per manual.

Realignment chainages of the Project Highway are tabulated below:

Design Chainage (m) as per Plan & Profile		
From	**To**	**Length (m)**
152490	152560	70
152620	152700	80
152800	152860	60
152975	153425	450
153680	153780	100
153820	153870	50
154155	154235	80
155040	155120	80
155580	155650	70
155710	156220	510
156300	156980	680
157130	157480	350
158300	158470	170
158680	158760	80
158830	159450	620
159590	159660	70
159730	159760	30
159800	159830	30
159880	159930	50
160060	160150	90
160620	160810	190
160910	160970	60
161530	161690	160
161790	162030	240
162100	162165	65
162210	162275	65
162600	162710	110
162745	162790	45
162840	162900	60
162960	163040	80
163080	163290	210
163380	163440	60
163570	163850	280
163920	164010	90
164220	164270	50

164100	164150	50
164800	164860	60
164910	164990	80
165740	165800	60
165870	165920	50
165980	166140	160
166235	166495	260
166640	166670	30
	Total	**6235**

In above realignment chainages some stretches particularly landslide portion Plan & Profile may be modified as per site condition.

3. INTERSECTIONS AND GRADE SEPARATORS

All intersections and grade separators shall be as per Section 3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.
[Refer to provision of the relevant Manual and specify the requirements. Explain where necessary with drawings/sketches/general arrangement]
Properlydesignedintersectionsshallbeprovidedatthelocationsandofthetypes and features given in the tables below:

(a) At-grade intersections

Sl. No.	Design chainage (Km)	Side	Type of Junction	Remarks
1	**156550**	**RHS**	**Minor**	**To Village**

(5) Grade separated intersection with/without ramps

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

4. ROAD EMBANKMENT AND CUT SECTION

5.1 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.

4.2 The existing road including raising shall be reconstructed as per FRL mentioned in Plan & Profile as attached in Annex III of Schedule A.

The existing road shall be raised in the following sections:

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

Nil

5. PAVEMENT DESIGN

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

(b) Type of pavement

5.1.1 Flexible pavement design i.e. Granular base and sub base with DBM & BC as per IRC 37-2012, plate for 8 CBR and 30 msa, was considered in previous completed stretch as tabulated below-

Sl. No.	Section (Design Km)	Design Length (km)	BC (mm)	DBM (mm)	WMM (250)	GSB (mm)	Total Crust (mm)
1	Km 152+490 to Km 166+700	14.210	40	100	250	200	590

5.1.2 As per latest code IRC:37-2018 Flexible pavement design as per Clause 2.2 Cementitious Base and Sub bases with a Crack Relief layer of aggregate interlayer below the bituminous surfacing, as per Plate 36 & Effective CBR 8% and 40 msa is considered as tabulated below.

Sl. No.	Section (Design Km)	Design Length (km)	BC (mm)	DBM (mm)	WMM (mm) as CRL	Cementitious Base (mm)	GSB (mm)	Total Crust (mm)
1	Km 152+490 to Km 166+700	Balance length	40	60	100	190	200	590

Since, the successful bidder under EPC mode can use various types of flexible pavements mentioned in IRC:37-2018, they may carry out their own due diligence to arrive at project cost before submitting bids and also use of New/ alternative material and Technology in Construction of Highways may be adopted as per MoRTH Circular no. RW/NH-33044/18/2020-S&R (P&B) dated 14.12.2020.

Bituminous Grade VG 30 / VG 40/ CRMB/ PMB shall be used for DBM &BC.

5.2 Design requirements

5.2.1 Design Period and Strategy

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

5.2.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual. The Contractor shall design the pavement for design traffic of 40 msa& minimum Effective CBR of 8%.

6. Balance work of 4 laning: layer wise and side wise

6.1 Earthwork upto Subgrade Top:

SL. NO.	CHAINAGE			LENGTH IN Mtrs
	From	To	Side	
1	155+650	155+710	LHS	60
2	155+840	156+100	LHS	260
3	157+250	157+480	LHS	230
4	158+030	158+100	LHS	70
5	162+920	162+960	LHS	40
6	166+600	166+640	LHS	40
7	166+670	166+700	LHS	30
8	153+180	153+250	RHS	70
9	154+960	155+000	RHS	40
10	155+650	155+710	RHS	60
11	155+840	156+100	RHS	260
12	156+300	156+390	RHS	90
13	157+250	157+450	RHS	200
14	161+280	161+325	RHS	45
15	162+900	162+960	RHS	60
16	165+450	165+500	RHS	50
17	166+600	166+700	RHS	100
	Total Length (2 Lane)			**1705**
	Total Length (4 Lane)			**852.5**

6.2 Preparation of subgrade:

SL. NO.	CHAINAGE			LENGTH IN Mtrs
	From	To	Side	
1	153+250	153+425	LHS	175
2	154+890	156+420	LHS	1530
3	157+130	158+240	LHS	1110
4	158+400	158+610	LHS	210
5	160+625	160+650	LHS	25
6	161+180	161+270	LHS	90
7	162+600	162+960	LHS	360

8	164+000	164+080	LHS	80
9	164+123	164+300	LHS	177
10	165+120	165+250	LHS	130
11	165+400	165+425	LHS	25
12	166+090	166+265	LHS	175
13	166+600	166+700	LHS	100
14	153+180	153+250	RHS	70
15	153+880	153+940	RHS	60
16	154+880	156+418	RHS	1538
17	157+000	158+240	RHS	1240
18	158+390	158+610	RHS	220
19	158+780	158+820	RHS	40
20	159+140	159+370	RHS	230
21	161+200	161+400	RHS	200
22	162+600	162+960	RHS	360
23	165+100	165+250	RHS	150
24	165+450	165+630	RHS	180
25	166+090	166+290	RHS	200
26	166+400	166+700	RHS	300
	Total Length (2 Lane)			**8975**
	Total Length (4 Lane)			**4487.5**

6.3 Granular Works (Sub –Base)

SL. NO.	CHAINAGE			LENGTH IN Mtrs
	From	To	Side	
1	153+250	153+425	LHS	175
2	154+890	156+420	LHS	1530
3	157+130	158+240	LHS	1110
4	158+400	158+610	LHS	210
5	160+625	160+650	LHS	25

6	161+180	161+300	LHS	120
7	162+600	162+960	LHS	360
8	164+000	164+300	LHS	300
9	165+120	165+250	LHS	130
10	165+400	165+425	LHS	25
11	165+450	165+630	LHS	180
12	166+090	166+265	LHS	175
13	166+600	166+700	LHS	100
14	153+180	153+250	RHS	70
15	153+880	153+940	RHS	60
16	154+810	156+418	RHS	1608
17	156+850	158+240	RHS	1390
18	158+390	158+610	RHS	220
19	158+780	158+900	RHS	120
20	159+140	159+370	RHS	230
21	161+200	161+460	RHS	260
22	162+600	162+960	RHS	360
23	165+100	165+250	RHS	150
24	165+450	165+630	RHS	180
25	166+090	166+290	RHS	200
26	166+400	166+700	RHS	300
	Total Length (2 Lane)			**9588**
	Total Length (4 Lane)			**4794**

6.4 Granular Works (Base, Shoulders)

SL. NO.	**CHAINAGE**			**LENGTH IN Mtrs**
	From	**To**	**Side**	
1	152+960	152+975	LHS	15
2	153+070	153+500	LHS	430
3	154+800	156+420	LHS	1620

