NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

(Ministry of Road, Transport & Highways)

Government of India

Schedules

FOR

"Construction of Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 Km) in the state of Arunachal Pradesh under SARDP-NE"

Engineering, Procurement & Construction (EPC) Mode

BID DOCUMENT

May-2020

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 **Construction of Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 Km) in the state of Arunachal Pradesh under SARDP-NE** , Project Highway shall include the land, buildings, structures and road works as described in Annex-1 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-ll** 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-Ill. 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.

Annex-I
(Schedule-A)

1. Site

The Site of **Construction of Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 Km) in the state of Arunachal Pradesh under SARDP-NE** i.e. from the end of Lungba village to zero-point village 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 Kradaddi district and KurungKumey district.

The project corridor i.e. Joram-Koloriang passes through settlements of Lungba village and Zero-point village.
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	88+700	77+363	
2	88+960	77+783	
3	89+045	77+873	
4	92+155	80+983	
5	92+375	81+083	
6	97+455	86+163	
7	97+610	86+263	
8	99+960	88+613	
9	100+055	88+683	
10	100+175	88+803	
11	100+330	88+963	
12	100+620	89+253	
13	101+180	89+763	
14	102+780	91+363	
15	102+887	91+643	
16	104+850	92+363	

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
1	88+700	104+850	77+363	92+363	15000	24 m	

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)	Lane Width (m)	Remarks
	From	To	From	To			
	88+700	**104+850**	**77+363**	**92+363**	**15000**	**3.0-3.25**	
1			**77+363**	**77+450**	**87**	**3.0-3.25**	
2			**77+450**	**77+660**	**210**	**12.00**	
3			**77+660**	**77+783**	**123**	**3.0-3.25**	
4			**77+783**	**77+873**	**90**	**12.00**	
5			**77+873**	**80+983**	**3110**	**3.0-3.25**	
6			**80+983**	**81+083**	**100**	**12.00**	
7			**81+083**	**83+050**	**1967**	**3.0-3.25**	
8			**83+050**	**83+666**	**616**	**12.00**	
9			**83+666**	**83+770**	**104**	**3.0-3.25**	
10			**83+770**	**83+900**	**130**	**12.00**	

11			**83+900**	**84+000**	**100**	**12.00**	
12			**84+000**	**84+300**	**300**	**12.00**	
13			**84+300**	**85+000**	**700**	**12.00**	
14			**85+000**	**86+000**	**1000**	**12.00**	
15			**86+000**	**86+163**	**163**	**12.00**	
16			**86+163**	**86+263**	**100**	**12.00**	
17			**86+263**	**86+700**	**437**	**12.00**	
18			**86+700**	**86+850**	**150**	**12.00**	
19			**86+850**	**87+300**	**450**	**12.00**	
20			**87+300**	**87+880**	**580**	**12.00**	
21			**87+880**	**88+200**	**320**	**12.00**	
22			**88+200**	**88+440**	**240**	**12.00**	
23			**88+440**	**88+613**	**173**	**12.00**	
24			**88+613**	**88+730**	**117**	**3.0-3.25**	
25			**88+730**	**88+803**	**73**	**12.00**	
26			**88+803**	**88+963**	**160**	**12.00**	
27			**88+963**	**88+990**	**27**	**12.00**	
28			**88+990**	**89+253**	**160**	**12.00**	
29			**89+253**	**89+763**	**510**	**12.00**	
30			**89+763**	**90+000**	**237**	**12.00**	

31			**90+000**	**90+500**	**150**	**12.00**	
32			**90+500**	**90+654**	**154**	**12.00**	
33			**90+654**	**90+900**	**246**	**3.0-3.25**	
34			**90+900**	**91+300**	**300**	**12.00**	
35			**91+300**	**91+643**	**343**	**3.0-3.25**	
36			**91+643**	**91+996**	**353**	**12.00**	
37			**91+996**	**92+080**	**84**	**3.0-3.25**	
38			**92+080**	**92+100**	**20**	**12.00**	
39			**92+100**	**92+363**	**263**	**3.0-3.25**	

5. Major Bridges

The Site includes the following Major Bridges:

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

6. Railway over-bridges (ROB)

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

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

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	Superstructure		
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 Structures	No. of Spans with span length (m)	Total Width (m)
NIL					

11. Culverts

The Site includes the 64 Nos of culverts at the following locations and types:

Sl. No.	Existing Chainage (km)	Type of Culvert	Span/Dia (m)	Width (m)	Remarks
1	88765	SLAB	2	4	
2	88881	SLAB	2	4	
3	89078	SLAB	2	4	
4	89270	SLAB	**2**	4	
5	89358	SLAB	2	4	
6	89920	SLAB	2	4	
7	90035	SLAB	2	4	
8	90273	SLAB	2	4	
9	91016	SLAB	2	4	
10	91045	SLAB	2	4	
11	91478	SLAB	2	4	
12	91680	SLAB	2	4	
13	91931	SLAB	2	**4**	
14	92030	Multicell Hume Pipe Culvert	4	4	
15	92210	SLAB	2	4	
16	92380	SLAB	2	4	
17	92455	SLAB	2	4	
18	92995	SLAB	2	4	
19	93157	SLAB	2	4	
20	94673	SLAB	2	4	
21	94755	SLAB	2	4	
22	95393	SLAB	2	4	
Sl. No.	**Existing Chainage (km)**	**Type of Culvert**	**Span/Dia (m)**	**Width (m)**	**Remarks**
23	95792	SLAB	2	4	
24	95930	SLAB	2	4	
25	96190	SLAB	2	4	
26	96585	SLAB	2	4	
27	96782	SLAB	2	4	
28	97150	SLAB	2	4	
29	97418	SLAB	2	4	
30	97764	SLAB	2	4	
31	97900	SLAB	2	4	
32	98183	SLAB	2	4	
33	98282	SLAB	2	4	
34	98670	SLAB	2	4	
35	98900	SLAB	2	4	
36	99218	SLAB	2	4	

