

**NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT
CORPORATION LTD.**

(Ministry of Road, Transport & Highways)

Government of India

Schedules

FOR

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

**Engineering, Procurement & Construction
(EPC) Mode**

BID DOCUMENT

December-2016



**National Highways & Infrastructure Development Corporation Ltd
(A Government of India Undertaking)**

SCHEDULE – A
(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

- 1.1 Site of the Two-Laning of Existing **Akajan - Likabali - Bame Road** on EPC basis from Existing km 71+000 to km 99+000 (Design **km 65+810 to km 91+928**) 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.
The Project alignment is approachable for all location for execution of works.
- 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's Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.1 of this Agreement.
- 1.4 The alignment plans of the Project Highway are specified in **Annex-III**. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be modified.
- 1.5 The status of the environment clearances obtained or awaited is given in **Annex-IV**.



"Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"

Annex I (Schedule-A)

1. Site

The Site of the [Two-Lane] Project Highway comprises the section of **Akajan - Likabali - Bame** road commencing from Existing km 71.000 to km 99+000 (Design **km 65+810 to km 91+928**) i.e. New Ego - Basar Section in the State of Arunachal Pradesh. The road is of sub-standard single lane with poor road surface, passing through mountainous terrain, in general. The road is deficient in geometric features at almost all locations. The stretch lies within Lower West Siang district.

The project corridor i.e. **Akajan - Likabali - Bame** passes through settlements of Ego, Padi & Basar

The Index Map is appended at the end of this **Schedule-A**.

2. Chainage References (Existing Vs Design)

“Existing Chainage” means Km Stones existing on the Project Highway. During topography survey, observations are made to these Km stones and after finalization of alignment by improving the existing geometry the chainage has been referred to “Design Chainage”. The relationship between the “Existing Chainage” and the “Design Chainage” as per field surveys of the location of existing Km stones for the “Project Highway” is given below:

SL NO	EXISTING CHAINAGE (KM)	DESIGN CHAINAGE(KM)	REMARKS
1	71.000	65.810	
2	71.500	66.266	
3	72.000	66.770	
4	72.500	67.261	
5	73.000	67.760	
6	73.500	68.247	
7	74.000	68.746	
8	74.500	69.240	
9	75.000	69.749	
10	75.500	70.242	

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SL NO	EXISTING CHAINAGE (KM)	DESIGN CHAINAGE(KM)	REMARKS
11	76.000	70.732	
12	76.500	71.227	
13	77.000	71.672	
14	77.500	72.150	
15	78.000	72.642	
16	78.500	73.122	
17	79.000	73.620	
18	79.500	74.123	
19	80.000	74.604	
20	80.500	75.110	
21	81.000	75.550	
22	81.500	76.010	
23	82.000	76.489	
24	82.500	76.950	
25	83.000	77.450	
26	83.500	77.950	
27	84.000	78.415	
28	84.500	78.885	
29	85.000	79.350	
30	85.500	79.810	
31	85.500-89.000	79.810- 81.966	Realignment
32	89.000	81.966	
33	89.500	82.450	
34	90.000	82.934	
35	90.500	83.431	
36	91.000	83.901	
37	91.500	84.383	
38	92.000	84.872	
39	92.500	85.362	
40	93.000	85.830	
41	93.500	86.312	
42	94.000	86.798	
43	94.500	87.277	
44	95.000	87.772	
45	95.500	88.278	
46	96.000	88.737	
47	96.500	89.225	
48	97.000	89.738	
49	97.500	90.250	
50	98.000	90.750	
51	98.500	91.225	
52	99.000	91.928	



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3 Land

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

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length in m (Design)	Existing/Available ROW (m)	Remarks
	From	To	From	To			
1	71+000	99+000	65+810	91+928	26.118	9m to 12m	No ROW available in realignment stretches of total 7.088 km. as given in para 3.3 of Annexure-1 Schedule-B.

4. Carriageway

The present carriageway of the Project Highway is substandard single lane configuration. The type of the existing pavement is flexible.

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length in m (Design)	Existing Lane Width (m)	Remarks
	From	To	From	To			
1	71+000	99+000	65+810	91+928	26118	3.0- 3.25	Lane width other than realignment portion



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5. Major Bridges

The Site includes the following Medium Size Bridge:

Sl. No.	Design Chainage (km)	Type of Structures			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
1	66+475	Open/Pile	Pier/Abutment	RCC SLAB	2 X 28.00	8.40
2	69+590	Open	Abutment	RCC SLAB	1 X 22.50	4.30
3	89+475	Open	Abutment	RCC SLAB	1 X 53.00	7.80
4	90+975	Open	Abutment	RCC SLAB	1X 34.00	8.40

6. Railway over-bridges (ROB)

The Site includes the following Railway Over Bridges

The site includes the following Railway Over Bridges						
Sl. No.	Chainage (km)	Type of Structures			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Superstructure		
NIL						

7 Grade Separators

The Site includes the following Grade separators

The site includes the following grade separators						
Sl. No.	Chainage (km)	Type of Structures			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
NIL						



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8. Minor Bridges

The Site includes the following minor Bridges:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structures			No. of Spans with Span Length (m)	Total Width (m)
			Foundation	Sub-Structure	Super Structure		
NIL							

9. Railway level crossings / Railway Track

The Site includes the following railway level crossings:

Sl. No.	Road Segment	Existing Chainage (km)	Remarks
Nil			

10. Underpasses (vehicular, Non Vehicular)

The Site includes the following underpasses:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structure	No. of Spans with Span Length (m)	Width (m)
Nil					



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11. Culverts

The Site includes the **166** Nos of culverts at the following locations and types:

SI No	Existing Chainage (KM)	Type of structure	Span/ Dia. (M)	Width of Structure (m)	Remarks
1	71.004	BOX	0.60	7.2	
2	71.120	CAUSWAY	7	7	
3	71.286	BOX	0.60	6.2	
4	71.461	BOX	0.60	6.2	
5	71.941	BOX	0.60	6.2	RHS NO HEADWALL ANDPARTLY BLOCKED
6	72.760	BOX	0.60	7	
7	72.175	BOX	0.60	6	LHS NO HEADWALL
8	72.278	BOX	0.60	6.3	PARTLY BLOCKED
9	72.359	PIPE	0.60	7	LHS NO HEADWALL
10	72.426	SLAB	8	7.4	FAIR
11	72.522	BOX	0.60	6.5	
12	72.560	BOX	0.60	7	PARTLY BLOCKED
13	72.789	BOX	1.5	7.2	PARTLY BLOCKED
14	72.914	BOX	0.65	6.8	PARTLY BLOCKED
15	72.951	BOX	1	7	
16	73.091	BOX	0.60	6	BOTH SIDE NOT HEADWALL
17	73.189	BOX	1.5	6.5	PARTLY BLOCKED
18	73.281	BOX	0.60	6.8	PARTLY BLOCKED
19	73.411	CAUSEWAY		35	
20	73.588	SLAB	1.5	7.8	
21	73.772	BOX	0.60	6	RHS NO HEADWALL
22	74.420	BOX	0.60	6.4	
23	74.560	BOX	0.60	7	BOTH SIDE NOT HEADWALL
24	74.706	SLAB	1.20	6.2	
25	74.919	BOX	0.60	6.2	
26	75.063	BOX	1.00	7.3	PARTLY BLOCKED
27	75.164	PIPE	0.90	6.6	BOTH NO HEADWALL
28	75.268	PIPE	0.60	5.8	PARTLY BLOCKED

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Sl No	Existing Chainage (KM)	Type of structure	Span/ Dia. (M)	Width of Structure (m)	Remarks
29	75.408	BOX	1.60	6.7	RHS NO HEADWALL
30	75.729		BLOCKED	5.6	LHS NO HEADWALL AND BLOCK CULVAT
31	75.933	BOX	0.60	7.2	LHS NO HEADWALL AND PARTLY BLOCKED
32	76.551	CAUSEWAY	17.00		VP
33	76.143	BOX	BLOCKED	7	RHS NO HEADWALL AND BLOCK CULVAT
34	76.393	PIPE	0.60	6.5	RHS NO HEADWALL AND PARTLY BLOCKED
35	76.566	CAUSEWAY	20.00		VP
36	76.708	BOX	0.60	6.1	
37	76.832	BOX	0.60	6.15	PARTLY BLOCKED
38	76.924	BOX	0.60	5.5	RHS NO HEADWALL AND PARTLY BLOCKED
39	77.136		BLOCKED	6.4	RHS NO HEADWALL AND BLOCK CULVAT
40	77.334	BOX	0.60	6.7	
41	77.611	CAUSEWAY	3.90		VP
42	77.753	BOX	BLOCKED	6.5	RHS NO HEADWALL AND BLOCK CULVAT
43	77.949	BOX	0.60	6.4	LHS NO HEADWALL
44	78.063	BOX	1.00	7	RHS NO HHEADWALL
45	78.289	BOX	1.50	6.8	LHS NO HEADWALL
46	78.371	BOX	0.60	6.8	RHS NO HEADWALL AND PARTLY BLOCKED
47	78.455	CAUSEWAY	42.74		
48	78.509	SLAB	6.00	4.3	NALAH
49	78.684		BLOCKED	6.9	LHS NO HEADWALL AND BLOCK CULVAT
50	78.836	BOX	0.60	6.7	RHS NO HEADWALL AND PARTLY BLOCKED
51	78.952	BOX	0.60	6.2	
52	79.100	SLAB	5.80	6.9	NALAH
53	79.100	SLAB	8.00	6.9	NALAH
54	79.100	SLAB	6.10	6.9	NALAH
55	79.230	BOX	0.60	6.8	PARTLY BLOCKED
56	79.426	BOX	0.60	5.8	PARTLY BLOCKED
57	79.525		BLOCKED	6	LHS NO HEADWALL AND BLOCK CULVAT
58	80.321	SLAB	8.30	7.3	
59	80.393	SLAB	1.20	7	RHS NO HEADWALL\
60	80.455	BOX	1.20	6.6	LHS NO HEADWALL AND PARTLY BLOCKED
61	80.735	BOX	1.50	7.4	
62	81.049		BLOCKED	7	BLOCK CULVAT
63	81.242	BOX	0.60	6.5	PARTLY BLOCKED
64	81.662	BOX	0.60	6.5	RHS NO HEADWALL AND PARTLY BLOCKED
65	81.776	BOX	0.60	5.9	RHS NO HEADWALL AND PARTLY BLOCKED
66	81.944	BOX	0.60	6.6	RHS NO HEADWALL

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Sl No	Existing Chainage (KM)	Type of structure	Span/ Dia. (M)	Width of Structure (m)	Remarks
67	82.149	BOX	0.60	6.7	PARTLY BLOCKED
68	82.326	BOX	0.60	6.6	PARTLY BLOCKED
69	82.361	BOX	0.40	6.5	
70	82.662	BOX	0.60	6.5	
71	83.314	CAUSEWAY	16.42	5.3	
72	84.224	BOX	0.60	6.5	PARTLY BLOCK RHS NO HEADWALL
73	84.610	BOX	0.60	5.8	PARTLY BLOCK RHS NO HEADWALL
74	84.696	BOX	0.60	5.4	PARTLY BLOCK RHS NO HEADWALL
75	85.112	BOX	0.60	6.5	RHS NO HEADWALL
76	85.329	BOX	0.60	6.2	RHS AND LHS NO HEADWALL
77	85.404	BOX	1.20	6.8	RHS AND LHS NO HEADWALL
78	85.495	BOX	0.60	6.1	BLOCKED
79	85.649	BOX	1.00	6.2	RHS NOT HEADWALL AND PARTLY
80	85.667	BOX	1.50	7	RHS AND LHS NOT HEADWALL AND
81	85.772	BOX	0.80	8.6	PARTLY BLOCKED AND LHS NOT
82	85.839	BOX	0.60	5.8	RHS AND LHS NO HEADWALL AND PARTLY
83	85.978	BOX	0.60	5.8	
84	86.031	BOX	1.70	7.3	
85	86.100	BOX	0.90	7	RHS AND LHS NO HEADWALL AND PARTLY
86	86.156	BOX	0.60	7.4	LHS NO HEADWALL AND PARTLY BLOCKED
87	86.427	BOX	0.70	7.4	
88	86.684	BOX	1.30	7.4	LHS NO HEADWALL
89	86.893	BOX	0.60	7	
90	86.972	BOX	1.10	7	RHS AND LHS NO HEADWALL
91	87.064	BOX	1.40	7	
92	87.257	BOX	0.60	7	
93	87.318	BOX	0.60	5.6	RHS NO HEADWELL
94	87.582	BOX	BLOCKED	6.9	LHS NO HEADWALL AND BLOCKED
95	87.777	BOX	0.60	5.6	RHS NO HEADWALL PARTLY BLOCKED
96	88.142	BOX	0.60	6.5	RHS NO HEADWALL AND PARTLY BLOCKED
97	88.252	BOX	2.00	7.3	RHS NO HEADWALL
98	88.364	BOX	0.50	7.8	PARTLY BLOCKED
99	88.468	BOX	0.56	6.4	RHS NO HEADWALL AND PARTLY BLOCKED
100	88.643	BOX	0.60	7.3	RHS NO HEADWALL AND PARTLY BLOCKED
101	88.872	BOX	0.65	6.3	LHS NO HEADWALL
102	89.510	BOX	0.60	6.6	LHS NO HEADWALL
103	89.149	BOX	0.60	6.8	RHS NO HEADWALL AND PARTLY BLOCKED
104	89.176	BOX	1.20	7.5	BOTH SIDE NOT HEADWALL

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Sl No	Existing Chainage (KM)	Type of structure	Span/ Dia. (M)	Width of Structure (m)	Remarks
105	89.403	BOX	0.60	6.2	PARTLY BLOCKED
106	89.595	BOX	0.60	6.6	PARTLY BLOCKED
107	89.672	BOX	0.60	6.32	
108	89.741	BOX	1.50	7	PARTLY BLOCKED
109	90.070	BOX	0.60	6.2	PARTLY BLOCKED
110	90.297	BOX	0.50	6.3	LHS NO HEADWALL AND PRATLY BLOCKED
111	90.424	BOX	0.90	6.85	PARTLY BLOCKED
112	90.628	BOX	1.20	8.6	
113	90.704	BOX	0.65	6.7	
114	90.893	BOX	0.90	7.4	
115	91.151	BOX	1.10	7.6	RHS NO HEADWALL AND PARTLY BLOCKED
116	91.233	BOX	0.65	7.1	
117	91.574	BOX	BLOCKED	5.7	BLOCKED
118	91.855	BOX	BLOCKED	7	BLOCKED
119	92.891	BOX	0.60	9	FAIR
120	92.215	BOX	0.70	6	PARTLY BLOCKED
121	92.328	BOX	5.70	7	PARTLY BLOCKED
122	92.410	BOX	1.80	7	PARTLY BLOCKED
123	92.511	BOX	0.70	7.2	
124	92.632	BOX	0.70	6.8	
125	92.739	BOX	0.70	8.3	LHS NO HEADWALL
126	92.812	BOX	0.70	8	LHS NO HEADWALL AND PARTLY BLOCKED
127	92.896	BOX	BLOCKED	6.7	BLOCKED
128	93.058	BOX	0.90	6.6	RHS NO HEADWALL AND PARTLY BLOCKED
129	93.142	BOX	BLOCKED	7.4	BLOCKED
130	93.224	BOX	0.70	6.3	
131	93.287	BOX	1.20	6.7	LHS NO HEADWALL AND PARTLY BLOCKED
132	93.340	BOX	1.50	6.2	PARTLY BLOCKED
133	93.359	BOX	1.50	7.2	PARTLY BLOCKED
134	93.411	BOX	1.00	6.3	PARTLY BLOCKED
135	93.528	BOX	0.70	6.8	
136	93.616	BOX	0.70	6.6	PARTLY BLOCKED
137	93.679	BOX	0.70	6.4	PARTLY BLOCKED
138	93.718	BOX	1.20	6	PARTLY BLOCKED
139	93.820	BOX	2.00	6.4	PARTLY BLOCKED
140	93.863	BOX	0.70	6.6	
141	94.061	BOX	1.20	7.2	LHS NO HEADWALL
142	94.209	BOX	1.20	6.8	LHS NO HEADWALL