4	157+130	158+660	LHS	1530
5	159+450	160+040	LHS	590
6	160+600	160+650	LHS	50
7	161+180	161+530	LHS	350
8	162+540	162+960	LHS	420
9	164+000	164+315	LHS	315
10	165+120	166+265	LHS	1145
11	166+560	166+700	LHS	140
12	153+115	153+450	RHS	335
13	153+800	153+950	RHS	150
14	154+780	156+500	RHS	1720
15	156+850	158+900	RHS	2050
16	159+100	159+400	RHS	300
17	160+690	160+815	RHS	125
18	161+200	161+550	RHS	350
19	162+530	163+100	RHS	570
20	163+340	165+650	RHS	2310
21	166+090	166+700	RHS	610
	Total Length (2 Lane)			**15125**
	Total Length (4 Lane)			**7562.5**

6.5 DBM with Prime coat & Tack Coat

SL NO	CHAINAGE			LENGTH IN Mtrs
	From	To	Side	
1	152+830	152+990	LHS	160
2	153+050	153+550	LHS	500
3	154+775	156+420	LHS	1645
4	157+130	158+660	LHS	1530
5	159+440	160+040	LHS	600
6	160+500	160+650	LHS	150
7	161+160	161+560	LHS	400

8	162+540	162+960	LHS	420
9	164+000	164+315	LHS	315
10	165+100	166+265	LHS	1165
11	166+550	166+700	LHS	150
12	153+115	153+470	RHS	355
13	153+570	154+000	RHS	430
14	154+760	156+610	RHS	1850
15	156+830	159+430	RHS	2600
16	160+690	160+820	RHS	130
17	161+195	161+690	RHS	495
18	162+070	165+650	RHS	3580
19	166+090	166+700	RHS	610
	Total Length (2 Lane)			**17085**
	Total Length (4 Lane)			**8542.5**

6.6 BC with Tack Coat : From Km 152+490 to Km 166+700= 14.210 Km (4 lane)

7 Rectification/Reconstruction of Damaged stretch :

Bidders are requested to visit the site/stretch to understand the requirement of rectification as per their own assessment. The locations and length given in Schedule-A are tentative.

7.1 DBM stretch :

SL. NO.	CHAINAGE			LENGTH IN Mtrs
	From	To	Side	
1	152+490	152+830	LHS	340
2	152+990	153+050	LHS	60
3	153+610	154+300	LHS	690
4	154+340	154+775	LHS	435
5	156+420	156+540	LHS	120
6	156+630	156+730	LHS	100
7	156+745	156+900	LHS	155
8	156+945	157+000	LHS	55
9	157+030	157+046	LHS	16
10	157+100	157+110	LHS	10
11	158+660	159+420	LHS	760
12	160+040	160+500	LHS	460
13	160+650	160+810	LHS	160
14	161+560	161+580	LHS	20
15	162+175	162+540	LHS	365
16	162+960	163+000	LHS	40

17	163+015	163+030	LHS	15
18	163+060	163+580	LHS	520
19	163+690	164+000	LHS	310
20	164+315	164+785	LHS	470
21	166+265	166+295	LHS	30
22	166+420	166+470	LHS	50
23	152+490	153+090	RHS	600
24	159+430	160+065	RHS	635
25	160+200	160+210	RHS	10
26	160+230	160+520	RHS	290
27	160+535	160+665	RHS	130
28	160+890	161+000	RHS	110
29	161+690	162+070	RHS	380
30	165+650	166+090	RHS	440
	Total Length (2 Lane)			**7776**
	Total Length (4 Lane)			**3888**

7.2 WMM stretch :

Sl No	Chainage		Length	Side
	From	To		
1	152+490	152+960	470	LHS
2	152+975	153+000	25	LHS
3	153+050	153+070	20	LHS
4	153+500	153+550	50	LHS
5	153+640	153+690	50	LHS

6	153+930	154+050	120	LHS
7	154+170	154+185	15	LHS
8	154+775	154+800	25	LHS
9	156+630	156+655	25	LHS
10	156+945	156+960	15	LHS
11	157+030	157+046	16	LHS
12	157+100	157+110	10	LHS
13	158+820	158+830	10	LHS
14	158+910	159+420	510	LHS
15	159+440	159+450	10	LHS
16	160+520	160+600	80	LHS
17	160+800	160+810	10	LHS
18	161+160	161+180	20	LHS
19	161+530	161+560	30	LHS
20	162+240	162+280	40	LHS
21	162+315	162+326	11	LHS
22	162+395	162+410	15	LHS
23	162+960	162+980	20	LHS
24	163+495	163+515	20	LHS
25	163+690	163+745	55	LHS
26	163+990	164+000	10	LHS
27	165+100	165+120	20	LHS
28	165+550	165+560	10	LHS
29	166+430	166+450	20	LHS
30	152+905	153+090	185	RHS
31	153+950	153+985	35	RHS
32	156+500	156+610	110	RHS
33	156+830	156+850	20	RHS
34	158+900	159+100	200	RHS
35	159+430	159+990	560	RHS
36	160+037	160+055	18	RHS
37	160+200	160+210	10	RHS
38	160+280	160+300	20	RHS
39	160+465	160+520	55	RHS
40	160+535	160+655	120	RHS
41	161+690	161+720	30	RHS
42	161+960	161+975	15	RHS
43	162+035	162+530	495	RHS
44	163+330	163+340	10	RHS
45	166+020	166+090	70	RHS
	Total Length(2 Lane)		**3685**	
	Total Length(4 Lane)		**1842.5**	

7.3 GSB stretch :

Sl. No.	Chainage		Length	Side
	From	To		
1	152+960	152+975	15	LHS
2	153+070	153+250	180	LHS
3	153+425	153+450	25	LHS
4	153+930	154+050	120	LHS
5	158+910	159+420	510	LHS
6	159+450	160+040	590	LHS
7	161+300	161+530	230	LHS
8	164+300	164+315	15	LHS
9	166+430	166+450	20	LHS
10	152+905	153+090	185	RHS
11	153+800	153+880	80	RHS
12	153+940	153+950	10	RHS
13	154+780	154+810	30	RHS
14	156+418	156+500	82	RHS
15	158+240	158+390	150	RHS
16	158+610	158+780	170	RHS
17	159+100	159+140	40	RHS
18	159+370	159+400	30	RHS
19	161+460	161+550	90	RHS
20	161+825	161+830	5	RHS
21	162+035	162+070	35	RHS
22	162+530	162+600	70	RHS
23	162+960	163+100	140	RHS
24	163+340	164+000	660	RHS
25	164+100	164+140	40	RHS
26	164+667	164+780	113	RHS
27	165+250	165+450	200	RHS
28	165+630	165+650	20	RHS
29	166+290	166+400	110	RHS
	Total Length(2 Lane)		**3965**	
	Total Length(4 Lane)		**1982.5**	

7.4 The distressed locations should be identified with their exact chainages. The distresses should then be marked up in a grid pattern covering the distressed portion and also beyond the distressed portion. Then the entire DBM layer within the identified grid must be scrapped off thoroughly. After scrapping of DBM layer, the top WMM surface must be thoroughly checked with respect to degree of compaction and plasticity (within the grid) randomly by doing the test pits at few locations. Further it should be extended for GSB and subgrade layer with extraction of layer material to observe CBR value. If result does not comply in any of the layers then in that grid all the material including subgrade should be excavated and reconstructed freshly.