37	99415	SLAB	2	4	
38	99471	SLAB	2	4	
39	99715	SLAB	2	4	
40	99975	SLAB	2	4	
41	100097	SLAB	2	4	
42	100260	SLAB	2	4	
43	100710	SLAB	2	4	
44	100889	SLAB	2	4	
45	101030	SLAB	2	4	
46	101200	SLAB	2	4	
47	101338	SLAB	2	4	
48	101465	SLAB	2	4	
49	101678	SLAB	2	4	
50	101773	SLAB	2	4	
51	102020	SLAB	2	4	
52	102579	SLAB	2	4	
53	102764	SLAB	2	4	
54	103115	SLAB	2	4	
55	103557	SLAB	2	4	
56	103800	SLAB	2	4	
57	103964	SLAB	2	4	
58	104089	SLAB	2	4	
59	104500	SLAB	2	4	
60	104671	SLAB	2	4	
61	104820	SLAB	2	4	

12. Bus Shelters

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

Sl. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
NIL					

13. Truck Lay Bye

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

Sl. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side

NIL

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	88700	88960	LHS		
2	38960	89045	LHS		
3	89045	92270	LHS		
4	92270	92375	LHS		
5	92375	97510	LHS		
6	97510	97610	LHS		
7	97610	99984	LHS		
8	99984	100055	LHS		
9	100055	100177	LHS		
10	100177	100330	LHS		
11	100330	100625	LHS		
12	100625	101180	LHS		
13	101180	102800	LHS		
14	102800	102887	LHS		
15	102887	104850	LHS		

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	NH
NIL								

16. Minor Junctions

The details of major junctions are as follows:

SL. No.	Existing Chainage	Design Chainage	Type

	(Km)	(Km)	'T' Junction	Cross Road both sides
1	92.449	81.303	Y-Junction	-
2	94.355	82.163	Y-Junction	-
3	94.758	82.993	Y-junction	-

17. Bypasses

The details of bypasses are as follows:

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

18. Other Structures/Details

The details of other structures are as follows:

SL. No.	Type	Existing Chainage(Km)	Length (m)	Width (m)
NIL				

Annex-11

Schedule – A
Details for Providing Right of Way

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

SI. No	Design Chainage		Length in km	Existing ROW	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To				
(i) 100% of RoW	77.363	92,363	15.00	**24.0 mtr**	24.0 mtr	Full RoW width is available

Annex-III
(Schedule-A)
Alignment Plans

It is enclosed.

Annex-IV

(Schedule-A)

Environmental Clearances

The following Forest clearance has been obtained:

The project highway does not require environment clearance as per MoEF corrigendum dated 22.08.2013.

Forest Clearance (stage II) has been issued by Ministry of Environment and Forest vide their letter no FOR.3-204/Cons/2016/1769-1775, dated 16th January 2018 (Copy enclosed) after fulfillment of all the stipulated conditions of stage-II approval. The EPC Contractor is to comply with all stipulations pertaining to execution at site during construction as stated in approval in totality.

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

INDEX MAP OF PROJECT HIGHWAY SECTIONS

It is enclosed.

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 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)

Project is construction/ improvement of the existing single lane road to two lane with paved 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. 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 herein 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 patrols, 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 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 Independent consultant / 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: (PKG-II)

Sl.NO.	DESIGN CHAINAGE		EXISTING CHAINAGE		LENGTH
	FROM	TO	FROM	TO	(m)
1	77783	77873	88960	89045	90
2	80983	81083	92155	92375	100
3	86163	86263	97455	97610	100
4	88613	88683	99960	100055	70
5	88803	88963	100175	100330	160
6	89253	89763	100620	101180	510

Sl.NO.	DESIGN CHAINAGE		EXISTING CHAINAGE		LENGTH
	FROM	TO	FROM	TO	(m)
7	91363	91643	102780	102887	280
Total					**1310**

Probable location of Sharp Curves: Package-II

SL. No	Design Chainage(m)		Side	Remarks
	From	To		
1	77373	77394	LEFT	<300 Radius
2	77549	77633	RIGHT	<300 Radius
3	77680	77716	RIGHT	<300 Radius
4	77756	77777	LEFT	<300 Radius
5	77827	77835	RIGHT	<300 Radius
6	77905	77922	LEFT	<300 Radius
7	78067	78071	RIGHT	<300 Radius
8	78154	78178	RIGHT	<300 Radius
9	78255	78266	LEFT	<300 Radius
10	78335	78353	RIGHT	<300 Radius
11	78489	78507	LEFT	<300 Radius
12	78695	78699	LEFT	<300 Radius
13	78772	78805	RIGHT	<300 Radius
14	78863	78908	LEFT	<300 Radius

SL. No	Design Chainage(m)		Side	Remarks
15	78954	79053	RIGHT	<300 Radius
16	79108	79128	LEFT	<300 Radius
17	79235	79237	LEFT	<300 Radius
18	79314	79418	LEFT	<300 Radius
19	79482	79494	RIGHT	<300 Radius
20	79543	79597	RIGHT	<300 Radius
21	79722	79751	RIGHT	<300 Radius
22	79814	79821	LEFT	<300 Radius
23	79880	79915	RIGHT	<300 Radius
24	79999	80078	LEFT	<300 Radius
25	80157	80188	RIGHT	<300 Radius
26	80233	80250	LEFT	<300 Radius
27	80332	80361	RIGHT	<300 Radius
28	80412	80428	LEFT	<300 Radius
29	80505	80520	LEFT	<300 Radius
30	80574	80592	RIGHT	<300 Radius
31	80667	80699	RIGHT	<300 Radius
32	80759	80791	LEFT	<300 Radius
33	80847	80914	RIGHT	<300 Radius
34	81016	81029	LEFT	<300 Radius
35	81102	81105	RIGHT	<300 Radius

