SCHEDULES

[CONSTRUCTION OF BALANCE WORK OF 2 – LANING OF EXISTING AKAJAN-LIKABALI-BAME ROAD ON EPC BASIS FROM DESIGN KM 33.00 TO KM 65.810 (EXISTING KM 36.00 TO KM 71.00) IN THE STATE OF ARUNACHAL PRADESH UNDER SARDP-NE]

SCHEDULE - A

SITE OF THE PROJECT

1. The Site

1.1 Site of the Two-Laning of Existing Akajan - Likabali - Bame Road on EPC basis from design km. 33.000 to km. 65.810 (Existing km. 36.000 to km. 71.000) in the state of Arunachal Pradesh under SARDP-NE,Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

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

1.3 An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause8.2.1 of this Agreement.

1.4 The alignment plans of the Project Highway are specified in Annex-III. Alignment plans have been given for sections where the existing alignment is proposed to be modifiedas well as where existing alignment is to be followed.

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

Annex - I
(Schedule-A)

1. Site

The Site for the Two-Laning Project Highway comprises the section of Akajan - Likabali - Bame Road commencing from Km 36.000 to Km 71.000 (Existing) and from Km 33 .000 toKm 65.810 (Design) i.e. Akajan - Likabali - Bame Section in the State of Arunachal Pradesh. The land, carriageway and structures comprising the Site are described below.

2. Land

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

S. No.	Existing Chainage (Km)		Design Chainage (Km)		Design Length (Km)	ROW (m)	Remarks
	From	To	From	To			
1	36.000	71.000	33.000	65.810	32.810	24	Details given in drawings indicating existing alignment and improvements in alignment.

3. Carriageway

The present carriageway detail is shown in the table below.

The type of the existing pavement is flexible.

S. No.	Existing Chainage (km)		Design Chainage (km)		Design Length (Km)	Lane width (m)	Remarks
	From	To	From	To			
1	36.000	71.000	33.000	65.810	32.810	3.66	Single Lane

3.1 Earth work

The present Earth work detail is shown in the table below.

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
1	33000	33508	508	
2	33508	33700	192	

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
3	33700	33900	200	
4	33900	34380	480	
5	34380	34420	40	
6	34420	34800	380	
7	34800	34850	50	
8	34850	35020	170	
9	35020	35550	530	
10	35550	35620	70	
11	35620	35720	100	
12	35720	36350	630	
13	36350	36420	70	
14	36420	37150	730	
15	37150	37220	70	
16	37320	37620	300	
17	37650	38300	650	
18	38300	39200	900	
19	39620	39720	100	
20	39720	39820	100	
21	39820	40370	550	
22	40370	40450	80	
23	40970	41100	130	
24	41100	41300	200	
25	41300	41630	330	
26	41630	41650	20	
27	41650	41840	190	

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
28	41840	41880	40	
29	42050	42200	150	
30	42200	42290	90	
31	42600	42880	280	
32	42880	42900	20	
33	42900	43200	300	
34	43200	43220	20	
35	43500	43620	120	
36	43620	43800	180	
37	43800	43980	180	
38	43980	44080	100	
39	44080	44200	120	
40	44200	44270	70	
41	44270	44300	30	
42	44300	44500	200	
43	44500	44560	60	
44	44560	44700	140	
45	44700	44780	80	
46	44780	44900	120	
47	44900	44970	70	
48	44970	45160	190	
49	45160	45250	90	
50	45250	45400	150	
51	45400	45500	100	
52	45500	45780	280	

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
53	45780	45850	70	
54	45850	46040	190	
55	46040	46100	60	
56	46100	46200	100	
57	46200	46250	50	
58	46400	46500	100	
59	46500	46530	30	
60	46530	46600	70	
61	46800	46900	100	
62	46900	46970	70	
63	47350	47700	350	
64	48300	48400	100	
65	48400	48700	300	
66	48700	48800	100	
67	48800	49000	200	
68	49000	49120	120	
69	49120	49284	164	
70	49284	49400	116	
71	49400	49500	100	
72	49500	50150	650	
73	50150	50180	30	
74	50180	50300	120	
75	50300	50380	80	
76	50380	50750	370	
77	50750	50800	50	

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
78	50800	51080	280	
79	51080	51200	120	
80	51200	52280	1080	
81	52280	52350	70	
82	52350	52550	200	
83	52550	52780	230	
84	52780	52830	50	
85	52830	53064	234	
86	53064	53400	336	
87	53500	53800	300	
88	53800	53900	100	
89	53900	54230	330	
90	54230	54560	330	
91	54560	54600	40	
92	54600	54800	200	
93	54800	54950	150	
94	54950	55300	350	
95	55300	55400	100	
96	55400	55430	30	
97	55430	55830	400	
98	55830	56300	470	
99	56300	56900	600	
100	57000	57250	250	
101	57300	57570	270	
102	57740	57900	160	

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
103	58000	58400	400	
104	60530	60650	120	
105	60650	60800	150	
106	60800	60880	80	
107	60880	61050	170	
108	61050	61700	650	
109	61700	62000	300	
110	62000	62500	500	
111	62500	62600	100	
112	62600	62660	60	
113	62660	62700	40	
114	62700	62800	100	
115	63080	63200	120	
116	63200	64030	830	
117	64030	64050	20	
118	64090	64290	200	
119	64290	64450	160	
120	64450	64630	180	
121	64630	64900	270	
122	64900	64970	70	
123	65000	65150	150	
124	65190	65250	60	
125	65400	65450	50	
126	65450	65610	160	
			26260	

3.2 GSB

The present GSB detail is shown in the table below.

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
1	33000	33510	510	
2	33510	33600	90	
3	34420	34800	380	
4	34800	34850	50	
5	34850	35100	250	
6	35720	36350	630	
7	39720	39820	100	
8	40370	40450	80	
9	42200	42290	90	
10	43620	43800	180	
11	43800	43980	180	
12	43980	44080	100	
13	44080	44200	120	
14	44270	44330	60	
15	44330	44500	170	
16	44560	44700	140	
17	44700	44780	80	
18	44780	44900	120	
19	44900	44970	70	
20	44970	45160	190	
21	48300	48400	100	
22	48400	48700	300	

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
23	48700	48800	100	
24	49000	49120	120	
25	49120	49284	164	
26	49284	49400	116	
27	49400	49500	100	
28	49500	50150	650	
29	50150	50180	30	
30	50180	50300	120	
31	50500	50620	120	
32	50620	50800	180	
33	50800	51040	240	
34	51200	51300	100	
35	51300	51600	300	
36	51600	51700	100	
37	51700	52280	580	
38	52350	52550	200	
39	54530	54660	130	
40	54660	54800	140	
41	54950	55300	350	
42	55300	55400	100	
43	55400	55430	30	
44	55430	55830	400	
45	56300	56900	600	
46	60650	60800	150	
47	61700	62000	300	

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
48	62500	62600	100	
49	63200	64030	830	
50	64630	64900	270	
51	65450	65610	160	
			10770	

3.3 WMM

The present WMM detail is shown in the table below.

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
1	33000	33510	510	
2	33510	33600	90	
3	43620	43800	180	
4	43800	43980	180	
5	43980	44080	100	
6	44080	44200	120	
7	44270	44330	60	
8	44560	44700	140	
9	44700	44780	80	
10	44780	44900	120	
11	44970	45160	190	
12	48400	48700	300	
13	49120	49284	164	
14	49284	49400	116	
15	49400	49500	100	

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
16	49500	50150	650	
17	50150	50180	30	
18	50180	50300	120	
19	50500	50620	120	
20	51200	51300	100	
21	51600	51700	100	
22	54530	54660	130	
			3700	

3.4 DBM

The present DBM detail is shown in the table below.