If subgrade soil is complying with the physical properties while GSB does not, then excavation should be made upto GSB layer and reconstruction should be done from GSB layer. The same should be done for WMM also.

8. ROADSIDE DRAINAGE

Drainage system including surface and subsurface drains for the Project Highway has been provided as per Section 6 of the Manual. However balance drains shall be provided in the table given below:

RCC Covered Drain (U Shaped) in built up area and other section PCC Drain (Trapezoidal shaped)

SL. NO.	DESIGN CHAINAGE (Km)		Length (M)	Remarks
	FROM	TO		
1	As per TCS II Schedule	In Built up section	555m	As per Four lane manual 2014 & IRC : SP-48
2	As per TCS I Schedule	Widening on Hill Side	5480m	
3	As per TCS III Schedule	Re-alignment section	6235m	

9. DESIGN OF STRUCTURES

9.1 General

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

9.1.2 Width of the carriageway of new bridges and structures shall be as per figure 7.2 A and figure 7.3 of the Four lane manual (IRC SP:84-2014)

9.1.3 Cross section of two lane new bridge with existing two lane shall be as per figure 7.4 A &&.4 B of four lane Manual (IRC:84-2014)

9.1.4 The following structures shall be provided with footpaths:

Sl. No.	Design (Km)	Type of Structure			Span Length (m)	Footpath Width (m)	Remarks
		Foundation	Sub-structure	Superstructure			
1	165+158	RCC T-Beam Girder			1 x 24.75	1.5	Dzuza

9.1.5 All bridges shall be high-level bridges.

9.1.6 The following structures shall be designed to carry utility services specified in Table below:

Sl. No.	Bridge at km	Utility service to be carried	Scope
1	165+158	Water Pipe	New

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

10.1 Culverts

10.1.1 Overall width of all culverts shall be equal to the roadway width of the approaches.

10.1.2 Widening of Proposed culverts:

The culverts at the following locations shall be constructed as widening / new culverts:

Sl. No	Design Ch.	Span Arrangement	Type of Culvert	Completed	Balance to be constructed
1	152+515	(1X1.5X1.5)	Box culvert	1.00	0.0
2	152+577	(1X1.5X1.5)	Box culvert	1.00	0.0
3	152+826	(1X1.5X1.5)	Box culvert	1.00	0.0
4	152+858	(1X1.5X1.5)	Box culvert	1.00	0.0
5	152+900	(1X1.5X1.5)	Box culvert	1.00	0.0
6	152+965	(1X1.5X1.5)	Box culvert	1.00	0.0
7	153+104	(1X1.5X1.5)	Box culvert	1.00	0.0
8	153+422	(1X1.5X1.5)	Box culvert	1.00	0.0
9	153+450	(1X1.5X1.5)	Box culvert	1.00	0.0
10	153+610	(1X1.5X1.5)	Box culvert	1.00	0.0
11	153+652	(1X1.5X1.5)	Box culvert	1.00	0.0
12	153+820	(1X1.5X1.5)	Box culvert	1.00	0.0
13	153+881	(1X1.5X1.5)	Box culvert	1.00	0.0
14	153+980	(1X1.5X1.5)	Box culvert	1.00	0.0
15	154+022	(1X1.5X1.5)	Box culvert	1.00	0.0
16	154+133	(1X1.5X1.5)	Box culvert	1.00	0.0
17	154+243	(1X1.5X1.5)	Box culvert	1.00	0.0
18	154+340	(1X1.5X1.5)	Box culvert	1.00	0.0
19	154+388	(1X1.5X1.5)	Box culvert	1.00	0.0
20	154+450	(1X1.5X1.5)	Box culvert	1.00	0.0
21	154+495	(1X1.5X1.5)	Box culvert	1.00	0.0
22	154+612	(1X1.5X1.5)	Box culvert	1.00	0.0
23	154+808	(1X1.5X1.5)	Box culvert	1.00	0.0
24	154+834	(1X1.5X1.5)	Box culvert	1.00	0.0
25	154+908	(1X1.5X1.5)	Box culvert	0.50	0.5
26	154+989	(1X1.5X1.5)	Box culvert	0.00	1.0
27	155+039	(1X1.5X1.5)	Box culvert	0.00	1.0
28	155+130	(1X1.5X1.5)	Box culvert	0.00	1.0
29	155+445	(1X1.5X1.5)	Box culvert	0.00	1.0
30	155+555	(1X1.5X1.5)	Box culvert	0.00	1.0
31	155+680	(1X1.5X1.5)	Box culvert	0.00	1.0
32	155+707	(1X1.5X1.5)	Box culvert	0.00	1.0
33	155+820	(1X1.5X1.5)	Box culvert	0.00	1.0
34	155+867	(1X1.5X1.5)	Box culvert	0.00	1.0
35	156+087	(1X1.5X1.5)	Box culvert	0.00	1.0

36	156+230	(1X1.5X1.5)	Box culvert	0.50	0.50
37	156+418	(1X1.5X1.5)	Box culvert	1.00	0.0
38	156+485	(1X1.5X1.5)	Box culvert	1.00	0.0
39	156+543	**(1x4.0X3.0)**	Box culvert	1.00	0.0
40	156+595	(1X1.5X1.5)	Box culvert	1.00	0.0
41	156+786	(1X1.5X1.5)	Box culvert	1.00	0.0
42	156+847	(1X1.5X1.5)	Box culvert	1.00	0.0
43	157+003	(1X1.5X1.5)	Box culvert	1.00	0.0
44	157+074	**(1x3.0x3.0)**	Box culvert	1.00	0.0
45	157+750	(1X1.5X1.5)	Box culvert	1.00	0.0
46	157+800	(1X1.5X1.5)	Box culvert	1.00	0.0
47	157+475	**(1X4.0X3.0)**	Box culvert	0.00	1.0
48	158+045	**(1x3.0x3.0)**	Box culvert	0.00	1.0
49	158+140	(1X1.5X1.5)	Box culvert	0.50	0.5
50	158+254	(1X1.5X1.5)	Box culvert	1.00	0.0
51	158+296	(1X1.5X1.5)	Box culvert	1.00	0.0
52	158+754	(1X1.5X1.5)	Box culvert	1.00	0.0
53	158+896	(1X1.5X1.5)	Box culvert	1.00	0.0
54	159+445	(1X1.5X1.5)	Box culvert	1.00	0.0
55	159+567	(1X1.5X1.5)	Box culvert	1.00	0.0
56	159+656	(1X1.5X1.5)	Box culvert	1.00	0.0
57	159+701	(1X1.5X1.5)	Box culvert	1.00	0.0
58	159+860	(1X1.5X1.5)	Box culvert	1.00	0.0
59	159+891	(1X1.5X1.5)	Box culvert	1.00	0.0
60	159+978	(1X1.5X1.5)	Box culvert	1.00	0.0
61	160+037	(1X1.5X1.5)	Box culvert	1.00	0.0
62	160+279	(1X1.5X1.5)	Box culvert	1.00	0.0
63	160+385	(1X1.5X1.5)	Box culvert	1.00	0.0
64	160+541	(1X1.5X1.5)	Box culvert	1.00	0.0
65	160+640	**(1x3.0x3.0)**	Box culvert	1.00	0.0
66	160+822	(1X1.5X1.5)	Box culvert	1.00	0.0
67	160+876	(1X1.5X1.5)	Box culvert	1.00	0.0
68	160+990	(1X1.5X1.5)	Box culvert	1.00	0.0
69	161+057	(1X1.5X1.5)	Box culvert	1.00	0.0
70	161+205	(1X1.5X1.5)	Box culvert	0.50	0.5
71	161+300	(1X1.5X1.5)	Box culvert	0.00	1.0
72	161+556	(1X1.5X1.5)	Box culvert	1.00	0.0
73	161+640	(1X1.5X1.5)	Box culvert	1.00	0.0
74	161+715	(1X1.5X1.5)	Box culvert	1.00	0.0
75	161+758	(1X1.5X1.5)	Box culvert	1.00	0.0
76	161+820	**(1x6.0x3.0)**	Box culvert	1.00	0.0
77	161+918	(1X1.5X1.5)	Box culvert	1.00	0.0
78	162+030	(1X1.5X1.5)	Box culvert	1.00	0.0
79	162+085	(1X1.5X1.5)	Box culvert	1.00	0.0
80	162+175	(1X1.5X1.5)	Box culvert	1.00	0.0