SL. No	Design Chainage(m)		Side	Remarks
36	81224	81244	RIGHT	<300 Radius
37	81530	81572	LEFT	<300 Radius
38	81708	81751	LEFT	<300 Radius
39	81802	81818	RIGHT	<300 Radius
40	81909	81947	RIGHT	<300 Radius
41	81989	82085	LEFT	<300 Radius
42	82190	82218	RIGHT	<300 Radius
43	82333	82389	LEFT	<300 Radius
44	82454	82480	RIGHT	<300 Radius
45	82570	82602	LEFT	<300 Radius
46	82662	82728	RIGHT	<300 Radius
47	82779	82812	LEFT	<300 Radius
48	82894	82914	RIGHT	<300 Radius
49	83128	83359	RIGHT	<300 Radius
50	83682	83764	LEFT	<300 Radius
51	83927	83934	RIGHT	<300 Radius
52	84028	84043	RIGHT	<300 Radius
53	84079	84112	LEFT	<300 Radius
54	84504	84570	RIGHT	<300 Radius
55	84745	84770	LEFT	<300 Radius
56	84865	84884	LEFT	<300 Radius

SL. No	Design Chainage(m)		Side	Remarks
57	85120	85151	LEFT	<300 Radius
58	85381	85425	RIGHT	<300 Radius
59	85536	85560	LEFT	<300 Radius
60	85670	85686	LEFT	<300 Radius
61	85769	85808	RIGHT	<300 Radius
62	85880	85917	LEFT	<300 Radius
63	86134	86154	LEFT	<300 Radius
64	86295	86306	RIGHT	<300 Radius
65	86381	86469	LEFT	<300 Radius
66	86537	86557	RIGHT	<300 Radius
67	86634	86675	LEFT	<300 Radius
68	86804	86846	LEFT	<300 Radius
69	86900	86933	RIGHT	<300 Radius
70	87018	87025	LEFT	<300 Radius
71	87083	87140	RIGHT	<300 Radius
72	87191	87208	LEFT	<300 Radius
73	87268	87284	RIGHT	<300 Radius
74	87329	87363	LEFT	<300 Radius
75	87482	87512	RIGHT	<300 Radius
76	87585	87605	LEFT	<300 Radius
77	87646	87683	RIGHT	<300 Radius

SL. No	Design Chainage(m)		Side	Remarks
78	87757	87779	LEFT	<300 Radius
79	87852	87876	RIGHT	<300 Radius
80	87932	87942	LEFT	<300 Radius
81	88003	88054	RIGHT	<300 Radius
82	88147	88178	LEFT	<300 Radius
83	88318	88349	RIGHT	<300 Radius
84	88513	88535	LEFT	<300 Radius
85	88604	88617	LEFT	<300 Radius
86	88693	88708	RIGHT	<300 Radius
87	88764	88810	LEFT	<300 Radius
88	88866	88873	RIGHT	<300 Radius
89	89280	89312	RIGHT	<300 Radius
90	89363	89393	LEFT	<300 Radius
91	89475	89493	LEFT	<300 Radius
92	89555	89588	LEFT	<300 Radius
93	89755	89764	RIGHT	<300 Radius
94	89842	89877	RIGHT	<300 Radius
95	89946	89968	LEFT	<300 Radius
96	90121	90153	LEFT	<300 Radius
97	90226	90231	RIGHT	<300 Radius
98	90308	90345	RIGHT	<300 Radius

SL. No	Design Chainage(m)		Side	Remarks
99	90411	90473	LEFT	<300 Radius
100	90569	90597	RIGHT	<300 Radius
101	90654	90725	LEFT	<300 Radius
102	90761	90818	RIGHT	<300 Radius
103	90873	90889	LEFT	<300 Radius
104	91065	91076	LEFT	<300 Radius
105	91125	91144	RIGHT	<300 Radius
106	91174	91217	LEFT	<300 Radius
107	91296	91308	RIGHT	<300 Radius
108	91397	91403	LEFT	<300 Radius
109	91476	91497	RIGHT	<300 Radius
110	91539	91554	LEFT	<300 Radius
111	91603	91613	RIGHT	<300 Radius
112	91682	91683	LEFT	<300 Radius
113	91740	91796	RIGHT	<300 Radius
114	91873	91924	LEFT	<300 Radius
115	92192	92253	LEFT	<300 Radius
116	92307	92342	RIGHT	<300 Radius

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	KM	
1.	77.363	92.363	15.000	20 m - 60 m wide for construction work.

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

[Refer to paragraph 2.6.1 of the Manual and specify]

(a) In built-up sections, 1.5m wide Solid footpath has been considered as TCS-1 for normal camber and TCS-3 for super elevation.

(b) In open country, paved shoulders of 1.5m in width shall be provided and 1.0m earthen shoulder shall be covered with 200mm thick compacted layer of granular material as TCS-2 for normal camber, as TCS-4 for super elevation, as TCS-5 for pick up Bus stop & passenger shelter and as TCS-6 for Gabion wall and super elevation.

(c) Design and specifications of paved shoulders and granular material shall conform to the requirements specified in paragraphs 5.9.9 and 5.9.10 of the Manual.

2.5 Width of Carriageway/Roadway width

2.5.1 Two-Laning with paved shoulders shall be undertaken. The paved carriageway shall be [7(seven) m] wide and paved 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 paved 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:

Sl 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:

Sl 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 length indicated below:[Refer to paragraph2.13 of the manual and provide details]

Sl 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]

Sl 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].