S. No.	Design Chainage (Km)		Length (m)	Remarks
	From	To		
1	49500	50150	**650**	

4. Major Bridges

The Site includes the following Major Bridges:

S. No.	Location (Km)	Span of the Bridge (m)	Structural condition of the Bridge
1	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):

Sl.	Chainage	Type of Structure	No. of spans	Width (m)	ROB/

No.	(Km)	Foundation	Superstructure	with span length (m)		RUB
Nil						

6. Grade separators

The Site includes the following grade separators:

Sl. No.	Chainage (Km)	Type of Structure		No. of spans with span length (m)	Width (m)
		Foundation	Superstructure		
Nil					

7. Minor bridges

The Site includes the following minor bridges:

Sl. No.	Chainage (Km)	Span of Bridge (m)	Structural condition of Bridge
1	38.011	10.00	To be replaced with new bridge
2	51.080	10.00	10 m span New Minor Bridge constructed at Ch: 48.910. **Protection work, Crash Barrier, Approach Slab works to be done.**
3	52.335	7.00	To be replaced with new bridge
4	54.70 (Design 50.407 New Location)	60 ft	New minor bridge 18 m span proposed to replace existing bailey bridge.
5	58.956	7.00	To be replaced with new bridge
6	64.786	8.00	To be replaced with new bridge
7	**63.640**	**52.00**	**Good and in functional condition**

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 culverts are in damaged condition and proposed to be replaced as mentioned in Schedule-B:

The Site includes the following culverts:

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
1	33105	2.0 X 2.0	Top slab completed	Top slab completed
2	33271	2.0 X 2.0	Top slab completed	Top slab completed
3	33390	2.0 X 2.0	Top slab completed	Top slab completed
4	33530	2.0 X 2.0	Top slab completed	Top slab completed
5	34010	2.0 X 2.0	Top slab completed	Top slab completed
6	34925	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
7	36130	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
8	36282	2.0 X 2.0	Top slab completed	Top slab completed
9	36552	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
10	36726	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
11	36882	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
12	37050	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
13	37818	3.0 X 2.0	Top slab completed	Top slab completed
14	38152	2.0 X 2.0	Top slab completed	Top slab completed
15	38220	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
16	38562	2.0 X 2.0	Top slab completed	Top slab completed
17	38726	2.0 X 2.0	Top slab completed	Top slab completed
18	38952	2.0 X 2.0	Top slab completed	Top slab completed
19	39702	2.0 X 2.0	Top slab completed	Top slab completed
20	40230	3.0 X 2.0	Top slab completed	Top slab completed

21	41806	2.0 X 2.0	Top slab completed	Top slab completed
22	41927	2.0 X 2.0	Top slab completed	Top slab completed
23	42130	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
24	43163	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
25	43570	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
26	43672	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
27	43724	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
28	43785	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
29	44060	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
30	44177	2.0 X 2.0	Top slab completed	Top slab completed
31	44244	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
32	44368	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
33	45164	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
34	45394	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
35	45561	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
36	48436	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
37	48618	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
38	48788	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
39	49007	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
40	49284	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
41	49414	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
42	49637	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
43	49691	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed

44	49751	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
45	49851	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
46	49934	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
47	49998	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
48	50183	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
49	50644	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
50	50810	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
51	50946	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
52	51028	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
53	51237	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
54	51380	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
55	51575	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
56	51736	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
57	51774	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
58	51939	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
59	52037	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
60	52353	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
61	52477	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
62	52684	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
63	52837	2.0 X 2.0	Top slab completed	Top slab with Crash barrier completed
64	52966	3.0 X 2.0	Top slab with Crash barrier completed	Top slab completed
65	53566	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
66	53724	2.0 X 2.0	Top slab completed	Top slab completed

67	53824	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
68	54066	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
69	54650	2.0 X 2.0	Top slab completed	Top slab completed
70	55209	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
71	55508	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
72	55633	2.0 X 2.0	Top slab with Crash barrier completed	Top slab completed
73	56211	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
74	56390	2.0 X 2.0	Top slab completed	Top slab completed
75	56622	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
76	56824	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
77	57173	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
78	57395	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
79	57501	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
80	62588	2.0 X 2.0	Top slab completed	Top slab completed

11. Bus bays

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

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

12. Truck Lay byes

The details of truck lay byes are as follows:

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

13. Road side drains

The details of the roadside drains are as follows:

S. No.	Location		Side	Type	
	From Km	to Km		Masonry/cc (Pucca)	Earthen (Kutcha)
Nil					

14. Major junctions

The details of major junctions are as follows:

S. No.	Location		At grade	Separated	Category of Cross Road			
	Existing Ch.	Design Ch.			NH	SH	MDR	Others
Nil								

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

15. Minor junctions

The details of the minor junctions are as follows:

S. No.	Existing Ch.	Design Ch.	Side	Type of junction	Remarks
Nil					

16. Bypasses

The details of the bypasses are as follows:

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

17. Other structures

17.1 Breast walls

The Site includes the following Breast wall locations:

Location of Breast walls			
Design Chainage		Length of B/Wall of 3m height (m)	Side
From	To		
49+286	49+300	14	LHS
49+424	49+454	30	LHS
49+454	49+465	11	LHS

49+880	49+910	30	LHS
50+200	50+240	40	LHS
50+310	50+325	15	LHS
50+740	50+760	20	LHS
		160	

17.2 Retaining wall

The Site includes the following Retaining wall locations:

Location of Retaining walls			
Design Chainage		**Length of R/Wall (m)**	**Side**
From	**To**		
36+132	36+137	5	LHS
37+455	37+463	8	LHS
38+017	38+027	10	LHS
38+154	38+163	9	LHS
38+954	38+965	11	LHS
		43	

17.3 Road side-lined drain

The Site includes the following Road side-lined drain locations:

Location of Road side-lined drain			
Design Chainage		**Length(m)**	**Side**
From	**To**		
36+950	37+049	99	RHS
48+437	48+506	69	LHS
48+437	48+617	180	RHS
48+619	48+787	168	LHS
49+285	49+413	128	LHS
49+415	49+500	85	LHS
49+500	49+636	136	LHS

49+638	49+690	52	LHS
49+752	49+850	98	LHS
49+852	49+933	81	LHS
49+935	49+997	62	LHS
49+999	50+182	183	LHS
51+289	51+389	100	LHS
51+576	51+735	159	LHS
51+737	51+773	36	LHS
52+355	52+476	121	LHS
53+567	53+723	156	LHS
53+725	53+823	98	LHS
55+211	55+291	80	LHS
55+569	55+632	63	LHS
56+212	56+312	100	LHS
61+800	61+950	150	LHS
62+005	62+076	71	LHS
62+165	62+250	85	LHS
		2560	

Annex - II
(Schedule-A)

Dates for providing Right of Way

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

Sl. No	Design Chainage (Km)		Length (Km)	Width (m)	Date of providing ROW*
	From Km	to Km			
1	2	3	4	5	6
Right of Way (full width)	33.000	65.810	32.810	24.0	100 % at Appointed Date

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:

Annex - IV
(Schedule-A)

Environment Clearances

The Project Highway does not attract EJA notification 2006.

The following Forest clearances have been obtained:

In principle Approval and Final Approval have been obtained from Km 36.000 to Km 71.000

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 Two-Laning and strengthening of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3 Specifications and Standards

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

Annex - I
(Schedule-B)

Description of Two-Laning

1. WIDENING OF THE EXISTING HIGHWAY

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

1.2 WIDTH OF CARRIAGEWAY

1.2.1 Construction of Two-Lane pavement without paved shoulders shall be undertaken. The paved carriageway shall be 7(seven) m wide with hard shoulders in accordance with the typical cross sections drawings.

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

2. GEOMETRIC DESIGN AND GENERAL FEATURES

2.1 General

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

2.2 Design speed

The design speed shall be the minimum design speed of 40 km per hr and ruling design speed of 50 km per hr for hilly terrain.

2.3 Improvement of the existing road geometrics

Improvement of the existing road geometrics shall be carried out as per Section-2 of Manual (IRC: SP73-2007).

2.4 Right of Way

Sl. No	Design Chainage (Km)		Proposed Length (Km)	Width (m)	Remarks
	From Km	to Km			
1	33.000	65.810	32.810	24.00	

2.5 Type of shoulders

The shoulder shall be hard shoulder on both sides of the carriageway as per para 2.5 of the Manual.

2.6 Lateral and vertical clearances at underpasses

2.6.1 Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per paragraph 2.11 of the Manual.

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

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

2.7 Lateral and vertical clearances at overpasses

2.7.1 Lateral and vertical clearances at overpasses shall be as per paragraph 2.12 of the Manual.

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

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

2.8 Service roads

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

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

2.9 Grade separated structures

2.9.1 Grade separated structures shall be provided as per paragraph 2.14 of the Manual. The requisite particulars are given below and GADs are annexed at Annexure "D"

Sl. No.	Existing Chainage of the structure	Design Chainage of structure	Length (m)	Number and length of spans (m)	Approach gradient	Remarks, if any
Nil						

2.10 Cattle and pedestrian underpass /overpass

Cattle and pedestrian underpass/ overpass shall be constructed as follows:[Refer to paragraphs 2.14.3 of the Manual and specify the requirements of cattle and pedestrian underpass/ overpass].