81	162+222	(1X1.5X1.5)	Box culvert	1.00	0.0
82	162+299	(1X1.5X1.5)	Box culvert	1.00	0.0
83	162+326	(1X1.5X1.5)	Box culvert	1.00	0.0
84	162+364	(1X1.5X1.5)	Box culvert	1.00	0.0
85	162+392	(1X1.5X1.5)	Box culvert	1.00	0.0
86	162+428	(1X1.5X1.5)	Box culvert	1.00	0.0
87	162+457	(1X1.5X1.5)	Box culvert	1.00	0.0
88	162+497	(1X1.5X1.5)	Box culvert	1.00	0.0
89	162+551	(1X1.5X1.5)	Box culvert	1.00	0.0
90	162+730	(1X1.5X1.5)	Box culvert	1.00	0.0
91	162+820	(1X1.5X1.5)	Box culvert	0.50	0.5
92	162+980	(1X1.5X1.5)	Box culvert	1.00	0.0
93	163+065	(1X1.5X1.5)	Box culvert	1.00	0.0
94	163+138	(1X1.5X1.5)	Box culvert	1.00	0.0
95	163+177	(1X1.5X1.5)	Box culvert	1.00	0.0
96	163+280	(1X1.5X1.5)	Box culvert	1.00	0.0
97	163+309	(1x2.0X2.0)	Box culvert	1.00	0.0
98	163+380	(1X1.5X1.5)	Box culvert	1.00	0.0
99	163+514	(1X1.5X1.5)	Box culvert	1.00	0.0
100	163+579	(1X1.5X1.5)	Box culvert	1.00	0.0
101	163+694	(1X1.5X1.5)	Box culvert	1.00	0.0
102	163+892	(1X1.5X1.5)	Box culvert	1.00	0.0
103	164+018	(1x2.0X2.0)	Box culvert	1.00	0.0
104	164+123	(1X1.5X1.5)	Box culvert	1.00	0.5 (Extension Culvert of due to alignment change)
105	164+314	(1X1.5X1.5)	Box culvert	1.00	0.0
106	164+431	(1X1.5X1.5)	Box culvert	1.00	0.0
107	164+507	(1X1.5X1.5)	Box culvert	1.00	0.0
108	164+596	(1X1.5X1.5)	Box culvert	1.00	0.0
109	164+667	(1X1.5X1.5)	Box culvert	1.00	0.0
110	164+782	(1x2.0X2.0)	Box culvert	1.00	0.0
111	164+907	(1X1.5X1.5)	Box culvert	1.00	0.0
112	165+014	(1X1.5X1.5)	Box culvert	1.00	0.0
113	165+290	(1X1.5X1.5)	Box culvert	1.00	0.0
114	165+390	(1X1.5X1.5)	Box culvert	0.00	1.0
115	165+418	(1X1.5X1.5)	Box culvert	0.50	0.5
116	165+691	(1X1.5X1.5)	Box culvert	0.00	1.0
117	166+247	(1X1.5X1.5)	Box culvert	0.00	1.0
118	165+762	(1X1.5X1.5)	Box culvert	1.00	0.0
119	165+837	(1X1.5X1.5)	Box culvert	1.00	0.0
120	165+974	(1X1.5X1.5)	Box culvert	1.00	0.0
121	166+092	(1X1.5X1.5)	Box culvert	0.50	0.5
122	166+191	(1X1.5X1.5)	Box culvert	0.50	0.5
123	166+210	(1X1.5X1.5)	Box culvert	0.50	0.5
124	166+340	(1X1.5X1.5)	Box culvert	1.00	0.0

125	166+450	(1X1.5X1.5)	Box culvert	1.00	0.0

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

[Refer provision of the relevant Manual and provide details]

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

11.1 Floor protection works shall be as specified in the relevant IRC Codes and Specifications.

12 Bridges

12.1 Existing bridges to be re-constructed/widened

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

[Refer provision of the relevant Manual and provide details]

Sl. No.	Bridge location	Salient details of existing bridge		Adequacy or otherwise of the existing waterway, vertical clearance etc.*	Scope
	(km)	Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)		
1	Nil				

(ii) The following narrow bridges shall be widened:

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

12.2 Additional new bridges (Minor)

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

Sl. No.	Location (km)	Total Length (m)	Scope
1	158+817	9.8	All Balance work
2	161+255	14.75	All Balance work
3	165+158	24.75	2 lane
4	165+585	9.8	All Balance work

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

[Refer provision of the relevant Manualand provide details:]

Sl.No.	Location at km	Scope
Nil		

12.2.2 Repairs/replacements of railing/parapets of the existing bridges shall be undertaken as follows:

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

Sl. No.	Location at km	Scope
1	161+225	Repair
2	165+158	Repair

12.2.3 Drainage system for bridge decks

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

12.3 Structures in marine environment

Nil

12.4 Rail-road bridges

12.4.1 Design construction and detailing of ROB/RUB shall be as specified in provision of the relevant Manual

Nil

12.4.2 Road over-bridges

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

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

12.4.3 Road under-bridges

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

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

12.5 Grade separated structures

Nil

12.6 Repairs and strengthening of bridges and structures

12.6.1 Bridges

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

Sl. No.	Location of bridge (km)	Scope
1	161+255	Existing 2 lane
2	165+158	Existing 2 lane
3	155+254	Existing 2 lane

12.6.2 ROB / RUB

Nil

12.6.3 Overpasses/Underpasses and other structures

Nil

12.7 List of Major Bridges and Structures

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

Location (Km)	Proposed span (in m)	Proposed width	Scope
155+254	**1 x 81**	New Two Lane	All Balance work

13. TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

(a) Traffic control devices and road safety works shall be provided in accordance with Section 9 of the Manual.

(b) Specifications of the reflective sheeting. As per the Clause 9.3 of the Manual of Specifications and Standards

14. ROADSIDE FURNITURE

(a) Road side furniture shall be provided in accordance with the provisions of Section 12 of the Manual.