Sl 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.

Sl No.	Location	Type of Crossing
Nil		

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 15.000 km) shall be 2-lane carriageway with 1.5m wide paved and 1.0m wide earthen shoulders facility.

Following typical cross sections shall be provided for the Project Highway:

TCS–I : Typical cross section of pavement in Built up area normal camber
TCS – II : Typical cross section of pavement in open country area normal camber
TCS – III : Typical cross section of pavement in built up area super elevation.
TCS – IV : Typical cross section of pavement in open country area super elevation.
TCS- V : Typical cross section of pavement in open country area with pick up bus stop & passenger shelter.
TCS- VI : Typical cross section of pavement in open country area with Gabion

wall super elevation.

The cross section schedule shall be as follows:

Sl.NO.	DESIGN CHAINAGE		LENGTH (m)	TCS TYPE	Remarks / Location
	FROM	TO			
1	77363	77783	420	II, VI	Reconstruction and widening
2	77783	77873	90	II	Realignment
3	77873	80983	3110	II, VI	Reconstruction and widening
4	80983	81083	100	II, VI	Realignment
5	81083	82163	1080	II, VI	Reconstruction and widening
6	82163	86163	4000	II, V, VI	Reconstruction and widening
7	86163	86263	100	II	Realignment
8	86263	88613	2350	II	Reconstruction and widening
9	88613	88683	70	II	Realignment
10	88683	88803	120	II, VI	Reconstruction and widening
11	88803	88963	160	II	Realignment
12	88963	89253	290	II	Reconstruction and widening
13	89253	89763	510	II	Realignment
14	89763	91363	1600	II	Reconstruction and widening
15	91363	91643	280	II	Realignment
16	91643	92363	720	II, VI	Reconstruction and widening
Total =			**15000 Mtrs**		

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.

Sl.no	Existing Chainage		Design Chainage		Name of Village/town etc
	From (Km)	To (Km)	From (km)	To (km)	
1	95.310	95.815	82.963	83.463	Meer

3 INTERSECTIONS AND GRADE SEPARATORS

3.1 Introduction

All intersections shall be as per Section3 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].

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

Sl No.	Location of Intersection	Intersection Town area	Existing Configurations				Type of Intersection	Figure No.	Other Features
				Type					
Nil									

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

(b) Minor Intersections

Sl No.	Location of Intersection	Type of Intersection	Side
1	81.303	Y	RHS
2	82.163	Y	LHS
3	82.993	Y	LHS
4	89.963	Y	RHS

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

3.3 Grade Separated Intersections with/without Ramps

Sl 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

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 Be. 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 5.1'0 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		
2	77+363	92+363	15	20

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

5.5 Design Parameters

The flexible pavement for the main carriageway is a 2-lane carriageway having 1.5 m wide paved 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 20msa 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)	Reliability	90%
(iv)	Effective Roadblock Soil Resilient Modulus	Corresponding to 4-day soaked CBR value of 8.0% to 10.0%
(v)	Layer Coefficients	As per the IRC 37 : 2012 procedures
(vi)	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)/ subgrade 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 Paved 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 (msa) corresponding subgrade 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.	Section (km)		Remarks
	From	To	
1	77+363	92+363	Poor condition of existing pavement

6 ROADSIDE 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:

i) 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 Lined Drains

Sl. No	Design Chainage (m)		Length(m)	Side	Remarks
	From	To			
1	77363	77499	136	one side	Reconstruction and widening
2	77499	77570	71	Both side	Reconstruction and widening
3	77570	77611	41	one side	Reconstruction and widening
4	77611	77671	60	one side	Reconstruction and widening
5	77671	77744	73	one side	Reconstruction and widening
6	77744	77783	39	Both side	Reconstruction and widening
7	77783	77873	90	Both side	Realignment
8	77873	78234	361	one side	Reconstruction and widening
9	78234	78283	49	Both side	Reconstruction and widening
10	78283	78495	212	one side	Reconstruction and widening
11	78495	78557	62	Both side	Reconstruction and widening
12	78557	78592	35	one side	Reconstruction and widening
13	78652	78672	20	one side	Reconstruction and widening
14	78672	79988	1316	Both side	Reconstruction and widening
15	79988	80014	26	one side	Reconstruction and widening
16	80014	80055	41	Both side	Reconstruction and widening
17	80055	80119	64	one side	Reconstruction and widening
18	80119	80160	41	Both side	Reconstruction and widening
19	80160	80289	129	one side	Reconstruction and widening

20	80289	80362	73	Both side	Reconstruction and widening
21	80362	80405	43	one side	Reconstruction and widening
22	80405	80430	25	Both side	Reconstruction and widening
23	80430	80500	70	one side	Reconstruction and widening
24	80500	80506	6	Both side	Reconstruction and widening
25	80506	80515	9	one side	Reconstruction and widening
26	80515	80520	5	Both side	Reconstruction and widening
27	80520	80609	89	one side	Reconstruction and widening
28	80609	80691	82	Both side	Reconstruction and widening
29	80691	80764	73	one side	Reconstruction and widening
30	80764	80859	95	Both side	Reconstruction and widening
31	80859	80880	21	one side	Reconstruction and widening
32	80880	80900	20	one side	Reconstruction and widening
33	80900	80983	83	Both side	Reconstruction and widening
34	80983	81083	100	Both side	Realignment
35	81083	81137	54	Both side	Reconstruction and widening
36	81137	81251	114	one side	Reconstruction and widening
37	81251	81303	52	Both side	Reconstruction and widening
38	81303	81693	390	one side	Reconstruction and widening
39	81693	82163	470	one side	Reconstruction and widening
40	82163	82204	41	one side	Reconstruction and widening
41	82204	82813	609	Both side	Reconstruction and widening