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Sl No	Existing Chainage (KM)	Type of structure	Span/ Dia. (M)	Width of Structure (m)	Remarks
143	94.303	BOX	2.00	7.7	
144	94.485	BOX	0.60	6.8	
145	94.665	BOX	0.60	5.8	RHS NO HEADWALL PARTLY BLOCKED
146	94.749	BOX	BLOCKED	6.9	
147	94.841	BOX	0.60	6.6	
148	95.071	BOX	0.50	4.9	RHS NO HEADWALL AND BLOCKED
149	95.169	BOX	1.00X	7	
150	95.309	BOX	1.20	6.8	PARTLY BLOCKED
151	95.373	BOX	BLOCKED	6.5	BLOCKED
152	95.543	BOX	0.60	6.54	
153	95.702	BOX	1.50	6.7	RHS NO HEADWALL
154	95.813	BOX	0.70	6.3	
155	95.921	BOX	BLOCKED	6.5	RHS NO HEADWALL AND BLOCKED
156	96.320	BOX	1.20	7.2	
157	96.300	BOX	BLOCKED	7.2	LHS NO HEADWALL AND BLOCKED
158	96.474	BOX	BLOCKED	6.4	BLOCKED
159	96.923	BOX	0.60	5.8	RHS NO HEADWALL AND PARTLY BLOCKED
160	97.243	SLAB	8.00	7.35	NALAH
161	97.408	BOX	0.80	6.50	LHS NO HEADWALL AND BLOCKED
162	97.562	BOX	0.76	6.90	LHS NO HEADWALL AND BLOCKED
163	97.795	BOX	0.60	6.50	RHS NO HEADWALL AND PARTLY BLOCKED
164	97.903	BOX	0.70	7.00	LHS NO HEADWALL AND BLOCKED
165	98.693	PIPE	0.9	8.00	RHS NO HEADWALL AND PARTLY BLOCKED
166	99.037	BOX	0.93	7.50	RHS NO HEADWALL AND PARTLY BLOCKED

12. Bus Shelters

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

S. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
1	Ego	71+80		Left	
2	Dali	75+00		Left	
3	Padi	76+50		Left	
4	Padi	77+00			Right

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S. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
5	Temple	83+70		Left	
6	Everest	87+50		Left	
7	Basar	96+80		Left	
8	Basar Town	97+975		Left	
9	Old Basar	98+775			Right

13. Truck Lay Bye

The details of truck lay byes on the Site are as follows:

S. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
1	Padi	72.900	19	√	
2	Padi - Dali	76.000	18	√	
3	Rimi Camp	80.889	18	√	
4	Rimi - Everest	84.675	21	√	
5	Kamdak	88.900	20	√	

14. Road side drains.

The details of the road side drains on the Site are as follows:

Sl. No.	Existing Location		Side	Type	
	From (km)	From (km)		Masonry/CC (Pucca)	Earthen (Kutcha)
1	71.000	99.000	Hill Side	-	✓



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15. Major Junctions

The details of major junctions are as follows:

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

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

16. Minor Junctions

The details of major junctions are as follows:

S. No.	Existing Chainage	Design Chainage	Type	
	(Km)	(Km)	'T' Junction	Cross Road both sides
1	91.798	89.523	√	-
2	92.388	90.15		√
3	92.788	90.495		√
4	92.83	90.58	√	
5	92.93	90.71	√	
6	93.135	90.86	√	
7	93.378	91.1	√	
8	93.443	91.177	√	
9	93.51	91.235	√	
10	93.564	91.3	√	
11	93.723	91.45	√	
12	93.838	91.573	√	
13	93.985	91.713	√	
14	94.006	91.832	√	
15	94.111	89.523	√	

17. Bypasses

"Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"



The details of bypass are as follows:

S. No.	Name of Proposed Bypass (Town)	Road Segment	Existing Chainage		Length (km)	Carriageway	
			From (km)	To (km)		Width m)	Type
NIL							

18. Other Structures/Details

The details of other structures are as follows:

S No.	Type	Existing Chainage (km)	Length (m)	Width
Nil				



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Annex-II
(Schedule-A)

Details for Providing Right of Way

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

Sl. No	Design Chainage		Length (Km)	Existing ROW as per Clause 3 of Schedule A	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To				
(i) 90% of ROW (full width)	65+810	91+928	26+118	9-12 m	24 m To 45m	At appointed date
(ii) Balance Right of way (width)						Within 90 days after the appointed Date as per clause 8.2 of DCA



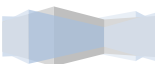
“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Annex-III
(Schedule-A)

Alignment Plans

The existing alignment of the Project Highway shall be modified in the following sections as per the enclosed alignment plan.

ENCLOSED



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Annex-IV
(Schedule-A)

Environmental Clearances

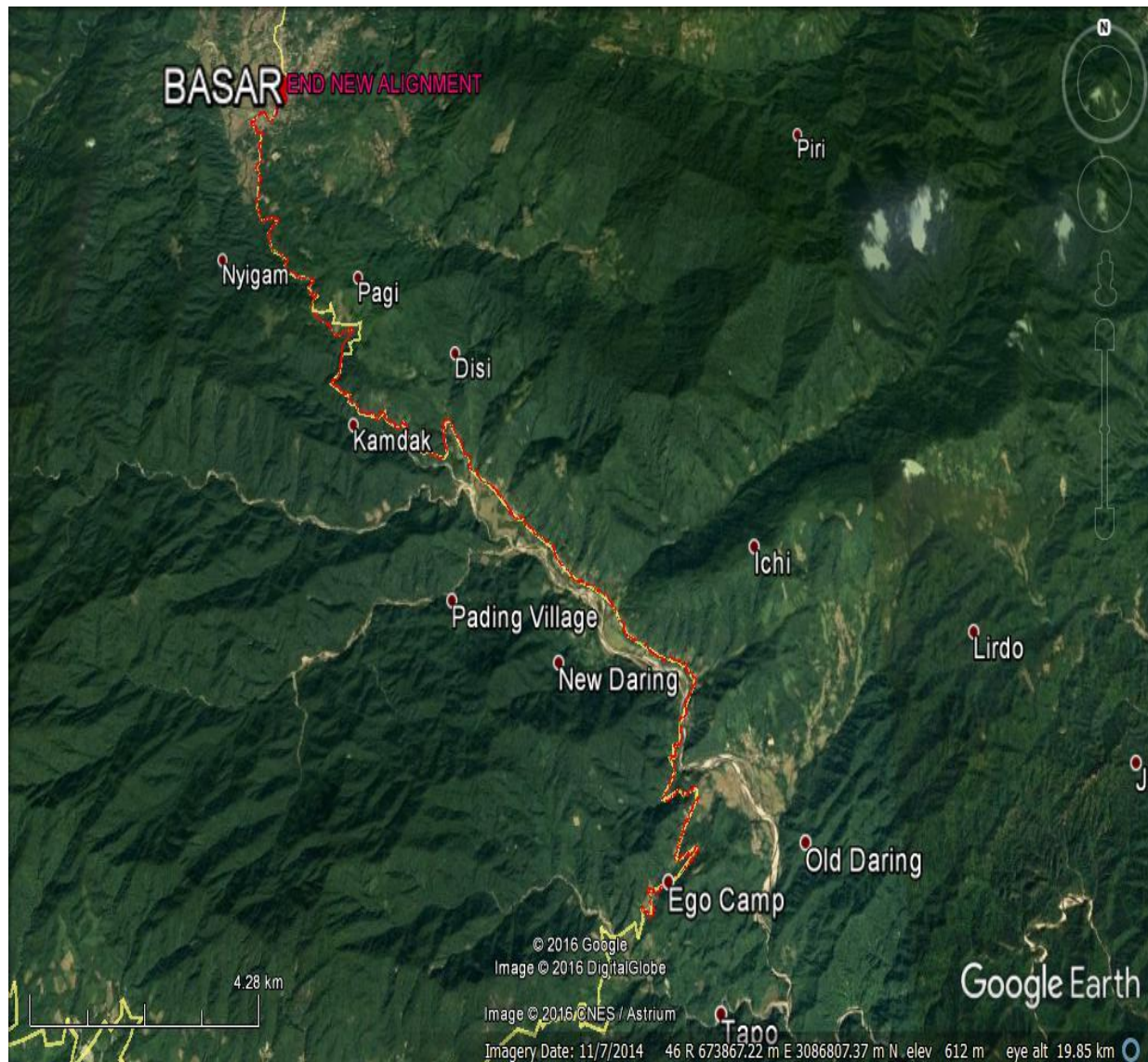
The project Highway does not require Environment Clearance as per M o E F corrigendum dated 22.08.2013.

In addition, the Stage-I Clearance is applied online dated 07.09.2016 which is likely to be received shortly. The Money will be deposited with M o E F for final approval on receipt of Stage-I clearance. Temporary working provision will be ensured before appointed date. All conditions imposed by M o E F while issuing the Approval in Principle(AIP) and final forest clearance(FC) to be adhered during construction stage and after construction stage are to be complied with.

The muck dumping sites in forest area stand identified and freezed by Forest department to be abided by agency during dumping of muck as stated in Schedule 'F'



INDEX MAP OF PROJECT HIGHWAY SECTIONS



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

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

Project is construction/improvement of the existing single lane road two two lane with hard shoulder in accordance with IRC / SP:73: 2015, IRC / SP: 48: 1998 and other relevant codes including standard good practice of the road construction

1.0 SCOPE OF THE PROJECT

1.1 GENERAL

The following sections of this schedule briefly highlight the scope of the work of the 'Project'. The descriptions of the requirements for the various elements of the Project Highway given here in under are the bare minimum requirements for the 'Project'.

In the planning, design and execution of the works and other works in connection with the repair, maintenance or improvement of the Project Highway and functions associated with the construction of the Project Highway and roadside facilities, the Construction Contractor shall take all such actions and do all such things (including, but not limiting to, organizing itself, adopting measures and standards, executing procedures, including inspection procedures and highway patrol, and engaging and managing agents and employees) as will;

- a. enable the NHIDCL to provide an acceptably safe highway in respect of its condition (structural safety) and use (road safety);
- b. enable the NHIDCL to fulfill its statutory and common law obligations;
- c. enable the NHIDCL to provide a congestion free uninterrupted flow of traffic on the Project Highway;
- d. enable the NHIDCL to provide a level of highway service to the public not inferior to that provided on the trunk road during construction or improvement works;
- e. enable the police, local authorities, and others with statutory duties or functions in relation to the Project Highway or adjoining roads to fulfill those duties and functions;
- f. minimize the occurrence and adverse effects of accidents and ensure that all accidents and emergencies are responded to as quickly as possible;
- g. minimize the risk of damage, destruction or disturbance to third party property;
- h. ensure that members of the public are treated with all due courtesy and consideration;
- i. provide a safe, clear and informative system of road signs;



- j. comply with any specified programme requirements, including for the completion of the new road;
- k. enable standards of reliability, durability, accessibility, maintainability, quality control and assurance, and fitness for purpose appropriate to a highway of the character of the Project Highway to be achieved throughout the Contract Period;
- l. ensure adequate off-street parking facilities for both passenger and goods vehicles;
- m. provide adequate bus bays for stopping of buses and bus shelters for commuters to wait under protection;
- n. achieve a high standard in the appearance and aesthetic quality of the Project Highway and achieve integration of the Project Highway with the character of the surrounding landscape through both sensitive design and sensitive management of all visible elements including those on the existing road;
- o. Undertake proper safety audit through an appropriate consultant (i.e. apart from the Authority Engineer)
- p. Carry out accident recording and reporting (to NHIDCL) by type on regular basis; and
- q. Ensure adequate safety of the Project Workers on the work site.

2.0 GEOMETRIC DESIGN AND GENERAL FEATURES

2.1.1 General

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

2.1.2 WIDENING OF THE EXISTING HIGHWAY

Notwithstanding the basic alignment plans enclosed with this document the Construction Contractor shall himself carryout and be responsible for engineering surveys, investigation and detailed engineering designs and prepare the working drawings for all the components relevant for the improvement and up-gradation of the Project Highway to fulfill the scope of the project as envisaged herein under. These shall comply with design specifications and standards given in **Schedule–D**. The designs for different project facilities shall follow the locations and indicative designs given in **Schedule–C** and shall comply with design specifications and standards outlined in **Schedule–D**. All the designs and drawings shall be reviewed by the Authority Engineer prior to execution.



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

2.1.3 Improvement of the existing road geometries

[Refer to paragraph 2.1 (v) of the Manual and provide details]

The hilly gradients shall be corrected in such a way so as to attain a limiting gradient of 6% in order to achieve longitudinal drainage. Also vertical curves shall be improved / introduced so that the vertical curves meet IRC: SP-73 - 2015 standards.

The horizontal alignment of the Project Highway shall be improved as per the standards set out in **Schedule-D**.

The improvement shall be done in consultation with the Authority Engineer / Project Company ensuring that the proposed improvements are accommodated within the land width available as far as practical otherwise action to acquire more land shall be resorted to through NHIDCL.