(b) The Overhead traffic signs: location and size

Sl. No.	Location (Km)	Remarks
1	Full width overhead sign at 166+700	Location may change in consultation with Authority's Engineer
2	Cantilever over head signs (6 nos.)	Location to be identified in consultation with Authority's Engineer

15. COMPULSORY AFFORESTATION

The number of trees which are required to be planted by the contractor as compulsory afforestation shall be as per Forest Conservation Act and as per the section 11 of four lane Manual 2014

16. HAZARDOUS LOCATION / SAFETY PRECAUTIONS / PROTECTION WORKS

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

16.1 Gabion Breast Wall :- The provision of Gabion Breast wall including slope protection measures are:

Sl. no.	Chainage		Length(m)
	From km.	To Km.	
1	158350	158538	188
		Total	**188**

16.2 PCC / RCC Breast Wall :- The tentative locations and proposed type of Breast walls are as following:

Sl. No.	Chainage		Side	Length (M)	Proposed Provision	Remarks
	From	To				
1	152965	153050	RHS	85	Breast Wall (3m ht.)	
2	154880	154910	RHS	30		
3	155050	155200	RHS	150	Breast Wall (3m ht.)	
4	155680	155700	RHS	20	Breast Wall (3m ht.) required to protect HT tower which is 10 m away from ROW	
5	155840	156230	BHS	780	Breast Wall (3m ht.)	
6	156230	156390	RHS	160	Breast Wall (3m ht.)	
7	156850	156960	RHS	110	Breast Wall (3m ht.)	
8	157830	158650	RHS	820		
9	158840	158900	RHS	60		
10	158690	158810	RHS	120		
11	158820	158840	RHS	20		
12	158950	159100	RHS	150		
13	159980	160040	RHS	60		
14	160070	160110	RHS	40	Breast Wall (3m ht.)	
15	161300	161550	RHS	250	Breast Wall (3m ht.)	
16	163360	163840	RHS	480		
17	164530	164550	RHS	20		
18	165650	165680	RHS	30		
19	164750	164910	RHS	160		
20	164950	165100	RHS	150	Breast Wall (3m ht.)	
21	165180	165290	RHS	110		
22	165390	165420	RHS	30		
23	165670	165840	RHS	170		
24	165910	166000	RHS	90		
25	166250	166340	RHS	90		
26	166340	166700	RHS	360		
27	166100	166250	RHS	150	RCC Breast Wall (3m ht.) as per site requirement	
28	165290	165390	RHS	100		
29	164315	164430	RHS	115		
30	164000	164300	RHS	300		
31	162550	162980	RHS	430		
32	159100	159370	RHS	270		
32	157950	158300	RHS	350		
33	157100	157750	RHS	650		
34	156100	156230	RHS	130		
35	155700	155840	RHS	140		

36	153104	153420	RHS	316		
37	165420	165520	RHS	100		
Total				**7596**		

16.2.1 Retaining Wall : The Provision of Retaining wall including slope protection measures are:

Sl.No	**CHAINAGE**		**Length**
	From	**To**	**(m)**
1	154890	154910	20
2	155100	155140	40
3	156220	156280	60
4	156490	156530	40
5	157990	158080	90
6	159460	159470	10
7	159550	159560	10
8	159840	159860	20
9	160280	160360	80
10	161130	161170	40
11	161300	161360	60
12	162570	162600	30
13	162780	162800	20
14	162925	162950	25
15	164180	164200	20
16	164200	164220	20
17	164270	164305	35
18	164415	164470	55
19	165330	165400	70
20	165550	165565	15
21	165595	165640	45
22	165680	165730	50
23	165800	165850	50
24	165930	165970	40
Total			**945**

17. Metal Beam Crash Barrier / Parapet wall with Cement Concrete block:

The parapet wall shall be provided on valley edge in complete length minus built up length, bridge span etc. Minimum length of parapet shall be 7362 m. The design of parapet shall be as per IRC SP48:1998.Typical details of metal crash barrier are given in as per manual. Increase in length if any as per site requirement will not constitute change of scope.

18. SPECIAL REQUIREMENT FOR HILL ROADS

All special features shall be provided as per Manual. The side slope shall be protected by using suitable slope protection measures all along the highway on Hill side and valley side as per site requirements.

18.1 Landslide Mitigation:

Landslide Mitigation has to be provided at the specified chainages mentioned below. The following are the Landslide Mitigation measures to be adopted with the technical specification mentioned below:

18.1.1 For Sinking Zone in the following chainages :

1. Between Km 152.830 to Km 152.990
2. Between Km 157.400 to Km 157.500
3. Between Km 158.000 to Km 158.070
4. Between Km 162.010 to Km 162.100
5. Between Km 162.800 to Km 162.850

18.1.2 System for reinforcing the earth

It includes reinforcing and strengthening of the unstable slopes while doing the excavation in a top down manner by in-situ soil reinforcement of the excavated slope surface based on the detail soil investigation and slope stability analysis.

System for reinforcing the earth shall consist of reinforced earth wall structure as per the specification below and soil nailing/ ground anchors. The backfilled reinforced earth wall is to be mechanically connected with the soil nailed/ ground anchored stabilized slope.

(i) **Fascia :** The fascia element shall be of prefabricated and hot deep galvanized mild steel bar steel mesh having minimum bar diameter of 8mm and minimum galvanization thickness in accordance with BS 729: 1971 (1994).

(ii) **Soil Reinforcing Element:** High Adherence Geosynthetic Straps with grooves on both sides to generate high friction and having coating for better durability as soil reinforcing element. Any other similar material for Soil Reinforcement can be used after the approval from AE.

(iii) **Connection between fascia and soil reinforcing element:** mechanical connection system shall be used, using rust/corrosion resistant steel meeting the long term strength criteria.

(iv) **Fill material:** Backfill material shall be reasonably free from organic or other deleterious material confirming to MoRTH “Specification of Road and Bridges Works”, Fifth Revision or IRC: SP: 102-2014.

(v) **Drainage:** Drainage gallery minimum 600mm wide having 20mm down aggregates as per MoRTH specification.

(vi) **Soil Nailing:** To be done as per AS 4678:2002 or any other relevant code as per site condition with approval of AE.

(vii) **Ground Anchors:** Depending on the soil strata, height of the structure and slope stability design, the excavated slope surface to be strengthened by Permanent Ground Anchors.

(viii) **Connection System:** The connection between the reinforced soil slope and soil nail and/ or ground anchors shall be mechanical in nature for full load transfer mechanism. All steel components of the connection shall be hot-dip galvanized to BS 729:1971 requirements or IS 4759:1996.

The Contractor shall be responsible for accurate assessment of the actual requirement as per site situation & prepare designs for slope protection & stabilization as per the specifications & standards stipulated in schedule 'D' and submit the same to the AE for review through the proof consultant and implement it accordingly thereafter. Further the Proof and Safety Consultancy for the above work will only be done through IIT/CBRI/CSIR.

18.2 Landslide in the following chainages:

1. Between Km 153.104 to 153.350 = 316m
2. Between Km 155.700 to 155.840 = 140m
3. Between Km 156.100 to 156.230 = 130m
4. Between Km 157.200 to 157.500 = 300m
5. Between Km 157.500 to 157.750= 250m
6. Between Km 157.950 to 158.300=350m
7. Between Km 158.900 to 159.400= 500m
8. Between Km 160.600 to 160.700=100m
9. Between Km 162.030 to 162.100=70m
10. Between Km 162.550 to 163.000=450m
11. Between Km 163.300 to 163.850=550m
12. Between Km 164.000 to 164.430=430m
13. Between Km 165.000 to 165.100=100m
14. Between Km 165.250 to 165.390=140m
15. Between Km 165.420 to 165.520=100m
16. Between Km 166.100 to 166.250=150m

Total= 3706m

18.3 A brief chainage-wise summary of the slope stabilization solutions is given below which is to be implemented in consultation with Authority's Engineer.