42	82813	82830	17	one side	Reconstruction and widening
43	82830	82859	29	Both side	Reconstruction and widening
44	82859	82881	22	one side	Reconstruction and widening
45	82881	82943	62	one side	Reconstruction and widening
46	82943	82984	41	one side	Reconstruction and widening
47	82984	84132	1148	one side	Reconstruction and widening
48	84132	84192	60	one side	Reconstruction and widening
49	84192	84443	251	one side	Reconstruction and widening
50	84443	84465	22	one side	Reconstruction and widening
51	84465	84787	322	one side	Reconstruction and widening
52	84787	84872	85	one side	Reconstruction and widening
53	84872	85027	155	one side	Reconstruction and widening
54	85027	85102	75	one side	Reconstruction and widening
55	85102	85245	143	Both side	Reconstruction and widening
56	85245	85438	193	one side	Reconstruction and widening
57	85438	85714	276	one side	Reconstruction and widening
58	85714	85830	116	one side	Reconstruction and widening
59	85830	85882	52	one side	Reconstruction and widening
60	85882	86163	281	one side	Reconstruction and widening
61	86163	86215	52	Both side	Realignment
62	86215	86263	48	Both side	Realignment
63	86263	86752	489	one side	Reconstruction and widening
64	86752	86781	29	Both side	Reconstruction and widening

65	86781	86969	188	one side	Reconstruction and widening
66	86969	87036	67	Both side	Reconstruction and widening
67	87036	87404	368	one side	Reconstruction and widening
68	87404	87450	46	Both side	Reconstruction and widening
69	87450	87832	382	one side	Reconstruction and widening
70	87832	87862	30	Both side	Reconstruction and widening
71	87862	88027	165	one side	Reconstruction and widening
72	88027	88082	55	Both side	Reconstruction and widening
73	88082	88213	131	one side	Reconstruction and widening
74	88213	88243	30	Both side	Reconstruction and widening
75	88243	88613	370	one side	Reconstruction and widening
76	88613	88683	70	Both side	Realignment
77	88683	88803	120	one side	Reconstruction and widening
78	88803	88963	160	Both side	Realignment
79	88963	89156	193	Both side	Reconstruction and widening
80	89156	89207	51	one side	Reconstruction and widening
81	89207	89253	46	Both side	Reconstruction and widening
82	89253	89344	91	Both side	Realignment
83	89344	89436	92	Both side	Realignment
84	89436	89492	56	Both side	Realignment
85	89492	89763	271	Both side	Realignment
86	89763	89963	200	one side	Reconstruction and widening
87	89963	90172	209	one side	Reconstruction and widening
88	90172	90308	136	one side	Reconstruction and widening

89	90308	90562	254	one side	Reconstruction and widening
90	90562	90795	233	one side	Reconstruction and widening
91	90795	91363	568	one side	Reconstruction and widening
92	91363	91643	280	Both side	Realignment
93	91643	91938	295	one side	Reconstruction and widening
94	91938	92075	137	one side	Reconstruction and widening
95	92075	92259	184	one side	Reconstruction and widening
96	92259	92317	58	one side	Reconstruction and widening
97	92317	92363	46	Both side	Reconstruction and widening
Total=			**19665 Mtrs**		

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

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 and accordingly they may carry out their own diligence to arrive at project cost before submitting the bid. Also the catch water drain for the project stretch is 3425 Rm.

7 DESIGN OF STRUCTURES

7.1 General

The Project road includes provision of no major bridges (span>=60m), **one minor bridge** (span<60m) and **62 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 form 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 7.3 (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.

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Proposed Span (m)
1	88.926	77.593	RCC Slab/Box	2
2	89.041	77.713	RCC Slab/Box	3
3	89.238	77.893	RCC Slab/Box	3
4	89.431	78.078	RCC Slab/Box	4
5	89.515	78.168	RCC Slab/Box	4
6	90.080	78.673	RCC Slab/Box	2
7	90.193	78.773	RCC Slab/Box	3
8	90.431	79.013	RCC Slab/Box	3
9	91.174	79.758	RCC Slab/Box	3
10	91.201	79.788	RCC Slab/Box	3
11	91.728	80.263	RCC Slab/Box	6
12	91.836	80.378	RCC Slab/Box	2
13	92.087	80.588	RCC Slab/Box	3
14	92.173	80.703	RCC Slab/Box	3

15	92.532	81.068	RCC Slab/Box	3
16	92.609	81.158	RCC Slab/Box	6
17	93.149	81.683	RCC Slab/Box	4
18	93.310	81.803	RCC Slab/Box	3
19	95.948	84.433	RCC Slab/Box	3
20	96.323	84.843	RCC Slab/Box	2
21	96.738	85.243	RCC Slab/Box	2
22	96.930	85.443	RCC Slab/Box	3
23	97.292	85.803	RCC Slab/Box	2
24	97.555	86.053	RCC Slab/Box	3
25	97.911	86.403	RCC Slab/Box	3
26	98.045	86.533	RCC Slab/Box	2
27	98.322	86.808	RCC Slab/Box	2
28	98.422	86.908	RCC Slab/Box	3
29	98.815	87.282	RCC Slab/Box	3
30	99.040	87.503	RCC Slab/Box	3
31	99.345	87.813	RCC Slab/Box	4
32	99.553	88.013	RCC Slab/Box	4
33	99.612	88.093	RCC Slab/Box	2
34	99.858	88.333	RCC Slab/Box	3
35	100.107	88.583	RCC Slab/Box	3

