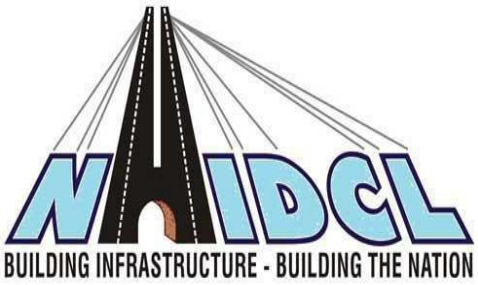
TECHNICAL SCHEDULES

FOR

CONSTRUCTION/UPGRADATION OF EXISTING ROAD TO 2 LANE WITH PAVED SHOULDER INCLUDING GEOMETRIC IMPROVEMENT FROM RANIPOOL TO PAKYONG FROM KM 2.000 TO KM 16.167 (BALANCE WORK) OF NH-717-A ON EPC BASIS UNDER SARDP-NE PHASE-A IN THE STATE OF SIKKIM



NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

(NHIDCL)

2022

SCHEDULES

SCHEDULE – A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

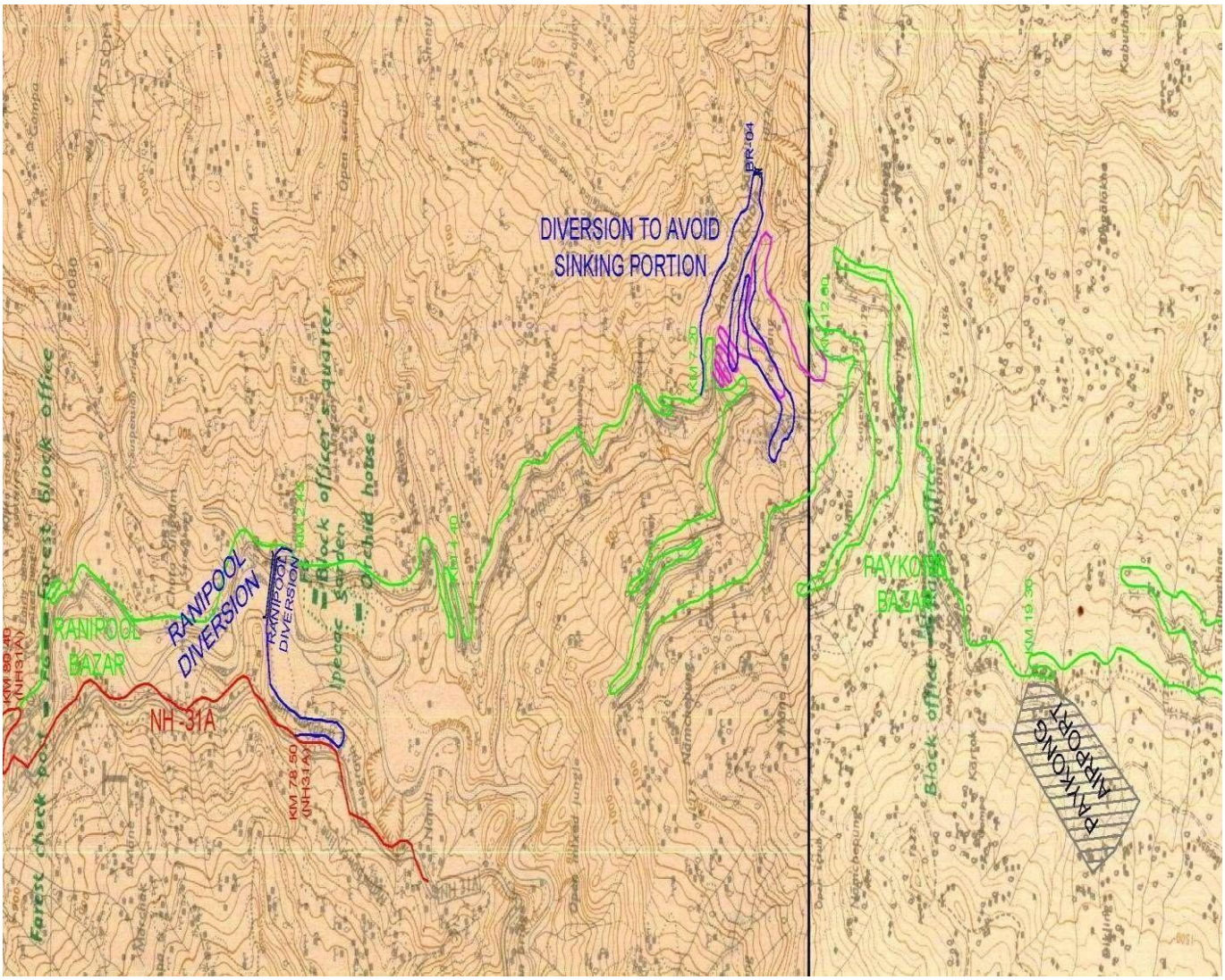
(i) Site for the construction of project highway is from new take-off point at km 3+100 (i.e. located at out skirt of Ranipool town toward Pakyong) on Ranipool - Pakyong section of NH-717A, Km 02+000 to Km 16+540 at Pakyong near Airport gate on EPC basis Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

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

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

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

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



Project Location Map

Annex – I

(Schedule-A)

Site

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

1. Site

Pakyong, one of the District Head Quarters has been gaining its importance due to lone Green Field Airport.

