Schedules

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1 The Site

(i) Site of the 4-lane/ 2-lane Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

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

(iii) An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2 (i) of this Agreement.

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

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

Annex – I *(Schedule-A)*

Site

Through suitable drawings and description in words, the land, buildings, structures and road works comprising the Site shall be specified briefly but precisely in this Annex-I.

1. Site

The Site of the Project comprises the section ofNH-37) commencing from Village Nalanihulla (Design Chainage 626+030) to Village Chotahapjan (Design Chainage 650+450)on existing Tinsukhia -Makum Bypass of NH 37 from Km 0+000 (Chotahapjan) to Km 16+900 (Bogapani section) (2-Lane+PS) of NH-38 in Tinsukia District in the State of Assam. The land, carriageway and structures comprising the Site are described below. **All chainages in this section are design chainages.**

Sl. No.	Design Chainage	Existing Chainage
NH-37		
1	626+030	626+030
2	627+000	627+000
3	628+000	628+000
4	629+000	629+000
5	630+000	630+000
6	631+000	631+000
7	632+000	632+000
8	633+000	633+000
9	634+000	634+000
10	635+000	635+000
11	636+000	636+000
12	637+000	637+000
13	638+000	638+000
14	639+000	639+000
15	640+000	640+000
16	641+000	641+000
17	642+000	642+000
18	643+000	643+000
19	644+000	644+000
20	645+000	645+000
21	646+000	646+000
22	647+000	647+000
23	648+000	648+000
24	649+000	649+000
25	650+000	650+000
26	650+450	650+450
NH-38		
27	2+300	5+000
28	3+145	6+000
29	4+145	7+000

Sl. No.	Design Chainage	Existing Chainage
30	5+135	8+000
31	6+130	9+000
32	7+120	10+000
33	8+110	11+000
34	10+110	13+000
35	11+110	14+000
36	13+115	16+000
37	14+115	17+000
38	15+115	18+000
39	16+115	19+000

2. Land

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

Stretch	Road Segment	Existing Ch.		Existing Average ROW (m)
		From	To	
Section 3				
1	NH-37	Km 626+030	Km 650+450	45
2	NH-38	Km 0+000	Km 2+400	45
3	NH-38	Km 2+400	Km 16+900	25-30

3. Carriageway

Variable cross-sectional parameters were found for the project road as mentioned below.

Chainage (km)		Length (km)	Existing Carriageway		Existing Shoulder	
From	To		Type	Width (m)	Type	Width (m)
Section 3 (NH-37 and NH-38 part)						
626+030	650+450	24.42	Bituminous	10	Earthen	1.0-1.5
0+000	16+900	16.9	Bituminous	10	Earthen	1.0-1.5

Presence of roadside drain is not that conspicuous. In general, the project road is predominantly on embankment varying between 1.0m-2.0m height.

4. Major Bridges

The Site includes the following Major Bridges:

SL NO.	Design Chainage	No. of Spans	Span Arrangement (m)	Clear Span (m)	Length of Bridge (m)	Clear Roadway Width (m) between kerbs	Total Width (m)	Width of Footpath (m)	Super structure Type
NIL									

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

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

S. No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Superstructure			
1	648+588 of NH-37	Pile	RCC Girder	19.22+19.22	13.05	ROB cum VUP

6. Grade separators

The Site includes the following grade separators:

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

7. Minor bridges

The Site includes the following minor bridges:

SL NO.	Existing Chainage (km)	No. of Spans	Span Arrangement (m)	Length of Bridge (m)	Total Width (m)	Super structure Type
1	632+679 of NH-37	1	1X7.0	7.0	11.9	RCC Solid Slab
2	9+155 of NH-38	1	1X7.6	7.6	11.7	RCC Solid Slab

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location (km)	Remarks
NIL		

9. Underpasses (vehicular, non-vehicular) The Site includes the following underpasses:

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

10. Culverts

The Site has the following culverts:

Sl No	Existing Chainage (km)	Type of Culvert	Span Arrangement/Dia. (m)	Vent Height (m)	Total Width of Structure (m)	Total Roadway Width(m)
From Km 626+030 (near Nalani Hulla village) to Km 650+546 (Chotahapjan) of NH-37						
1	626+253	HPC	1 x 1.2	-	15.3	11.1
2	626+421	Slab	1 x 1.8	2.5	11.8	9.5
3	626+487	HPC	1 x 1.2	-	17.6	11.1
4	626+852	Slab	1 x 2.5	2.3	11.9	9.8
5	627+825	Slab	1 x 3.0	2.3	10.6	9.7
6	629+125	Slab	1 x 3.0	2.3	10.8	7.3
7	629+535	Slab	1 x 5.0	3.0	10.9	10.2
8	630+130	Slab	1 x 3.0	2.3	11.0	10.0
9	630+884	Slab	1 x 2.7	2.2	12.2	9.9
10	631+817	HPC	1 x 1.2	-	17.9	12.1
11	632+220	HPC	1 x 1.2	-	20.3	7.0
12	633+287	Slab	1 x 4.0	2.5	20.3	7.0
13	634+506	Slab	1 x 5.0	3.0	25.1	7.0
14	634+895	HPC	1 x 1.2	-	20.0	7.0
15	635+963	HPC	1 x 1.2	-	20.0	7.0
16	636+089	HPC	1 x 1.2	-	20.0	7.0
17	637+385	HPC	1 x 1.2	-	20.0	7.0
18	637+579	HPC	1 x 1.2	-	20.0	7.0
19	637+765	HPC	1 x 1.2	-	20.0	7.0
20	637+951	HPC	1 x 1.2	-	20.0	7.0
21	638+328	HPC	1 x 1.2	-	20.0	7.0
22	638+500	HPC	1 x 1.2	-	20.0	7.0
23	638+749	HPC	1 x 1.2	-	20.0	7.0
24	639+041	HPC	1 x 1.2	-	20.0	7.0
25	639+195	HPC	1 x 1.2	-	20.0	7.0
26	639+255	HPC	1 x 1.2	-	20.0	7.0
27	639+494	HPC	1 x 1.2	-	20.0	7.0
28	639+700	HPC	1 x 1.2	-	20.0	7.0
29	639+948	Slab	1 x 5.0	3.0	11.3	8.3
30	640+089	Slab	1 x 5.0	3.0	11.0	9.6
31	640+486	HPC	1 x 1.2	-	20.0	7.0
32	641+190	HPC	1 x 1.2	-	20.0	7.0
33	642+000	Slab	1 x 5.0	3.0	10.8	8.5
34	642+125	HPC	1 x 1.2	-	20.0	7.0
35	642+630	HPC	1 x 1.2	-	20.0	7.0
36	642+900	HPC	1 x 1.2	-	20.0	7.0
37	643+340	HPC	1 x 1.2	-	20.0	7.0
38	646+012	HPC	1 x 1.2	-	20.0	7.0
39	646+214	HPC	1 x 1.2	-	20.0	7.0
40	646+645	HPC	1 x 1.2	-	20.0	7.0
41	646+742	HPC	1 x 1.2	-	20.0	7.0
42	647+165	HPC	1 x 1.2	-	20.0	7.0
43	648+932	HPC	1 x 1.2	-	15.0	7.7
44	649+359	HPC	1 x 1.2	-	17.0	7.7
45	649+471	Slab	1 x 2.5	2.0	10.7	6.97
From Km 00+000 (Chotahapjan) to Km 16+900 (Bogapani) of NH-38						
46	0+360	Slab	1 x 1.5	-	12.0	-
47	0+810	Slab	1 x 1.5	-	12.0	-
48	1+578	Slab	1 x 3.0	-	12.0	-
49	1+850	Slab	1 x 1.5	-	12.0	-
50	1+970	Slab	1 x 5.5	-	12.0	-

Sl No	Existing Chainage (km)	Type of Culvert	Span Arrangement/Dia. (m)	Vent Height (m)	Total Width of Structure (m)	Total Roadway Width(m)
51	2+833	Slab	Chocked	-	-	-
52	3+320	Slab	1X0.9	-	11.7	9.8
53	3+479	Slab	1X0.9	-	11.7	9.8
54	3+867	Slab	1X0.8	-	11.7	9.8
55	4+458	Box	1X6.0	-	11.7	9.7
56	4+788	Slab	1X0.9	-	11.7	9.8
57	5+113	Slab	1X0.9	-	11.7	9.7
58	5+745	Slab	1X2.5	-	11.7	9.7
59	5+883	Slab	1X2.5	-	11.7	9.7
60	7+504	Box	1X3.0	-	11.7	9.7
61	8+982	Box	1X1.8	-	11.7	9.7
62	9+219	Slab	1X1.0	-	11.8	9.8
63	9+474	Box	1X2.5	-	11.7	9.7
64	10+374	Box	1X0.9	-	11.7	9.8
65	11+060	Slab	1X0.9	-	12.0	9.8
66	10+824	Box	1X0.9	-	11.7	9.8
67	11+583	Box	1X0.9	-	11.7	9.8
68	11+778	Box	1X1.0	-	11.7	9.7
69	13+180	Slab	1x2.0	-	12.0	9.7
70	13+520	Box	1X1.0	-	11.7	9.7
71	13+810	Slab	1X0.9	-	12.0	9.7
72	14+304	Slab	1X1.5	-	12.0	10
73	16+134	Box	1X2.6	-	11.8	9.7
74	16+336	Box	1X1.0	-	12	10

11. Bus bays

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

S. No.	Chainage (km)	Length (m)	Side
NIL			

12. Truck Lay byes

The details of truck lay byes are as follows:

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

13. Road side drains

The details of the roadside drains are as follows:

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

14. Major junctions

The details of major junctions are as follows:

Sl No.	Existing Chainage (km)	Road Segment	Side	Destination	Surfacing Type	Carriageway Width (m)
NH-37						
1	632+080	NH-37	RHS	Jugipathar Gaon	Bituminous	10.0
2	634+300	NH-37	Both	LHS-Guijan Ghat RHS-DC office, Tinsukia	Bituminous	7.0
3	650+040	NH-37	LHS	Tingari Bongali Gaon	Bituminous	7.0
NH-38						
4	5+000	NH-38	RHS	Makum	Bituminous	7.0
5	15+550	NH-38	LHS	Doom Dooma	Bituminous	7.0

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

15. Minor junctions

The details of the minor junctions are as follows:

Sl. No.	Existing Chainage (km)	Type of Intersection	Type	Side
1	628+200	Minor	3 legged	RHS
2	630+120	Minor	4 legged	Both
3	633+130	Minor	4 legged	Both
4	636+270	Minor	4 legged	Both
5	637+140	Minor	4 legged	Both
6	637+450	Minor	4 legged	Both
7	642+800	Minor	4 legged	Both
8	646+700	Minor	4 legged	Both
9	647+600	Minor	4 legged	Both
NH-38				
10	6+655	Minor	3 legged	Left
11	8+335	Minor	3 legged	Left
12	13+345	Minor	3 legged	Left
13	17+945	Minor	3 legged	Left
14	18+955	Minor	3 legged	Left

16. Bypasses

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

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

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

Sl. No	Chainage (KM)		Length (km)	Total Width (m)	Date of providing Right of Way
	FROM	TO			
(i) Full Right of Way (full width)	626+030 of NH-37	650+450 of NH-37	24.420	45-60	At appointed date
	0+000 of NH-38	2+400 of NH-38	2.400	45	At appointed date
	2+400 of NH-38	16+900 of NH-38	14.500	25m to 30m	At appointed date
(ii) Part Right of Way (part width)			NA		
(a) Stretch					
(b) Stretch					
(c) Stretch					
(iii) Balance Right of Way (width)			NA		
(a) Stretch					
(b) Stretch					
(c) Stretch					

Annex - III

(Schedule-A)

Alignment Plans

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

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

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

(Annexure-IV)
Schedule-A
Utilities

The Site includes the following Utilities:

(i) Electrical utilities

(a) Extra High-tension Lines

(EHT Lines)

Sl no.	Chainage		Length (in Km)				Crossings				
	From	To	400KV	220KV	110KV	66KV	800KV	765KV	400KV	220KV	110KV
-	-	-	-	-	-	-	-	-	-	-	-

(b) High Tension/Low Tension Lines

(HT/LT Lines)

Sl no.	Chainage		Length (in Km)			Crossings			Transformer	
	From	To	33KV	11KV	LT	33KV	11KV	LT	No.	Capacity
NH-37										
1	626+400	627+010			0.56					
2	628+200	628+200						1		
3	629+400	629+400						1		
4	629+620	629+850			0.23					
5	630+280	630+900		0.62	0.62					
6	630+900	631+120		0.22						
7	632+070	632+400		0.33	0.15		1	1		
8	632+570	632+850		0.28						
9	632+860	632+860						1		
10	632+860	633+150		0.27	0.09					
11	633+150	633+150						1		
12	633+150	633+250		0.10	0.10					
13	633+250	633+420		0.17						
14	633+700	634+030		0.33				1		
15	634+030	634+300		0.24	0.24					
16	634+300	634+300				2	2			
17	634+300	634+480		0.36	0.18					
18	634+480	634+760		0.56						

Sl no.	Chainage		Length (in Km)			Crossings			Transformer	
	From	To	33KV	11KV	LT	33KV	11KV	LT	No.	Capacity
19	634+760	634+880		0.12	0.12				*1*	
20	634+880	635+330		0.45						
21	635+330	635+330							1	
22	636+000	636+280			0.28					
23	636+280	636+280							1	
24	636+280	636+700		0.42						
25	636+700	637+000		0.30					*1*	
26	637+000	637+150	0.15	0.15						
27	637+150	637+150				1	1			
28	637+150	637+440	0.29	0.29						
29	637+480	637+580		0.10			1			
30	637+850	637+850				1	1			
31	637+930	637+930					1			
32	640+240	640+370			0.13					
33	640+370	640+530			0.32					
34	640+530	640+810			0.28			1		
35	640+810	640+970		0.16			1		*1*	
36	641+050	641+050					2			
37	641+500	641+500						1		
38	641+530	641+900			0.37					
39	641+930	641+930						1		
40	642+150	642+150					1	1		
41	642+180	642+320		0.28						
42	642+320	642+370			0.05					
43	642+750	642+850		0.05			1	1		
44	644+400	644+700		0.38					1	
45	645+650	645+650			0.03					
46	645+700	645+800			0.06			1		
47	645+880	645+880				1				
48	645+950	646+010			0.06					
49	646+050	646+170		0.09	0.09				1	
50	646+170	646+270		0.10	0.10					
51	646+270	646+270					2			
52	646+270	646+440		0.17					1	
53	646+440	646+550			0.11					
54	646+660	646+660						1		
55	646+700	646+700					1	1		
56	646+700	646+830			0.13					
57	646+960	646+960					1			
58	647+400	647+660								

Sl no.	Chainage		Length (in Km)			Crossings			Transformer	
	From	To	33KV	11KV	LT	33KV	11KV	LT	No.	Capacity
59	647+660	647+820			0.10					
60	648+050	648+050					1			
61	648+780	648+930		0.15				1		
62	648+930	649+580		0.65					*1*	
63	649+580	650+050		0.47	0.56					
NH-38										
1	0+000	0+300		0.30						
2	1+980	2+230		0.25		1				
3	2+230	2+500		0.47						
4	12+100	12+450		0.70	0.43					
5	12+450	12+800		0.70	0.55				*1*	
6	16+500	16+900		0.40	0.05					

(ii) Public Health utilities (Water/Sewage Pipe lines):

Sl no.	Chainage		Length (in Km)				Crossings			
			Water Supply Line		Sewage Line		Water Supply Line		Sewage Line	
	From	To	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow
NH-37										
1	626+030	650+450	-	350	-	-	-	1	-	-
NH-38										
2	0+000	16+900	-	-	-	-	-	-	-	-

Annex – V

(Schedule-A)

Environment Clearances

The following environment clearances have been obtained:

Environment Clearances is not applicable for the project

The following environment clearances are awaited:

-NIL-

Schedule - B

(See Clause 2.1)

Development of the Project Highway

1. Development of the Project Highway

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

2. Rehabilitation and augmentation

Rehabilitation and augmentation shall include four lane at grade improvement 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 Project highway

Description of the Project Highway shall be given by the Authority in detail together with explanatory drawings (where necessary) to explain the Authority's requirements precisely in order to avoid subsequent changes in the Scope of the Project. The particulars that must be specified in this Schedule-B are listed below as per the requirements of the Manual of Specifications and Standards for Four Laning of Highways (IRC: SP: 84-2019) and for two Lanning of Highways (IRC: SP: 73-2018), referred to as the Manual. If any standards, specifications or details are not given in the Manual, the minimum design/construction requirements shall be specified in this Schedule. In addition to these particulars, all other essential project specific details, as required, should be provided in order to define the Scope of the Project clearly and precisely.

1. Widening of the Existing Highway

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

(ii) Width of Carriageway

(a) In rural areas, at grade four-Laning with paved shoulders for NH-37 and Two -Laning with paved shoulders for NH-38 shall be undertaken. The paved carriageway shall be 7(seven) m for NH-37 and 3.5m for NH-38 (excluding paved shoulder and kerb shyness) wide on either side in accordance with the typical cross section's drawings in the Manual.

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

Sl. No.	Built-up stretch	Location (km to km)	Width(m)	Typical cross section

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

Sl. No.	Built-up stretch	Location (km to km)	Width(m)
1	Tingrai	Km 12+000 to Km 13+0000	10m paved C/W with 1.5 both side RCC covered Drain cum footpath

2. Geometric Design and General Features

(i) General

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

(ii) Design speed

The design speed shall be the minimum design speed of 80 kmph for Plain/ Rolling terrain..

(iii) Improvement of the existing road geometrics

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

Details of Proposed Bypasses:

Sl. No.	Design Ch.(km)		Length (m)	Remarks
	From	To		
NIL				

Details of Realignments:

Sl.no.	From	To	Length	TCS	Description
1	631500	631963	463	5	TYPICAL CROSS SECTION OF 4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN APPROACH OF VUP WITH BOTH SIDE SLIP ROAD
2	631963	631988	25	Str	VUP
3	631988	632430	443	5	TYPICAL CROSS SECTION OF 4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN APPROACH OF VUP WITH BOTH SIDE SLIP ROAD

(iv) Right of Way

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

(v) Type of shoulders

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

Sl. NO	Stretch		Length (km)	Width (m)		Reamarks
	From (km)	To (km)		Paved shoulder	RCC Covered Drain cumFootpath	
1	12+000	13+000	1.000	1.5m (on either side)	1.5m (on either side)	Tingrai Built-up

Note: At Tingrai Built-up portion of NH-38 existing road profile to be raised and both side RCC covered Drain to be provided for proper Drainage.