36	100.245	88.723	RCC Slab/Box	3
37	100.379	88.843	RCC Slab/Box	3
38	100.842	89.326	RCC Slab/Box	2
39	101.054	89.493	RCC Slab/Box	3
40	101.167	89.598	RCC Slab/Box	3
41	101.348	89.778	RCC Slab/Box	3
42	101.474	89.908	RCC Slab/Box	2
43	101.603	90.033	RCC Slab/Box	3
44	101.823	90.223	RCC Slab/Box	4
45	101.900	90.323	RCC Slab/Box	4
46	102.157	90.575	RCC Slab/Box	4
47	102.717	91.126	RCC Slab/Box	2
48	103.247	91.656	RCC Slab/Box	3
49	103.697	92.080	RCC Slab/Box	2
50	103.938	92.287	RCC Slab/Box	3

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

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

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Span (m)
1	89.011	77.813	RCC Slab/Box	2
2	89.524	78.313	RCC Slab/Box	2
3	89.832	78.583	RCC Slab/Box	2
4	91.381	80.083	RCC Slab/Box	4
5	91.475	80.173	RCC Slab/Box	5
6	91.797	80.473	RCC Slab/Box	6
7	92.660	81.363	RCC Slab/Box	6
8	94.228	82.869	RCC Slab/Box	4
9	95.495	84.140	RCC Slab/Box	6
10	100.566	89.183	RCC Slab/Box	2
11	102.318	90.873	RCC Slab/Box	2
12	103.467	91.991	RCC Slab/Box	3

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

[Refer to paragraph 7.23 of the Manual and provide details]

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Proposed Span

…….NIL……

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	Design Chainage	Proposed Span(m)	Proposed Width(m)	Remarks
NIL					

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		
NIL								

7.3.2 The following structures shall be provided with footpaths:

Sl 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

Sl No.	Bridge at km	Utility Services to be Carried	Remarks
1	80.883		10 m span

7.3.4 Additional new bridges

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

No new bridges at the following locations on the Project Highway shall be constructed.

Sl No.	Location (km)	Total Length (m)	Remarks
Nil			

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]

Sl 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]

Sl 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 7.21 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 7.19 of the Manual and specify modification, if any]

7.4.2 Road over-bridges

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

GAD drawings attached:

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 7.23 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

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

B. ROB / RUB

Sl No.	Location of	Nature and Extent of Repairs/Strengthening to be Carried out

	Bridge (km)	
Nil		

C. Overpasses / Underpasses and Other Structures

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

7.8 List of Major Bridges and Structures

The following is the list of Major Bridges

Sl No.	Location (km)
Nil	

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 amounted 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 busbays 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

Traffic Signages, Road Marking and other appurtenances	**unit**	**Quantity**
5th KM stone	No.	3

Traffic Signages, Road Marking and other appurtenances	unit	Quantity
KM Stone	No.	12
Hectometre Stone	No.	60
Providing and fixing of PCC M-15 Boundary Pillar@ every 200 m on both sides/Boundary stone (clause 13 herein)	No.	150
Centre line	sqm	525
Edge Line at Paved Shoulder	sqm	3000
At Junctions	sqm	8
Cautionary,90cm equilateral triangle	No	128
Speed limit, 60cm circular	No	8
Stop sign,90cm high octagon	No	4
Direction and place identification signs upto 0.9 sqm size board	Sqm	361.20
Direction and place identification signs more than 0.9 sqm size board	Sqm	36
Metal beam crash barrier single faced	m	335
Road Marker	No	4500
RCC guard post	No	260
Overhead Gantry Sign Board	tonne	4
Hazard markers 80-100 cm above GL	No	60

9 ROADSIDE 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 instillation 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 (01 No. of gantry) as per this manual.

Sl No.	Location (km)	Size	Remarks
1	77+513	12m x 2.1m	Overhead Gantry

10 COMPULSORY AFFORESTATION

[Refer to paragraph 12.1 of the Manual and specify the number of trees which are required to be planted by the Contractor as compensatory afforestation.] Minimum 850 nos. trees are required to be planted.

11 HAZARDOUS LOCATIONS

iv) 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	To		
1	80383	80588	205	Radius<300m
2	81143	81223	80	Radius<300m
3	84133	84183	50	Radius<300m

The safety barriers, protective works shall also be provided at the hazardous location/lengths.
The minimum quantity of protection work is presented in the following table:

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.

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	Nil
2.Breast wall with PCC	Rm	438
3. Breast wall sausage type by gabion/ Specialized treatment for slide protection as specified above-	Rm	425
4. Retaining Wall with PCC	Rm	3000
5. Catch water drain	Rm	3425
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 (m)	To (m)		

1	77520	77532	12	
2	77697	77708	11	
3	79015	79036	21	
4	88133	88174	41	
5	88340	88364	24	
6	89256	89289	33	
7	90612	90832	220	
8	91312	91350	38	

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.*

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.	Chainage		Length
	From(km)	To(km)	
1	80358.00	80408.00	50.00
2	80533.00	80593.00	60.00
Total=			**110 Mtrs**

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

1. Project Facilities

This schedule indicates the minimum spatial and functional requirements of the facilities to be provided on the Project Highway Package No**. DPR/J-K/AR-1/SARDP-NE**, start from design chainage km 77+363 to design chainage km 92+363 at Ziro (total length of 15.000 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 shall include:

(a)	toll plaza[s];	-
(b)	roadside furniture;	-
(c)	pedestrian facilities;	-
(d)	truck lay-byes;	-
(e)	bus-bays and bus shelters;	-
(f)	rest areas; and	-
(g)	others to be specified	-

2. Description of Project Facilities

Toll Plaza

NIL

Bus Shelters

The bus bays and bus shelters shall be provided at following locations of proposed road of the hilly terrain, where there is a general constraint on space, pick up bus stops have been provided. The typical layout indicated in Fig: 12.3 of the manual may be adopted.