Sl. No.	Location	Span/opening (m)	Type of crossing
Nil			

2.11 Typical cross-sections of the Project Highway

Typeof cross-section shall be provided as per profile and site condition in accordance with the Manual.

3 INTERSECTIONS AND GRADE SEPARATORS

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

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

(a) At-grade intersections

Sl. No.	Existing Chainage (m)	Design Chainage (m)	Side	Type of intersection	Remarks
Nil					

(b) Grade separated intersection with/without ramps

Sl. No.	Existing Chainage (m)	Design Chainage (m)	Side	Type of intersection	Remarks
Nil					

4 ROAD EMBANKMENT AND CUT SECTION

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

4.2 The existing road including raising shall be reconstructed as per FRL mentioned inPlan & Profile as attached in annex 3 of schedule A.

The Formation cutting work shall be done asper following:

From	To	Length (m)	Remarks
37220	37320	100	
37620	37650	30	
39200	39600	400	
39600	39620	20	
40450	40680	230	
40680	40970	290	
41880	42000	120	
42000	42050	50	
42290	42550	260	
42550	42600	50	
43220	43450	230	
43450	43500	50	
46250	46400	150	
46600	46800	200	
46970	47200	230	
47200	47350	150	
47700	48300	600	
53400	53500	100	
56900	57000	100	
57250	57300	50	
57570	57740	170	
57900	58000	100	
58400	60530	2130	
62800	63080	280	
64050	64090	40	
64970	65000	30	
65250	65400	150	
65150	65190	40	
65610	65810	200	
Total length (in m)		**6550**	

5 PAVEMENT DESIGN

5.1 Pavement design shall be carried out in accordance with Section 5 of the Manual. Minimum Crust thickness as per the following shall be provided.

Items	**Thickness**
GSB (in Widening portion)	300 mm (Bottom 150 mm extended to full formation width)
WMM	250 mm
DBM	60 mm
BC with CRMB	40 mm

5.2 Type of pavement

Flexible pavement shall be adopted for Project Highway.

5.3 Design requirements

5.3.1 Design Period and strategy

The pavement shall be designed for a minimum design period of 15 years. Stage construction shall not be permitted.

5.3.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for entire Project Highway for design traffic of not less than 10 million standard axles (msa).

5.4 Reconstruction of stretches

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

Sl. No.	**Existing Chainage (m)**		**Design Chainage (m)**		**Design Length (m)**	**Remarks**
	From	**To**	**From**	**To**		
1	As indicated in drawings.					

5.4.2 The existing road shall be reconstructed as per FRL mentioned in Plan &Profile (Annex III of Schedule A).

6 ROADSIDE DRAINAGE

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per Section 6 of the Manual. However, Lined/unlined drains shall be provided in the following stretches-

The Roadside Lined drain shall be constructed as per following:

From	To	Length (m)	Side
33+000	33+500	500	LHS
33+030	33+100	70	RHS
33+500	34+000	500	RHS
34+000	34+500	500	RHS
34+030	34+100	70	LHS
34+300	34+390	90	LHS
34+500	35+000	500	RHS
34+900	34+990	90	LHS
35+000	35+500	500	RHS
35+500	36+000	500	RHS
36+000	36+500	500	RHS
36+500	36+950	450	RHS
37+049	37+500	451	RHS
37+500	38+000	500	RHS
38+000	38+500	500	RHS
38+350	38+410	60	LHS
38+500	39+000	500	RHS
38+500	38+550	50	LHS
39+000	39+500	500	RHS
39+450	39+520	70	LHS
39+500	40+000	500	RHS
40+000	40+500	500	RHS
40+500	40+830	330	RHS
40+870	41+000	130	RHS
41+000	41+500	500	RHS
41+500	42+000	500	RHS
42+000	42+500	500	RHS

From	To	Length (m)	Side
42+500	43+000	500	RHS
43+000	43+500	500	RHS
43+500	44+000	500	RHS
44+000	44+500	500	RHS
44+500	45+000	500	RHS
44+700	44+760	60	LHS
45+000	45+500	500	RHS
45+500	46+000	500	RHS
46+000	46+500	500	RHS
46+310	46+340	30	LHS
46+500	47+000	500	RHS
47+000	47+500	500	LHS
47+270	47+300	30	RHS
47+500	48+000	500	LHS
47+970	48+010	40	RHS
48+000	48+437	437	LHS
48+617	48+660	43	RHS
48+580	48+619	39	LHS
49+000	49+285	285	LHS
49+690	49+752	62	LHS
50+182	50+380	198	LHS
50+430	51+000	570	LHS
51+000	51+090	90	LHS
51+120	51+289	169	LHS
51+389	51+500	111	LHS
51+500	51+576	76	LHS
51+773	52+000	227	LHS
51+800	51+860	60	RHS
52+000	52+355	355	LHS
52+476	52+500	24	LHS
52+360	52+420	60	RHS
52+500	52+570	70	LHS

From	To	Length (m)	Side
52+580	53+000	420	LHS
52+860	52+940	80	RHS
53+000	53+500	500	LHS
53+500	53+567	67	LHS
53+823	54+000	177	LHS
54+000	54+500	500	LHS
54+500	55+000	500	LHS
54+550	54+600	50	RHS
54+680	54+750	70	RHS
54+800	54+870	70	RHS
55+000	55+211	211	LHS
55+291	55+500	209	LHS
55+632	55+700	68	LHS
55+720	56+100	380	RHS
56+150	56+212	62	LHS
56+312	56+500	188	LHS
56+500	57+000	500	LHS
57+000	57+500	500	LHS
57+500	58+000	500	LHS
57+770	57+820	50	RHS
58+000	58+400	400	LHS
58+410	58+500	90	RHS
58+500	58+570	70	RHS
58+800	59+000	200	LHS
59+000	59+350	350	LHS
59+350	59+720	370	RHS
59+730	60+000	270	LHS
60+000	60+440	440	LHS
60+340	60+400	60	RHS
60+520	61+000	480	RHS
61+000	61+500	500	RHS
61+500	61+800	300	RHS

From	To	Length (m)	Side
61+950	62+000	50	LHS
62+079	62+165	86	LHS
62+250	62+380	130	LHS
62+420	62+500	80	LHS
62+500	63+000	500	LHS
63+000	63+500	500	LHS
63+500	64+000	500	LHS
64+000	64+500	500	LHS
64+500	64+570	70	LHS
64+620	65+000	380	LHS
65+000	65+365	365	LHS
65+375	65+605	230	LHS
48+340	48+430	90	RHS
48+750	48+870	120	RHS
48+790	48+870	80	LHS
48+930	49+000	70	LHS
48+930	49+000	70	RHS
49+000	49+200	200	RHS
49+300	49+350	50	RHS
49+420	49+440	20	RHS
50+710	50+760	50	RHS
51+400	51+440	40	RHS
52+160	52+200	40	RHS
52+700	52+800	100	RHS
54+870	54+970	100	RHS
55+509	55+569	60	LHS
57+670	57+700	30	RHS
57+920	57+970	50	RHS
60+520	60+650	130	LHS
60+770	60+870	100	LHS
62+020	62+130	110	RHS
63+660	63+760	100	RHS

From	To	Length (m)	Side
65+500	65+600	100	RHS
Total length (in m)		**32130**	

Unlined drain to be provided as per site requirement other than Side-Lined drain locations.

7 DESIGN OF STRUCTURES

7.1 General

7.1.1 All bridges, culverts and structures shall be designed and constructed in accordance with section 7 of the Manual and shall conform to the cross-sectional features and other details specified therein.

7.1.2 Width of the carriageway of new bridges and structures shall be as per figure 7.2 and figure 7.3 of the Manual.

7.1.3 The following structures shall be provided with footpaths:
NIL

7.1.4 All bridges shall be high-level bridges.

7.1.5 The following structures shall be designed to carry utility services specified in table below:
NIL

7.1.6 Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections given in section 7 of the Manual.