(b) In open country area, 2.5 m width paved shoulder on either side and 1.5m width Earthen shoulder has been proposed in TCS-1A, 1B, 2A, 2B,6

(c) In open country area, 1.5 m width paved shoulder on either side and 1.0m width Earthen shoulder has been proposed in TCS-3

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

(vi) Lateral and vertical clearances at underpasses

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

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

Sl. No	Design Chainage (km)	Type	Lateral clearance (m)	Minimum vertical clearance (m)
1	631+975	VUP	25	5.5
2	634+406	VUP	30	5.5

(vii) Lateral and vertical clearances at overpasses

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

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

Sl. No	Design Chainage (km)	Type	Lateral clearance (m)	Minimum vertical clearance (m)
Nil				

(viii) Service roads/Slip road

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

Design Chainage (km)		Length (m)	TCS
From	To		
631500	631963	925	5
631988	632430	885	5
633990	634390	800	5
634420	634820	800	5
648090	648552	462	4B
Total Length (including Both sides)		**3872**	

(ix) Grade separated structures

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

Sl No.	Type of Underpasses	Design Chainage (km)	Span Arrangement (Nos. x Length in m)	Total Length (m)	Overall Width (m)	Structure Type
1	VUP	631+975	1 x 25.0	25.0	2 x 15.1	RCC I-Girder
2	VUP	634+406	1 x 30.0	30.0	2 x 15.1	PSC I-Girder

(x) Cattle and pedestrian underpass/overpass

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

Sl. No.	Location	Type of crossing
NIL		

(xi) Typical cross-sections of the Project Highway

Typical cross section details are given below:

Sl No	Design Chainage		Length (m)	TCS Type	Widening Side	Description
	From	To				
1	626030	626200	170	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)

Sl No	Design Chainage		Length (m)	TCS Type	Widening Side	Description
	From	To				
2	626200	627230	1030	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
3	627230	627330	100	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
4	627330	629460	2130	2A	LHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
5	629460	629530	70	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
6	629530	629980	450	2A	LHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
7	629980	630040	60	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
8	630040	631500	1460	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
9	631500	631963	463	5	Realignment	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN APPROACH OF VUP WITH

Sl No	Design Chainage		Length (m)	TCS Type	Widening Side	Description
	From	To				
						BOTH SIDE SLIP ROAD
10	631963	631988	25	Str		VUP
11	631988	632430	443	5	Realignment	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN APPROACH OF VUP WITH BOTH SIDE SLIP ROAD
12	632430	632585	155	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
13	632585	632592	7	Str	MNB	MNB
14	632592	632690	98	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
15	632690	632790	100	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
16	632790	633450	660	2A	LHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
17	633450	633790	340	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
18	633790	633840	50	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC

Sl No	Design Chainage		Length (m)	TCS Type	Widening Side	Description
	From	To				
						WIDENING)
19	633840	633990	150	2A	LHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
20	633990	634390	400	5		4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN APPROACH OF VUP WITH BOTH SIDE SLIP ROAD
21	634390	634420	30	STR		VUP
22	634420	634820	400	5		4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN APPROACH OF VUP WITH BOTH SIDE SLIP ROAD
23	634820	635020	200	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
24	635020	635290	270	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
25	635290	636990	1700	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
26	636990	637760	770	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)

Sl No	Design Chainage		Length (m)	TCS Type	Widening Side	Description
	From	To				
27	637760	639460	1700	2A	LHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
28	639460	639570	110	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
29	639570	639710	140	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
30	639710	639830	120	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
31	639830	640480	650	2A	LHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
32	640480	640540	60	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
33	640540	641050	510	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
34	641050	641260	210	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC

Sl No	Design Chainage		Length (m)	TCS Type	Widening Side	Description
	From	To				
						WIDENING)
35	641260	643240	1980	2A	LHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
36	643240	643470	230	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
37	643470	646320	2850	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
38	646320	646440	120	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
39	646440	646970	530	2A	LHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
40	646970	647070	100	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
41	647070	648090	1020	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)

Sl No	Design Chainage		Length (m)	TCS Type	Widening Side	Description
	From	To				
42	648090	648552	462	4B		4-LANE DIVIDED CARRIAGEWAY AT ROB APPROACHES WITH SLIP ROAD AND RE WALL ON BOTH SIDES
43	648552	648591	39	STR		ROB
44	648591	649040	449	4C		4-LANE DIVIDED CARRIAGEWAY AT ROB APPROACHES WITHOUT SLIP ROAD
45	649040	649190	150	2A	RHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
46	649190	649540	350	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
47	649540	649870	330	2A	LHS	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (ECCENTRIC WIDENING)
48	649870	650450	580	2B	Both	4-LANE DIVIDED CARRIAGEWAY WITH 1.5M WIDE RAISED MEDIAN IN RURAL AREA (CONCENTRIC WIDENING)
NH-38 Part						
Sl No	**Design Chainage**		**Length (m)**	**TCS Type**	**Widening**	**Description**
	From	**To**				
1	0	6281	6281	3	Concentric	Typical Cross-section of 2-lane Carriageway in rural Area
2	6281	6289	8	Str	Retain and Repair	MNB
3	6289	12000	5711	3	Concentric	Typical Cross-section of 2-lane Carriageway in rural Area

Sl No	Design Chainage		Length (m)	TCS Type	Widening Side	Description
	From	To				
4	12000	13000	1000	3A	Concentric	Bulit-up area with Both side RCC Covered drain cum footpath
5	13000	16900	3900	3	Concentric	Typical Cross-section of 2-lane Carriageway in rural Area

Refer to Typical cross section drawing in Annexure III of schedule A

3. Intersections and Grade Separators

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

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

(i) At-gradeintersections
Properly designed at grade intersectionsi.e major and minor intersection shall be provided at the locations and of the features given in the table below:

Major Junctions List:

Sl No.	Design Chainage (km)	Road Segment	Side	Destination	Surfacing Type	Carriageway Width (m)
NH-37						
1	632+080	NH-37	RHS	Jugipathar Gaon	Bituminous	10.0
2	634+300	NH-37	Both	LHS-Guijan Ghat RHS-DC office, Tinsukia	Bituminous	7.0
3	650+040	NH-37	LHS	Tingari Bongali Gaon	Bituminous	7.0
NH-38						
4	2+400	NH-38	RHS	Makum	Bituminous	7.0
5	15+550	NH-38	LHS	Doom Dooma	Bituminous	7.0

Minor Junctions List:

Sl. No.	Design Chainage (km)	Type of Intersection	Type	Side
NH-37				
1	628+200	Minor	3 legged	RHS
2	630+120	Minor	4 legged	Both
3	633+130	Minor	4 legged	Both
4	636+270	Minor	4 legged	Both

5	637+140	Minor	4 legged	Both
6	637+450	Minor	4 legged	Both
7	642+800	Minor	4 legged	Both
8	646+700	Minor	4 legged	Both
9	647+600	Minor	4 legged	Both
NH-38				
10	6+655	Minor	3 legged	Left
11	8+335	Minor	3 legged	Left
12	13+345	Minor	3 legged	Left
13	17+945	Minor	3 legged	Left
14	18+955	Minor	3 legged	Left

Note: In case any additional junction is identified during construction period, the same shall be improved as per manual and will not qualify for Change of Scope. The EPC contractor shall develop the junctions to the maximum possible extent, upto the satisfaction of AE, within the provided land only.

(ii) Grade separated intersection with/with out ramps

Sl No.	Type of Intersection	Design Chainage (km)	Span Arrangement (Nos. x Length in m)	Total Length (m)	Overall Width (m)	Structure Type
Nil						

4. Road Embankment and Cut Section

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

(ii) Raising of the existing road as per Section 4 of the Manual
The existing road shall be raised in the following sections:

Sl. No.	Section (from km to km)	Length (km)	Extent of raising
1	Km 12+000 to Km 13+000 of NH-38 (Tingrai Built-Up)	1.000	0.6m from Existing Road level

5. Pavement Design

(i) Pavement design shall be carried out in accordance with the provision of section 5 of the Manual.

(ii) Type of pavement

Flexible pavement shall be proposed at the entire project road.

(iii) Design requirements

Design of new pavement has been carried out based on IRC: 37-2018 "Guidelines for the design of Flexible Pavements"

(a) Design Period and strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 15 years. Stage construction shall not be permitted.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for minimum design traffic of 31 msa for NH-37 and 24 msa for NH-38. However, in case the traffic is more at the time of design of project highway, then the higher design traffic will be adopted for pavement design.

Service Roads/ Slip Roads shall be designed for 10 msa design traffic.

(c) Design Subgrade CBR

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for minimum subgrade CBR of 8%.

(iv) Reconstruction of stretches

Contractor shall investigate the existing pavement and finalize the reconstruction stretch in consultation with Authority's Engineer.
Those shall be designed as new pavement.

(v) Overlay stretches

Contractor shall investigate the existing pavement and finalize the overlay stretch in consultation with Authority's Engineer. However, the overlay thickness will not be less than 30mm BC &50mm DBM.

6. Roadside Drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per section 6 of the manual and as per cross section schedule provided as Annexure -I to this schedule.

- Unlined trapezoidal drain needs to be provided at both side in rural area with a minimum length of 77639m.

- RCC Covered drain needs to be provided at both side in built-up area, approach and major junctions location with a minimum length of 7334m.

Note: The length of drains as specified above is indicative. In case any additional length is identified during construction period, the same shall be improved as per manual and will not qualify for Change of Scope.
The EPC Contractor shall ensure proper functioning of road side drain & median drain at super elevation locationby designing them as per site condition and considering the outfall location.

7. Design of Structures

(i) General

(a) All Grade separator, Bridges, culverts and structures shall be designed and constructed in accordance with the section 7 of the Manual and shall conform to the cross- sectional features and other details specifiedtherein.