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

Improvement due to Realignments:

SI.NO.	EXISTING CHAINAGE		DESIGN CHAINAGE		LENGTH (m)
	FROM	TO	FROM	TO	
1	72281	72374	67050	67130	80
2	72950	73400	67700	68150	450
3	76473	76647	71200	71350	150
4	76873	76944	71550	71615	65
5	77976	78200	72550	72823	273
6	80600	81100	75218	75628	410
7	82062	82500	76550	76950	400
8	83615	83800	78050	78220	170



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

9	84238	85000	78650	79350	700
10	85350	88940	79680	81900	2220
11	89600	90421	82550	83350	800
12	90500	90648	83426	83550	124
13	91300	91572	84194	84450	256
14	92488	92807	85350	85650	300
15	93040	93340	85870	86150	280
16	93800	93873	86596	86672	76
17	94200	94300	86995	87184	189
18	95330	95700	88305	88450	145
TOTAL					7088

Probable location of Sharp Curves:

Sl. No	Design Chainage(m)		Side	Remarks
	From	To		
1	70915.512	71057.402	Right	Radius < 300
2	71199.758	71223.275	Right	Radius < 300
3	71358.956	71383.641	Left	Radius < 300
4	71461.271	71490.655	Left	Radius < 300
5	71542.531	71567.526	Right	Radius < 300
6	71601.307	71633.626	Left	Radius < 300
7	71718.644	71777.719	Left	Radius < 300
8	71826.774	71872.023	Right	Radius < 300
9	71928.343	71979.129	Left	Radius < 300
10	72008.151	72039.8	Right	Radius < 300
11	72080.85	72111.254	Left	Radius < 300
12	72140.422	72189.536	Right	Radius < 300
13	72211.238	72310.668	Left	Radius < 300
14	72351.24	72387.195	Right	Radius < 300
15	72459.179	72567.939	Right	Radius < 300
16	72809.6	72927.714	Left	Radius < 300
17	72980.613	73025.136	Right	Radius < 300
18	73093.14	73203.894	Left	Radius < 300
19	73374.634	73407.857	Left	Radius < 300
20	73476.267	73509.886	Right	Radius < 300



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Sl. No	Design Chainage(m)		Side	Remarks
	From	To		
21	73642.591	73663.56	Right	Radius < 300
22	73686.826	73729.633	Left	Radius < 300
23	73760.939	73768.056	Right	Radius < 300
24	73831.637	73840.703	Left	Radius < 300
25	73870.746	73956.284	Right	Radius < 300
26	73979.708	74154.668	Left	Radius < 300
27	74202.14	74246.442	Right	Radius < 300
28	74375.014	74426.688	Left	Radius < 300
29	74508.507	74553.009	Left	Radius < 300
30	74586.241	74627.978	Right	Radius < 300
31	74680.481	74698.141	Right	Radius < 300
32	74744.18	74778.235	Left	Radius < 300
33	74807.676	74850.484	Right	Radius < 300
34	74915.675	75000.302	Left	Radius < 300
35	75066.722	75147.239	Left	Radius < 300
36	75205.093	75256.436	Right	Radius < 300
37	75281.161	75334.011	Left	Radius < 300
38	75401.067	75444.286	Right	Radius < 300
39	75489.468	75521.039	Left	Radius < 300
40	75604.112	75610.533	Right	Radius < 300
41	75667.234	75684.434	Right	Radius < 300
42	75727.945	75760.558	Left	Radius < 300
43	75783.999	75846.047	Right	Radius < 300
44	75921.259	76048.958	Right	Radius < 300
45	76118.441	76158.82	Left	Radius < 300
46	76228.106	76259.388	Right	Radius < 300
47	76281.086	76353.11	Left	Radius < 300
48	76380.138	76427.298	Right	Radius < 300
49	76527.531	76549.795	Left	Radius < 300
50	76684.169	76695.068	Right	Radius < 300
51	76751.064	76773.312	Right	Radius < 300
52	76809.046	76829.899	Left	Radius < 300
53	76857.635	76901.71	Right	Radius < 300
54	76942.882	76955.957	Right	Radius < 300



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Sl. No	Design Chainage(m)		Side	Remarks
	From	To		
55	77001.016	77044.158	Left	Radius < 300
56	77092.824	77101.967	Right	Radius < 300
57	77124.344	77186.323	Left	Radius < 300
58	77213.887	77241.474	Right	Radius < 300
59	77289.043	77390.474	Right	Radius < 300
60	77425.259	77493.168	Left	Radius < 300
61	77532.071	77554.402	Right	Radius < 300
62	77643.291	77687.307	Right	Radius < 300
63	77728.619	77836.304	Left	Radius < 300
64	77941.351	78002.671	Right	Radius < 300
65	78029.791	78075.009	Left	Radius < 300
66	78127.479	78148.425	Left	Radius < 300
67	78233.868	78259.583	Right	Radius < 300
68	78293.36	78345.046	Left	Radius < 300
69	78371.953	78391.22	Right	Radius < 300
70	78430.28	78487.888	Right	Radius < 300
71	78558.601	78621.962	Left	Radius < 300
72	78668.174	78715.164	Right	Radius < 300
73	78765.551	78832.09	Right	Radius < 300
74	78854.757	78928.981	Left	Radius < 300
75	79034.496	79070.447	Right	Radius < 300
76	79101.11	79139.55	Left	Radius < 300
77	79164.627	79187.541	Right	Radius < 300
78	79216.07	79262.209	Left	Radius < 300
79	79298.821	79330.733	Left	Radius < 300
80	79366.763	79403.003	Right	Radius < 300
81	79447.662	79541.694	Right	Radius < 300
82	79612.129	79659.147	Left	Radius < 300
83	79703.414	79737.965	Left	Radius < 300
84	79766.349	79794.671	Right	Radius < 300
85	79817.11	79835.378	Left	Radius < 300
86	79887.385	79909.673	Right	Radius < 300
87	79945.44	79969.954	Left	Radius < 300
88	79996.725	80026.553	Right	Radius < 300



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Sl. No	Design Chainage(m)		Side	Remarks
	From	To		
89	80054.47	80077.739	Left	Radius < 300
90	80174.89	80215.336	Right	Radius < 300
91	80508.654	80526.458	Right	Radius < 300
92	80557.476	80586.193	Left	Radius < 300
93	80602.226	80631.554	Left	Radius < 300
94	80691.91	80713.43	Right	Radius < 300
95	80825.277	80854.926	Left	Radius < 300
96	80899.712	80954.986	Right	Radius < 300
97	81040.312	81074.088	Right	Radius < 300
98	81261.661	81284.198	Left	Radius < 300
99	81566.813	81580.71	Right	Radius < 300
100	81805.271	81868.013	Right	Radius < 300
101	81946.779	81977.989	Left	Radius < 300
102	82015.609	82067.916	Right	Radius < 300
103	82094.047	82135.448	Left	Radius < 300
104	82161.883	82198.97	Left	Radius < 300
105	82221.298	82259.697	Right	Radius < 300
106	82316.376	82321.537	Right	Radius < 300
107	82382.988	82457.662	Right	Radius < 300
108	82506.788	82593.046	Right	Radius < 300
109	82615.463	82710.323	Left	Radius < 300
110	82754.885	82791.998	Right	Radius < 300
111	82817.744	82848.825	Left	Radius < 300
112	82871.029	82904.768	Right	Radius < 300
113	82946.166	82951.225	Left	Radius < 300
114	82980.412	82998.12	Right	Radius < 300
115	83033.068	83051.45	Left	Radius < 300
116	83082.961	83092.717	Right	Radius < 300
117	83135	83178.297	Right	Radius < 300
118	83200.615	83241.025	Left	Radius < 300
119	83311.463	83338.629	Left	Radius < 300
120	83366.1	83390.778	Right	Radius < 300
121	83410.893	83427.263	Left	Radius < 300
122	83448.967	83494.115	Right	Radius < 300



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Sl. No	Design Chainage(m)		Side	Remarks
	From	To		
123	83528.404	83552.11	Left	Radius < 300
124	83647.856	83707.03	Right	Radius < 300
125	83749.953	83834.839	Left	Radius < 300
126	83918.323	83983.092	Right	Radius < 300
127	84018.055	84090.686	Left	Radius < 300
128	84198.583	84206.851	Right	Radius < 300
129	84266.752	84299.963	Left	Radius < 300
130	84328.075	84404.47	Right	Radius < 300
131	84509.94	84519.443	Right	Radius < 300
132	84543.619	84565.01	Left	Radius < 300
133	84588.232	84602.57	Right	Radius < 300
134	84648.083	84662.219	Right	Radius < 300
135	84686.232	84710.668	Left	Radius < 300
136	84748.912	84769.897	Right	Radius < 300
137	84791.607	84807.842	Left	Radius < 300
138	84832.509	84899.077	Right	Radius < 300
139	84925.73	84961.278	Left	Radius < 300
140	84994.219	85027.225	Right	Radius < 300
141	85048.536	85075.97	Left	Radius < 300
142	85098.871	85140.112	Right	Radius < 300
143	85165.226	85218.616	Left	Radius < 300
144	85266.981	85318.017	Left	Radius < 300
145	85368.745	85383.799	Left	Radius < 300
146	85440.011	85497.861	Right	Radius < 300
147	85541.599	85610.794	Left	Radius < 300
148	85682.582	85717.837	Right	Radius < 300
149	85737.918	85762.691	Left	Radius < 300
150	85803.192	85838.891	Right	Radius < 300
151	85868.44	85896.421	Left	Radius < 300
152	85918.753	85936.209	Right	Radius < 300
153	85958.171	85979.12	Left	Radius < 300
154	86057.887	86119.718	Right	Radius < 300
155	86142.306	86174.039	Left	Radius < 300
156	86203.921	86218.636	Right	Radius < 300



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Sl. No	Design Chainage(m)		Side	Remarks
	From	To		
157	86264.911	86297.14	Right	Radius < 300
158	86463.258	86478.149	Left	Radius < 300
159	86539.409	86557.949	Right	Radius < 300
160	86591.631	86620.522	Left	Radius < 300
161	86737.77	86769.878	Right	Radius < 300
162	86829.563	86888.78	Left	Radius < 300
163	86933.436	86957.454	Right	Radius < 300
164	87010.77	87032.224	Right	Radius < 300
165	87074.625	87105.538	Left	Radius < 300
166	87142.981	87219.025	Right	Radius < 300
167	87303.523	87327.979	Right	Radius < 300
168	87413.384	87445.948	Left	Radius < 300
169	87474.336	87510.036	Right	Radius < 300
170	87572.334	87597.31	Left	Radius < 300
171	87639.446	87730.581	Right	Radius < 300
172	87782.939	87821.398	Right	Radius < 300
173	87872.573	87883.686	Right	Radius < 300
174	87948.775	87995.034	Left	Radius < 300
175	88138.271	88180.622	Left	Radius < 300
176	88256.243	88397.643	Right	Radius < 300
177	88428.75	88494.791	Left	Radius < 300
178	88556.333	88584.757	Right	Radius < 300
179	88659.977	88704.331	Right	Radius < 300
180	88753.321	88801.603	Left	Radius < 300
181	88825.488	88890.835	Right	Radius < 300
182	88922.625	88947.523	Left	Radius < 300
183	88986.573	89010.433	Right	Radius < 300
184	89095.864	89130.196	Right	Radius < 300
185	89157.784	89182.178	Right	Radius < 300
186	89206.45	89226.069	Left	Radius < 300
187	89294.643	89307.228	Right	Radius < 300
188	89336.191	89356.953	Right	Radius < 300
189	89390.851	89438.886	Left	Radius < 300
190	89522.135	89565.198	Left	Radius < 300



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Sl. No	Design Chainage(m)		Side	Remarks
	From	To		
191	89587.483	89616.804	Right	Radius < 300
192	89649.158	89681.761	Left	Radius < 300
193	89749.6	89767.56	Left	Radius < 300
194	89879.199	89968.211	Right	Radius < 300

2.2 Design speed

The design speed shall be as per IRC 73 : 2015 however in exceptional cases the minimum design speed of [30 km per hr for hilly and mountainous terrain].

2.3 Proposed Right of Way

[Refer to paragraph 2.3 of the Manual]. Details of the proposed Right of Way are tabulated below.

Sl. No	Design Chainage		Length	Width (m)
	From	To		
1.	65.810	91.928	26.118	24 To 45m

- 2.3.1 The Scheduled date on which the Authority shall provide ROW to the contractor is given in Annexure-II of Schedule A

2.4 Type of Shoulders

Hard Shoulder

[Refer to paragraph 2.6.1 of the Manual and specify]



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

2.5 Width of Carriageway/Roadway width

- 2.5.1 Two-Laning with hard shoulders shall be undertaken. The carriageway shall be [7(seven) m] wide and hard shoulder in accordance with the typical cross sections drawings in the Manual.
- 2.5.2 Except as otherwise provided in this Agreement, the width of the hard shoulder carriageway and cross-sectional features shall conform to Para 2.7 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:

SI No.	Location [Chainage (km)]		Span/Opening (m)	Remarks
	From	To		
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:

SI No.	Location [Chainage(km)]		Span/Opening (m)	Remarks
	From	To		
Nil				

2.8 Service roads

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



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

to paragraph 2.13 of the Manual and provide details]

SI No.	Location of Service Road (km)		Right Hand Side (RHS) / Left Hand Side (LHS) / Both Sides	Length (km) of Service Road
	From	To		
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:

[Refer to paragraphs 2.14.1 of the Manual and provide details]

SI No.	Location of Structure	Length (m)	Number and Length of Spans (m)	Approach Gradient	Remarks, if any
Nil					

2.9.2 In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows: [Refer to paragraphs 2.14.2 of the Manual and specify the type of vehicular under pass/ overpass structure and whether the cross road is to be carried at the existing level, raised or lowered].

SI No.	Location	Type of Structure/Length (m)	Cross Road at			Remarks, if any
			Existing Level	Raised Level	Lowered Level	
Nil						

2.9.3 Cattle and pedestrian underpass / Overpass

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

SI No.	Location	Type of Crossing
Nil		

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



2.10 Typical cross-sections of the Project Highway

Typical cross-sections to be followed as per IRC: SP-73-2015 and in addition the proposed cross section for various situations are given in Fig.B-1 to B-4. These illustrate the widening proposals for the project highway. The Project Highway (length 26+118 km) shall be 2-lane carriageway with 1.5m wide Hard shoulders facility.

Following typical cross sections shall be provided for the Project Highway However to be designed as per manual.

TCS – I: Typical cross section of 2-lane carriageway with Lined Drain

TCS – II: Typical cross section of 2-lane carriageway with Lined Drain & Retaining Wall

TCS – III: Typical cross section of 2-lane carriageway with Lined Drain & Breast Wall

TCS – IV: Typical cross section of 2-lane carriageway with Breast wall & Retaining wall.