7.2 Culverts

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

7.2.2 Reconstruction of existing/New culverts:

The culverts shall be constructed as per following:

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
1	34+617	1.5 X 2.0	Not started	Not started
2	35+314	5.0 X 4.0	Not started	Not started
3	35+542	1.5 X 2.0	Not started	Not started
4	35+734	1.5 X 2.0	Not started	Not started
5	35+832	1.5 X 2.0	Not started	Not started
6	35+924	1.5 X 2.0	Not started	Not started
7	36+007	1.5 X 2.0	Not started	Not started
8	36+371	3.0 X 2.0	Not started	Not started
9	37+106	4.0 X 3.0	Not started	Not started
10	37+160	4.0 X 3.0	Not started	Not started

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
11	37+265	2.5 X 2.0	Not started	Not started
12	37+747	3.0 X 2.0	Not started	Not started
13	38+826	3.0 X 2.0	Not started	Not started
14	38+862	2.5 X 2.0	Not started	Not started
15	39+035	6.0 X 6.0	Not started	Not started
16	39+231	3.0 X 2.0	Not started	Not started
17	39+287	3.0 X 2.0	Not started	Not started
18	39+437	3.0 X 2.0	Not started	Not started
19	39+537	3.0 X 2.0	Not started	Not started
20	40+341	1.5 X 2.0	Not started	Not started
21	40+435	2.5 X 2.0	Not started	Not started
22	40+513	3.0 X 2.0	Not started	Not started
23	40+567	2.5 X 2.0	Not started	Not started
24	40+658	4.0 X 3.0	Not started	Not started
25	41+130	3.0 X 2.0	Not started	Not started
26	41+255	2.5 X 2.0	Not started	Not started
27	41+300	3.0 X 2.0	Not started	Not started
28	41+361	3.0 X 2.0	Not started	Not started
29	41+423	5.0 X 4.0	Not started	Not started
30	41+631	3.0 X 2.0	Not started	Not started
31	41+985	2.0 X 2.0	Not started	Not started
32	42+056	2.0 X 2.0	Not started	Not started
33	42+166	3.0 X 2.0	Not started	Not started
34	42+442	2.0 X 2.0	Not started	Not started
35	42+532	2.5 X 2.0	Not started	Not started
36	42+638	1.5 X 2.0	Not started	Not started
37	43+017	3.0 X 2.0	Not started	Not started
38	43+304	1.5 X 2.0	Not started	Not started
39	43+460	1.5 X 2.0	Not started	Not started
40	43+610	3.0 X 2.0	Not started	Not started

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
41	43+846	3.0 X 2.0	Not started	Not started
42	44+508	1.5 X 2.0	Not started	Not started
43	44+917	1.5 X 2.0	Not started	Not started
44	45+309	2.5 X 2.0	Not started	Not started
45	45+930	1.5 X 2.0	Not started	Not started
46	46+014	4.0 X 3.0	Not started	Not started
47	46+234	2.0 X 2.0	Not started	Not started
48	46+308	2.0 X 2.0	Not started	Not started
49	46+382	4.0 X 3.0	Not started	Not started
50	46+669	1.5 X 2.0	Not started	Not started
51	46+812	1.5 X 2.0	Not started	Not started
52	47+459	4.0 X 3.0	Not started	Not started
53	47+604	4.0 X 3.0	Not started	Not started
54	47+804	1.5 X 2.0	Not started	Not started
55	48+014	4.0 X 3.0	Not started	Not started
56	48+059	2.0 X 2.0	Not started	Not started
57	48+133	1.5 X 2.0	Not started	Not started
58	48+334	2.0 X 2.0	Not started	Not started
59	48+890	4.0 X 3.0	Not started	Not started
60	49+078	1.5 X 2.0	Not started	Not started
61	53+171	1.5 X 2.0	Not started	Not started
62	53+364	5.0 X 4.0	Not started	Not started
63	54+188	4.0 X 3.0	Not started	Not started
64	54+280	1.5 X 2.0	Not started	Not started
65	55+858	1.5 X 2.0	Not started	Not started
66	56+151	4.0 X 3.0	Not started	Not started
67	56+914	2.5 X 2.0	Not started	Not started
68	57+004	2.5 X 2.0	Not started	Not started
69	57+314	2.0 X 2.0	Not started	Not started
70	57+726	2.5 X 2.0	Not started	Not started

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
71	57+889	2.5 X 2.0	Not started	Not started
72	58+008	2.5 X 2.0	Not started	Not started
73	58+108	1.5 X 2.0	Not started	Not started
74	58+200	2.0 X 2.0	Not started	Not started
75	58+457	1.5 X 2.0	Not started	Not started
76	58+511	3.0 X 2.0	Not started	Not started
77	58+623	6.0 X 5.0	Not started	Not started
78	58+647	3.0 X 2.0	Not started	Not started
79	59+165	4.0 X 3.0	Not started	Not started
80	59+234	4.0 X 3.0	Not started	Not started
81	59+321	3.0 X 2.0	Not started	Not started
82	59+391	1.5 X 2.0	Not started	Not started
83	59+519	6.0 X 6.0	Not started	Not started
84	59+764	6.0 X 6.0	Not started	Not started
85	59+954	3.0 X 2.0	Not started	Not started
86	60+154	2.5 X 2.0	Not started	Not started
87	60+254	1.5 X 2.0	Not started	Not started
88	60+327	1.5 X 2.0	Not started	Not started
89	60+420	2.5 X 2.0	Not started	Not started
90	60+754	1.5 X 2.0	Not started	Not started
91	60+888	1.5 X 2.0	Not started	Not started
92	60+999	3.0 X 2.0	Not started	Not started
93	61+088	3.0 X 2.0	Not started	Not started
94	61+224	2.5 X 2.0	Not started	Not started
95	62+004	1.5 X 2.0	Not started	Not started
96	62+164	3.0 X 2.0	Not started	Not started
97	62+226	3.0 X 2.0	Not started	Not started
98	62+407	4.0 X 3.0	Not started	Not started
99	62+754	3.0 X 2.0	Not started	Not started
100	62+854	1.5 X 2.0	Not started	Not started

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
101	63+009	2.0 X 2.0	Not started	Not started
102	63+199	3.0 X 2.0	Not started	Not started
103	63+304	5.0 X 5.0	Not started	Not started
104	63+419	4.0 X 3.0	Not started	Not started
105	63+505	2.5 X 2.0	Not started	Not started
106	63+804	4.0 X 3.0	Not started	Not started
107	64+023	5.0 X 4.0	Not started	Not started
108	64+214	2.5 X 2.0	Not started	Not started
109	64+349	3.0 X 2.0	Not started	Not started
110	64+690	3.0 X 2.0	Not started	Not started
111	64+836	3.0 X 2.0	Not started	Not started
112	64+908	2.5 X 2.0	Not started	Not started
113	64+967	1.5 X 2.0	Not started	Not started
114	65+022	1.5 X 2.0	Not started	Not started
115	65+158	4.0 X 3.0	Not started	Not started
116	65+258	1.5 X 2.0	Not started	Not started
117	65+370	3.0 X 2.0	Not started	Not started
118	65+554	1.5 X 2.0	Not started	Not started

Catch pit, Guide wall works at upstream side and Floor protection, curtain walls works at downstream side and Crash barrier to be constructed as per following:

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
1	33105	2.0 X 2.0	Top slab completed	Top slab completed
2	33271	2.0 X 2.0	Top slab completed	Top slab completed
3	33390	2.0 X 2.0	Top slab completed	Top slab completed
4	33530	2.0 X 2.0	Top slab completed	Top slab completed
5	34010	2.0 X 2.0	Top slab completed	Top slab completed
6	34925	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
7	36130	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
8	36282	2.0 X 2.0	Top slab completed	Top slab completed
9	36552	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
10	36726	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
11	36882	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
12	37050	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
13	37818	3.0 X 2.0	Top slab completed	Top slab completed
14	38152	2.0 X 2.0	Top slab completed	Top slab completed
15	38220	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
16	38562	2.0 X 2.0	Top slab completed	Top slab completed
17	38726	2.0 X 2.0	Top slab completed	Top slab completed
18	38952	2.0 X 2.0	Top slab completed	Top slab completed
19	39702	2.0 X 2.0	Top slab completed	Top slab completed
20	40230	3.0 X 2.0	Top slab completed	Top slab completed
21	41806	2.0 X 2.0	Top slab completed	Top slab completed
22	41927	2.0 X 2.0	Top slab completed	Top slab completed
23	42130	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
24	43163	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
25	43570	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
26	43672	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
27	43724	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
28	43785	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
29	44060	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
30	44177	2.0 X 2.0	Top slab completed	Top slab completed
31	44244	2.0 X 2.0	Top slab with Crash	Top slab with Crash