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

Sl No	Design Chainage (km)	Proposed Span Arrang (No. of Span x Span length in m)	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
NIL							

Width of the carriageway of new grade separator structure shall be asfollows:

Sl No.	Type of Underpasses	Design Chainage (km)	Span Arrangement (Nos. x Length in m)	Total Length (m)	Overall Width (m)	Structure Type
1	VUP	631+975	1 x 25.0	25.0	2 x 15.1	RCC I-Girder
2	VUP	634+406	1 x 30.0	30.0	2 x 15.1	PSC I-Girder

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

Sl N-o.	Design Chainage (km)	Remarks
1	632+679	MNB, Footpath on both sides

(d) All bridges shall be high-level bridges

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

Sl. No.	Bridge at km	Utility service to be carried	Remarks
NH-37			
1	632+679	-	-
NH-38			
3	6+285	-	-

(f) Cross-section of the new culverts for the Project Highway shall conform to the typical cross-sections given in the section 7 of the Manual.

(ii) Culverts

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

(b) Reconstruction of existingculverts:

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

Sl. No.	Design Chainage (km)	Type of Existing Culvert	Existing Span Arrangement /Dia. (m)	Type of Proposed Culvert	Proposed Span Arrangement (m)	Improvement Proposal	Remarks
From Km 626+030 (near Nalani Hulla village) to Km 650+546 (Chotahapjan) (4Lane Section)							
1	643+431	HPC	1 x 1.2	HP Culvert	1 x 1.2	Reconstruction	-
From Km 00+000 (Chotahapjan) to Km 16+900 (Bogapani) (2Lane Section)							
2	2+833	Slab	-	Box Culvert	1x2.0x2.0	Reconstruction	Choked
3	3+320	Slab	1X0.9	Box Culvert	1x2.0x2.0	Reconstruction	-
4	3+479	Slab	1X0.9	Box Culvert	1x2.0x2.0	Reconstruction	-
5	3+867	Slab	1X0.8	Box Culvert	1x2.0x2.0	Reconstruction	-
6	4+788	Slab	1X0.9	Box Culvert	1x2.0x2.0	Reconstruction	-
7	5+113	Slab	1X0.9	Box Culvert	1x2.0x2.0	Reconstruction	-
8	8+982	Slab	1X1.8	Box Culvert	1x2.0x2.0	Reconstruction	-
9	9+219	Slab	1X1.0	Box Culvert	1x2.0x2.0	Reconstruction	-
10	9+474	Box	1X2.5	Box Culvert	1x3.0x2.0	Reconstruction	-
11	10+374	Box	1X0.9	Box Culvert	1x2.0x2.0	Reconstruction	-
12	10+824	Box	1X0.9	Box Culvert	1x2.0x2.0	Reconstruction	-
13	11+060	Slab	1X0.9	Box Culvert	1x2.0x2.0	Reconstruction	-
14	11+583	Box	1X0.9	Box Culvert	1x2.0x2.0	Reconstruction	-
15	11+778	Box	1X1.0	Box Culvert	1x2.0x2.0	Reconstruction	-
16	13+520	Box	1X1.0	Box Culvert	1x2.0x2.0	Reconstruction	-
17	13+810	Slab	1X0.9	Box Culvert	1x2.0x2.0	Reconstruction	-
18	16+336	Box	1X1.0	Box Culvert	1x2.0x2.0	Reconstruction	-

Note: The span and opening of these culverts as specified are indicative. The design of waterway has to be done considering the site requirements. Change in this configuration **shall not attract provisions of "change of scope" article of this Agreement**

(c) Widening of existing culverts:

All existing culverts which are not to be reconstructed shall be widened tothe roadway width of the Project Highway as per the typical cross section given in the section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

Sl No	Design Ch. (KM)	Type of Ex. Culvert	Ex. Span Arrangement /Dia. (m)	Type of Prop. Culvert	Prop. Span Arrangement /dia (m)	Improvement Proposal
From Km 626+030 (near Nalani Hulla village) to Km 650+546 (Chotahapjan) (4Lane Section)						
1	626+253	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
2	626+421	Slab	1 x 1.8	Box Culvert	1 x 1.8 x 2.5	Ext.Retain+New 2Lane
3	626+487	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
4	626+852	Slab	1 x 2.5	Box Culvert	1 x 2.5 x 2.3	Ext.Retain+New 2Lane
5	627+825	Slab	1 x 3.0	Box Culvert	1 x 3.0 x 2.3	Ext.Retain+New 2Lane
6	629+125	Slab	1 x 2.0	Box Culvert	1 x 2.0 x 2.3	Ext.Retain+New 2Lane
7	629+535	Slab	1 x 5.0	Box Culvert	1 x 5.0 x 3	Ext.Retain+New 2Lane
8	630+130	Slab	1 x 1.5	Box Culvert	1 x 1.5 x 2.3	Ext.Retain+New 2Lane
9	630+884	Slab	1 x 3.0	Box Culvert	1 x 3.0 x 2.2	Ext.Retain+New 2Lane
10	631+830	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
11	632+314	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
12	633+378	Slab	1 x 4.0	Box Culvert	1 x 4.0 x 2.5	Ext.Retain+New 2Lane
13	634+597	Slab	1 x 5.0	Box Culvert	1 x 5.0 x 3	Ext.Retain+New 2Lane
14	634+986	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
15	636+054	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
16	636+180	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
17	637+476	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
18	637+670	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
19	637+856	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
20	638+042	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
21	638+419	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
22	638+591	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
23	638+840	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
24	639+132	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
25	639+286	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
26	639+346	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
27	639+585	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
28	639+691	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane

29	640+039	Slab	1 x 5.0	Box Culvert	1 x 5.0 x 3	Ext.Retain+New 2Lane
30	640+180	Slab	1 x 5.0	Box Culvert	1 x 5.0 x 3	Ext.Retain+New 2Lane
31	640+577	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
32	641+281	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
33	642+091	Slab	1 x 5.0	Box Culvert	1 x 5.0 x 3	Ext.Retain+New 2Lane
34	642+216	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
35	642+721	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New2Lane
36	642+991	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
37	646+103	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
38	646+305	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
39	646+736	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
40	646+833	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
41	647+265	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
42	649+023	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
43	649+450	HPC	1 x 1.2	HP Culvert	1 x 1.2	Ext.Retain+New 2Lane
44	649+562	Slab	1 x 2.5	Box Culvert	1 x 2.5 x 2	Ext.Retain+New 2Lane
From Km 00+ 000 (Chotahapjan) to Km 16+900 (Bogapani) (2Lane Section)						
45	1+850	Slab	1 x 1.5	Box Culvert	1 x 1.5 x 2.0	Retain & widen
46	1+970	Slab	1 x 5.5	Box Culvert	1 x 5.5 x 3.0	Retain & widen

Note: The span and opening of these culverts as specified are indicative. The design of waterway has to be done considering the site requirements. Change in this configuration **shall not attract provisions of "change of scope" article of this Agreement**

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

Sl. No.	Design Chainage (km)	Type of Proposed Culvert	Proposed Span Arrangement/dia (m)	Improvement Proposal
From Km 626+030 (near Nalani Hulla village) to Km 650+546 (Chotahapjan) (4Lane Section)				
1	627+100	HP Culvert	1 x 1.2	New construction
2	627+302	Box Culvert	1 x 2.5 x 2.5	New construction
3	627+540	HP Culvert	1 x 1.2	New construction
4	628+090	HP Culvert	1 x 1.2	New construction
5	628+475	Box Culvert	1 x 2.5 x 2.5	New construction
6	628+750	HP Culvert	1 x 1.2	New construction
7	631+220	HP Culvert	1 x 1.2	New construction
8	631+500	HP Culvert	1 x 1.2	New construction
9	633+001	Box Culvert	1 x 2.5 x 2.5	New construction
10	633+761	HP Culvert	1 x 1.2	New construction
11	634+028	Box Culvert	1 x 2.5 x 2.5	New construction
12	635+536	Box Culvert	1 x 2.5 x 2.5	New construction

13	636+481	HP Culvert	1 x 1.2	New construction
14	636+830	Box Culvert	1 x 2.5 x 2.5	New construction
15	640+921	HP Culvert	1 x 1.2	New construction
16	641+541	HP Culvert	1 x 1.2	New construction
17	641+779	HP Culvert	1 x 1.2	New construction
18	643+591	HP Culvert	1 x 1.2	New construction
19	643+981	Box Culvert	1 x 2.5 x 2.5	New construction
20	644+291	Box Culvert	1 x 2.0 x 2.0	New construction
21	644+531	Box Culvert	1 x 2.5 x 2.5	New construction
22	644+641	HP Culvert	1 x 1.2	New construction
23	644+981	HP Culvert	1 x 1.2	New construction
24	645+081	Box Culvert	1 x 2.5 x 2.5	New construction
25	645+411	HP Culvert	1 x 1.2	New construction
26	645+631	Box Culvert	1 x 2.5 x 2.5	New construction
27	645+961	HP Culvert	1 x 1.2	New construction
28	646+561	HP Culvert	1 x 1.2	New construction
29	647+051	HP Culvert	1 x 1.2	New construction
30	647+421	HP Culvert	1 x 1.2	New construction
31	647+806	Box Culvert	1 x 2.5 x 2.5	New construction
32	648+356	Box Culvert	1 x 2.5 x 2.5	New construction
From Km 00+000 (Chotahapjan) to Km 16+900 (Bogapani) (2Lane Section)				
33	2+520	Box Culvert	1x2.0x2.0	New construction
34	6+500	HP Culvert	1x1.2	New construction
35	6+836	Box Culvert	1x2.0x2.0	New construction
36	7+954	Box Culvert	1x2.0x2.0	New construction
37	8+404	Box Culvert	1x2.0x2.0	New construction
38	9+924	Box Culvert	1x2.0x2.0	New construction
39	11+990	Box Culvert	1x2.0x2.0	New construction
40	12+340	Box Culvert	1x2.0x2.0	New construction
41	12+690	Box Culvert	1x2.0x2.0	New construction
42	13+040	Box Culvert	1x2.0x2.0	New construction
43	14+754	Box Culvert	1x2.0x2.0	New construction
44	15+204	Box Culvert	1x2.0x2.0	New construction
45	15+654	Box Culvert	1x2.0x2.0	New construction