Details of Bus shelters

Sl No.	Project Facility	Design Ch/Location (km)
1	Bus Shelter	88.828
2	Bus Shelter	82.931

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 Authority Engineer/ 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
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/rectificaation**
II	Edge drop at shoulders exceeding	7 (seven) days

Nature of Defects or deficiency		Time limit for repair/rectification
	40mm	
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
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-room of 5 m above carriageway or obstruction in visibility of road signs	24 hours
II	Removal of fallen trees from carriageway	4 hours
III	Deterioration in health of trees and bushes	Timely watering and treatment

Nature of Defects or deficiency		Time limit for repair/rectification
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 inapproach roads, pedestrian facilities, truck lay-byes, bus-bays, bus -shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and service roads	15 (fifteen) days
II	Damaged vehicles or debris on the road	4 (Four) hours
III	Malfunctioning crane	4 (Four) hours
BRIDGES		
a	**Superstructures**	
I	Any damage, cracks, spalling/scaling Temporary measures Permanent measures	 within 48 hours within 15 (fifteen) days or as specified by the Authority‟s Engineer
b	**Foundation**	
I	Scouring and/or cavitation	15 (fifteen) days
c	**Piers, abutments, return walls and wing walls**	
I	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
d	**Bearing (metallic) of bridges**	

Nature of Defects or deficiency		Time limit for repair/rectification
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, toes, floor or guide bunds	30 (thirty) days
VII	Growth of vegetation affecting the Structure or obstructing the waterway	15 (fifteen) days
g	**Hill Roads**	
I	Damage to retaining wall/breast wall	7 (seven) days
II	Landslides requiring clearance	12 (Twelve) hours
III	Snow requiring clearance	24 (Twenty four) hours

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

SCHEDULE - F
(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 certfications 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 Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 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 Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 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, 1st Parliament street, New Delhi-110001

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

For and on behalf of the bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Adress)

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 Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 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 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, 1st Parliament street, New Delhi-110001

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

For and on behalf of the bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

Notes:

(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 Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 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 {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 Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1st Parliament street, New Delhi-110001

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

For and on behalf of the bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Adress)

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 vis a vis OVERALL PROJECT
1	2	3	4
Road works including culverts, minor bridges, underpasses, overpasses, approaches to ROB/RUB/ Major Bridges/ Structures (but excluding service roads)		**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.	16.50%
		(2) Granular work (sub-base, shoulders)	
		GSB	5.69%
		WMM & Shoulders	8.56%
		(3) Bituminous work	
		a)DBM With Prime coat & Tack coat.	11.01%
		b)BC with Tack coat.	5.58%
		(4) Rigid Pavement	0.00%
		a)Dry Lean Cement Concrete	0.00%
		b)Cement Concrete	0.00%
		(5)Widening and repair of culvert	0.00%
		(6)Protection of existing works	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4
		(7)Widening and repair of minor bridges	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.	1.18%
		(2) Granular work (sub-base, shoulders)	
		GSB	0.39%
		WMM & Shoulders	0.82%
		(3) Bituminous work	0.00%
		a)DBM With Prime coat & Tack coat.	1.05%
		b) BC with Tack coat.	0.53%
		(4) Rigid Pavement	0.00%
		a)Dry Lean Cement Concrete	0.00%
		b)Cement Concrete	0.00%
		(5)Protection work	0.00%
		(6)RCC/Reinf. Earth retaining Wall in approaches of ROB	0.00%
		(7)Drainage Works	0.00%
		(8)Protection Work	0.00%
		C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:	
		(1)Box / Slab Culverts	16.58%
		(2) HP Culvert	0.00%
		(3) Embankment	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4
		Protection(New Lane)	
		(4) Grade separated structures	0.00%
		(5) Overpass	0.00%
		(6) Elephant Underpass	0.00%
		(7) Approaches to ROB and Viaduct	0.00%
		(8) Minor Bridges	
		Foundation	0.39%
		Sub structure	0.46%
		Super Structure	0.29%
		(9) Cattles/Pedestrian Underpasses	0.00%
		(10) Vehicular Underpass	0.00%
Major Bridge works and ROB/RUB	0.00%	**A- Widening and repairs of Major Bridges**	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3)Super-structure(including wearing coat,crash barrier etc. complete in all respect)	0.00%
		B- Widening and repair of	
		(a) ROB	0.00%
		(b) RUB	0.00%
		C- New Major Bridges	
		(1) other Miscellaneous Items	0.00%
		(2) Guide Bundh	0.00%
		(3) Foundation	0.00%
		(4) Sub structure	0.00%
		(5) Super-structure (including wearing coats, crash barriers etc. complete)	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4
		(6) Protection works	
		D- New rail-road bridges including viaduct	
		(a) ROB	0.00%
		(b) RUB	0.00%
Structures(Elevated sections, reinforced earth)	0.00%	(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including crash barriers etc. complete)	0.00%
		(4) Reinforced Earth Wall (includes Approaches of ROB, Underpasses, Overpasses, Flyover etc.)	0.00%
Other Works			
		(i)Service roads/Slip roads	0.00%
		(ii)Toll Plaza	0.00%
		(iii)(a)Road side drain & Toe wall	9.26%
		(b)Catch water drain/Chute drain	0.58%
		(iv)Road signs, marking, Km stones, Safety devices etc.	
		(a)Pavement Marking	0.21%
		(b)Crash barrier/W metal crash barrier	0.09%
		(c)Traffic Sign	0.15%
		(d)Road Boundary stone, km Stone,5th km stone and hectometer stone	0.01%
		(e)Traffic blinker LED delineator,stud,reflective payment marker, tree	0.23%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4
		reflector	
		(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.)	0.01%
		(i)Protection Work (Provision of Rip-Rap or similar work in valley side of the curves as special safety features)	0.01%
		(j)Footpath and Separator	0.92%
		(v)Project facilities	
		(a)Truck lay-byes	0.75%
		(b)Bus bays and Bus Shelter	0.26%
		(c)Major Junction	0.00%
		(d)Minor Junction	0.09%
		(e)Median filling shrub plantation and maintanance 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	0.00%
		(i) Others	0.07%
		(j)Road Appurtenances	0.03%
		(vi)Repairs to	