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
			barrier completed	barrier completed
32	44368	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
33	45164	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
34	45394	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
35	45561	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
36	48436	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
37	48618	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
38	48788	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
39	49007	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
40	49284	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
41	49414	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
42	49637	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
43	49691	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
44	49751	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
45	49851	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
46	49934	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
47	49998	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
48	50183	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
49	50644	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
50	50810	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
51	50946	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
52	51028	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
53	51237	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
54	51380	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
55	51575	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
56	51736	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
57	51774	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
58	51939	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
59	52037	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
60	52353	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
61	52477	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
62	52684	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
63	52837	2.0 X 2.0	Top slab completed	Top slab with Crash barrier completed
64	52966	3.0 X 2.0	Top slab with Crash barrier completed	Top slab completed
65	53566	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
66	53724	2.0 X 2.0	Top slab completed	Top slab completed
67	53824	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
68	54066	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
69	54650	2.0 X 2.0	Top slab completed	Top slab completed
70	55209	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
71	55508	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
72	55633	2.0 X 2.0	Top slab with Crash barrier completed	Top slab completed
73	56211	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
74	56390	2.0 X 2.0	Top slab completed	Top slab completed
75	56622	2.0 X 2.0	Top slab with Crash	Top slab with Crash

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
			barrier completed	barrier completed
76	56824	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
77	57173	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
78	57395	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
79	57501	2.0 X 2.0	Top slab with Crash barrier completed	Top slab with Crash barrier completed
80	62588	2.0 X 2.0	Top slab completed	Top slab completed

The Balance works of culverts shall be constructed asper following:

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
1	33+819	2.0 X 2.0	Not started	Raft completed
2	33+908	2.0 X 2.0	PCC completed	Not started
3	34+210	2.0 X 2.0	Top slab completed	Top slab reinforcement
4	34+310	2.0 X 2.0	Top slab with Crash barrier completed	Raft completed
5	34+560	2.0 X 2.0	Top slab completed	Not started
6	35+048	2.0 X 2.0	Not started	Top slab completed
7	35+130	2.0 X 2.0	Top slab completed	Top slab reinforcement
8	35+412	2.0 X 2.0	Top slab completed	Raft completed
9	35+669	2.0 X 2.0	Top slab reinforcement	Top slab reinforcement
10	36+472	2.0 X 2.0	Top slab completed	Not started
11	37+464	2.0 X 2.0	Top slab completed	PCC completed
12	38+028	2.0 X 2.0	Top slab completed	Not started
13	38+283	2.0 X 2.0	Top slab reinforcement	Top slab completed
14	38+610	2.0 X 2.0	Not started	Top slab completed
15	39+955	3.0 X 2.0	Top slab reinforcement	Top slab reinforcement
16	40+160	2.0 X 2.0	Raft completed	Raft completed
17	42+297	2.0 X 2.0	Not started	Top slab completed

Sl. No.	Culvert location	Span/Opening (m)	LHS	RHS
18	44+300	2.0 X 2.0	Not started	Raft completed
19	45+040	2.0 X 2.0	Not started	Top slab completed
20	45+481	2.0 X 2.0	Not started	PCC completed
21	45+691	2.0 X 2.0	Raft completed	Not started
22	45+716	2.0 X 2.0	Wall completed	Top slab with Crash barrier completed
23	49+188	3.0 X 2.0	Top slab completed	Not started
24	51+480	2.0 X 2.0	Top slab completed	Not started
25	52+286	2.0 X 2.0	Top slab completed	Raft completed
26	53+064	2.0 X 2.0	Top slab with Crash barrier completed	Wall completed
27	54+988	3.0 X 2.0	Not started	Top slab with Crash barrier completed
28	55+292	2.0 X 2.0	Top slab completed	Not started
29	55+951	2.0 X 2.0	Not started	Raft completed
30	57+071	2.0 X 2.0	Top slab completed	Not started
31	57+254	2.0 X 2.0	PCC completed	PCC completed
32	61+339	2.0 X 2.0	Not started	Excavation done
33	61+457	2.0 X 2.0	Not started	Excavation done
34	61+547	2.0 X 2.0	Not started	PCC completed
35	61+657	2.0 X 2.0	Not started	Wall completed
36	61+711	2.0 X 2.0	Not started	Top slab completed
37	62+079	2.0 X 2.0	Top slab completed	Not started
38	62+337	2.0 X 2.0	Top slab completed	Not started
39	62+679	2.0 X 2.0	Wall completed	Not started

7.2.3 Widening of existing culverts
NIL

7.2.4 Additional new culverts shall be constructed as per particulars given in para 7.2.2 above.

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

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

7.3 Bridges

7.3.1 Existing bridges to be re- constructed/Additional New Minor Bridges

Sl. No.	Bridge location (Km)	Span of the Bridge (m)	Remarks
1	40+831	10.00	Minor Bridge
2	48+910	10.00	10 m span New Minor Bridge constructed at Ch: 48.910. **Protection work, Crash Barrier, Approach Slab works to be done.**
3	51+106	7.00	Minor Bridge
4	64+605	8.00	Minor Bridge
5	50+407	18.00	Minor Bridge
6	52+580	7.00	Minor Bridge

GAD is attached at Annex B of annex 1 of this Schedule.

(ii) The following Bridges shall be widened:
NIL

7.3.2 Deleted

7.3.3 The railings of existing bridges shall be replaced by crash barriers at thefollowing locations:

Sl. No.	Location at km	Remarks
Nil		

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

Sl. No.	Location at km	Remarks
Routine Maintenance of Existing Bridge to be done as and when required		

7.3.5 Drainage system for bridge decks

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

7.3.6 Structures in marine environment

NIL

7.4. Rail-road bridges

7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual.

NIL

7.4.2 Road over-bridges

Road over-bridges (road over rail) shall be provided at the following level crossings, as per GAD drawings attached at Annexure "C" to this Schedule:

Sl. No.	Existing Location of Level crossing Railway Track (Chainage Km)	Proposed Location of Level crossing / Railway Track (Chainage Km)	Length of bridge (m)
Nil			

7.4.3 Road under-bridges

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

Sl. No.	Existing Location of Level crossing Railway Track (Chainage Km)	Proposed Location of Level crossing / Railway Track (Chainage Km)	Length of bridge (m)
Nil			

7.5 Grade separated structures

NIL

7.6 Repairs and strengthening of bridges and structures

A. Bridges

The existing bridges and structures to be repaired/strengthened are given below:

NIL

B. ROB / RUB

NIL

C. Overpasses/Underpasses and other structures

NIL

7.7 List of Major Bridges and Structures

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

Sl. No.	Proposed Chainage	Proposed Span in (m)	Proposed Width in (m)	Proposed Centre Line	EXISTING RL
1	60+479	62.00	12.00		

8 TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

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

8.2 Specifications of the reflective sheeting. As per Clause 9.3 of the Manual of specifications and standards.

9 ROADSIDE FURNITURE

9.1 Roadside furniture shall be provided in accordance with the provisions of Section 11 of the Manual.

9.2 The Overhead traffic signs: location and size

Full width overhead sign: 1 no. (Start of the Project)

Cantilever overhead signs: 2 nos. (Locations to be finalized in consultation with Authority's Engineer).

10 COMPULSORY AFFORESTATION

The number of trees which are required to be planted by the Contractor as compulsory Afforestation shall be as per Forest Conservation Act and as per the Manual.

11 HAZARDOUS LOCATIONS

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

Sl. No.	Location stretch from (km) to (km)	LHS/RHS
The Project highway passes through mountainous and steep terrain. Metal Beam Crash Barrier of aggregate length of 5.32 Km (minimum) shall be provided at high embankment		

and at sharp curve locations. Additional Metal Beam Crash Barrier / parapet wall shall be provided from safety considerations, if required. No change of scope shall be considered for the additional length of metal beam/parapet wall, so provided.

12 SPECIAL REQUIREMENT FOR HILL ROADS

All special features shall be provided as per Manual.

TI1e side slope shall be protected by using suitable slope protection measures allalong the highway on Hill side and Valley side. The details of the protection work are listed in "Annex B" and the typical sections for the protection works are given in "Annex A".

Contractor shall identify areas and provide the suitable protection measures tostabilize all the landslide zones. A report on the land slide zones shall be furnished along with the design for the review of the Authority Engineer. No change of scope shall be considered for the additional protection measures, if any.