TCS – V: Typical cross section of 2-lane carriageway with RCC Covered Drain in Urban Areas

The cross section schedule shall be as follows:

SL.NO	Design Chainage		LENGTH (Km)	TYPE	REMARKS
	FROM	TOTAL			
1	65.810	65.950	0.140	TCS-I	Reconstruction and widening
2	65.950	66.250	0.300	TCS-I	Reconstruction and widening
3	66.250	66.430	0.180	TCS-II	Reconstruction and widening
4	66.430	66.450	0.020	TCS-I	Reconstruction and widening
5	66.450	66.500	0.050	TCS-II	Reconstruction and widening
6	66.500	66.820	0.320	TCS-I	Reconstruction and widening
7	66.820	66.950	0.130	TCS-III	Reconstruction and widening
8	66.950	67.050	0.100	TCS-I	Reconstruction and widening
9	67.050	67.130	0.080	TCS-III	Realignment Section
10	67.130	67.70	0.570	TCS-I	Reconstruction and widening
11	67.700	68.150	0.450	TCS-III	Realignment Section
12	68.150	71.200	3.050	TCS-I,II,V	Reconstruction and widening
13	71.200	71.350	0.150	TCS-III	Realignment Section
14	71.350	71.550	0.20	TCS-I	Reconstruction and widening

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



SL.NO	Design Chainage		LENGTH (Km)	TYPE	REMARKS
	FROM	TOTAL			
15	71.550	71.615	0.065	TCS-I	Realignment Section
16	71.615	72.550	0.935	TCS- I,III	Reconstruction and widening
17	72.550	72.823	0.273	TCS-III	Realignment Section
18	72.823	72.850	0.027	TCS-I	Reconstruction and widening
19	72.850	73.950	1.100	TCS-III	Reconstruction and widening
20	73.950	74.110	0.160	TCS-I	Reconstruction and widening
21	74.110	74.250	0.140	TCS-III	Reconstruction and widening
22	74.250	74.730	0.480	TCS-III	Reconstruction and widening
23	74.730	74.830	0.100	TCS-I	Reconstruction and widening
24	74.830	74.85	0.020	TCS-III	Reconstruction and widening
25	74.85	75.218	0.368	TCS-V	Reconstruction and widening
26	75.218	75.628	0.410	TCS-I	Realignment Section
27	75.628	76.550	0.922	TCS-III, IV	Reconstruction and widening
28	76.550	76.950	0.400	TCS-IV	Realignment Section
29	76.950	78.050	1.100	TCS-I, III	Reconstruction and widening
30	78.05	78.22	0.170	TCS-I	Realignment Section
31	78.220	78.650	0.430	TCS-III	Reconstruction and widening
32	78.650	79.350	0.700	TCS-II,III,IV	Realignment Section
33	79.350	79.680	0.330	TCS-I	Reconstruction and widening
34	79.680	81.900	2.220	TCS-I, II, III, IV, V	Realignment Section
35	81.90	82.550	0.650	TCS- II,IV	Reconstruction and widening
36	82.550	83.350	0.800	TCS-II, IV	Realignment Section
37	83.350	83.426	0.076	TCS- II, IV	Reconstruction and widening
38	83.426	83.550	0.124	TCS- II, IV	Realignment Section
39	83.550	84.194	0.644	TCS- I,II,II	Reconstruction and widening
40	84.194	84.450	0.256	TCS-I, III	Realignment Section
41	84.450	85.350	0.900	TCS-I,II,III,IV,V	Reconstruction and widening
42	85.350	85.650	0.300	TCS-III	Realignment Section
43	85.650	85.870	0.220	TCS-I	Reconstruction and widening
44	85.870	86.150	0.280	TCS-III	Realignment Section
45	86.150	86.596	0.446	TCS-I	Reconstruction and widening
46	86.596	86.672	0.076	TCS-III	Realignment Section
47	86.672	86.995	0.323	TCS-I	Reconstruction and widening
48	86.995	87.184	0.189	TCS-III	Realignment Section
49	87.184	88.305	1.121	TCS-I,III, V	Reconstruction and widening
50	88.305	88.45	0.145	TCS-I	Realignment Section
51	88.450	91.928	3.478	TCS-V	Reconstruction and widening

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



SL.NO	Design Chainage		LENGTH (Km)	TYPE	REMARKS
	FROM	TOTAL			
		TOTAL	26.118		

Note: The extent of cross section type is indicative and shall be reviewed in consultation with the Authority Engineer at the time of construction as per the site condition.

The alternative cross section of the Project Highway at the cross drainage structures shall follow the typical cross section in consultation with the Authority Engineer at the time of construction.

2.11 Longitudinal Section

As a minimum, the Construction Contractor shall achieve the proposed finished road level as indicated in the plan and profile drawings for this purpose in FFSR. However, the final finished road levels (FRL) will be finalized as per site conditions in consultation with NHIDCL.

2.12 Built-Up Areas

The alignment passes through Built up areas as tabulated below.

S no	Existing Chainage		Design Chainage		Name of Village/town etc
	From(km)	TO(km)	From(km)	To (Km)	
1	71.000	72.090	65.810	66.850	EGO
2	74.400	76.500	68.538	71.250	DALI
3	78.200	79.300	72.850	73.950	PADI
4	80.200	81.000	74.850	75.650	RIMI CAMP
5	87.500	87.900	80.850	81.250	EVEREST
6	88.800	89.000	81.750	81.950	KAMDAK
7	95.300	97.267	87.527	90.067	NYGAM
8	97.400	99.000	90.150	91.928	BASAR

3 INTERSECTIONS AND GRADE SEPARATORS

3.1 Introduction

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

[Refer to paragraphs 3.1.1, 3.1.2 and 3.3 of the Manual and specify the requirements. Explain where necessary with drawings/sketches/general arrangement].

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



There are no intersections with cross roads having bituminous surfacing. The cross roads fall into the category VRs. The Construction Contractor has to construct the following:

- i) Typical junction treatments as specified in Final Project Report shall be applied. Design types of intersections are as given below:

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

3.2 At-grade Intersections

(a) Major Intersections

SI No.	Location of Intersection	Intersection Towards	Existing Configurations				Type of Intersection	Figure No.	Other Features
			Location	Type	Width (m)	Surface			
Nil									

Details of junction improvements shall be as per IRC SP: 73-2015.

(b) Minor Intersections

SI No.	Location of Intersection	Type of Intersection	Side
1	89.523	3-Legged	Right side
2	90.15	4-Legged	Both Side
3	90.495	4-Legged	Both Side
4	90.58	3-Legged	Left Side
5	90.71	3-Legged	Right side
6	90.86	3-Legged	Right side
7	91.1	3-Legged	Left Side

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



SI No.	Location of Intersection	Type of Intersection	Side
8	91.177	3-Legged	Right side
9	91.235	3-Legged	Right side
10	91.3	3-Legged	Left Side
11	91.45	3-Legged	Right side
12	91.573	3-Legged	Left Side
13	91.713	3-Legged	Right side
14	91.832	3-Legged	Left Side
15	91.838	3-Legged	Right side

Details of junction improvements shall be as per IRC SP: 73-2015.

3.3 Grade Separated Intersections with/without Ramps

SI No.	Location (km)	Salient Features	Minimum Length of Viaduct to be Provided (m)	Road to be Carried Over/Under the Structures
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 Raising of the existing road [Refer to paragraph 4.2.2 of the Manual and specify sections to be raised].

The existing road shall be raised in the following sections:

Sl No.	Section (km)		Length (km)	Extent of Raising*	Remarks
	From	To			
Nil					

* Difference between levels at proposed c/l and existing road/ground below proposed c/l

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



5 PAVEMENT DESIGN

5.1 General

Pavement design shall be carried out in accordance with section 5 of the Manual. The detailed pavement design including overlay and pavement characteristics requirements of the Project Highway shall be done in accordance with Schedule D. Flexible pavement shall be considered for the project road. Flexible Pavement design shall be carried out in accordance with Section 5 of the Two Lane Manual (IRC: SP 73 -2015).

5.2 Type of pavement

Flexible pavement shall be adopted for Project Highway in accordance with IRC: 37-2012. Clause 2.2 of IRC: 37-2012 identifies five type of flexible pavements. The estimated cost of civil works is based on flexible pavements consisting of Granular base, Sub base, DBM and BC. Since, the successful bidders under EPC mode can use any type of five flexible pavements mentioned Clause 2.2 of IRC: 37-2012, they may carry out their own diligence to arrive at project cost before submitting bids.

5.3 Design requirements

[Refer to paragraph 5.4, 5.9 and 5.10 of the Manual and specify design requirements and strategy]

5.3.1 Design Period and strategy

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

5.4 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of 20 million standard axles as follows.

PACKAGE	Design Chainage (km)		Length (km)	15Year MSA*
	From	To		
	65+ 810	91+928	26+118	20

*As per 5.4.1 of IRC: SP: 73-2015



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

5.5 Design Parameters

The flexible pavement for the main carriageway is a 2-lane carriageway having 1.5 m wide hard shoulder and 1.0 m wide earthen shoulder in some stretches. This shall be designed using the IRC 37: 2012 Method for the projected traffic levels and the following indicative design input parameters:

Indicative Design Parameters

(i)	Performance Period	15 years + Construction Period of 24 months
(ii)	Traffic on Design Lane	Minimum 20 m s a as per IRC-SP-73. Design should take care of the maximum wheel load derived from the axle load survey on the design lane
(iii)	Design serviceability Loss	2.0
(iv)	Reliability	90%
(v)	Overall Standard Deviation	0.49
(vi)	Effective Roadblock Soil Resilient Modulus	Corresponding to 4-day soaked CBR value of 8.0% to 10.0%
(vii)	Layer Coefficients	As per the IRC 37 : 2012 procedures
(viii)	Drainage quality of Pavement	Good

5.5.1 The Project highway will be a light-trafficked section connecting the major arterial network of the country. The design exercise should therefore duly take into account the importance of the road, the performance level and the maintenance requirements during the performance period. The provision of Wet Mix Macadam (granular base)/cement-treated base/ sub-base (crushed stone only)/ sub grade layer(s) and the use of 60/70 Bitumen in bituminous base layers and preferably polymer modified bitumen in wearing course shall be considered while deciding about the composition of the pavement structure. The design should also accompany the Quality Assurance Plan (QAP) along with its implementation scheme for the construction of the pavement structure.

5.5.2 However, in case of a change in the pavement design at the detailed engineering stage, the same shall not be considered as a change in scope of work nor shall qualify for a variation order.

5.5.3 Hard shoulders of 1.5 m width shall have same thickness of the pavement as that of the main carriageway with same composition as that of main carriageway for monolithic construction.



5.5.4 Contractor shall design the pavement for design traffic of 20 million standard axles corresponding sub grade CBR.

5.5.5 Rigid Pavement

No rigid pavement has been considered for the Project Highway.

5.6 Reconstruction / Realignment/ Bypass of sections

[Refer to paragraph 5.9.7 of the Manual and specify the sections, if any, to be reconstructed.]

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

Sl No.	Existing Section (km)		Remarks
	From	To	
1	71+000	85+350	Poor condition of existing pavement
2	85+350	88+900	Proposed Realignment Section
3	88+900	99+000	Poor condition of existing pavement

6 ROAD SIDE DRAINAGE

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per section 6 of the Manual.

The improvements in the drainage and the slope erosion shall be made as per the following norms:

6.1 Drainage Measures

Following measures shall be adopted:

- Open side Trapezoidal drains at the hill side for widening at hill sides.



- ii) Open side Trapezoidal drains at both sides in realignment stretches by hill cut.

Open side trapezoidal cross section drain shall be provided on hill sides of the project highway in order to intercept surface water from the carriageway, shoulders and hill slopes. RCC Lined drains have slopes also been proposed in urban/semi urban/intersection stretches. The concrete drains shall be covered in reaches along commercial establishments and intersections. The drains outfall into the natural water courses i.e. either in culverts or bridges. Table below gives the location of lined drains.

These are guidelines for minimum provisions. However, contractor has to design as per requirement of road in accordance with manual.

Details of Drains :

SL. NO	DESIGN CHAINAGE		LENGTH (M)	SIDE	REMARKS
	FROM	TO			
1	65810	66704	1690	Both	COVERED DRAIN
2	66704	68489	1785	One	LINED DRAIN
3	68489	69709	2440	Both	COVERED DRAIN
4	69709	72150	2441	One	LINED DRAIN
5	72150	73234	2168	Both	COVERED DRAIN
6	73234	75050	1816	One	LINED DRAIN
7	75050	75739	1378	Both	COVERED DRAIN
8	75739	80500	4761	One	LINED DRAIN
9	80500	80897	794	Both	COVERED DRAIN
10	80897	81597	700	One	LINED DRAIN
11	81597	81797	400	Both	COVERED DRAIN
12	81797	87197	5400	One	LINED DRAIN
13	87197	87397	394	Both	COVERED DRAIN
14	87397	87527	130	One	LINED DRAIN
15	87527	89433	3812	Both	COVERED DRAIN
16	89433	89450	17	One	LINED DRAIN
17	89450	91928	3300	Both	COVERED DRAIN
TOTAL LENGTH			33426		

Note: (The above locations shall be reviewed in consultation with the Authority Engineer at the time of construction as per the site condition).



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Trapezoidal section for the drain/ditch has been proposed as it is more economical and efficient as compared to rectangular cross section V-Shaped. These road side drains have been designed of adequate capacity to carry 100% surface runoff of the drainage area of highway ROW and the adjoining land. The side slopes have been kept as 1H: 1V in case of unlined drain/ditches. However, successful bidder may adopt any type of PCC drain as per IRC & accordingly they may carry out their own diligence to arrive at project cost before submitting the bid.

7 DESIGN OF STRUCTURES

7.1 General

The Project road from Ego to Basar, includes provision of **1 major bridges** (span \geq 100m), **9 minor bridges** (span $<$ 60m) **96 box culverts**. All culverts and other 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. New bridges and culverts shall be constructed wide enough to accommodate the adjacent road cross section as given in this Schedule-B. The details of existing culverts are given in Schedule-A.

The details of culverts shall be provided by the EPC Contractor and locations are given in Clause 8.2 of Schedule-B.

All the cross-drainage structures and other structures shall be designed in accordance with the design standards set out in **Schedule-D**.

The following guidelines shall be followed:

- i) All the cross drainage structures for the new carriageway shall be designed in such a way so that the outer most face of railing/parapet shall be in line with the out most edge of shoulder.
- ii) The existing culverts shall be extended to match the new road cross sections.
- iii) The adequacy of the vent size for all culverts/bridges shall be ascertained through detailed hydrological surveys and finalized in consultation with the IC/Project Company. The highest flood level/maximum supply level shall be properly assessed after collecting flood histories from local authorities/interviews with locals/irrigation authorities.



- iv) For drainage purpose the new/to be reconstructed box culverts of minimum span 2.0 m shall be provided.
- v) Suitable river training works, bank protection and embankment protection works ensuring safety of bridge structure and its approaches against damage by flood water / rain water shall be provided.

The cross drainage plan of the highway shall be finalized in consultation with IC/Project Company and if required additional culverts shall be provided.

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 culverts

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

[Refer to paragraph 8.2.3 (i) of the Manual and provide details]. These are guidelines for minimum provisions. However, contractor has to design as per requirement of road in accordance with manual.

* Specify modifications, if any, required in the road level etc.