Note: The span and opening of these culverts as specified are indicative. The design of waterway has to be done considering the site requirements. Change in this configuration **shall not attract provisions of "change of scope" article of this Agreement**

(e) The existing culverts at the following locations shall be retained as per the table below:

Sl. No.	**Design Chainage (km)**	**Type of Culvert**	**Span Arrangement (m)**	**Remarks**

Sl. No.	Design Chainage (km)	Type of Culvert	Span Arrangement (m)	Remarks
From Km 626+030 (near Nalani Hulla village) to Km 650+546 (Chotahapjan) (4Lane Section)				
Nil				
From Km 00+000 (Chotahapjan) to Km 16+900 (Bogapani) (2Lane Section)				
1	0+360	Slab Culvert	1x1.5	Retain
2	0+810	Slab Culvert	1x1.5	Retain
3	1+578	Slab Culvert	1x3.0	Retain
4	4+458	Box Culvert	1X6.0	Retain
5	5+745	Slab Culvert	1X2.5	Retain
6	5+883	Slab Culvert	1X2.5	Retain
7	7+504	Box Culvert	1X3.0	Retain
8	13+180	Slab Culvert	1x2.0	Retain
9	14+304	Slab Culvert	1X1.5	Retain
10	16+134	Box Culvert	1X2.6	Retain

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

Sl. No.	Location at km	Type of repair required
1	Locations as mentioned in Para 7 ii-(c), above.	All necessary repairs as per Manual

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

(iii) Bridges:

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

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

Sl No	Design Chainage (km)	Proposed Span Arrang (No. of Span x Span length in m)	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
NIL							

Note: The span and opening of these bridges as specified are indicative. The design of waterway has to be done considering the site requirements. Change in this configuration **shall not attract provisions of "change of scope" article of this Agreement.**

(ii) The following narrow bridges shall be widened:

Sl No	Design Chainage (km)	Proposed Span Arrang (No. of Span x Span length in m)	Proposed Category	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
NH-37								
1	632+679	1 x 7.0 x 4.0	MNB	7.0	2 x 13.5	RCC Box	Retain + New 2Lane	Existing retained and widened

Note: The span and opening of these bridges as specified are indicative. The design of waterway has to be done considering the site requirements. **Change in this configuration shall not attract provisions of "change of scope" article of this Agreement.**

(iii) The following existing bridges shall be retained& repaired:

Sl No	Design Chainage (km)	Span Arrang. (No. of Span x Span length in m)	Category	Total Length (m)	Width of structure (m)	Type of Superstructure	Improvement Proposal	Remarks
NH-38								
1	6+285	1 x 7.6	MNB	7.6	1x11.7	RCC Slab	Repair & rehabilitation	Ext. Retain (2Lane structure)

(b) Additional new bridges:

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

Sl No	Design Chainage (km)	Proposed Span Arrang (No. of Span x Span length in m)	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
NIL							

Note: The span and opening of these bridges as specified are indicative. The design of waterway has to be done considering the site requirements. Change in this configuration shall not attract provisions of "change of scope" article of this Agreement.

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

Sl No	Design Chainage (km)	Proposed Span Arrang (No. of Span x Span length in m)	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
NIL							

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

Sl No	Design Chainage (km)	Proposed Span Arrang (No. of Span x Span length in m)	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
NIL							

(e) Drainage system for bridgedecks

An effective drainage system for bridge decks shall be provided as specified in section 7 of the Manual

(f) Structures in marineenvironment

NIL

(iv) Rail-roadbridges:

(a) Design, construction and detailing of ROB/RUB shall be as specified in the provision of Manual.

(b) Roadover-bridges

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

Sl. No.	Location of ROB (Chainage km)	Length of bridge (m)	Span Arrangement (m)	Proposed Width (m)	Remarks
1	**648+588 of NH-37**	**45.0**	**1 x 20 + 1 x 25**	**Existing Retain + 1 x15.3**	**GAD has been approved from NFR**

(c) Road under-bridges

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

Sl.	Location of Level crossing (Chainage	Number and length of
NIL		

(v) Grade separated structures

Design of grade separator shall be as per section 7 of the manual. Locations and type of the grade separated structures specified in paragraphs 2 (ix).

(vi) Repairs and strengthening of bridges andstructures

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

(a) Bridges

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

(b) ROB /RUB

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

(c) Overpasses/Underpasses and otherstructures

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

(vii) List of Major Bridges and Structures

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

Sl no.	Design Chainage (km)	Proposed Span Arrang (No. of Span x Span length in m)	Proposed Category	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure
NIL						

8. Traffic Control Devices and Road Safety Works

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

(ii) Specificationsofthereflectivesheeting should be of high intensity grade with encapsulated lens or with micro prismatic retro reflective element in accordance with ASTM Standard D 4956 – 04.

9. Road side Furniture

(i) Roadside furniture shall be provided in accordance with the provision of section 9 of the Manual.

(ii) Overhead traffic signs:

Minimum 6 nos. overhead traffic signs shall be provided for the project stretch.

Note: The exact location of Signs and size shall be finalized as per provisions in Manual and as per site conditions.

10. Compulsory Afforestation

Compulsory afforestation should be as per section 11 of the manual

11. Hazardous Locations

Metal Beam Crash Barrier:
Metal Beam Crash Barrier need to be provided as per site requirement with a minimum length of 11756 m

Note: The length of crash barrier is indicative. In case any additional length is identified during construction period, the same shall be improved as per manual and will not qualify for Change of Scope

12. Special Requirement for Hill Roads

NA

13. Special Requirement for High Embankment Zone

Toe Wall:
Toe wall need to be provided at high embankment location with a minimum length of 19500 m to restrict the embankment toe with in the available ROW.

Note: The lengths of these protection works are indicative. In case any additional length is identified during construction period, the same shall be improved as per manual and will not qualify for Change of Scope

14. Utilities

A minimum 2m wide strip of land at the extreme edge of ROW shall be kept for accommodating utilities.

Utility duct shall be provided as per Schedule –C.

15. Change of Scope

The length of Structures and bridges specified hereinabove 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 undertaken in accordance with the provisions of Article 13.

(Schedule B-1)

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

Sr. No	Type of Utility	Unit	Quantity
A			
A1	33 KV (HT) Pole	Nos.	498
A2	LT Pole	Nos.	
A3	11 KV Pole	Nos.	
A4	Transformers	Nos.	10
B			
B1	Water Pipe Line	meters	350
C	***Felling of Tress***	***Nos.***	***152***

Sheet-I (Annexure-I to Sch-B1)

Utility Shifting

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

Notes:

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

(b) The supervision charges at the rates/charges applicable of the Utility Owning

Department shall be paid directly by the Authority to the Utility owning Department as and when Contractor / Concessionaire furnishes demand of Utility Owning Department along with a copy of estimates cost given by the utility owning agencies.

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

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

Note II: - Copy of Utility shifting plans enclosed as Annexure II to Schedule-B1

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;

(b) Road side furniture;

(c) Street lighting;

(d) Pedestrian facilities;

(e) Tree plantation;

(f) Trucklay-byes;

(g) bus-bays and bus shelters;

(h) rest areas; and

(i) others to be specified

2. Description of Project Facilities

Each of the Project Facilities is described below:

(a) Toll Plaza

Toll plaza shall be designed as per the guidelines of the manual and it is provided at following locations: -

Sl. No.	Location(Design km)
Nil	

(b) Road side Furniture

The roadside furniture shall include the provision of the;

i. Traffic Signs

Traffic signs include roadside signs, overhead signs, curb mounted signs etc. provided for the entire Project Highway as per Manual.

ii. Pavement Markings

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

iii. LED Traffic Blinkers

LED Traffic Blinker signal provided for entire project as per Manual.

iv. Delineators

Delineators for the entire Project Highway at the locations as suggested in IRC Manual.

v. Boundary stones

For the entire Project Highway as suggested in relevant IRC Manual.

vi. Hectometer / Kilometer stones

For the entire Project Highway as suggested in relevant IRC Manual.

(c) Street Lighting

Lighting shall be provided at the following locations:

i. Lighting shall be provided at bus stops, and as per manual recommended in Schedule D.

ii. High Mast Lighting shall be provided at Major Junction,

The EPC Contractor will obtain all permissions / load sanctions / power supply, etc. from the Electricity Authorities. The Contractor shall be solely responsible for submission of application along with all necessary documents to supply authority. Further the Contractor shall be responsible for follow up of the application and getting the release of the supply to lighting. All statutory approvals / permissions have to be obtained by the Contractor for energizing / operating the lights.

(d) Pedestrian facilities;

Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with NHIDCL and as per manual

(e) Tree plantation;

Landscaping and Tree plantation shall be provided. The location for these provisions shall be finalized in consultation with Independent Engineer

(f) Truck lay-byes;

Truck lay bays shall be provided at locations given below:

Sl no.	Design Chainage(km)	Side
	1 No	Both Sides

(g) bus-bays and bus shelters;

Bus bays shall be provided at locations given below:

Sl. No.	Design Chainages (km)	Side
NH-37		
1	631+600 (631+900)	Both
2	636+900	LHS
3	637+300 (637+700)	RHS
4	647+400 (646+700)	Both
NH-38		
1	2+000	LHS
2	2+100	RHS
3	12+200	RHS
4	12+700	LHS

In case during the execution of the project, Bus-bays at any other location is required to be provided, the same shall not considered as change of scope. Further, the above locations are indicative and shall be finalized with Authority's Engineer.