13 Utilities

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

14 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 min 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.

GSB shall be constructed asper following:

Design Chainage		Length(m)
From	To	
33600	33900	300
33900	34380	480
34380	34420	40
35100	35550	450
35550	35620	70
35620	35720	100
36350	36420	70
36420	37150	730
37150	37220	70
37220	37320	100
37320	37620	300
37620	37650	30
37650	38300	650
38300	39200	900
39200	39600	400
39600	39620	20
39620	39720	100
39820	40370	550
40450	40550	100
40550	40680	130
40680	40970	290
40970	41100	130
41100	41300	200
41300	41630	330
41630	41650	20
41650	41840	190
41840	41880	40
41880	42000	120
42000	42050	50
42050	42200	150

Design Chainage		Length(m)
From	To	
42290	42550	260
42550	42600	50
42600	42880	280
42880	42900	20
42900	43200	300
43200	43220	20
43220	43450	230
43450	43500	50
43500	43620	120
44200	44270	70
44500	44560	60
45160	45250	90
45250	45400	150
45400	45500	100
45500	45780	280
45780	45850	70
45850	46040	190
46040	46100	60
46100	46200	100
46200	46250	50
46250	46400	150
46400	46500	100
46500	46530	30
46530	46600	70
46600	46800	200
46800	46900	100
46900	46970	70
46970	47200	230
47200	47250	50
47250	47350	100
47350	47700	350

Design Chainage		Length(m)
From	To	
47700	48000	300
48000	48300	300
48800	49000	200
50300	50380	80
50380	50500	120
51040	51200	160
52280	52350	70
52550	52780	230
52780	52830	50
52830	53064	234
53064	53400	336
53400	53500	100
53500	53800	300
53800	53900	100
53900	54230	330
54230	54530	300
54800	54950	150
55830	56300	470
56900	57000	100
57000	57250	250
57250	57300	50
57300	57570	270
57570	57740	170
57740	57900	160
57900	58000	100
58000	58400	400
58400	60530	2130
60530	60650	120
60800	60880	80
60880	61050	170
61050	61700	650

Design Chainage		Length(m)
From	**To**	
62000	62500	500
62600	62660	60
62660	62700	40
62700	62800	100
62800	62850	50
62850	63080	230
63080	63200	120
64030	64050	20
64050	64090	40
64090	64290	200
64290	64450	160
64450	64630	180
64900	64970	70
64970	65000	30
65000	65150	150
65150	65190	40
65190	65250	60
65250	65400	150
65400	65450	50
65610	65810	200
		22040

Profile correction course for the GSB shall be done as per following:

Design Chainage		Length(m)
From	To	
34420	34800	380
34800	34850	50
34850	35100	250
35720	36350	630
39720	39820	100
40370	40450	80
42200	42290	90
44330	44500	170
44900	44970	70
48300	48400	100
48700	48800	100
49000	49120	120
50620	50800	180
50800	51040	240
51300	51600	300
51700	52280	580
52350	52550	200
54660	54800	140
54950	55300	350
55300	55400	100
55400	55430	30
55430	55830	400
56300	56900	600
60650	60800	150
61700	62000	300
62500	62600	100
63200	64030	830
64630	64900	270
65450	65610	160
Total length (in m)		**7070**

WMM shall be constructed asper following:

Design Chainage		Length(m)
From	To	
33600	33900	300
33900	34380	480
34380	34420	40
34420	34800	380
34800	34850	50
34850	35100	250
35100	35550	450
35550	35620	70
35620	35720	100
35720	36350	630
36350	36420	70
36420	37150	730
37150	37220	70
37220	37320	100
37320	37620	300
37620	37650	30
37650	38300	650
38300	39200	900
39200	39600	400
39600	39620	20
39620	39720	100
39720	39820	100
39820	40370	550
40370	40450	80
40450	40550	100
40550	40680	130
40680	40970	290
40970	41100	130
41100	41300	200
41300	41630	330

Design Chainage		Length(m)
From	To	
41630	41650	20
41650	41840	190
41840	41880	40
41880	42000	120
42000	42050	50
42050	42200	150
42200	42290	90
42290	42550	260
42550	42600	50
42600	42880	280
42880	42900	20
42900	43200	300
43200	43220	20
43220	43450	230
43450	43500	50
43500	43620	120
44200	44270	70
44330	44500	170
44500	44560	60
44900	44970	70
45160	45250	90
45250	45400	150
45400	45500	100
45500	45780	280
45780	45850	70
45850	46040	190
46040	46100	60
46100	46200	100
46200	46250	50
46250	46400	150
46400	46500	100

Design Chainage		Length(m)
From	To	
46500	46530	30
46530	46600	70
46600	46800	200
46800	46900	100
46900	46970	70
46970	47200	230
47200	47250	50
47250	47350	100
47350	47700	350
47700	48000	300
48000	48300	300
48300	48400	100
48700	48800	100
48800	49000	200
49000	49120	120
50300	50380	80
50380	50500	120
50620	50800	180
50800	51040	240
51040	51200	160
51300	51600	300
51700	52280	580
52280	52350	70
52350	52550	200
52550	52780	230
52780	52830	50
52830	53064	234
53064	53400	336
53400	53500	100
53500	53800	300
53800	53900	100

Design Chainage		Length(m)
From	To	
53900	54230	330
54230	54530	300
54660	54800	140
54800	54950	150
54950	55300	350
55300	55400	100
55400	55430	30
55430	55830	400
55830	56300	470
56300	56900	600
56900	57000	100
57000	57250	250
57250	57300	50
57300	57570	270
57570	57740	170
57740	57900	160
57900	58000	100
58000	58400	400
58400	60530	2130
60530	60650	120
60650	60800	150
60800	60880	80
60880	61050	170
61050	61700	650
61700	62000	300
62000	62500	500
62500	62600	100
62600	62660	60
62660	62700	40
62700	62800	100
62800	62850	50

Design Chainage		Length(m)
From	To	
62850	63080	230
63080	63200	120
63200	64030	830
64030	64050	20
64050	64090	40
64090	64290	200
64290	64450	160
64450	64630	180
64630	64900	270
64900	64970	70
64970	65000	30
65000	65150	150
65150	65190	40
65190	65250	60
65250	65400	150
65400	65450	50
65450	65610	160
65610	65810	200
Total length (in m)		**29110**

Profile correction course for the WMM shall be done asper following:

Design Chainage		Length(m)
From	To	
33000	33510	510
33510	33600	90
43620	43800	180
43800	43980	180
43980	44080	100
44080	44200	120
44270	44330	60
44560	44700	140
44700	44780	80
44780	44900	120
44970	45160	190
48400	48700	300
49120	49284	164
49400	49500	100
50180	50300	120
50500	50620	120
51200	51300	100
51600	51700	100
54530	54660	130
Total length (in m)		**2904**

The Retaining wall shall be constructed asper following:

Location of Retaining walls			
Design Chainage		Height Of Wall (m)	Length(m)
From	To		
33+000	33+020	20	LHS
33+870	33+910	40	LHS
34+540	34+580	40	LHS
35+200	35+300	100	LHS
35+350	35+400	50	LHS

Location of Retaining walls			
Design Chainage		Height Of Wall (m)	Length(m)
From	To		
35+700	35+730	30	LHS
37+860	37+900	40	LHS
38+410	38+432	22	LHS
38+420	38+460	40	LHS
38+590	38+630	40	LHS
38+990	39+020	30	LHS
39+040	39+070	30	LHS
39+100	39+130	30	LHS
39+550	39+580	30	LHS
39+730	39+760	30	LHS
40+280	40+340	60	LHS
40+480	40+510	30	LHS
40+540	40+580	40	LHS
41+260	41+370	110	LHS
41+590	41+620	30	LHS
41+635	41+675	40	LHS
41+700	41+720	20	LHS
45+250	45+280	30	LHS
45+691	45+715	24	LHS
45+770	45+840	70	LHS
46+050	46+100	50	LHS
46+170	46+200	30	LHS
46+220	46+260	40	LHS
46+430	46+460	30	LHS
46+600	46+750	150	LHS
46+950	47+000	50	LHS
47+000	47+060	60	RHS
47+980	48+180	200	RHS
56+640	56+680	40	RHS

Location of Retaining walls			
Design Chainage		Height Of Wall (m)	Length(m)
From	To		
56+840	56+880	40	RHS
57+070	57+110	40	RHS
61+190	61+260	70	LHS
61+430	61+480	50	LHS
62+730	62+780	50	RHS
63+100	63+150	50	RHS
63+200	63+250	50	RHS
63+930	64+020	90	RHS
64+770	64+800	30	RHS
64+850	64+900	50	RHS
Total length (in m)		**2196**	

DBM shall be constructed asper following:

Design Chainage		Length(m)
From	To	
33000	49500	16500
50150	65810	15660
Total length (in m)		**32160**

BC to be constructed in entire project stretch from Km 33.000 to Km 65.810.