Sl No	Existing Chainage	size in (M)	Design Chainage	Sl No	chainage	size in (M)	Design Chainage
As Desired							

7.2.3 Additional new culverts shall be constructed as per particulars given in the table below:

BOX CULVERT DETAILS

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



SI No	Existing Chainage (km)	Design Chainage (km)	Proposed Span (m)	Proposal
1	71.286	66.057	2.00	RCC Box/Slab
2	71.461	66.228	1.5	RCC Box/Slab
3	72.175	66.944	2.00	RCC Box/Slab
4	72.278	67.046	2.00	RCC Box/Slab
5	72.522	67.283	2.00	RCC Box/Slab
6	72.789	67.55	2.00	RCC Box/Slab
7	72.951	67.71	2.00	RCC Box/Slab
8	73.091	67.85	2.00	RCC Box/Slab
9	73.189	67.946	2.00	RCC Box/Slab
10	73.588	68.335	2.00	RCC Box/Slab
11	73.772	68.517	2.00	RCC Box/Slab
12	74.42	69.158	2.00	RCC Box/Slab
13	74.56	69.3	2.00	RCC Box/Slab
14	74.706	69.445	2.00	RCC Box/Slab
15	75.063	69.813	2.00	RCC Box/Slab
16	75.164	69.914	2.00	RCC Box/Slab
17	75.268	70.016	2.00	RCC Box/Slab
18	75.408	70.15	2.00	RCC Box/Slab
19	75.729	70.47	2.00	RCC Box/Slab
20	76.143	70.873	2.00	RCC Box/Slab
21	76.708	71.385	2.00	RCC Box/Slab
22	76.924	71.593	2.00	RCC Box/Slab
23	77.136	71.808	2.00	RCC Box/Slab
24	77.949	72.592	2.00	RCC Box/Slab
25	78.371	73.459	2.00	RCC Box/Slab
26	78.836	73.572	2.00	RCC Box/Slab
27	78.952	73.85	2.00	RCC Box/Slab
28	79.23	74.04	2.00	RCC Box/Slab
29	79.426	74.135	2.00	RCC Box/Slab
30	79.525	75.002	2.00	RCC Box/Slab
31	80.393	75.066	2.00	RCC Box/Slab
32	80.455	75.311	2.00	RCC Box/Slab
33	80.735	75.578	2.00	RCC Box/Slab
34	81.049	75.578	2.00	RCC Box/Slab
35	81.242	75.77	2.00	RCC Box/Slab



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

SI No	Existing Chainage (km)	Design Chainage (km)	Proposed Span (m)	Proposal
36	81.776	76.273	2.00	RCC Box/Slab
37	81.944	76.435	2.00	RCC Box/Slab
38	82.361	76.833	2.00	RCC Box/Slab
39	82.588	77.045	2.00	RCC Box/Slab
40	82.662	77.118	2.00	RCC Box/Slab
41	84.224	78.637	2.00	RCC Box/Slab
42	84.61	79.004	2.00	RCC Box/Slab
43	84.696	79.068	2.00	RCC Box/Slab
44	85.112	79.47	2.00	RCC Box/Slab
45	85.329	79.655	2.00	RCC Box/Slab
46	85.404	79.72	2.00	RCC Box/Slab
47	85.495	79.805	2.00	RCC Box/Slab
48	85.649	79.95	2.00	RCC Box/Slab
49	BY PASS	BY PASS	2.00	RCC Box/Slab
50	BY PASS	BY PASS	2.00	RCC Box/Slab
51	BY PASS	BY PASS	2.00	RCC Box/Slab
52	BY PASS	BY PASS	2.00	RCC Box/Slab
53	BY PASS	BY PASS	2.00	RCC Box/Slab
54	BY PASS	BY PASS	2.00	RCC Box/Slab
55	BY PASS	BY PASS	2.00	RCC Box/Slab
56	BY PASS	BY PASS	2.00	RCC Box/Slab
57	BY PASS	BY PASS	2.00	RCC Box/Slab
58	BY PASS	BY PASS	2.00	RCC Box/Slab



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SI No	Existing Chainage (km)	Design Chainage (km)	Proposed Span (m)	Proposal
59	89.51	82.015	2.00	RCC Box/Slab
60	89.149	82.105	2.00	RCC Box/Slab
61	89.403	82.355	2.00	RCC Box/Slab
62	89.595	82.539	2.00	RCC Box/Slab
63	89.741	82.683	2.00	RCC Box/Slab
64	90.07	83.003	2.00	RCC Box/Slab
65	90.297	83.225	2.00	RCC Box/Slab
66	90.704	83.607	2.00	RCC Box/Slab
67	90.893	83.785	2.00	RCC Box/Slab
68	91.233	84.13	2.00	RCC Box/Slab
69	91.574	84.453	2.00	RCC Box/Slab
70	91.855	84.732	2.00	RCC Box/Slab
71	92.328	85.184	2.00	RCC Box/Slab
72	92.41	85.267	2.00	RCC Box/Slab
73	92.632	85.495	2.00	RCC Box/Slab
74	92.896	85.73	2.00	RCC Box/Slab
75	93.287	86.096	2.00	RCC Box/Slab
76	93.411	86.22	2.00	RCC Box/Slab
77	93.528	86.33	2.00	RCC Box/Slab
78	93.616	86.416	2.00	RCC Box/Slab



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

SI No	Existing Chainage (km)	Design Chainage (km)	Proposed Span (m)	Proposal
79	93.718	86.519	2.00	RCC Box/Slab
80	93.82	86.626	2.00	RCC Box/Slab
81	93.863	86.662	2.00	RCC Box/Slab
82	94.061	86.86	2.00	RCC Box/Slab
83	94.209	87.004	2.00	RCC Box/Slab
84	94.303	87.087	2.00	RCC Box/Slab
85	94.485	87.262	2.00	RCC Box/Slab
86	94.749	87.52	2.00	RCC Box/Slab
87	94.841	87.614	2.00	RCC Box/Slab
88	95.07	87.778	2.00	RCC Box/Slab
89	95.169	87.939	2.00	RCC Box/Slab
90	95.309	88.083	2.00	RCC Box/Slab
91	95.702	88.45	2.00	RCC Box/Slab
92	95.813	88.561	2.00	RCC Box/Slab
93	96.032	88.771	2.00	RCC Box/Slab
94	96.3	89.029	2.00	RCC Box/Slab
95	96.474	89.192	2.00	RCC Box/Slab
96	96.923	89.66	2.00	RCC Box/Slab

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

[Refer to paragraph 8.2.3 of the Manual and provide details]

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Proposed Span
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“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



		As desired		

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

7.3 Bridges

7.3.1 The existing bridges to be reconstructed/widened

- (i) The existing bridges at the following locations shall be reconstructed as new structures (Minor Bridge)

Sl No.	Existing Chainage (KM)	Design Chainage (KM)	Proposed Span(m)	Proposed Width(m)	Remarks
1	74+840	69+590	1X22.5	12.000	As per Manual

Sl No	Bridge Location (km)	Salient Details of Existing Bridge					Adequacy or Otherwise of the Existing Waterway, Vertical Clearance etc.	Remarks
		Span Arrangement (m)	Carriageway Width (m)	Total Width (m)	Type of Superstructure	Type of Foundation		
1	71+659	2 X 28.10	7.500	8.40	RCC Slab	Open	5m	Retained as suitable for Two lane Traffic (Railing to be reconstructed)
2	74+840	1 X 22.50	4.300	5.00	RCC Slab	Open	5m	Proposed New Bridge

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

3	96+600	1 X 53.00	7.500	8.40	RCC Slab	Open	7.5m	Retained as suitable for Two lane Traffic
4	98+075	1x 34.00	8.200	8.40	RCC Slab	Open	5.50M	Retained as suitable for Two lane Traffic ned

7.3.2 The following structures shall be provided with footpaths:

SI No.	Location (km)	Remarks
Nil		

7.3.3 Additional New Minor Bridges

New minor bridges at the following locations on the project highways shall be constructed In Package as per manual

Sr. No.	Designed Chainage (km)	River/ Nallah Name	Proposed Span Arrangement (m)
1	65.89	Nallah	1x 10
2	68.16	Nallah	1x 10
3	70.785	Nallah	1x 10
4	71.271	Nallah	1x 10
5	72.258	Nallah	1x 10
6	74.923	Nallah	1x 10
7	77.75	Nallah	1x 10
8	90.975	Nallah	1x 10
9	91.418	Nallah	1x 10

7.3.4 Additional new bridges

[Specify additional new bridges if required, and attach GAD]

One new bridges at the following locations on the Project Highway shall be constructed as per manual



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

SI No.	Location Designed (km)	Total Length (m)	Remarks
1	80+052	102.000	Realignment

- 7.3.5 The railings of existing bridges shall be replaced by crash barriers at the following locations:
[Refer to paragraph 7.18 (iv) of the Manual and provide details]

SI No.	Location (km)	Remarks
Nil		

- 7.3.6 Repairs/replacements of railings/parapets of the existing bridges shall be undertaken as follows:
[Refer to paragraph 7.18 (v) of the Manual and provide details]

SI No.	Location (km)	Remarks
Nil		

- 7.3.7 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 8.21 of the Manual

- 7.3.8 Structures in marine environment

[Refer to paragraph 7.22 of the Manual and specify the necessary measures / treatments for protecting structures in marine environment, where applicable]

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. [Refer to paragraph 8.19 of the Manual and specify modification, if any]

7.4.2 Road over-bridges

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



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

Sl No.	Location of Level Crossing (km)	Length of Bridge (m)
Nil		

7.4.3 Road under-bridges

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

Sl No.	Location of Level Crossing (km)	Number and Length of Span (m)
Nil		

7.5 Grade Separated Structures

[Refer to paragraph 7.20 of the Manual]

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

7.6 Underpasses/Overpasses

There is no Underpass/Overpass proposed on the Project Highway.

7.7 Repairs and strengthening of bridges and structures

[Refer to paragraph 8.23 of the Manual and provide details]

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

A. Bridges



SI No.	Location of Bridge (km)	Nature and Extent of Repairs/Strengthening to be Carried out
Nil		

B. ROB / RUB

SI No.	Location of Bridge (km)	Nature and Extent of Repairs/Strengthening to be Carried out
Nil		

C. Overpasses / Underpasses and Other Structures

SI No.	Location of Bridge (km)	Nature and Extent of Repairs/Strengthening to be Carried out
Nil		

7.8 List of Major Bridges and Structures

The following is the list of Major Bridges on Package

SI No.	Location Design (km)	Total Length (m)	Remarks
1	66.475	56.00	Retained Existing as suitable for Two lane Traffic
2	80.052	102.00	New in Realignment Section
3	89.475	53.00	Retained Existing as suitable for Two lane Traffic
4	90.975	34	Retained Existing as suitable for Two lane Traffic



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

8 TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

8.1 General

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

Specifications of the reflective sheeting [Refer to paragraph 9.3 of the Manual and specify]

Traffic signs and pavements markings shall include roadside signs, overhead signs, curve amount signs and road marking along the Project Highway. The design and marking for the project Highway shall be as per design standards indicated in **Schedule-D** and the location for various treatments shall be finalized in consultation with the Authority Engineer and Project Company.

The road markings shall be applied to lane lines, road center lines, edge lines, continuity line, stop lines, give way lines, directional arrows, diagonal/chevron markings, and Zebra crossings at parking areas.

PCC kerbs (duly painted) approximately 460 RM (minimum) shall be provided by EPC Contractor in bus bays and Islands.

8.2 Road/Traffic Signs

- (i) A complete range of permanent retro-reflective traffic signs as per the requirements defined in but not limited to the FPR, for the safe and efficient movement of traffic. These sign are to be of regulatory, warning and informatory types and placed on the roadside except at the start and end of the project road and start and end of two bypasses where overhead directional and lane designation signs shall be mounted on the steels portals.
- (ii) Temporary traffic and construction signs are to be provided during construction and maintenance operations for traffic diversion and pedestrian safety.

8.3 Pavement Marking



- (i) Retro-reflective thermoplastic paint is proposed for use.
The road markings shall be applied to lane lines, road center lines, edge lines, continuity line, stop lines, give way lines, diagonal/chevron markings, Zebra crossings and at parking areas.
- i) Delineators bollards and other safety devices shall be provided on entire project Highway and other locations as directed by NHIDCL.
- ii) All signs shall be the reflectorized type with high intensity retro-reflective sheeting conforming to ASTM D 4956-01, type VIII and /or type IX of micro prismatic type. All sign boards of size more than 1.2 m and less than 0.9 m shall be provided at the locations finalized in consultation with NHIDCL.
- iii) Cautionary sign boards (900mm Equilateral Triangle), stop sign (900mm Octagonal) mandatory sign boards(600mm dia), Village name boards (600X900mm), Hazard Plate (300X900mm), chevron signboard (600X750mm), Facility information sign (600X800mm), Advance direction sign (1800X1200mm), Place identification sign (1200X900mm) shall be provided by the Construction Contractor with suitable interval in consultation with NHIDCL.

The minimum quantity of Traffic signages and pavement marking are tabulated here for Package

Traffic Signage s, Road Marking and other appurtenances	unit	Quantity
Road Marking on Centre line & Edge	Sq m	6530
90 cm Direction & Place Identification sign	Nos.	38
60 cm Equilateral Triangle	Nos.	100
60 cm Circular	Nos.	75
90 CM High Octagon	Nos.	8
Warning Sign	Nos	20
Information Sign	Nos	18
Delineator on Parapet Wall	Nos	382
Hectometer Stone	Nos.	135
Boundary Stone (as per clause 13 herein under)	Nos.	270
5th km stone	Nos.	5
Km stone	Nos.	22
W Type metal Crash Barrier	R m	7500



9 ROAD SIDE FURNITURE

9.1.1 Roadside furniture shall be provided in accordance with the provisions of Section 11 of the Manual IRC: SP: 73-2007.

9.1.2 Overhead traffic signs: location and size

[Refer to paragraph 11.5 of the Manual and provide details]

The overhead signs shall be the reflectorized type with high intensity retro-reflective sheeting conforming to ASTM D 4956-01, type VIII and /or type IX of micro prismatic type. The retro reflected sheets of Engineering Grade and high intensity grade (ordinary) shall not be used. The height, lateral clearance, location and installation shall be as per relevant clauses of MoRTH specifications. Overhead sign shall be installed ahead of major intersections and urban areas as per detailed design requirements. The minimum number of overhead signs shall be 03 (01 No. of gantry and 02 No. of Cantilever) as per this manual.

10 COMPULSORY AFFORESTATION

[Refer to paragraph 11.1 of the Manual and specify the number of trees which are required to be planted by the Contractor as compensatory afforestation.]

Minimum 2100 nos. trees are required to be planted.

11 HAZARDOUS LOCATIONS

- i) Metal Beam crash barrier length of minimum 10050m (single runner, heavy duty and W-shape) shall be provided at the locations of bridge approaches and high embankments (3.0m and more), at sharp curves on both sides. Heavy duty metal beam crash barriers shall be provided on this project by the Construction Contractor at the locations finalized in consultation with NHIDCL. Typical details of metal crash barrier are given in as per manual.