(h) Rest Areas

NIL

(i) Utilities

Provision of accommodating utilities shall be made within utility corridor on either side of Project Highway. At an interval of 0.5 Km, utility ducts in form of NP-4 Hume Pipe shall be provided across the Project Highway and along with inspection chamber as per IRC: SP: 84-2019 requirements. Location & diameter for such utility crossing shall be finalized in consultation with Authority Engineer & concerned Utility Agency.

Schedule - D

(See Clause 2.1)

Specifications and Standards

1. Construction

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

2. Design Standards

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

Manual of Specifications and Standards for FourLaning of Highways (IRC: SP: 84 2019), referred to herein as the Manual

Annex – I

(Schedule-D)

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Four-Laning of Highways (IRC: SP:84-2019), referred to as the Manual, and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority'sEngineer.

2. Deviations from the Specifications and Standards

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

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

Sl no.	Clause Referred in Manual	Item	Provision as per Manual	Modified provision	Remarks
1	2.6	Shoulders	Table 2.2 of IRC: SP:73-2018	Width of paved shoulder in rural area is 1.5 m and earthen shoulder in rural area is 1.0m on either side	
1	2.5	Median	Table 2.2 of IRC: SP:84-2019	Width of median in rural area is 1.5 m (Excluding 0.5 m kerb shyness on either side)	
2	2.2	Design Speed	Table 2.1 of IRC: SP:84-2019	Design speed is restricted at stretches mentioned in Table D1.	

Table D1: Speed Restricted Stretches

Element ID	Circular Details				Transition Details				Speed (Kmph)
	Start Chainage	End Chainage	Radius (m)	Direction	Start Chainage	L1	L2	End Chainage	
NH-37									
1	630+780.252	630+821.906	300	Right	630+705.252	75	75	630+896.906	80
2	630+987.959	631+003.914	400	Left	630+912.959	75	75	631+078.914	80
3	631+252.732	631+304.676	300	Left	631+177.732	75	75	631+379.676	80
4	631+804.882	632+178.574	300	Left	631+729.882	75	75	632+253.574	80
5	633+221.776	633+229.263	300	Right	633+146.776	75	75	633+304.263	80
6	633+429.671	633+450.201	400	Right	633+354.671	75	75	633+525.201	80
7	640+462.566	640+524.746	300	Right	640+387.566	75	75	640+599.746	80
8	643+115.586	643+343.218	300	Left	643+040.586	75	75	643+418.218	80
9	643+495.071	643+562.569	320	Left	643+420.071	75	75	643+637.569	80
NH-38									
10	2+301.875	2+442.211	300	Left	2+226.875	75	75	2+517.211	80
11	13+401.920	13+416.072	500	Left	13+356.920	45	45	13+461.072	80
12	13+557.696	13+614.407	400	Right	13+502.696	55	55	13+669.407	80
13	15+254.773	15+411.889	400	Right	15+199.773	55	55	15+466.889	80

SCHEDULE - E

(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

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

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

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

2 Repair/rectification of Defects and deficiencies

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

3 Other Defects and deficiencies

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

4 Extension of time limit

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

5 Emergency repairs/restoration

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

6 Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

All damages occurring to the Project Highway on account of a Force Majeure Event or 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	Performacne Parameter	Level ofService (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approaches	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 limitof 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% ofarea	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

AssetType	PerformancePar ameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	MaintenanceSpecifications
		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	MaintenanceSpecifications
		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 ofslab	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 morejoints**	w = width of crack L = length of crack d = depth of crack D = depth ofslab	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 > 1m. 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 reconstructaffected. 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 befull 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 ofslab	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, ifL > l m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair withstapling.
			4	w = 6.0 - 12.0 mm, usually associated withspalling	Not Applicable, as it may be full depth	Within 15 days
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as pernorms 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 morejoints**	**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 3pieces		
			5	w > 6 mm and/or panelbroken		

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 withepoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one cornerbroken		
			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 reconstructthe

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 fulldepth	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. Within30days
			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	**RavellingorHoneycomb 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 ifaffecting. 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 patchtest	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 continuou stretch of minimum 5 km. Within 30 days	
10	**Popout (Small Hole), Pothole Refer Para 8.4**	n = number/m^2 d = diameter h = maximumdepth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d=50-100mm;h<50mm;n<1 per 5 m^2	Partial depth repair 65 mm deep.	
			2	d=50-100mm;h>50mm;n<1 per 5 m^2	Within 15 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
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5m^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 5m^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 crackedportion.	
			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 diamondgrinding	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 groutingand raising sunken slab	
14	**Blowup or Buckling**	h = vertical displacement from normalprofile	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 morepieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos<20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstate pavement at normal level	

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

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

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

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

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="3">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="5">Highway</td><td rowspan="5">Availability of Safe Sight Distance</td><td colspan="3">As per IRC SP : 84-2014, a minimum of safe stopping sight distance shall be available throughout.</td><td rowspan="5">Monthly</td><td rowspan="5">Manual Measurements with Odometer along with video/ image backup</td><td rowspan="5" 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 rowspan="5">IRC:SP 84-2019</td></tr>
<tr><td>Design Speed, kmph</td><td>Desirable Minimum Sight Distance (m)</td><td>Safe Stopping Sight Distance (m)</td></tr>
<tr><td>100</td><td>360</td><td>180</td></tr>
<tr><td>80</td><td>260</td><td>130</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td colspan="3"><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2months</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 Performancefor Dry Retro reflectivity during night time:</u>
<table>
<tr><th>Design Speed</th><th colspan="2">(RL) Retro Reflectivity (mcd/m²/lux)</th></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<tr><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td>65 - 100</td><td>250</td><td>120</td></tr>
<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/m²/lux Minimum Threshold Level: 50 mcd/m²/lux					
	Skid Resistance	Initial and Minimum performance for SkidResistance: 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	TestingMethod	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:84-2019,IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail asintended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2019
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2019, IRC:119-2015
	End Treatment of	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84-2019,

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification s and Standards
	Traffic Safety Barriers			backup			IRC:119-2015
	Attenuators	Functionality: Functioning of Attenuators asintended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119-2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectificatio n	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual 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:84-2019
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:84-2019
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2019
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2019
	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:84-2019
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2019

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:84-2019
	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:84-2019
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction byvegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2019
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 84-2019

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 barrelbefore rainy season.	15 days before onset of monsoon and within 30 days after end ofrainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansionjoints	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 asperIRC: 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 aggregatelength					

	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 andpitching	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 expansionjoint	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 andguard 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: 84-2019 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 InspectionUnit	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 portionwith 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 outnecessary 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 5years for spans more than 30m and every 10 years for spans between 15m to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening structure	of	super	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace	seal	in	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 specifications 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 InspectionUnit	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 InspectionUnit	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 ofreinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	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 tobearings.	3 months	MORTH specification 2810and 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 inmajor 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 andpitching.	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 thecontractor.							

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiringreplacement	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) [TollPlaza]		
(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 mobilecrane	4 (four) hours
Bridges		
(a) Superstructure		
(i)	Any damage, cracks, spalling/ scaling Temporarymeasures Permanentmeasures	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 wingwalls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) ofbridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasingof 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 guidebunds	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 beforeissuing the bidding document, with the approval of the competent authority.]

Schedule - F

(See Clause 4.1 (vii)(a))

Applicable Permits

1. Applicable Permits

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

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

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

(c) Licence for use of explosives;

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

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

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

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

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

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

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

SCHEDULE - G

(See Clauses 7.1.and 19.2)

FORM OF BANK GUARANTEE

Annexure-I

(See Clause 7.1)

[Performance Security/Additional Performance Security]

National Highways & Infrastructural Development Corporation Ltd.
PTI Building, 3rd Floor,
4, Parliament Street
New Delhi - 110001

WHEREAS:

(A) _____ [name and address of contractor] (hereinafter called the "Contractor") and National Highways and Infrastructure Development Corporation Ltd. , (here in after called the "Authority") have entered into an agreement (here in after called the "Agreement") for "Widening/Improvement from km 626+030 (Nalani hulla gaon) to km 650+450 (Chotahapjan) on existing Lahoal – Chabua- Tinsukhia-Makum Bypass of NH 37 and from Km 0+000 (Chotahapjan) to Km 16+900 (Bogapani section) of existing NH-38 of Dibrugarh to Ledo section in the State of Assam on EPC mode (section-3)" in the state of Assam on EPC mode " 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& Infrastructure Development Corporation Limited, that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between

the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

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

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

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

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

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

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

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

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

Sl.		Particulars	Details
1	g n e	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	d	Beneficiary Bank Account No.	90621010002659
3		Beneficiary Bank Branch	IFSC SYNB0009062
4	a	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	n d	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1st Parliament street, New Delhi-110001

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.

Annexure – II
(Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

National Highways & Infrastructural Development Corporation Ltd.
PTI Building, 3rd Floor,
4, Parliament Street
New Delhi - 110001

WHEREAS:

[name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the National Highways and Infrastructure Corporation Ltd., (hereinafter called the "Authority") for the "Widening/Improvement to 4 (Four) Lane with Paved Shoulder from km 626+030 (Nalani hulla gaon) to km 650+450 (Chotahapjan) on existing Tinsukhia -Makum Bypass of NH 37 and Improvement of existing NH-38 from Km 0+000 (Chotahapjan) to Km 16+900 (Bogapani section) (2-Lane +PS) in the State of Assam on EPC mode(section-3)

" subject to and in accordance with the provisions of the Agreement

(A) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest free 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 three 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/third} 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 installment 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& Infrastructure Development Corporation Limited], 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.