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4
		bridges/structures	
		(a)Providing wearing coat	0.00%
		(b)Replacement of bearings, joints	0.00%
		(c)Providing crash barrier	0.00%
		(d)Other items	0.00%
		(vii) Road Side Plantation & Median plantation	0.00%
		(viii) Repair of protection works	0.00%
		(ix) Traffic diversion, Safety and traffic management during construction	0.00%
		(x)Miscellaneous item	0.02%
		(xi)Slope Protection Works as special requirement for hill road	
		(a)Breast Wall/ Gabion wall	3.13%
		(b)Retaining Wall	10.42%
		(c)Parapet	0.00%
		(d)Plantation (Vetiver, Hydro seeding and Mulching or similar techniques etc.) for slope protection on exposed hill slopes as slide mitigation measure.	4.49%
		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:

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.	16.50%	
(2) Granular work (sub- base, base, shoulders)		
GSB	5.69%	
WMM & Shoulders	8.56%	
(3) Bituminous work		
a) DBM with prime coat and Tack coat	11.01%	
b) BC with Tack coat	5.58%	
(4) Concrete Pavement		
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.

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.	1.18%	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)		
GSB	0.59%	
WMM & Shoulders	0.82%	
(3) Bituminous work		
a) DBM with prime coat and Tack coat	1.05%	
b) BC with Tack coat	0.53%	
(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	16.58%	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%	

STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
(6) Elephant underpasss	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		**Foundation:** Cost of Foundation of each minor bridge shall be determined on pro rata basis with respect to total linear length of minor bridges payment shall be made on completion of foundation of one minor bridge. **Sub-structure**: Cost of Sub Structure of each minor bridge shall be determined on pro rate basis with respect to total linear length of minor bridges payment shall be made on completion of sub structure of one minor bridge. **Super-structure:** Cost of Super structure of each minor bridge shall be determined on pro rata basis with respect to total linear length of minor bridge payment shall be made on completion of super structure including approaches of one minor bridge.
Foundation	0.39%	
Sub Structure	0.46%	
Super Structure	0.29%	
(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 x weightage for bituminous work x (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/RUBshall 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	0.00%	
(4) Sub-structure	0.00%	
(5) Super-structure (including wearing coat, crash barriers etc. complete in all respect)	0.00%	
(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%	

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.

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	9.26%	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	0.58%	

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	0.21%	
(b)Crash barrier/W metal crash barrier	0.09%	
(c)Traffic Sign	0.15%	
(d)Road Boundary stone, km Stone,5th km stone and hectometer stone	0.01%	
(e)Traffic blinker LED delineator,stud,reflective payment marker, tree reflector	0.23%	
(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.)	0.01%	
(i)Protection Work (Provision of Rip-Rap or similar work in valley side of the curves as special safety features)	0.01%	
(j)Footpath and Separator	0.92%	
(v)Project facilities		
(a)Truck lay-byes	0.75%	
(b)Bus bays and Bus Shelter	0.29%	
(c)Major Junction	0.00%	

STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
(d)Minor Junction	0.09%	Payment shall be made on pro rata basis for completed facilities.
(e)Median filling shrub plantation and maintanance 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	0.00%	
(i) Others	0.07%	
(j)Road Appurtenances	0.03%	
(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%	
(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%	

STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
(ix) Traffic diversion, Safety and traffic management during construction	0.00%	Payment shall be made on prorate basis every six months.
(x) Miscellaneous Items	0.02%	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/Gabion wall	3.13%	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	10.42%	
(c)Parapet	0.00%	
(d)Plantation (Vetiver, Hydro seeding and Mulching etc.) for slope protection on exposed hill slopes as slide mitigation measure.	4.49%	

2 Procedure for payment for Maintenance

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

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

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 (ii))

Project Completion Schedule

1 Project Completion Schedule

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

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the **[192nd]** day from the Appointed Date (the "**Project Milestone- I**").

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

3. Project Milestone-II

(iii) Project Milestone-II shall occur on the date falling on the **[329th]** day from the Appointed Date (the "**Project Milestone- II**").

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

4. Project Milestone-III

(v) Project Milestone-III shall occur on the date falling on the **[467th]** day from the Appointed Date (the "**Project Milestone- III**").

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

5. Scheduled Completion Date

(vii) The Scheduled Completion Date shall occur on the [549 th] day from the Appointed Date.

(viii) 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 Balance work of two-Lane with paved shoulders of Joram –**
Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 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 Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 Km) in the state of 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…..

"**Construction of Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 Km) in the state of Arunachal Pradesh under SARDP-NE**"

ACCEPTED, SIGNED, SEALED	SIGNED, SEALED and
And DELIVERED	DELIVERED
For and on behalf of	For and on behalf of
CONTRACTOR by:	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 Balance work of two-Lane with paved shoulders of Joram –**

Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 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)

(Designation)

(Address)

"**Construction of Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 Km) in the state of Arunachal Pradesh under SARDP-NE**"

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**	
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	5

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

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

R=P/IOO x M x 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 Balance work of two-Lane with paved shoulders of Joram – Koloriang Road (NH-713) on EPC basis from existing Km 88.700 to Km 104.850 [Design Km. 77.363 to Km. 92.363] (Design Length - 15 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.

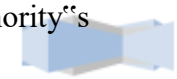
7.4 The Authority‟s Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

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 lastclaim

(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.