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

Sl. No	Location		Length (M)	Remarks
	From(M)	To (M)		
1	65810	65841.68	31.68	Radius < 300

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



Sl. No	Location		Length (M)	Remarks
	From(M)	To (M)		
2	65963.7	66009.96	46.263	Radius < 300
3	66327.92	66353.36	25.441	Radius < 300
4	66398.37	66444.35	45.977	Radius < 300
5	66857.88	66885.07	27.187	Radius < 300
6	66962.84	67011.82	48.988	Radius < 300
7	67050.16	67084.35	34.183	Radius < 300
8	67107.69	67135.84	28.152	Radius < 300
9	67169.92	67218.38	48.456	Radius < 300
10	67244.84	67290.23	45.386	Radius < 300
11	67320.83	67351.68	30.851	Radius < 300
12	67378.33	67410.19	31.854	Radius < 300
13	67532.51	67578.51	46	Radius < 300
14	67611.95	67644.63	32.674	Radius < 300
15	67769.35	67794.62	25.274	Radius < 300
16	67826.23	67845.6	19.367	Radius < 300
17	67886.88	67905.06	18.178	Radius < 300
18	67925.73	67973.48	47.746	Radius < 300
19	68144.63	68182.69	38.054	Radius < 300
20	68207.3	68225.33	18.024	Radius < 300
21	68569.45	68592.23	22.782	Radius < 300
22	68651.86	68665.15	13.298	Radius < 300
23	68684.78	68709.24	24.463	Radius < 300
24	69015.88	69063.78	47.901	Radius < 300
25	69471.97	69492.09	20.121	Radius < 300
26	69532.9	69564.13	31.227	Radius < 300
27	69600.24	69632.29	32.043	Radius < 300
28	69658.59	69700.47	41.886	Radius < 300
29	69796.7	69829.37	32.674	Radius < 300
30	69857.66	69878.36	20.7	Radius < 300
31	69898.16	69929.33	31.168	Radius < 300
32	69956.16	69988.78	32.618	Radius < 300
33	70010.27	70041.86	31.588	Radius < 300
34	70083.74	70109.15	25.401	Radius < 300
35	70129.37	70170.66	41.285	Radius < 300
36	70191.26	70214.74	23.48	Radius < 300
37	70239.28	70286.39	47.113	Radius < 300
38	70443.03	70479.31	36.273	Radius < 300
39	70706.17	70741.07	34.897	Radius < 300

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



Sl. No	Location		Length (M)	Remarks
	From(M)	To (M)		
40	70778.59	70821.15	42.554	Radius < 300
41	71199.76	71223.28	23.517	Radius < 300
42	71358.96	71383.64	24.685	Radius < 300
43	71461.27	71490.66	29.384	Radius < 300
44	71542.53	71567.53	24.995	Radius < 300
45	71601.31	71633.63	32.319	Radius < 300
46	71826.77	71872.02	45.249	Radius < 300
47	71928.34	71979.13	50.786	Radius < 300
48	72008.15	72039.8	31.649	Radius < 300
49	72080.85	72111.25	30.404	Radius < 300
50	72140.42	72189.54	49.114	Radius < 300
51	72351.24	72387.2	35.955	Radius < 300
52	72980.61	73025.14	44.523	Radius < 300
53	73374.63	73407.86	33.223	Radius < 300
54	73476.27	73509.89	33.619	Radius < 300
55	73642.59	73663.56	20.969	Radius < 300
56	73686.83	73729.63	42.807	Radius < 300
57	73760.94	73768.06	7.117	Radius < 300
58	73831.64	73840.7	9.066	Radius < 300
59	74202.14	74246.44	44.302	Radius < 300
60	74508.51	74553.01	44.502	Radius < 300
61	74586.24	74627.98	41.737	Radius < 300
62	74680.48	74698.14	17.66	Radius < 300
63	74744.18	74778.24	34.055	Radius < 300
64	74807.68	74850.48	42.808	Radius < 300
65	75401.07	75444.29	43.219	Radius < 300
66	75489.47	75521.04	31.571	Radius < 300
67	75604.11	75610.53	6.421	Radius < 300
68	75667.23	75684.43	17.2	Radius < 300
69	75727.95	75760.56	32.613	Radius < 300
70	76118.44	76158.82	40.379	Radius < 300
71	76228.11	76259.39	31.282	Radius < 300
72	76380.14	76427.3	47.16	Radius < 300
73	76527.53	76549.8	22.264	Radius < 300
74	76684.17	76695.07	10.899	Radius < 300
75	76751.06	76773.31	22.248	Radius < 300
76	76809.05	76829.9	20.853	Radius < 300
77	76857.64	76901.71	44.075	Radius < 300

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



Sl. No	Location		Length (M)	Remarks
	From(M)	To (M)		
78	76942.88	76955.96	13.075	Radius < 300
79	77001.02	77044.16	43.142	Radius < 300
80	77092.82	77101.97	9.143	Radius < 300
81	77213.89	77241.47	27.587	Radius < 300
82	77532.07	77554.4	22.331	Radius < 300
83	77643.29	77687.31	44.016	Radius < 300
84	78029.79	78075.01	45.218	Radius < 300
85	78127.48	78148.43	20.946	Radius < 300
86	78233.87	78259.58	25.715	Radius < 300
87	78371.95	78391.22	19.267	Radius < 300
88	78668.17	78715.16	46.99	Radius < 300
89	79034.5	79070.45	35.951	Radius < 300
90	79101.11	79139.55	38.44	Radius < 300
91	79164.63	79187.54	22.914	Radius < 300
92	79216.07	79262.21	46.139	Radius < 300
93	79298.82	79330.73	31.912	Radius < 300
94	79366.76	79403	36.24	Radius < 300
95	79612.13	79659.15	47.018	Radius < 300
96	79703.41	79737.97	34.551	Radius < 300
97	79766.35	79794.67	28.322	Radius < 300
98	79817.11	79835.38	18.268	Radius < 300
99	79887.39	79909.67	22.288	Radius < 300
100	79945.44	79969.95	24.514	Radius < 300
101	79996.73	80026.55	29.828	Radius < 300
102	80054.47	80077.74	23.269	Radius < 300
103	80174.89	80215.34	40.446	Radius < 300
104	80508.65	80526.46	17.804	Radius < 300
105	80557.48	80586.19	28.717	Radius < 300
106	80602.23	80631.55	29.328	Radius < 300
107	80825.28	80854.93	29.649	Radius < 300
108	81040.31	81074.09	33.776	Radius < 300
109	81261.66	81284.2	22.537	Radius < 300
110	81566.81	81580.71	13.897	Radius < 300
111	81946.78	81977.99	31.21	Radius < 300
112	82094.05	82135.45	41.401	Radius < 300
113	82161.88	82198.97	37.087	Radius < 300
114	82221.3	82259.7	38.399	Radius < 300
115	82316.38	82321.54	5.161	Radius < 300



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Sl. No	Location		Length (M)	Remarks
	From(M)	To (M)		
116	82754.89	82792	37.113	Radius < 300
117	82817.74	82848.83	31.081	Radius < 300
118	82871.03	82904.77	33.739	Radius < 300
119	82946.17	82951.23	5.059	Radius < 300
120	82980.41	82998.12	17.708	Radius < 300
121	83033.07	83051.45	18.382	Radius < 300
122	83082.96	83092.72	9.756	Radius < 300
123	83135	83178.3	43.297	Radius < 300
124	83200.62	83241.03	40.41	Radius < 300
125	83311.46	83338.63	27.166	Radius < 300
126	83366.1	83390.78	24.678	Radius < 300
127	83410.89	83427.26	16.37	Radius < 300
128	83448.97	83494.12	45.148	Radius < 300
129	83528.4	83552.11	23.706	Radius < 300
130	84198.58	84206.85	8.268	Radius < 300
131	84266.75	84299.96	33.211	Radius < 300
132	84509.94	84519.44	9.503	Radius < 300
133	84543.62	84565.01	21.391	Radius < 300
134	84588.23	84602.57	14.338	Radius < 300
135	84648.08	84662.22	14.136	Radius < 300
136	84686.23	84710.67	24.436	Radius < 300
137	84748.91	84769.9	20.985	Radius < 300
138	84791.61	84807.84	16.235	Radius < 300
139	84925.73	84961.28	35.548	Radius < 300
140	84994.22	85027.23	33.006	Radius < 300
141	85048.54	85075.97	27.434	Radius < 300
142	85098.87	85140.11	41.241	Radius < 300
143	85368.75	85383.8	15.054	Radius < 300
144	85682.58	85717.84	35.255	Radius < 300
145	85737.92	85762.69	24.773	Radius < 300
146	85803.19	85838.89	35.699	Radius < 300
147	85868.44	85896.42	27.981	Radius < 300
148	85918.75	85936.21	17.456	Radius < 300
149	85958.17	85979.12	20.949	Radius < 300
150	86142.31	86174.04	31.733	Radius < 300
151	86203.92	86218.64	14.715	Radius < 300
152	86264.91	86297.14	32.229	Radius < 300
153	86463.26	86478.15	14.891	Radius < 300



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Sl. No	Location		Length (M)	Remarks
	From(M)	To (M)		
154	86539.41	86557.95	18.54	Radius < 300
155	86591.63	86620.52	28.891	Radius < 300
156	86737.77	86769.88	32.108	Radius < 300
157	86933.44	86957.45	24.018	Radius < 300
158	87010.77	87032.22	21.454	Radius < 300
159	87074.63	87105.54	30.913	Radius < 300
160	87303.52	87327.98	24.456	Radius < 300
161	87413.38	87445.95	32.564	Radius < 300
162	87474.34	87510.04	35.7	Radius < 300
163	87572.33	87597.31	24.976	Radius < 300
164	87782.94	87821.4	38.459	Radius < 300
165	87872.57	87883.69	11.113	Radius < 300
166	87948.78	87995.03	46.259	Radius < 300
167	88138.27	88180.62	42.351	Radius < 300
168	88556.33	88584.76	28.424	Radius < 300
169	88659.98	88704.33	44.354	Radius < 300
170	88753.32	88801.6	48.282	Radius < 300
171	88922.63	88947.52	24.898	Radius < 300
172	88986.57	89010.43	23.86	Radius < 300
173	89095.86	89130.2	34.332	Radius < 300
174	89157.78	89182.18	24.394	Radius < 300
175	89206.45	89226.07	19.619	Radius < 300
176	89294.64	89307.23	12.585	Radius < 300
177	89336.19	89356.95	20.762	Radius < 300
178	89390.85	89438.89	48.035	Radius < 300
179	89522.14	89565.2	43.063	Radius < 300
180	89587.48	89616.8	29.321	Radius < 300
181	89649.16	89681.76	32.603	Radius < 300
182	89749.6	89767.56	17.96	Radius < 300

The safety barriers, protective works shall also be provided at the hazardous location/lengths.

12. SPECIAL REQUIREMENT FOR HILL ROADS

In accordance with section 13 of the manual (from IRC : SP : 73-2015), IRC :SP-1998 and Recommended practices for Treatment of Embankment and Roadside slopes for Erosion control (First Revision), IRC :56-2011 and relevant IRC codes.



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

12.1 Slope Protection

As the project involves cutting of existing hill slopes, it is imperative that slopes are stabilized for ensuring longevity of the slope and the road. Slope stability, erosion control and landslide correction shall be accomplished in accordance with IRC : SP: 48-1998. Reference may be drawn from IRC :56-2011.

(i) The **minimum quantity** of protection work may be taken as below:

Type of Protection Work		
Protection Work	Unit	Quantity
1. Parapet Wall	Rm	8140
2. Breast wall with PCC	Rm	8630
3. Breast wall sausage type by gabion/ Specialized treatment for slide protection as specified above-	Rm	500
4. Retaining Wall with PCC	Rm	8140
5. Catch water drain	Rm	NIL
6. Vetiver Plantation, Hydro Seeding and Hydro Mulching etc. including nets if required or similar works are to be done for slope protection and site mitigation measure upto a height of 12-15 m all along the road on barren slopes except hard rock location which needs to be protected with appropriate applicable technologies, if required.		

(ii) Location of existing Slide prone zones-

Sl No.	Design Chainage		Length (m)	Remarks
	From	To		
1	89+100	89+800	700	

Note- The Contractor shall be responsible for accurate assessment of the actual requirement as per site situation & prepare designs for slope protection & stabilization as per the specifications & standards stipulated in schedule 'D' and submit the same to the AE for review through the proof consultant and implement it accordingly thereafter.



"Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"

Any increase in quantity over and above the tentative qty. as mentioned in above table or through change in specifications will not be considered as change of scope. Therefore contractor shall make thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features at his own before submission of bid.

12.2 Rip rap Protection:

The **minimum quantity** of riprap protection or similar work to be provided at valley side shoulder in the following locations as special safety feature on valley side on curves.

SL NO	Design Chainage		LENGTH (M)
	FROM	TO	
1	65884.990	65916.990	32.000
2	67321.260	67351.260	30.000
3	67539.510	67571.510	32.000
4	67608.290	67648.290	40.000
5	69532.520	69564.520	32.000
6	69606.270	69626.270	20.000
7	70085.440	70107.440	22.000
8	70137.020	70163.020	26.000
9	70186.000	70220.000	34.000
10	72082.000	72110.000	28.000
11	75221.760	75251.760	30.000
12	75291.590	75323.590	32.000
13	76235.340	76255.340	20.000
14	77079.320	77115.320	36.000
15	77654.840	77678.840	24.000
16	80556.830	80586.830	30.000
17	80602.890	80630.890	28.000
18	82166.430	82194.430	28.000
19	82817.290	82849.290	32.000
20	83931.670	83961.670	30.000
21	85101.490	85137.490	36.000
22	85174.920	85208.920	34.000
23	85687.210	85713.210	26.000
24	85808.040	85834.040	26.000
25	85867.430	85897.430	30.000
26	87077.080	87103.080	26.000
27	87414.670	87444.670	30.000
28	88674.15	88690.15	16.000



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

SL NO	Design Chainage		LENGTH (M)
	FROM	TO	
		TOTAL	810.000

12.3 ROAD LAND BOUNDARY (Clause 12.2 IRC SP: 73 : 2015)

Road land (ROW) boundary shall be demarcated by putting RCC boundary pillars of size 60cm x 15cm x 15 cm embedded in concrete (as per IRC:25) along the Project Highway at 200 m interval on both sides. All the components used in delineating road land boundary shall be aesthetically pleasing, sturdy and vandal proof. The road land boundary shall be demarcated in consultation with NHIDCL.

12.4 Disposal of Debris: - As per Manual**13 CHANGE OF SCOPE**

The length of Structures, bridges and slope protection works whatsoever in terms of retaining wall, breast wall, gabion wall or under special requirement of hill slope 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 and specifications in this Schedule-B shall not constitute a Change of Scope.



SCHEDULE – C*(See Clause 2.1)***PROJECT FACILITIES****4 Project Facilities**

This schedule indicates the minimum spatial and functional requirements of the facilities to be provided on the Project Highway Package No.**DPR/Akajan-Likabali-Bame/2015 (KM71-99)AR/SARDP-NE**, start from design chainage km 65+810 to design chainage km 91+928 at Deed (Total length of 26.118 km) with an aim to cater to the envisaged demand till the end of the concession period.

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

- (a) Roadside furniture
- (b) Pedestrian facilities
- (c) Tree plantation
- (d) Bus shelters
- (e) Passing Places
- (f) Truck lay byes and
- (g) Others to be specified

5 Description of Project Facilities**Toll Plaza**

NIL

Bus Shelters

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

To ensure orderly movement of the through traffic, bus shelters have been proposed outside the residential area, away from bridges, and high embankments and not too close to the road intersections. The bus stops have been proposed on one side of the road.

Bus shelters shall be provided on the Project Highway at 7 locations as mentioned herein under. Bus shelters shall be constructed as per Manual on both sides of the Project Highway. These bus shelters will also have passenger shelter.

Details of Bus shelters

Sl. No.	Project Facility	Design Chainage (km)
1	Bus Shelter	66.550
2	Bus Shelter	69.75
3	Bus Shelter	71.05
4	Bus Shelter	71.85
5	Bus Shelter	78.150
6	Bus Shelter	81.250
7	Bus Shelter	89.550

Pedestrian Facilities

Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with NHIDCL. This should include (a) minimum Zebra Crossing with flashing Beacon or (b) Zebra Crossing with separate pedestrian phase or (c) any other provision as approved by NHIDCL.

Landscaping

Landscape treatment of the Project Highway shall be undertaken through planting of trees and ground cover of appropriate varieties and landscaping on surplus land in the ROW. The



Construction Contractor should plant at least 800 nos. of trees of minimum 6 ft. height with tree guard made up of MS sections.

Plantation scheme shall be prepared in consultation with the Forest Department of the Government of Arunachal Pradesh, and the Independent Consultant/ NHIDCL.

Environment

The Project Highway during design, construction and maintenance during implementation period shall conform to the environmental rules and regulations in force. The Construction Contractor shall be responsible for the same.