The Breast walls shall be constructed asper following:

Location of Breast walls			
Design Chainage		Length of B/Wall of 3m height (m)	Side
From	To		
34+930	34+980	50	RHS
34+930	34+960	30	LHS
35+190	35+205	15	RHS
38+420	38+450	30	RHS
40+260	40+370	110	RHS
40+480	40+520	40	RHS
41+120	41+150	30	RHS
41+260	41+370	110	RHS
43+750	43+780	30	RHS
43+790	43+840	50	RHS
45+244	45+300	56	RHS
44+960	45+040	80	RHS
45+770	45+830	60	RHS
47+700	47+901	201	LHS
48+330	48+400	70	LHS
49+190	49+270	80	LHS
49+286	49+390	104	LHS
49+300	49+390	90	LHS
49+420	49+424	4	LHS
49+465	49+530	65	LHS
49+540	49+630	90	LHS
49+720	49+790	70	LHS
49+870	49+880	10	LHS
49+910	49+920	10	LHS
49+920	49+940	20	LHS
50+240	50310	70	LHS
50+325	50+400	75	LHS
50+450	50+640	190	LHS

Location of Breast walls			
Design Chainage		Length of B/Wall of 3m height (m)	Side
From	To		
50+649	50+740	91	LHS
50+760	50+810	50	LHS
51+150	51+237	87	LHS
51+270	51+330	60	LHS
51+410	51+575	165	LHS
51+800	51+870	70	RHS
51+800	51+935	135	LHS
51+945	52+030	85	LHS
52+030	52+280	250	LHS
52+290	52+350	60	LHS
52+350	52+470	120	LHS
52+684	52+750	66	LHS
52+840	52+960	120	LHS
52+880	52+930	50	RHS
53+430	53+500	70	LHS
53+600	53+700	100	LHS
53+750	53+800	50	LHS
53+824	53+900	76	LHS
53+900	54+020	120	LHS
54+350	54+600	250	LHS
54+550	54+600	50	RHS
54+800	54+985	185	LHS
55+140	55+205	65	LHS
55+250	55+280	30	LHS
55+370	55+500	130	LHS
56+100	56+150	50	RHS
57+000	57+060	60	LHS
57+100	57+170	70	LHS
57+300	57+390	90	LHS

Location of Breast walls			
Design Chainage		Length of B/Wall of 3m height (m)	Side
From	To		
57+400	57+460	60	LHS
57+750	57+900	150	LHS
61+980	62+060	80	LHS
62+160	62+230	70	LHS
63+900	64+020	120	LHS
64+670	64+720	50	LHS
65+480	65+500	20	LHS
Total length (in m)		**5195**	

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SCHEDULE - C

(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

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

(a) Toll plaza[s];

(b) Roadside furniture;

(c) Pedestrian facilities;

(d) Tree plantation;

(e) Truck lay-byes;

(f) bus-bays and bus shelters;

(g) rest areas; and

(h) others to be specified

2 Description of Project Facilities

(a) Toll Plaza

NIL

(b) Road side Furniture

Roadside furniture shall be provided in accordance with the provisions of Section 9 of the Two Lane Manual (IRC: SP 73 -2018).

(c) Pedestrian Facilities

Pedestrians facilities in the form of guard rails, footpath, at grade pedestrian crossing etc. shall be provided wherever required as per section 9 of the Two Lane Manual (IRC : SP 73 -2018).

(d) Tree Plantation:

NIL

(e) Truck lay-byes:

The locations of proposed truck lay byes are as under -

Sl. No.	Existing Km	Design Km	Side	Remarks
NiL				

(f) Bus-byes and Bus Shelter,

The locations of proposed Bus bays are as under -

Sl. No.	Existing Chainage (Km)	Design Chainage (m)	Side	Remarks
1		**7600**	Left	Location may change according to approach road to village
2		**9300**	Left	

(g) Rest areas:

NIL

(h) Others to bespecified:

NIL

SCHEDULE -D

(See Clause2.1)

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:

Two Lane Manual (IRC : SP 73 -2018) of Specifications and Standards for Two Laning Published by Indian Roads Congress.

Annex - I
(Schedule-D)

Specifications and Standards for Construction

1 Specifications and Standards

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

2 Deviations from the Specifications and Standards

2 .1 The terms **'Concessionaire'**, **'Independent Engineer'** and **'Concession Agreement'** used in the Two Lane Manual (IRC : SP 73 -2018) shall be deemed to be substituted by the terms **'Contractor'**, **Authority's Engineer'** and '**Agreement**' respectively.

2.2 NIL

Schedule - E

(See Clauses 2.1 and 14.2)

Maintenance Requirements

1. Maintenance Requirements

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

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

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

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex – I

(Schedule-E)

Repair/rectification of Defects and deficiencies

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

Table -1: Maintenance Criteria for Pavements:

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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
s of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82-2015

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

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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure,	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83 - 2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83 - 2008

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

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

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

In addition to the above performance criterion, the contractor shall strictly maintain the rigid pavements as per requirements in the following table Table -2:

Maintenance Criteria for Rigid Pavements:

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

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

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

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

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

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

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

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

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

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

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

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

Joint Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total joint length	0	Difficult to discern.	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress of water	Clean, widen and reseal the joint. Within 7 days	

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

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

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

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

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

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

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

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

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.			Monthly	Manual Measurements with Odometer along with video/ image backup	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.		IRC:SP 84-2014
		Design Speed, kmph	**Desirable Minimum Sight Distance (m)**	**Safe Stopping Sight Distance (m)**					
		100	360	180					
		80	260	130					
						Visual	Re - painting	Cat-1 Defect –	IRC:35-
Pavement Marking	Wear	<70% of marking remaining			Bi-Annually	Assessment as per Annexure-F of IRC:35-2015		within 24 hours Cat-2 Defect within 2 months -	2015

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m²/lux Bituminous Road - 100mcd/m²/lux			Monthly	As per Annexure-D of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015
		Initial and Minimum Performance for Dry Retro reflectivity during night time:				As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015
		Design Speed	(RL) Retro Reflectivity (mcd/m²/lux)						
			Initial (7 days)	Minimum Threshold level (TL) & warranty period required up to 2 years	Bi-Annually				
	Night Time Visibility								
		Up to 65	200	80					
		65 - 100	250	120					
		Above 100	350	150					
		Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):							

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 Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings Etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as per IRC:67- 2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of	IRC:67-2012
						Gantry/Cantilever Sign boards	
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	hange of ignboard	48 hours in case of Mandatory	RC:67-2012

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

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

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

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

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

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

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

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

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

	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specificatio n 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundatio ns	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specificatio n 2500
	Protectio n works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observatio n or2	IRC: SP 40-1993 and IRC:SP:13-2004.

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

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

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

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

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

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

Schedule - F *(See Clause 4.1 (vii)(a))*

Applicable Permits

1. Applicable Permits

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

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

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

(c) Licence for use of explosives;

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

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

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

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

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

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

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

Schedule – G

(See Clauses 7.1 and 19.2)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

[Managing Director,
NHIDCL, PTI Building, New Delhi]
WHEREAS:

(A) _____[name and address of contractor] (hereinafter called the "**Contractor**") and [NHIDCL, PTI Building, New Delhi], (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "**Agreement**") for **Construction of Balance work of 2 – Laning of existing Akajan-Likabali-Bame Road on EPC basis from design Km 33.00 to Km 65.810 (Existing km 36.00 to km 71.00) in the state of Arunachal Pradesh under SARDP-NE)**, 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 NHIDCL], 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 shall also be operable at our Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

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

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

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

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

(Name)

(Designation)

(Code

Number)

(Address)

NOTES:

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

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

Annex – II

(Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

[Managing Director,

NHIDCL, PTI Building, New Delhi]

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [NHIDCL, PTI Building, New Delhi], (hereinafter called the "**Authority**") for the construction of the **Construction of Balance work of 2 – Laning of existing Akajan-Likabali-Bame Road on EPC basis from design Km 33.00 to Km 65.810 (Existing km 36.00 to km 71.00) in the state of Arunachal Pradesh under SARDP-NE)**, subject to and in accordance with the provisions of the Agreement

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

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid installment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

		Bhawan, 1st Parliament street, New Delhi-110001

13.