Sl. No.	Chainage		Length (m)	Avg. Height(m)	Area (sqm.)	Suggested Slope Stability Solution
	From	To				
1	153.000	153.350	350	35	12250	Hydroseeding with Coir Mat
2	154.840	154.900	60	15	900	Vetiver Plantation
3	155.500	155.840	340	15	5100	Drapery with Pocket Reinforced Erosion Control System (PRECS) which is proven anti-erosion Geocomposite with a combination of Double Twist (DT) hexagonal wire mesh (10x12) with wire dia. 2.7mm & Zinc coating & soil nails along with a pocket based non-woven geo – green blanket of 600 GSM system including lacing wire & ropes for reinforcement, seeds & mulches.
4	156.100	156.390	290	15	4350	Drapery with Pocket Reinforced Erosion Control System (PRECS) which is proven anti-erosion Geocomposite with a combination of Double Twist (DT) hexagonal wire mesh (10x12) with wire dia. 2.7mm & Zinc coating & soil nails along with a pocket based non-woven geo – green blanket of 600 GSM system including lacing wire & ropes for reinforcement, seeds & mulches.
5	157.100	157.700	600	25	15000	Drapery with Pocket Reinforced Erosion Control System (PRECS) which is proven anti-erosion Geocomposite with a combination of Double Twist (DT) hexagonal wire mesh (10x12) with wire dia. 2.7mm & Zinc coating & soil nails along with a pocket based non-woven geo – green blanket of 600 GSM system including lacing wire & ropes for reinforcement, seeds & mulches.
6	158.000	158.300	300	25	7500	Debris Flow Barriers in stages
7	158.660	158.760	100	20	2000	Hydroseeding with Coir Mat Vetiver grass
8	159.000	159.400	400	15	6000	Hydroseeding with Coir Mat
9	159.000	159.400	400	15	6000	Drapery with Pocket Reinforced Erosion Control System (PRECS) which is proven anti-erosion Geocomposite with a combination of Double Twist (DT) hexagonal wire mesh (10x12) with wire dia. 2.7mm & Zinc coating & soil nails along with a pocket based non-woven geo – green blanket of 600 GSM system including lacing wire & ropes for reinforcement, seeds & mulches with Drainages Holes

10	159.700	159.750	50	15	750	Hydroseeding with Coir Mat
11	159.870	160.050	180	15	2700	Drapery with ATLAS, DT Mesh & Coir mat
12	160.650	160.800	150	15	2250	TUTOR with nailing 1.5 x 1.5, 6m
13	161.050	161.170	120	20	2400	Drapery with ATLAS, DT Mesh & Coir mat
14	161.300	161.550	250	20	5000	Hydroseeding with Coir Mat
15	162.080	162.170	90	15	1350	Vetiver Plantation
16	162.500	163.000	500	25	12500	Hydroseeding with Coir Mat
17	163.000	163.270	270	15	4050	Vetiver Plantation
18	163.350	163.450	100	10	1000	Hydroseeding with Coir Mat
19	163.930	164.300	370	25	9250	Hydroseeding with Coir Mat
20	164.600	165.000	400	15	6000	Vetiver&Hydroseeding with Coir Mat
21	165.230	165.500	270	20	5400	Drapery with Pocket Reinforced Erosion Control System (PRECS) which is proven anti-erosion Geocomposite with a combination of Double Twist (DT) hexagonal wire mesh (10x12) with wire dia. 2.7mm & Zinc coating & soil nails along with a pocket based non-woven geo – green blanket of 600 GSM system including lacing wire & ropes for reinforcement, seeds & mulches.
22	165.670	166.090	420	20	8400	Hydroseeding with Coir Mat
23	166.100	166.700	600	15	9000	Hydroseeding With Coir Mat

18.4 Slope Protection/Stabilization work includes Jute netting with vetiver grass, nailing, wire Mess/Cable Net and Geogrid etc. The land for muck dumping to be leased/procured by the contractor and generated muck to be deposited in the leased/purchased ground. The muck dumping ground to be stabilized as per NGT orders and shall be covered with bio-engineering.

Any increase in quantity over and above the minimum qty. as mentioned in both the tables above or through change in specifications will not be considered as change of scope. Therefore contractor shall make 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.

Note : The contractor shall be responsible for accurate assessment and design of the actual requirement as per site situation and prepare design for slope protection and stabilization as per specification and standards stipulated in Schedule-D and submit the same to the Authority's Engineer/Authority for review through the Proof/Safety Consultant only through IIT/CBRI/CSIR and implement it accordingly thereafter. Therefore, contractor shall make 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. However, mechanical bio-engineering is essentially to be done for uniform vegetation all over the treated area.

19. UTILITIES

Provision of accommodating utilities shall be made both over as well as underground wherever required.

20. Change of Scope

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

(Schedule-B1)

1. The shifting of utilities and felling of trees shall be carried out by the concerned department. The cost of the same shall be borne by the concerned department.

SCHEDULE - C

(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

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

a) Toll plaza [s];
b) Roadside furniture;
c) Pedestrian facilities;
d) Tree plantation;
e) Truck lay-bays;
f) Bus-bays and bus shelters;
g) Rest areas; and
h) Others to be specified

2 Description of Project Facilities

a) **Toll Plaza:** The detail of Toll plaza proposed on Project road section is:

SI. No.	Existing Chainage (Km)	Design Chainage (Km)	Remarks
NIL			

*Typical layout of Toll plaza shall be as per fig 10.1 & 10.2 of four lane manual 2014

b) **Road Side Furniture**

Roadside furniture shall be provided in accordance with the provisions of Section 12 of the manual.

c) **Pedestrian Facilities**

Pedestrian Facilities in the form of guard rails, footpath, at grade pedestrian crossing etc. shall be provided wherever required as per Four Lane Manual.

d) **Tree plantation**

Tree plantation shall be done as per section 11 of Manual.

e) **Truck lay-bays**

The locations of proposed truck lay byes are as under:

Sl. No.	Existing Km	Design Km	Side	Remarks
NIL				

f) **Bus-bays and bus shelters**

11nos of Bus bays shall be provided, the location of proposed Bus bays are as under:

Sl. No.	Design Chainage	LHS	RHS	Village Name	Remarks
1	154+330		√		
2	155+400	√	√		
3	156+650	√	√	KIRUPHEMA	
4	158+400	√	√	ZUBZA	
5	160+820	√	√	SECHU ZUBZA	
6	161+600	√	√		
Total Numbers….		**11**			

g) **Rest areas:**

NIL

h) **Others to be specified:**

NIL

Annex – I
(Schedule – D)

Specifications and Standards for Construction

1 Specifications and Standards

All materials, works and construction operations shall confirm to the Two Lane Manual (IRC: SP 73 – 2018) of Specifications and Standards for Two Laning (IRC: SP: 73 – 2018), referred as the Two Lane Manual (IRC: SP: 73 – 2018), and MORTH Specifications for Road and Bridge Works, IRC: SP: 48-1998 and IRC 56-2011. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2 Deviations from the Specifications and Standards

2.1 The terms 'Concessionaire', 'Independent Engineer' and 'Concession Agreement' used in the Two Lane Manual (IRC: SP 73-2018) shall be deemed to be substituted by the terms **'Contractor', 'Authority's Engineer' and 'Agreement'** respectively.

Schedule - E

(See Clauses 2.1 and 14.2)

Maintenance Requirements

1. Maintenance Requirements

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

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

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

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

permissible limit shall be repaired or rectified by the Contractor within the time limit specified by the Authority's Engineer.