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

SIGNED , SEALED AND DELIVERED

For and on behalf of the bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

Notes:

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

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

SCHEDULE - H

See Clauses10.1 (iv) and 19.3

Contract Price Weightages

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

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

Item	Weightage in percentage to the Contract Price	Stage of Payment	Percentage Weightage
1	2	3	4
Road works including culverts, widening and repair of culverts.	51.98%	**A- Widening and strengthening of existing road (For 2 lane to 4 lane)**	
		(1)) Earthwork up to top of sub-grade	9.05%
		(2) Sub Base Course	11.05%
		(3) Non Bituminous Base Course	14.22%
		(4) Bituminous Base Course	27.28%
		(5) Wearing Coat	11.09%
		(6)Widening and repair of culvert	0.00%
		A.1- Widening and strengthening of existing road (For Strengthening of 2 lane) -For NH-38	
		(1)) Earthwork up to top of sub-grade	
		(2) Sub Base Course	2.22%
		(3) Non Bituminous Base Course	0.48%
		(4) Bituminous Base Course	5.26%
		(5) Wearing Coat	3.33%
		(6)Widening and repair of culvert	
		B.1- Reconstruction / New 4-Lane realignment/ bypass (Flexible Pavement)	
		(1)) Earthwork up to top of sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Non Bituminous Base Course	0.00%
		(4) Bituminous Base Course	0.00%
		(5) Wearing Coat	0.00%
		B.2- Reconstruction / New 2-Lane realignment/ bypass (Rigid Pavement)	
		(1)) Earthwork up to top of sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%

Item	Weightage in percentage to the Contract Price	Stage of Payment	Percentage Weightage
1	2	3	4
		(4) Pavement Quality Control (PQC) Course	0.00%
		C.1- Reconstruction / New Service road (Flexible Pavement)	0.00%
		(1)) Earthwork up to top of sub-grade	0.62%
		(2) Sub Base Course	0.77%
		(3) Non Bituminous Base Course	0.97%
		(4) Bituminous Base Course	0.89%
		(5) Wearing Coat	0.48%
		C.2- Reconstruction / New Service road (Rigid Pavement)	
		(1)) Earthwork up to top of sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) Course	0.00%
		D- Re-Construction and New culverts on existing road, realignments, bypasses:	
		Culverts (Length <6 m)	12.30%
Minor Bridges / Underpasses / Overpasses	14.41%	**A.1- Widening and repairs of Minor Bridges (length>6m and <60m)**	
		Minor Bridges	0.15%
		A.2- New Minor Bridges (length>6m and <60m)	
		(1) **Foundation:** On completion of the foundation work including foundation for wing and return walls, abutments, piers upto the abutment/pier cap.	0.44%
		(2) **Sub-Structure**:	0.54%
		(3) **Super-Structure:** On completion of the super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road sign & markings tests on completion etc. complete in all respect.	0.47%
		(4) **Approaches:** On completion of approaches including retaining walls, stone pitching, protection works complete in all respect and fit for use.	0.12%
		(5) Guide Bunds and River Training works :	

Item	Weightage in percentage to the Contract Price	Stage of Payment	Percentage Weightage
1	2	3	4
		On completion of Guide Bunds and river Training works complete in all respects	0.24%
		B.1- Widening and Repair of underpasses/overpasses	
		Underpasses/ Overpasses	0.00%
		B.2- New underpasses/ overpasses	
		(1) Foundation +Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	9.70%
		(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & makings, tests on completion etc. complete in all respect.	7.75%
		Wearing Coat (a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass- rigid pavement including drainage facility complete in all respects as specified as specified.	0.00%
		(3) Approaches: On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	80.59%
			0.00%
Major Bridges (Length >60m) works and ROB/RUB/elevated section/flyover including viaducts if any.	7.63%	**A.1 - Widening and repairs of Major Bridges**	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	0.00%
		(6) Wing walls/return walls	0.00%

Item	Weightage in percentage to the Contract Price	Stage of Payment	Percentage Weightage
1	2	3	4
		(7) Guide Bunds, River Training works etc.	0.00%
		(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		A.2- New Major Bridges	0.00%
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Guide Bunds, River Training works etc.	0.00%
		(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		B.1- Widening and Repair of underpasses/overpasses	
		(a) ROB	0.00%
		(b) RUB	0.00%
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure(including bearings)	0.00%
		(4) Wearing Coat: (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		B.2- New ROB/RUB	
		(a) ROB	0.00%

Item	Weightage in percentage to the Contract Price	Stage of Payment	Percentage Weightage
1	2	3	4
		(b) RUB	0.00%
		(1) Foundation	5.04%
		(2) Sub-structure	2.07%
		(3) Super-structure (including bearings)	10.46%
		(4) Wearing Coat: (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.	0.48%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	0.27%
		(6) Wing walls/return walls	0.00%
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	81.68%
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints .	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	0.00%
		C.2- New Elevated Section/Flyovers/Grade Separators	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints.	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	0.00%
		(6) Wing walls/return walls	0.00%

Item	Weightage in percentage to the Contract Price	Stage of Payment	Percentage Weightage
1	2	3	4
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	0.00%
Other works	24.26%	(i) Toll Plaza	0.00%
		(ii) Road side drains	11.11%
		(iii) Road signs, markings, km stones, safety devices, ….	18.54%
		(iv) Project facilities	0.00%
		(a) Bus Bays & Bus Shelter	1.80%
		(b) Truck lay-byes	0.82%
		(c) Rest areas	0.00%
		(d) Electrical Works	1.68%
		(e) Junctions	6.00%
		(f) others	2.87%
		(v) Road side plantation	5.30%
		(vi) Protection works other than elevated sections/ flyovers/grade separators and ROBs/RUBs. (Breast Wall & Retaining Wall)	0.00%
		(vii) Safety and traffic management during construction	0.00%
		Toe Wall	**51.88%**
Electrical utilities and Public Health Utilities (Water pipe lines and sewage lines	1.72%	(i) EHT Line	0.00%
		(ii). EHT crossings	0.00%
		(ii). HT/LT line	46.40%
		(iv). HT/LT crossings	53.15%
		(v). Water pipeline	0.45%
		(vi). Water pipeline crossings	0.00%

1.3 Procedure of estimating the value of work done

1.3.1 Roadworks.

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

Table 1.3.1

Stage of Payment	Percentage - weightage	Payment Procedure
A-Widening and Strengthening of existing road (For 2 lane to 4 lane)		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 1.00 km (One Kilometer) in 2 lane carriageway
(1) Earthwork up to top of the sub-grade	9.05%	
(2) Sub-Base Course	11.05%	
(3) Non Bituminous Base Course	14.22%	
(4) Bituminous Base Course	27.28%	
(5) Wearing Coat	11.09%	
(6) 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 for 2 lane carriageway
A.1-Widening and Strengthening of existing road (For Strengthening of 2 lane)		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 1.00 km (One Kilometer) in 2 lane carriageway
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-Base Course	2.22%	
(3) Non Bituminous Base Course	0.48%	
(4) Bituminous Base Course	5.26%	
(5) Wearing Coat	3.33%	
(6) 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 for 2 lane carriageway
B.1- Reconstruction/New 2-lane realignment/bypass (Flexible pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in 500 mtr for 2 Lane carriageway.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-Base Course	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing Coat	0.00%	
B.2- Reconstruction / New 2-Lane realignment/ bypass (Rigid Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5(five) km. length whichever
(1)) Earthwork up to top of sub-grade	0.00%	
(2) Sub Base Course	0.00%	

Stage of Payment	Percentage - weightage	Payment Procedure
(3) Dry Lean Concrete (DLC) Course	0.00%	is less.
(4) Pavement Quality Control (PQC) Course	0.00%	
C.1- Reconstruction / New Service road (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5(five) km. length whichever is less.
(1)) Earthwork up to top of sub-grade	0.62%	
(2) Sub Base Course	0.77%	
(3) Non Bituminous Base Course	0.97%	
(4) Bituminous Base Course	0.89%	
(5) Wearing Coat	0.48%	
C.2- Reconstruction / New Service road (Rigid Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5(five) km. length whichever is less.
(1)) Earthwork up to top of sub-grade	0.00%	
(2) Sub Base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	
D- Re-Construction and New culverts on existing road, realignments, bypass:		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 atleast five culvert for 2 lane carriageway
(1) Culverts (Length <6 m)	12.30%	

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

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

Where P= Contract Price

L = Total length in km

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

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

1.3.2 Minor Bridges and Underpasses/Overpasses.

Procedure for estimating the value of Minor bridge and Underpasses/

Overpasses shall be as stated in table1.3.2:

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
A.1- Widening and repair of minor bridges (length > 6m and <60m)	0.15%	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 completion of widening & repair works of a minor bridge.
A.2- New minor bridges		
(i) Foundation: On completion of the foundation work including foundations for wing and return walls.	0.44%	Cost of each minor bridge shall be determined on pro rata basis with respect to 25% each after completion of foundation and substructure, 30% aftre completion of super-Structure & 20% after completion of protection work
(ii) Sub-structure	0.54%	
(iii) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	0.47%	
(iv) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	0.12%	
(v) Guide Bunds and River Training Works: On completion of Guide Bunds and river Training Works complete in all respects	0.24%	
B.1- Widening and repair of underpasses/overpasses	0.00%	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the un derpasses/overpasses. Payment shall be made on the completion of widening & repair works of a underpass/overpass.
B.2- New Underpasses/Overpasses:	0.00%	

Stage of Payment	Weightage	Payment Procedure
(i) Foundation +Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap**.**	9.70%	**(i) foundation +Sub-Structure:** cost of each Underpass/Overpass shall be determined on pro rata basis with respect to the total linear length (m) of the Underpasses/Overpasses. Payment against foundation + sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation +sub-structure of each Underpasses/Overpasses subject to completion of atleast two foundations along with sub-structure upto abutment/pier cap each underpass/overpass. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect. Wearing coat (a)in case of Overpass- wearing coat including expansion joints complete in all respects as specified and **(b** in case of underpass- rigid pavement including drainage facility complete in all respects as specified.	7.75%	**(ii) Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(iii) Approaches: On completion of approaches including Retaining walls/Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	80.59%	**(iii) Approaches:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified.