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.

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

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. The Contract Price for this Agreement is Rs……../-

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

Table 2.1

Item	Stage For Payment	Weightage Percentage	Percentage Weightage vis a vis OVERALL PROJECT COST
(1)	(2)	(3)	(4)
Road works including culverts, minor bridges, Underpasses, overpasses, approaches to ROB/RUB/ Major bridges/ structures (but excluding service roads) **77.429%**	A. Widening /Strengthening/ Reconstruction & Raising of existing road		
	(i) Earthwork upto top of the subgrade	13.616%	10.543%
	(ii) Granular work (sub base Course)		
	(a) GSB	10.858%	8.407%
	Profile correction of executed GSB	0.348%	0.279%
	(B) WMM	16.144%	12.500%
	Profile correction of executed WMM	0.205	0.159%
	(iii) Bituminous work (Dense Bituminous Macadam	12.883%	9.975%
	(iv) Bituminous work (Bituminous Concrete)	9.276%	7.182%
	C. New culverts, minor bridges, underpasses, overpasses on existing road realignments, bypasses	0.00%	
	(i)Box/Slab Culverts	26.343%	20.379%
	Protection work and crash barrier of executed culverts	7.953%	6.158%
	(ii) Minor bridges		
	Foundation and Sub-Structure.	1.053%	0.825%
	Super Structure	0.828%	0.640%
	Protection work of executed minor bridge	0.493%	0.382%
Major Bridge Works **4.928%**	(ii) Major bridges		
	Foundation	0.920%	0.046%
	Sub-Structure.	68.712%	3.423%
	Super Structure	30.368%	1.513%
Structures (Elevated	Breast Wall	46.716%	4.921%
	Retaining Wall	53.284%	5.614%

sections, reinforced earth) **10.535%**			
Other works **7.054%**	(1) (a) Road side Drains & Toe Wall	71.624 %	5.052%
	(2) Road signs, markings, km stones, delineator, boundary wall etc	7.581%	0.535%
	(b) Crash Barrier/ W metal crash barrier	20.795%	1.467%
	(3) Project facilities	0.00%	0.00%
	(a) Bus bays and Bus Shelter	0.00%	0.00%

3. Procedure of estimating the value of work done

3.1 Road works including approaches to minor bridge, Major bridges and structures (excluding service roads)

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

Table 3.1

Stage For Payment	Weightage Percentage	PAYMENT PERCENTAGE
(1)	(2)	(3)
A. Widening /Strengthening/ Reconstruction & Raising of existing road		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (five) percentage of total length
(i) Earthwork upto top of the subgrade	13.616%	
(ii) Granular work (sub base Course)		
(a) GSB	10.858%	
Profile correction of executed GSB	0.348%	
(B) WMM	16.144%	
Profile correction of executed WMM	0.205	
(iii) Bituminous work (Dense Bituminous Macadam	12.883%	
(iv) Bituminous work (Bituminous Concrete)	9.276%	
C. New culverts, minor bridges, underpasses, overpasses on existing road realignments, bypasses	0.00%	
(i)Box/Slab Culverts	26.343%	Cost of one (01) completed culvert shall be determined pro rata with respect to the total number of culverts. Payment shall be made on completion of one culvert.
Protection work and crash barrier of executed culverts	7.953%	

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

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

Where P = Project Price

L = Total length in Km

3.2 Value of estimating of Minor Bridge/Major Bridge is as:

Procedure for estimating the value of Minor/major bridge works shall be as stated in table

Table 3.2

Stage For Payment	**Weightage Percentage**	**PAYMENT PERCENTAGE**
(1)	(2)	(3)
(i) Minor bridges		
Foundation and Sub-Structure.	1.053%	Cost of one (01) completed minor bridge shall be determined pro rata with respect to the total length of minor bridges. Payment shall be made on completion of each stage of minor bridge as per weightage given in the table.
Super Structure	0.828%	
Protection work of executed minor bridge	0.493%	
(ii) Major bridges		
Foundation	0.920%	Cost of one (01) completed major bridge shall be determined pro rata with respect to the total length of major bridges. Payment shall be made on completion of each stage of major bridge as per weightage given in the table.
Sub-Structure.	68.712%	
Super Structure	30.368%	

3.3 Structures (Elevated sections, reinforced earth)

Procedure for estimating the value of Breast wall/Retaining wall shall be as stated in table

Table 3.3

Stage For Payment	**Weightage Percentage**	**PAYMENT PERCENTAGE**
(1)	(2)	(3)
Breast Wall	46.716%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (five) percentage of total length
Retaining Wall	53.284%	

3.4 other works

Procedure for estimating the value of Breast wall/Retaining wall shall be as stated in table

Table 3.4

Stage For Payment	**Weightage Percentage**	**PAYMENT PERCENTAGE**
(1) (a) Road side Drains & Toe Wall	71.624 %	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (five) percentage of total length
(2) Road signs, markings, km stones, delineator, boundary wall etc	7.581%	
(b) Crash Barrier/ W metal crash barrier	20.795%	
(3) Project facilities	0.00%	
(a) Bus bays and Bus Shelter	0.00%	

4. Procedure for payment for maintenance

4.1 The cost for maintenance shall be stated in Clause 14.1.1.

1.1 4.2 Payment for maintenance shall be made in quarterly installments in accordance with the provisions of Clause 19.7.

Schedule - I

(See Clause 10.2 (iv))

Drawings

1. Drawings

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

2. Additional Drawings

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

Annex – I

(Schedule - I)

List of Drawings

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

Schedule – J

Project Completion Schedule

(See Clause 10.3 (ii))

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 192th day from the Appointed Date (the "**Project Milestone- I**").

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

3. Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the 239th day from the Appointed Date (the "**Project Milestone- II**").

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

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the 467th 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 549th [Scheduled Construction Period] day from the Appointed Date.

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

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

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

2. Tests

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

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

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

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

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

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

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

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

Schedule - L

(See Clause 12.2)

Completion Certificate

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated .....(the "**Agreement**"), for ["**Construction of Balance work of 2 – Laning of existing Akajan-Likabali-Bame Road on EPC basis from design Km 33.00 to Km 65.810 (Existing km 36.00 to km 71.00) in the state of Arunachal Pradesh under SARDP-NE]** through .....(Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name

) (Designation)

(Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

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

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

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

2. Percentage reductions in lump sum payments on monthly basis

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

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

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

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

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

Where,

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

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

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

this Schedule L1= Non-complying length L = Total length of the road,

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

Terms of Reference for Authority's Engineer

1. Scope

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the [NHIDCL, PTI Building, New Delhi 110001] (the "**Authority**") and ..... (the "**Contractor**") for **Construction of Balance work of 2 – Laning of existing Akajan-Likabali-Bame Road on EPC basis from design Km 33.00 to Km 65.810 (Existing km 36.00 to km 71.00) in the state of Arunachal Pradesh under SARDP-NE).,** 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 Engine**er's invited simultaneously with the bid of EPC project, then the status of bidding of EPC project only to be indicated

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

2. Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time Extension;

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

(c) the Termination Payment; or

(d) issuance of Completion Certificate or

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

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

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

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

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

4. Construction Period

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

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

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

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

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

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

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

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

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

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

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

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

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

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

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

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

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

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

5. Maintenance Period

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

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

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

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

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

6. Determination of costs and time

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

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

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

7. Payments

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

(ii) Authority's Engineer shall -

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

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

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

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

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

8. Other duties and functions

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

9. Miscellaneous

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

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

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

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

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

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

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

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

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

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

(f) Deductions:

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

ii. Any amount towards deduction of taxes; and

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

(g) Net claim: (e) – (f) (iii);

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

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

ii. For Change of Scope Orders, and

iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause 20.1)

Insurance

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

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

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, ……. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …… (the "**Agreement**"), for **[Construction of Balance work of 2 – Laning of existing Akajan-Likabali-Bame Road on EPC basis from design Km 33.00 to Km 65.810 (Existing km 36.00 to km 71.00) in the state of Arunachal Pradesh under SARDP-NE]** through (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's

Representative)

(Address)

**** End of the Document ***