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex – I

(Schedule-E) **Repair/rectification of Defects and deficiencies**

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

Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approache	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2

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					
s of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricte	Daily			7- 15 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
			d to 30 cm from the edge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
	Other Pavement Distresses			Bi-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,	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		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83-2008

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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Embankment/ Slope	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe	Daily			7-15 days	MORT&H Specification 408.4

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

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

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

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > l m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15 days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications -

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
						See Para 5.6.4 Within 15 days
4	**Multiple Cracks intersecting with one or more joints**	**w = width of crack**	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
				into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	ree or four corners broken		Reinstate sub-base, and reconstruct the

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
						slab as per norms and specifications within 30days
6	**Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w = width of crack L = length (m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m^2	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3 m/m^2		
			3	w > 1.5 mm and L < 3 m/m^2		
			4	w > 3 mm, L < 3 m/m^2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m^2 and deformation		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
Surface Defects						
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting.	
			4	r = 25 - 50 %		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
					Within 30 days	
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	**Scaling**	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	r < **2 %**	Local repair of areas damaged and liable to be damaged. Within 7days	
			2	r = 2 - 10 %		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	r = 10 - 20%	Bonded Inlay within 15 days	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 mm	Reconstruct slab within 30 days	
9	**Polished Surface/Glazing**	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm		
			2 '	t = 1 - 0.6 mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		

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

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

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

	in Cracks or Joints		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**
			1	h < 6 mm	No Action	
			2	h = 6 - 12 mm	Install Signs to Warn Traffic	

			3	h = 12 - 25 mm	within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstate pavement at normal level	

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

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

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

20	**Ponding**	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do-	

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>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>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>
</table>

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td></td><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m²/lux
Bituminous Road - 100mcd/m²/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td>Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>
<table>
<tr><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m²/lux)</td></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<tr><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td>65 - 100</td><td>250</td><td>120</td></tr>
<tr><td>Above 100</td><td>350</td><td>150</td></tr>
</table>
<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u></td><td>Bi-Annually</td><td>As per Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
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
		Initial 7 days Retro reflectivity: 100 mcd/m^2/lux Minimum Threshold Level: 50 mcd/m^2/lux					
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	hange of ignboard	48 hours in case of Mandatory	RC:67-2012

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

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

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

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

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

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

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

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

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

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

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

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f) Rest area		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g) [Toll Plaza]		
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a) Superstructure		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b) Foundations		

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

Nature of Defect or deficiency		Time limit for repair/ rectification
(iii)	Snow requiring clearance	24 (twenty four) hours

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

Schedule – F

(See Clause 4.1

(vii)(a)) **Applicable**

Permits

1. Applicable Permits

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

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

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

(c) Licence for use of explosives;

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

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

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

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

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

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

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

Schedule – G

(See Clauses 7.1 and 19.2)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

[MD, NHIDCL,

PTI Building] WHEREAS:

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

(B) The Agreement requires the Contractor to furnish a Performance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the {Construction Period/ Defects Liability Period and Maintenance Period} (as defined in the Agreement) in a sum of Rs….. cr. (Rupees ……. crore) (the "**Guarantee Amount**").

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

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

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

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

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

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

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

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

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

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

12. This guarantee shall also be operable 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. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the details below: -

SI. No	Particulars	Details

1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	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.

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

Annex – II

(Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

[MD, NHIDCL,

PTI Building, 3rd Floor, New Delhi] WHEREAS:

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

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

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

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

---

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid instalment of the Advance Payment under and in

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

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

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

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

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

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

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

11. This guarantee shall also be operable 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.

12. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the details
below: -

SI. No	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659

3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1st Parliament street, New Delhi-110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code

Number)

(Address)

NOTES:

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

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

SCHEDULE-H

(See Clauses 10.1.4 and 19.3)

Contract Price Weightages

1.1 The Contract Price for Balance works in this Agreement is **Rs.**

1.2 Proportions of the Contract Price for different stges of Construction of the project highway shall be as specified below:

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE
1	2	3	4
Road works including culverts, minor bridges, underpasses, overpasses, approaches to ROB/RUB/ Major Bridges/ Structures	**50.57%**	**A-Widening and Strengthening**	
		(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock.	2.12%
		(2) Granular work (sub-base)	2.01%
		(3) Granular work (base, shoulders)	5.13%
		(4) Bituminous work	
		a) DBM with Prime coat & Tack Coat	5.73%
		b) BC with Tack Coat	3.92%
		(5) Widening and repair of culverts	0.00%
		(6) Widening and repair of minor bridges	0.48%
		(7) Reconstruction of Damaged Stretch (for widening & realignment stretch)	6.33%
		B- New 4-lane alignment	
		(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock.	3.20%
		(2) Granular work (sub- base)	1.43%
		(3) Granular work (base, shoulders)	3.36%
		(4) Bituminous work	
		a) DBM with Prime coat & Tack Coat	4.24%
		b) BC with Tack Coat	3.42%

		C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:	
		(1) Culverts	3.70%
		(2) Protection work of Culverts	2.53%
		(3) Minor bridges balance work	
		(a) Foundation	0.88%
		(b) Sub-structure	1.18%
		(c) Super-structure (including crash barriers etc. complete)	0.91%
Major Bridge works and ROB/RUB	**3.07%**	**D- New Major Bridges**	
		(1) Balance work of Sub-structure	0.01%
		(2) Super-structure (including crash barriers etc. complete)	3.06%
Other Works	**46.36%**		
		(i) Foot Over Bridge	0.00%
		(ii) Toll Plaza	0.00%
		(iii) Road side drains	
		a) RCC / PCC Drain	1.11%
		(iv) Road signs, markings, km stones, safety devices, ….	0.44%
		(v) Project facilities	
		(a) Bus bays	0.33%
		(b) Truck lay-byes	
		(c) Junction Improvement	0.06%
		(d) others	0.06%
		(vi) Protection works	
		a) Slope Protection Works (Including Retaining wall, Gabion wall & Breast wall, Parapet etc)	
		Parapet wall on Valley Side.	1.52%
		Gabion Wall	0.59%

		Retaining Wall	2.80%
		Breast Wall	28.05%
		Slope protection measures in hill side i.e. a) vetiver plantation, b)Hydroseeding with coir netting c) Rock netting, d) Debris arrester, e) Reinforcement erosion control f) Sinking zone protection works etc.	
		a) Vetiver plantation	0.05%
		b) Hydroseeding with coir netting	1.88%
		c) Rock netting	2.17%
		d) Debris arrester	2.03%
		e) Erosion control system	1.88%
		f) Sinking zone protection works	2.67%
		(vii) Road furniture, Road Light, plantation & Miscellaneous works on issue of completion certificate	0.72%
			100.00%

TABLE 1.3.1		
1.3 Procedure of estimating the value of work done		
STAGE OF PAYMENT	**PERCENTAGE - WEIGHTAGE**	**PAYMENT PROCEDURE**
A-Widening and Strengthening		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 5 (Five) percent of the balance length.
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock.	2.12%	
(2) Granular work (sub- base)	2.01%	
(3) Granular work (base, shoulders)	5.13%	
(4) Bituminous work		
a) DBM with Prime coat & Tack Coat	5.73%	
b) BC with Tack Coat	3.92%	
(5) Widening and repair of culverts	0.00%	Cost of five completed culverts shall be determined pro rata with respect to the total number of culverts. Payment shall be made on the completion of five culverts.
(6) Widening and repair of minor bridges	0.48%	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 a minor bridge.
(7) Recostruction of Damaged DBM stretch	6.33%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in 0.25 km length.
B- New 4-lane alignment		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 5 (five) percent of the balance length.
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock.	3.20%	
(2) Granular work (sub- base)	1.43%	
(3) Granular work (base, shoulders)	3.36%	
(4) Bituminous work		
a) DBM with Prime coat & Tack Coat	4.24%	
b) BC with Tack Coat	3.42%	
C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:		

(1) Culverts	3.70%	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 five culverts.
(2) Protection work of Culverts	2.53%	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 five culverts.
(3) Minor bridges balance work		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
(a) Foundation	0.88%	
(b) Sub-structure	1.18%	
(c) Super-structure (including crash barriers etc. complete)	0.91%	

		of a minor bridge.