SCHEDULE – D
*(See Clause 2.1)***SPECIFICATIONS AND STANDARDS****1. Construction**

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

2. Design Standards

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

Two Lane Manual (IRC: SP 73 – 2015) of Specifications and Standards for Two Laning published by IRC and Hill Road Manual IRC SP 48:1998



Annex – I
(Schedule – D)

Specifications and Standards for Construction

1 Specifications and Standards

All materials, works and construction operations shall confirm to the Two Lane Manual (IRC: SP 73 – 2015) of Specifications and Standards for Two Laning (IRC: SP: 73 – 2015), referred as the Two Lane Manual (IRC: SP: 73 – 2015), and MORTH Specifications for Road and Bridge Works, IRC: SP: 48-1998 and IRC 56-2011. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2 Deviations from the Specifications and Standards

2.1 The terms 'Concessionaire', 'Independent Engineer' and 'Concession Agreement' used in the Two Lane Manual (IRC: SP 73- 2015) 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**

- 1.1 The Contractor shall, at all times maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.
- 1.2 The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfillment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.
- 1.3 All Materials, works and construction operations shall conform to the MORTH Specifications for Road and Bridge Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted.

2 Repair/rectification of Defects and deficiencies

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

3 Other Defects and deficiencies

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

4 Extension of time limit

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

5 Emergency repairs/restoration

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

6 Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

The Contractor shall carry out a detailed pre-monsoon inspection of all bridges, culverts and drainage system before [1st June] every year in accordance with the guidelines contained in IRC: SP : 35. Report of this inspection together with details of proposed maintenance works as required on the basis of this inspection shall be sent to the Authority's Engineer before the [10th June] every year. The Contractor shall complete the required repairs before the onset of the monsoon and send to the Authority's Engineer a compliance report. Post monsoon inspection shall be done by the [30th September] and the inspection report together with details of any damages observed and proposed action to remedy the same shall be sent to the Authority's Engineer.

8. Repairs on account of natural calamities

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

between the Parties.

Annex - I (Schedule -E)

Repair/rectification of Defects and deficiencies

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

	Nature of Defects or deficiency	Time limit for repair/rectification
	Roads	
a	Carriageway and paved shoulders	
I	Breach or blockade	Temporary restoration of traffic within 24 hours; permanent restoration within 15 (fifteen) days
II	Roughness value exceeding 2,200 mm in a stretch of 1 km (as measured by a calibrated bump integrator)	120 (one hundred and twenty) days
III	Pot holes	24 hours
IV	Any cracks in road surface	15(fifteen) days
V	Any depressions, rutting exceeding 10 mm in road surface	30 (thirty) days
VI	Bleeding/skidding	7 (seven) days



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

Nature of Defects or deficiency		Time limit for repair/rectification
VII	Any other defect/ distress on the road	15(fifteen) days
VIII	Damage to pavement edges	15(fifteen) days
IX	Removal of debris, dead animals	6 hours
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
Nature of defects or deficiency		Time limit for repair/rectification
II	Edge drop at shoulders exceeding 40mm	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 hours



	Nature of Defects or deficiency	Time limit for repair/rectification
VII	Railing, parapets, crash barrier	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 hours
II	Painting of km stone, railing, parapets/crash barrier	As and when required /once every year
III	Damaged/missing road signs 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 hours
II	Faults and minor failures	8 hours
e	Trees and plantation	
I	Obstruction in a minimum head-	24 hours

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	Nature of Defects or deficiency	Time limit for repair/rectification
	room of 5 m above carriageway or obstruction in visibility of road signs	
II	Removal of fallen trees from carriageway	4 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 hours
II	Defects in electrical, water and sanitary installations	24 hours
g	Toll Plazas	
h	Other project facilities and approach roads	
I	Damage in approach roads, pedestrian facilities, truck lay- bys, bus-bays, bus -shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and service	15 (fifteen) days

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



	Nature of Defects or deficiency	Time limit for repair/rectification
	roads	
II	Damaged vehicles or debris on the road	4 (Four) hours
III	Malfunctioning crane	4 (Four) hours

BRIDGES**a Superstructures**

I	Any damage, cracks, spalling/scaling	
	Temporary measures	within 48 hours
	Permanent measures	within 15 (fifteen) days or as specified by the Authority's Engineer

b Foundation

I	Scouring and/or cavitation	15 (fifteen) days
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c Piers, abutments, return walls and wing walls

I	Cracks and damages including settlement and tilting, spalling,	30 (thirty) days
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	Nature of Defects or deficiency	Time limit for repair/rectification
	scaling	
d	Bearing (metallic) of bridges	
I	Deformation, damages, tilting or shifting of bearings	14 (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,	30 (thirty) days

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	Nature of Defects or deficiency	Time limit for repair/rectification
	toes, floor or guide bunds	
VII	Growth of vegetation affecting the Structure or obstructing the waterway	15 (fifteen) days
g	Hill Roads	
I	Damage to retaining wall/breast wall	7 (seven) days
II	Landslides requiring clearance	12 (Twelve) hours
III	Snow requiring clearance	24 (Twenty four) hours

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



SCHEDULE - F
(See Clause 3.1.7(a))**APPLICABLE PERMITS****1 Applicable Permits**

1.1 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) License for use of explosives;
- (d) Permission of the State Government for drawing water from river/reservoir;
- (e) License from inspector of factories or other competent Authority for setting up batching plant;
- (f) Clearance of Pollution Control Board for setting up batching plant;
- (g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;
- (h) Permission of Village Panchayats and State Government for borrow earth; and
- (i) Any other permits or clearances required under Applicable Laws.

11.1 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.

2.0 The agency need to ensure compliance of AIP and FC stated in schedules 'A' Annexure - IV The necessary certifications need to be obtained from competent local forest department.

3.0 Muck dumping locations in forest area to be freezed in consultation with the forest department, the necessary certifications from local competent forest department is to be submitted.



SCHEDULE - G

(See Clauses 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE**Annex-I**

(See Clause 7.1.1)

[Performance Security/Additional Performance Security]

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

WHEREAS:

- (A) _____ [name and address of contractor] (hereinafter called the “Contractor”) and National Highways and Infrastructure Development Corporation Ltd. , (hereinafter called the “Authority”) have entered into an agreement (hereinafter called the “Agreement”) for the construction of **“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) 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:

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the National Highways Authority of India, that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.
3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from

enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited 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.

^{\$} Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement).

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 operatable at our..... Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
13. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the details below: -

Sl. 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, 1 st Parliament street, New Delhi-110001

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

"Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"



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 7.5.3)**

Form for Guarantee for Withdrawal of Retention Money

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

WHEREAS:

- (A) [name and address of contractor] (hereinafter called the “Contractor”) has executed an agreement (hereinafter called the “Agreement”) with the National Highways and Infrastructure Development Corporation Ltd., (hereinafter called the “Authority”) for the **“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) 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 7.5.3 of the Agreement, the Contractor may withdraw the retention money (hereinafter called the “Retention Money”) after furnishing to the Authority a bank guarantee for an amount equal to the proposed withdrawal.
- (C) We, through our branch at (the “Bank”) have agreed to furnish this bank guarantee (hereinafter called the “Guarantee”) for the amount of Rs. -----
- cr. (Rs.-----crore) (the “**Guarantee Amount**”).

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

1. The Bank hereby unconditionally and irrevocably 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

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



- Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the National Highways Authority of India, that the Contractor has committed default in the due and faithful performance of all or any of its obligations for 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 Retention Money and 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 Retention Money.
 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 90 (ninety) days after the date of the Completion Certificate specified in Clause 12.4 of the Agreement.
 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 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 operatable at our..... Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked

and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

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

Sl. 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, 1 st 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:

- (iii) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.
- (iv) 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 – III
(Schedule - G)
(See Clause 19.2)**

Form for Guarantee for Advance Payment

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

WHEREAS:

- (A) [name and address of contractor] (hereinafter called the “Contractor”) has executed an agreement (hereinafter called the “Agreement”) with the National Highways and Infrastructure Corporation Ltd., (hereinafter called the “Authority”) for the **“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) 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) 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

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

{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”)^{\$}.

^{\$} *The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment.*

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid installment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the National Highways Authority of India, that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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 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.
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 Advance Payment.
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 on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.

\$ 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).

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 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 operatable at our..... Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment there under 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:-

Sl. No	Particulars	Details
1	Name of the Beneficiary	National Highways and

"Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"



		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, 1 st Parliament street, New Delhi-110001

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

For and on behalf of the bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

Notes:

- i. The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.
- ii. The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.



SCHEDULE - H

(See Clauses 10.1.4 and 19.3)

Contract Price Weightages

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

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

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
Road works including culverts, minor bridges, underpasses, overpasses, approaches to ROB/RUB/ Major Bridges/ Structures (but excluding service roads)	64.649%	A- Widening and strengthening of existing road		
		(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock including Cleaning & grubbing with required site clearance etc.	31.628%	20.447%
		(2) Granular work (sub-base, shoulders)	11.253%	7.275%
		(3) Bituminous work	0.00%	0.00%
		a)DBM With Prime coat & Tack coat.	7.335%	4.742%
		b)BC with Tack coat.	4.234%	2.737%
		(4) Rigid Pavement	0.00%	0.00%
		a)Dry Lean Cement Concrete	0.00%	0.00%
		b)Cement Concrete	0.00%	0.00%

"Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"



ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		(5) Widening and repair of culvert	0.00%	0.00%
		(6) Protection of existing works	0.00%	0.00%
		(7) Widening and repair of minor bridges	0.00%	0.00%
		B - New 2-Lane alignment		
		Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock including Cleaning & grubbing with required site clearance etc.	11.697%	7.562%
		(2) Granular work (sub-base, shoulders)	4.162%	2.691%
		(3) Bituminous work	0.00%	0.00%
		a) DBM With Prime coat & Tack coat.	2.712%	1.753%
		b) BC with Tack coat.	1.737%	1.123%
		(4) Rigid Pavement	0.00%	0.00%
		a) Dry Lean Cement Concrete	0.00%	0.00%
		b) Cement Concrete	0.00%	0.00%
		(5) Protection work	0.00%	0.00%
		(6) RCC/Reinf. Earth retaining Wall in approaches of ROB	0.00%	0.00%
		(7) Drainage Works	0.00%	0.00%
		(8) Protection Work	0.00%	0.00%
		C- New culverts, minor bridges, underpasses, overpasses on existing		

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		road, realignments, bypasses:		
		(1)Box / Slab Culverts	17.863%	11.548%
		(2) HP Culvert	0.00%	0.00%
		(3) Embankment Protection(New Lane)	0.00%	0.00%
		(4) Grade separated structures	0.00%	0.00%
		(5) Overpass	0.00%	0.00%
		(6) Elephant Underpass	0.00%	0.00%
		(7) Approaches to ROB and Viaduct	0.00%	0.00%
		(8) Minor Bridges	7.380%	4.771%
		(9) Cattles/Pedestrian Underpasses	0.00%	0.00%
		(10) Vehicular Underpass	0.00%	0.00%
Major Bridge works and ROB/RUB	3.65%	A- Widening and repairs of Major Bridges		
		(1) Foundation	0.00%	0.00%
		(2) Sub-structure	0.00%	0.00%
		(3)Super-structure(including wearing coat,crash barrier etc. complete in all respect)	0.00%	0.00%
		B- Widening and repair of	0.00%	0.00%
		(a) ROB	0.00%	0.00%
		(b) RUB	0.00%	0.00%
		C- New Major Bridges		
		(1) other Miscellaneous Items	0.00%	0.00%
		(2) Guide Bundh	0.00%	0.00%

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		(3) Foundation	39.068%	1.426%
		(4) Sub structure	22.000%	0.803%
		(5) Super-structure (including wearing coats, crash barriers etc. complete)	38.932%	1.421%
		(6) Protection works	0.00%	0.00%
		D- New rail-road bridges including viaduct	0.00%	0.00%
		(a) ROB	0.00%	0.00%
		(b) RUB	0.00%	0.00%
Structures(Elevated sections, reinforced earth)	0.00%	(1) Foundation	0.00%	0.00%
		(2) Sub-structure	0.00%	0.00%
		(3) Super-structure (including crash barriers etc. complete)	0.00%	0.00%
		(4) Reinforced Earth Wall (includes Approaches of ROB, Underpasses, Overpasses, Flyover etc.)	0.00%	0.00%
Other Works	31.701%			
		(i)Service roads/Slip roads	0.00%	0.00%
		(ii)Toll Plaza	0.00%	0.00%
		(iii)(a)Road side drain & Toe wall	23.286%	7.382%
		(b)Catch water drain/Chute drain	0.00%	0.00%
		(iv)Road signs, marking, Km stones, Safety devices etc.	0.00%	0.00%
		(a)Pavement Marking	0.524%	0.166%
		(b)Crash barrier/W metal crash barrier	3.309%	1.049%

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		(c)Traffic Sign	0.199%	0.063%
		(d)Road Boundary stone, km Stone,5th km stone and hectometer stone	0.044%	0.014%
		(e)Traffic blinker LED delineator,stud,reflective payment marker, tree reflector	0.00%	0.00%
		(f)Solar stud and solar blinking LED	0.00%	0.00%
		(g)Traffic control devices and road safety works	0.00%	0.00%
		(h)Road furniture (overhead signboard etc.)	0.00%	0.00%
		(i)Protection Work (Provision of Rip-Rap or similar work in valley side of the curves as special safety features)	0.801%	0.254%
		(J)Miscellaneous Items	0.126%	0.040%
		(v)Project facilities		
		(a)Truck lay-byes	3.385%	1.075%
		(b)Bus bays and Bus Shelter	2.249%	0.713%
		(c)Major Junction	0.00%	0.00%
		(d)Minor Junction	5.053%	1.602%
		(e)Median filling shrub plantation and maintainance for 1 year	0.00%	0.00%
		(f)Interlocking concrete block pavement	0.00%	0.00%
		(g)CC Kerb	0.00%	0.00%
		(h)Rest area with development of site including one no bus bay	0.224%	0.071%

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		and bus shelter, landscaping and tree plantation		
		(i) Others	0.158%	0.050%
		(j) Road Appurtenances	0.00%	0.00%
		(vi) Repairs to bridges/structures	0.00%	0.00%
		(a) Providing wearing coat	0.00%	0.00%
		(b) Replacement of bearings, joints	0.00%	0.00%
		(c) Providing crash barrier	0.00%	0.00%
		(d) Other items	0.00%	0.00%
		(vii) Road Side Plantation & Median plantation	0.00%	0.00%
		(viii) Repair of protection works	0.00%	0.00%
		(ix) Traffic diversion, Safety and traffic management during construction	0.00%	0.00%
		(x) Miscellaneous item	0.00%	0.00%
		(xi) Slope Protection Works as special requirement for hill road	0.00%	0.00%
		(a) Breast Wall	17.981%	5.70%
		(b) Retaining Wall/Gabion wall	40.762%	12.922%
		(c) Parapet	1.088%	0.345%
		(d) Plantation (Vetiver, Hydro seeding and Mulching or similar techniques etc.) for slope protection on exposed hill slopes as slide mitigation	0.811%	0.257%



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		measure.		
		Total %		100.00%

1.3 Procedure of estimating the value of work done

1.3.1 Road works including approaches to minor bridges, Major Bridges and Structures (excluding service roads).

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



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

TABLE 1.3.1

STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
A-Widening and Strengthening		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock including Cleaning & grubbing with required site clearance etc.	20.447%	
(2) Granular work (sub- base, base, shoulders)	7.275%	
(3) Bituminous work	0.00%	
a) DBM with prime coat and Tack coat	4.742%	
b) BC with Tack coat	2.737%	
(4) Concrete Pavement	0.00%	
a) Dry Lean Cement Concrete	0.00%	
b) Cement Concrete	0.00%	
(6) Widening and repair of culverts	0.00%	Cost of five completed culverts shall be determined pro rata with respect to the total number of culverts. Payment shall be made on the completion of five culverts.
(7) Protection of existing works	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(8) Widening and repair of minor bridges	0.00%	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of a minor bridge.
B- New 2-lane alignment		Unit of measurement is linear length.