1.3.3 Major Bridge works, ROB/RUB andStructures.

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

Table 1.3.3

Stage of Payment	Weightage	Payment Procedure
A.1- Widening and repairs of Major Bridges		
(i) Foundation	0.00%	**(i) Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of atleast two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	0.00%	**(ii) Sub-structure :** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-sructure of the major bridge subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(iii) Super-structure (including bearings)	0.00%	**(iii) Super-structure :** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	**(iv) Wearing Coat :** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous :** Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Guide Bunds, River Training works etc.	0.00%	**(vii) Guide Bunds, River Training works :** Payment shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.

Stage of Payment	Weightage	Payment Procedure
(viii) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	**(viii) Approaches :** Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
A.2- New Major Bridges		
(i) Foundation	0.00%	**(i) Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of atleast two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	0.00%	**(ii) Sub-structure :** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-sructure of the major bridge subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(iii) Super-structure (including bearings)	0.00%	**(iii) Super-structure :** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	**(iv) Wearing Coat :** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous :** Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Guide Bunds, River Training works etc.	0.00%	**(vii) Guide Bunds, River Training works :** Payment shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(viii) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	**(viii) Approaches :** Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.

Stage of Payment	Weightage	Payment Procedure
B.1 - Widening and repairs of		
(a) ROB		
(b) RUB		
(i) Foundation	0.00%	**(i) Foundation:** Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROBs/RUBs. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB subject to completion of atleast two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	0.00%	**(ii) Sub-structure :** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-sructure of the ROB/RUB subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the ROB/RUB.
(iii) Super-structure (including bearings)	0.00%	**(iii) Super-structure :** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints in case of ROB. In casea of RUB, rigid pavement under RUB including drainage facility as specified.	0.00%	**(iv) Wearing Coat :** Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion jointds complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous :** Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	**(vii) Approaches :** Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B.2 - New	0.00%	
(a) ROB	0.00%	
(b) RUB	0.00%	

Stage of Payment	Weightage	Payment Procedure
(i) Foundation	5.04%	**(i) Foundation:** Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROBs/RUBs. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB subject to completion of atleast two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	2.07%	**(ii) Sub-structure :** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-sructure of the ROB/RUB subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the ROB/RUB.
(iii) Super-structure (including bearings)	10.46%	**(iii) Super-structure :** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints in case of ROB. In casea of RUB, rigid pavement under RUB including drainage facility as specified.	0.48%	**(iv) Wearing Coat :** Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion jointds complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.27%	**(v) Miscellaneous :** Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	81.68%	**(vii) Approaches :** Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C.1- Widening and repairs of Elevated Section/Flyovers/ Grade Separators	0.00%	

Stage of Payment	Weightage	Payment Procedure
(i) Foundation	0.00%	**(i) Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of atleast two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	0.00%	**(ii) Sub-structure :** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-sructure of the major bridge subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(iii) Super-structure (including bearings)	0.00%	**(iii) Super-structure :** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	**(iv) Wearing Coat :** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous :** Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.00%	**(vii) Approaches :** Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C.2- New Elevated Section/Flyovers/ Grade Separators	0.00%	

Stage of Payment	Weightage	Payment Procedure
(i) Foundation	0.00%	**(i) Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of atleast two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	0.00%	**(ii) Sub-structure :** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-sructure of the major bridge subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(iii) Super-structure (including bearings)	0.00%	**(iii) Super-structure :** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	**(iv) Wearing Coat :** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	**(v) Miscellaneous :** Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.00%	**(vii) Approaches :** Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.

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

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

1.3.4 Other works.

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Toll Plaza	0.00%	Rigid pavement, DLC-LHS-10.26%, Rigid pavement PQC-LHS-17.10%,Rigid pavement DLC-10.26% and rigid pavement PQC-RHS-17.10%. Steel truss & canopy-20.21%, Admin building-8.20% and finishing works-16.87%.
(ii) Road side drains	11.11%	Unit of measurement is linear length in km. Cost per km shall be determined on pro rata basis with respect to the total length of service drain.Payment shall be made forcompleted sie drain in a length of not less than 1.00 Km (one kilometer) of the total length of service roads for 2 lane carriageway.
(iii) Road signs, Markings, KM stones, Safety devices, …	18.54%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(iv) Project facilities	0.00%	Payment shall be made on pro rata basis for completed facilities.
a) Bus bays	1.80%	
b) Truck lay-byes	0.82%	
c) Rest areas	0.00%	
d) Electrical Works	1.68%	
e) Junctions	6.00%	
f) others	2.87%	
(v) Roadside plantation	5.30%	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 10% (ten per cent) of the total length.
(vi) Protection works other than elevated sections/flyovers/grade separators and ROBs/RUBs	0.00%	
(vii) Safety and traffic management during construction	0.00%	Payment shall be made on prorata basis every six months.
(viii) Toe Wall	51.88%	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 10% (ten per cent) of the total length.

1.3.5 Electrical Utilities and Public Health Utilities (Water pipe lines and sewage lines)

Procedure for estimating the value of Electrical Utilities and Public Health Utilities (Water pipe lines and sewage lines) shall be as stated in table 1.3.5:

Table 1.3.5

Stage of Payment	Weightage	Payment Procedure
(i) EHT Line	0.00%	Unit of measurement is as per completed activities. Cost per activitiy shall be determined on pro-rata basis as per its weightage nwith reference to total cost of EHT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of poles-20%, (ii) Conductor stringing including laying of cable-30%, (iii) DTR erection (if involved)- 15% and (iv) Charging of line including dismantling and site clearance-35% (with DTR) and 50% without DTR)
(ii) EHT crossings	0.00%	Cost of each crossing shall be determined on pro-rata basis with reference to the total no. of crossings. Payments shall be made for not less than 25% of the crossings subject to a minimum of 4 crossings.
(iii) HT/LT line (including Transformers if any)	46.40%	Unit of measurement is as per completed activities. Cost per activitiy shall be determined on pro-rata basis as per its weightage with reference to total cost of HT/LT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of poles-20%, (ii) Conductor stringing including laying of cable-30%, (iii) DTR erection (if involved)- 10% and (iv) Charging of line including dismantling and site clearance-40% (with DTR) and 50% without DTR)
(iv) HT/LT line crossings	53.15%	Cost of each crossing shall be determined on pro-rata basis with reference to the total no. of crossings. Payments shall be made for not less than 25% of the crossings subject to a minimum of 10 crossings.

Stage of Payment	Weightage	Payment Procedure
(v) Water pipeline.	0.45%	Unit of measurement is as per completed activities. Cost per activitiy shall be determined on pro-rata basis as per its weightage nwith reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)
(vi) Water pipeline crossings.	0.00%	Cost of each crossing shall be determined on pro-rata basis with reference to the total no. of crossings. Payments shall be made for not less than 25% of the crossings subject to a minimum of 8 crossings.
(vii) Sewage lines.	-	Unit of measurement is as per completed activities. Cost per activitiy shall be determined on pro-rata basis as per its weightage nwith reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)
(vii) Sewage line crossings.	-	Cost of each crossing shall be determined on pro-rata basis with reference to the total no. of crossings. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)

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 **260th** 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. ProjectMilestone-II

(i) Project Milestone-II shall occur on the date falling on the **480th** 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. ProjectMilestone-III

(i) Project Milestone-III shall occur on the date falling on the **620th** day from the Appointed Date (the "**Project Milestone-III**").

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

5. Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the **730th** day from the Appointed Date.

(ii) On or before the Scheduled Completion Date, the Contractor shall have completed

construction in accordance with this Agreement.

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

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

2. Tests

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

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

(iii) Tests for bridges: 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 "Widening/Improvement to 4 (Four) Lane with Paved Shoulder from km 626+030 (Nalani hulla gaon) to km 650+450 (Chotahapjan) on existing Tinsukhia -Makum Bypass of NH 37 and Improvement of existing NH-38 from Km 0+000 (Chotahapjan) to Km 16+900 (Bogapani section) (2-Lane +PS) in the State of Assam on EPC mode(section-3**)**

" 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 Engineerby:

(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 Paragraph2.

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/5thkmstones	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 asunder:

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

Where,

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

M= Monthly lump-sum payment in accordance 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 enteredintobetweenthe[nameandaddressoftheAuthority](the"**Authority**")and ..... (the "Contractor") #for "Widening/Improvement to 4 (Four) Lane with Paved Shoulder from km 626+030 (Nalani hulla gaon) to km 650+450 (Chotahapjan) on existing Tinsukhia - Makum Bypass of NH 37 and Improvement of existing NH-38 from Km 0+000 (Chotahapjan) to Km 16+900 (Bogapani section) (2-Lane +PS) in the State of Assam on EPC mode(section-3)
" in the state of Assam on EPC mode " and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

- In case the bid of 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 Clause18.2.

(v) The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article13.

(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 up to 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

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

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

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

(v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause10.4.

(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 there of 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 or thwith.

(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 Clause12.2.

(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 Programmed 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 Clause14.5.

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) TheAuthority'sEngineershalldeterminetheperiodofTimeExtensionthatisrequired 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 Clause18.5.

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 title

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 Clause19.16.

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 set back 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 in form 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 Clause19.3 (i) subsequent to the last claim;

(b) amounts reflecting adjustments in price for the a foresaid 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 up to 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 [construction of the ****section (km ** to km **) of

****] (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 ANDDELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

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