1.3.2 Major Bridge works.		
Procedure for estimating the value of Major Bridge works shall be as stated in table 1.3.2		
TABLE 1.3.2		
STAGE OF PAYMENT	**PERCENTAGE -WEIGHTAGE**	**PAYMENT PROCEDURE**
D- New Major Bridges		Payment shall be made on pro rata basis on completion of each stage of a Major Bridge as per the weightage given in this table.
(1) Balance work of Sub-structure	0.01%	
(2) Super-structure (including crash barriers etc. complete)	3.06%	

1.3.4 Other works.		
Procedure for estimating the value of the other works done shall be as stated in table 1.3.4:		
TABLE 1.3.4		
STAGE OF PAYMENT	**WEIGHTAGE**	**PAYMENT PROCEDURE**
(i) Foot Over Bridge	0.00%	Unit of measurement is completed FOB. Payment of FOB shall be made on pro rata basis with respect to the total of all items completed.
(ii) Toll Plaza	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(iii) Road side drains		Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
a) RCC / PCC Drain	1.11%	
b) Random Rubble Masonry Drain	0.44%	
(iv) Road signs, markings, km stones, safety devices, ….		Payment shall be made on pro rata basis for completed facilities.
(v) Project facilities	0.33%	
(a) Bus bays		
(b) Truck lay-byes	0.06%	
(c) Junction Improvement	0.06%	

(d) others		
(vi) Protection works		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 (ten) percent of the total length.
a) Slope Protection Works (Including Retaining wall, Gabion wall & Breast wall, Parapet etc)	1.52%	
Parapet wall on Valley Side.	0.59%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5 (ten) percent of the total length.
Gabion Wall	2.80%	
Retaining Wall	28.05%	
Breast Wall		
Slope protection measures in hill side i.e. a) vetiver plantation, b)Hydroseeding with coir netting c) Rock netting, d) Debris arrester, e) Reinforcement erosion control f) Sinking zone protection works etc.		Unit of measurement is Sqm. Payment shall be made on pro rata basis on completion of a stage in a area of not less than 5 (ten) percent of the total quantity.
a) Vetiver plantation	0.05%	Payment shall be Made on successful growth of grass of Minimum 6 inches (and not on plantation of grass)
b) Hydroseeding with coir netting	1.88%	Payment shall be Made on successful growth of grass of Minumum 6 inches (and not on plantation of grass)
c) Rock netting	2.17%	Unit of measurement is Sqm. Payment shall be made on pro rata basis on completion of a stage in a area of not less than 10 (ten) percent of the total quantity.
d) Debris arrester	2.03%	Unit of measurement is Sqm. Payment shall be made on pro rata basis on completion of a stage in a area of not less than 10 (ten) percent of the total quantity.
e) Erosion control system	1.88%	Unit of measurement is Sqm. Payment shall be made on pro rata basis on completion of a stage in a area of not less than 10 (ten) percent of the total

		quantity.
f) Sinking zone protection works	2.67%	Unit of measurement is Sqm. Payment shall be made on pro rata basis on completion of a stage in a area of not less than 10 (ten) percent of the total quantity.
(vii) Road furniture, Road Light, plantation & Miscellaneous works on issue of completion certificate	0.72%	Payment shall be made for completed items.

Schedule - I

(See Clause 10.2 (iv))

Drawings

1. Drawings

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

2. Additional Drawings

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

Annex – I

(Schedule - I)

List of Drawings

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

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1 Project Completion Schedule

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

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the **[36th]** 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 **[128th]** day from the Appointed Date (the "**Project Milestone- II**").

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

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the **[255th]** day from the Appointed Date (the "**Project Milestone- III**").

(ii) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 70% (seventy per cent) of the Contract Price and **should have** started construction of all project facilities.

5. Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the [365th] day from the Appointed Date.

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

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

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

2. Tests

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

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

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

the Authority's Engineer. Bridges with a span of 15 (fifteen) metres or more shall also be subjected to load testing.

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

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

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

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

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

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

Schedule - L

(See Clause 12.2)

Completion Certificate

1 I, …….. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated……(the "**Agreement**"), for **Balance work for Four-laning of NH-39 Dimapur — Kohima Road from Design Km 152.490 to Km 166.700 (Existing Km 156.000 to Km 172.900), in the state of Nagaland under SARDP-NE through an Engineering, Procurement and Construction(EPC) Contract (Package-III)** (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through .....(Name of Contractor), hereby

certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name

) (Designation)

(Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

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

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

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

2. Percentage reductions in lump sum payments on monthly basis

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

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%

(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
S. No.	**Item/Defect/Deficiency**	**Percentage**
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

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

Where,

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

M1= Monthly lump-sum payment in accordance para 1.2 above of this Schedule M2= Monthly lump-sum payment in accordance para 1.2 above of this Schedule L1= Non-complying length L = Total length of the road,

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

Terms of Reference for Authority's Engineer

1. Scope

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the [NHIDCL, PTI Building, Parliament Street, New Delhi-11001] (the "**Authority**") and

..... (the "**Contractor**")# for **Balance work for Four-laning of NH-39 Dimapur — Kohima Road from Design Km 152.490 to Km 166.700 (Existing Km 156.000 to Km 172.900), in the state of Nagaland under SARDP-NE through an Engineering, Procurement and Construction (EPC) Contract (Package-III)**, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

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

2. Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time Extension;

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

(c) the Termination Payment; or

(d) issuance of Completion Certificate or

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

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

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

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

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

4. Construction Period

(i) During the Construction Period, the Authority's Engineer shall review and approve the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety

Consultant in accordance with the provisions of Clause 10.1 (vi). The Authority's Engineer shall complete such review and approval and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

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

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

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

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

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

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

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

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix),

the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

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

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

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

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

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

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

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

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

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

5. Maintenance Period

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

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

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

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

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

6. Determination of costs and time

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

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

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

7. Payments

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

(ii) Authority's Engineer shall -

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

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

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

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

8. Other duties and functions

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

9. Miscellaneous

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

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

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

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

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

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

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

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

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

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

(f) Deductions:

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

ii. Any amount towards deduction of taxes; and

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

(g) Net claim: (e) – (f) (iii);

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

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

ii. For Change of Scope Orders, and

iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause 20.1)

Insurance

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

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

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, ……. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …… (the "**Agreement**"), for **Balance work for Four-laning of NH-39 Dimapur – Kohima Road from Design Km 152.490 to Km 166.700 (Existing Km 156.000 to Km 172.900), in the state of Nagaland under SARDP-NE through an Engineering, Procurement and Construction (EPC) Contract (Package-III)** (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests on completion of

Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

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