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock including Cleaning & grubbing with required site clearance etc.	7.562%	Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(2) Granular work (sub- base, base, shoulders)	2.691%	
(3) Bituminous work	0.00%	
a) DBM with prime coat and Tack coat	1.753%	
b) BC with Tack coat	1.123%	
(4) CC Pavement	0.00%	
(5) Protection Works	0.00%	
(6) RCC / Reinf. Earth ret wall in approaches of RoB	0.00%	
(7) Drainage Works	0.00%	
(8) Protection works	0.00%	
C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:		
(1) Box / Slab Culverts	11.548%	Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of five culverts.
(2) HP Culverts	0.00%	
(3) Embankment Protection (New Lane)	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(4) Grade Separated structures	0.00%	Cost of each structure shall be determined on pro rata basis with respect
(5) Overpasses	0.00%	

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
(6) Elephant underpass	0.00%	to the total number of structures. Payment shall be made on the completion of each number of structures specified.
(7) Approaches to ROB and Viaduct	0.00%	
(8) Minor bridges	4.771%	Cost of each minor bridge/Culvert shall be determined on pro rata basis with respect to the total linear length of the minor bridges/culvert. Payment shall be made on the completion of a minor bridge/culvert.
(9) Cattles/Pedestrian Underpasses	0.00%	Cost of each structure shall be determined on pro rata basis with respect to the total number of structures. Payment shall be made on the completion of each number of structures specified.
(10) Vehicular Underpasses	0.00%	

@. 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 = $P \times \text{weightage for bituminous work} \times (1/L)$

Where P= Contract Price

L = Total length in km

Similarly, the rates per km for stages (1), (2) and (4) above shall be worked out.

1.3 Procedure of estimating the value of work done

1.3.2 Major Bridge works and ROB/RUB.

Procedure for estimating the value of Major Bridge works and of ROB/RUB shall be as stated in table **1.3.2**:



TABLE 1.3.2

STAGE OF PAYMENT	WEIGHTAGE	PAYMENT PROCEDURE
A- Widening and repairs of Major Bridges		Cost of each Major Bridge (widening and repairs) shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridges (widening and repairs). Payment shall be made on completion of each stage of a Major Bridge as per the weightage given in this table.
(1) Foundation	0.00%	
(2) Sub-structure	0.00%	
(3) Super-structure (including wearing coat, crash barriers etc. complete in all respect)	0.00%	
B- Widening and repair of		Cost of each ROB/RUB (widening and repairs) shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB (widening and repairs). Payment shall be made on completion of an ROB/RUB
(a) ROB	0.00%	
(b) RUB	0.00%	
C- New Major Bridges		Payment shall be made on pro rata basis on completion of 25 (twenty five) percent of each stage of a Major Bridge as per the weightage given in this table.
(1) Other Miscellaneous Items	0.00%	
(2) Guide Bund	0.00%	
(3) Foundation	1.426%	
(4) Sub-structure	0.803%	
(5) Super-structure (including wearing coat, crash barriers etc. complete in all respect)	1.421%	
(6) Protection Works	0.00%	
D- New rail-road bridge		Payment shall be made on pro rata basis on completion of 25 (twenty five) percent of each stage of a ROB/RUB as per the weightage given in this table.
(a) ROB	0.00%	
(b) RUB	0.00%	



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

TABLE: 1.3.3

STAGE OF PAYMENT	WEIGHTAGE	PAYMENT PROCEDURE
(1) Foundation: On completion of the foundation works including foundations for wing and return walls	0.00%	Cost of each structure shall be determined on pro rata basis in respect to the total linear length (m) of all the structures. Payment shall be made on completion of each stage of a structure as per the weightage given in this table.
(2) Sub-structure: On completion of abutments, piers up to the abutment/pier cap	0.00%	
(3) Super-structure: On completion of the Structure along with super structure, including hand rails/crash barriers, wing walls, return walls, tests on completion etc., elevated structure complete in all respects and fit for use.	0.00%	
(4) Reinforced earth work	0.00%	Payment shall be made on pro rata basis on completion of 20 (twenty) percent of total area.



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1.3.4 Other works.

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

TABLE 1.3.4

STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
Other Engineering Works		
(i)Service roads/slip road	0.00%	Unit of measurement is linear length in km. Cost per km shall be determined on pro rata basis with respect to the total length of the service roads/slip roads. Payment shall be made for completed service roads/slip roads in a length of not less than 20 (twenty) percent of the total length of service roads/slip roads.
(ii)Toll Plaza	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(iii)(a)Road side drain & Toe wall	7.382%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length
(b)Catch water drain/Chute drain	0.00%	



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STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
(iv) Road signs, marking, Km stones, Safety devices etc.		Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(a) Pavement Marking	0.166%	
(b) Crash barrier/W metal crash barrier	1.049%	
(c) Traffic Sign	0.063%	
(d) Road Boundary stone, km Stone, 5th km stone and hectometer stone	0.014%	
(e) Traffic blinker LED delineator, stud, reflective payment marker, tree reflector	0.00%	
(f) Solar stud and solar blinking LED	0.00%	
(g) Traffic control devices and road safety works	0.00%	
(h) Road furniture (overhead signboard etc.)	0.00%	
(i) Protection Work (Provision of Rip-Rap or similar work in valley side of the curves as special safety features)	0.254%	
(J) Miscellaneous items	0.040%	
(v) Project facilities		
(a) Truck lay-byes	1.075%	
(b) Bus bays and Bus Shelter	0.713%	

“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”



STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
(c)Major Junction	(i)Protection Work (Provision of Rip-Rap or similar work in valley side of the curves as special safety features)	Payment shall be made on pro rata basis for completed facilities.
(d)Minor Junction	1.602%	
(e)Median filling shrub plantation and maintainance for 1 year	0.00%	
(f)Interlocking concrete block pavement	0.00%	
(g)CC Kerb	0.00%	
(h)Rest area with development of site including one no bus bay and bus shelter, landscaping and tree plantation	0.071%	
(i) Others	0.050%	
(j)Road Appurtenances	0.00%	
(vi)Repairs to bridges/structures		Payment shall be made for completed items.
(a)Providing wearing coat	0.00%	
(b)Replacement of bearings, joints	0.00%	
(c)Providing crash barrier	0.00%	
(d)Other items	0.00%	



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STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
(vii) Roadside Plantation & Median Plantation	0.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(viii) Repair of protection works	0.00%	
(ix) Traffic diversion, Safety and traffic management during construction	0.00%	Payment shall be made on prorata basis every six months.
(x) Miscellaneous Items	0.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length
(xi) Slope Protection works as special requirement for hill roads		
(a) Breast wall	5.700%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(b) Retaining wall/Gabion wall	12.922%	
(c) Parapet	0.345%	
(d) Plantation (Vetiver, Hydro seeding and Mulching etc.) for slope protection on exposed hill slopes as slide mitigation measure.	0.257%	

2 Procedure for payment for Maintenance

2.1 The cost for maintenance shall be as stated in Clause 14.1.1.

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



“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”

SCHEDULE - I
(See Clause 10.2.4)
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 Contractor is required to furnish all the drawings as per the manual and clause 10.2]



SCHEDULE - J
(See Clause 10.3.2)**PROJECT COMPLETION SCHEDULE****1 Project Completion Schedule**

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

2 Project Milestone-I

- 2.1 Project Milestone-I shall occur on the date falling on the 180th (one hundred and eightieth) day from the Appointed Date (the“Project Milestone-I”).
- 2.2 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

- 3.1 Project Milestone-II shall occur on the date falling on the 550th (Five hundred and fiftieth) day from the Appointed Date (the “Project Milestone-II”).
- 3.2 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 40% (Fourty per cent) of the Contract Price.



4 Project Milestone-III

- 4.1 Project Milestone-III shall occur on the date falling on the 915th (Nine hundred and fifteenth) day from the Appointed Date (the “Project Milestone- III”).
- 4.2 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 80% (Eighty per cent) of the Contract Price.

5 Scheduled Completion Date

- 5.1 The Scheduled Completion Date shall occur on the 1095th (one thousand ninety fifth) day from the Appointed Date.
- 5.2 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 12.1.2)
Tests on Completion

1 Schedule for Tests

- 1.1 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.
- 1.2 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

- 2.1 Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include all the tests required for quality control or as decided in consultation with the Authority's Engineer at the time of physical tests as per relevant IRC code Manual .
- 2.2 Riding quality test: Riding quality of each lane of the carriageway shall be checked with

the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be 2,000 (two thousand) mm for each kilometer.

- 2.3 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 Non destructive 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.
- 2.4 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.
- 2.5 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.
- 2.6 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

The Authority's Engineer or such other agency or person shall conduct all Tests set forth in this Schedule-K 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.



SCHEDULE - L
(See Clause 12.2 and 12.4)
PROVISIONAL 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 two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"** on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been undertaken to determine compliance of the Project Highway with the provisions of the Agreement.
- 2 Works that are incomplete on account of Time Extension have been specified in the Punch List appended hereto, and the Contractor has agreed and accepted that it shall complete all such works in the time and manner set forth in the Agreement. In addition, certain minor works are incomplete and these are not likely to cause material inconvenience to the Users of the Project Highway or affect their safety. The Contractor has agreed and accepted that as a condition of this Provisional Certificate, it shall complete such minor works within 30 (thirty) days hereof. These minor works have also been specified in the aforesaid Punch List.
- 3 In view of the foregoing, I am satisfied that the **"Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of**

"Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"

Arunachal Pradesh under SARDP-NE", can be safely and reliably placed in service of the Users thereof, and in terms of the Agreement, the Project Highway is hereby provisionally declared fit for entry into operation on this the day of 20.....

ACCEPTED, SIGNED, SEALED

And DELIVERED

For and on behalf of

CONTRACTOR by:

SIGNED, SEALED and

DELIVERED

For and on behalf of

AUTHORITY ENGINEER by:

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 two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"** on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.
- 2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the day of 20.....

SIGNED, SEALED AND DELIVERED For

and on behalf of the Authority's Engineer by:

(Signature)

(Name)

115



"Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"

(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

- 1.1 Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule-E.
- 1.2 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.
- 1.3 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

- 2.1 The following percentages shall govern the payment reduction:

Sl No	Item/Defect/Deficiency	Percentage (%)
a	Carriageway/Pavement	



SI No	Item/Defect/Deficiency	Percentage (%)
I	Potholes, cracks, other surface defects	15
II	Repair of edges, rutting	5
b	Road, Embankment, Cuttings, Shoulders	
I	Edge drop, inadequate crossfall, undulations, settlement, potholes, ponding, obstructions	10
II	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5
c	Bridges and Culverts	
I	Desilting, Cleaning, vegetation, growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20
II	Any Defects in superstructures, bearings and sub-structures	10
III	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers.	5
d	Roadside drains	
I	Cleaning and repair of drains	5
e	Road Furniture	
I	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones.	5



SI No	Item/Defect/Deficiency	Percentage (%)
f	Miscellaneous Items	
I	Removal of dead animals, broken down/accident 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

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

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

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

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

L1 = Non-complying Length

L = Total length of the road

R = Reduction (the amount to be deducted for 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 kilometre, the non-conforming length shall be taken as one kilometre.



SCHEDULE - N
(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

- 1.1 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.
- 1.2 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

- 1.1 These Terms of Reference (the "TOR") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated (the "Agreement"), which has been entered into between the National Highways and Infrastructure Development Corporation Ltd. (the "Authority") and (the "Contractor") for the **"Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE"**, on Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.
- 1.2 The TOR shall apply to construction and maintenance of the Project Highway.

2 Definitions and interpretation

- 2.1 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.
- 2.2 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.

- 2.3 The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Agreement shall apply, mutatis mutandis, to this TOR.

3. General

- 3.1 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.
- 3.2 The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:
- (a) any Time Extension;
 - (b) any additional cost to be paid by the Authority to the Contractor;
 - (c) the Termination Payment; or
 - (d) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding Rs. 5,000,000 (Rs. fifty lakh).
- 3.3 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.
- 3.4 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.
- 3.5 The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.



- 3.6 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**

- 4.1 During the Construction Period, the Authority's Engineer shall review the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1.6. The Authority's Engineer shall complete such review and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.
- 4.2 The Authority's Engineer shall review any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.
- 4.3 The Authority's Engineer shall review the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty-one) days stating the modifications, if any, required thereto.
- 4.4 The Authority's Engineer shall complete the review of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.
- 4.5 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.
- 4.6 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.
- 4.7 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.
- 4.8 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.
- 4.9 For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4.9, the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.
- 4.10 The Authority's Engineer shall test check at least 20 (twenty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.
- 4.11 The timing of tests referred to in Paragraph 4.9, and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.
- 4.12 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.



- 4.13 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.
- 4.14 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.
- 4.15 The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.4.
- 4.16 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.
- 4.17 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.
- 4.18 The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of



Article 12 and Schedule-K.

5. Maintenance Period

- 5.1 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.
- 5.2 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.
- 5.3 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.
- 5.4 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.
- 5.5 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

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



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

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

7. Payments

7.1 The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2.4 (d).

7.2 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.

7.3 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.

7.4 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

- 9.1 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.
- 9.2 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.
- 9.3 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.
- 9.4 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.
- 9.5 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 19.4.1, 19.6.1, and 19.8.1)
Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

- (a) The estimated amount for the Works executed in accordance with Clause 19.3.1 subsequent to the last claim;
- (b) Amounts reflecting adjustments in price for the aforesaid claim;
- (c) The estimated amount of each Change of Scope Order executed subsequent to the last claim
- (d) Amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2.3 (a);
- (e) Total of (a), (b), (c) and (d) above;
- (f) Deductions:
- (i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;



- (ii) Any amount towards deduction of taxes; and
- (iii) Total of (i) and (ii) above.
- (g) Net claim: (e) – (f) (iii);
- (h) The amounts received by the Contractor up to the last claim:
 - (i) For the Works executed (excluding Change of Scope orders);
 - (ii) For Change of Scope Orders, and
 - (iii) Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

- (a) the monthly payment admissible in accordance with the provisions of the Agreement;
- (b) the deductions for maintenance work not done;
- (c) net payment for maintenance due, (a) minus (b);
- (d) amounts reflecting adjustments in price under Clause 19.12; and
- (e) amount towards deduction of taxes

3. Contractor's claim for Damages

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



SCHEDULE - P**(See Clause 20.1)****INSURANCE****1. Insurance during Construction Period**

1.1 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.

1.2 The insurance under paragraph 1.1 (a) and (b) 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 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

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

3.2 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.





“Construction of two-Lane with hard shoulders of Akajan-Likabali-Bame Road on EPC basis from existing Km 71.00 to Km 99.00 [Design Km. 65.810 to Km. 91.928] (Design Length - 26.118 Km) in the state of Arunachal Pradesh under SARDP-NE”