The topography falls under the hilly terrain of IRC classification and traverse generally through rural area with semi-urban areas in some places.

Majority of the land use along the project road is for in rural areas and commercial, residential, etc in built-up sections.

Traffic on this stretch of project road is of mixed type mostly with small passenger's vehicles and commercial. The number of commercial vehicles & passenger vehicles are very high.

Site for the construction of project highway is from new take-off point at km 3+100 (i.e. located at out skirt of Ranipool town toward Pakyong) on Ranipool - Pakyong section of NH-717A, Km 02+000 to Km 16+167 at Pakyong near Airport gate in the State of Sikkim.

2. Referencing System

Kilometer stones are existing in some of the locations of the project highway. It is called the "Existing Chainage". During topographical survey with Total Station, observations made are 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 using the total station for the "Project Highway" is given below:

Design Chainage corresponding to Existing Chainage

Sr.No.	Existing Chainage (Km)		Design Chainage (Km)		Remarks
2	3+100	7+250	2+000	5+800	Existing Road
3	7+250	12+520	5+800	8+950	2nd Diversion from Andheri Khola(short cut to Pakyong)
4	12+520	19+100	8+950	15+500	Existing Road
5			15+500	16+540	Pakyong to Airport Gate

3. Land

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

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length in m (Design)	Existing/ Available ROW (m)	Remarks
	From	To	From	To			
1	3+100	7+250	2+000	5+800	3800	20 - 24	Existing Road
2	7+250	11+400	5+800	7+950	2150	20 - 24	2nd Diversion from Andheri Khola (short cut to Pakyong)
3	11+400	17+280	7+950	13+700	5750	20 - 24	Existing Road
4	17+280	19+100	13+700	15+500	1800	7 - 11	Existing Road
5			15+500	16+167	667	6.50	Pakyong to Airport Gate

4. Carriageway

The present carriageway of the Project Highway is substandard single lane/improvised 2-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			
2	3+100	7+250	2+000	5+800	3800	3.5 to 7.5	Existing Road
3	7+250	12+520	5+800	8+950	3150	3.5 to 7.5	Partial Existing Road
4	12+520	19+100	8+950	15+500	6550	3.5 to 7.5	Existing Road
5			15+500	16+167	667	3.5 to 4.5	Existing Road

5. Major Bridges

The Site includes the following Major Bridges:

S. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Superstructure		
Nil						

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

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

S.No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Superstructure			
Nil						

7. Grade separators

The Site includes the following grade separators:

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

8. Minor bridges

The Site includes the following minor bridges:

S.N	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub- structure	Super structure		
1	3+550	Open	Abutment	PSC-Girder	1x20	4.25
2	7+270	Open	Abutment	Steel	1x33	4.25

9. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location (km)	Remarks
Nil		

10. Underpasses (vehicular, non vehicular)

The Site includes the following underpasses:

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

11. Culverts

The Site has the following culverts:

S.No.	Chainage (km)	Type of Culvert)	Span /Opening with span length (m)	Width (m)
1	3090	Pipe	1 X 1	6.00
2	3360	Slab	1 X 1	6.00
3	3648	HPC	1 X 0.9	6.00
4	4217	HPC	1 X 0.9	6.00
5	4780	Slab	1 X 1	6.00
6	5360	Slab	1 X 1	6.00
7	5418	Slab	1 X 1.5	7.40
8	5620	Slab	1 X 1	7.00
9	5800	HPC	1 X 0.9	6.00
10	6030	Slab	1 X 1	7.00
11	6240	Slab	1 X 1.5	7.40
12	6850	Slab	1 X 1	7.00
13	7220	Slab	1X1	7.00
14	7900	HPC	1 X 0.9	6.00
15	8200	Slab	1 X 1	7.00
16	8290	Slab	1 X 1.5	7.40
17	8500	Slab	1 X 1	7.00
18	8800	Slab	1 X 1.5	7.40
19	9038	HPC	1 X 0.9	5.50
20	9380	Slab	1 X 1	7.00
21	10000	Slab	1 X 1	7.00
22	10100	HPC	1 X 0.9	6.00
23	10500	HPC	1 X 0.9	6.00
24	10780	HPC	1 X 0.9	6.00
25	10850	Slab	1 X 1	7.00
26	10920	Slab	1 X 1.5	6.00
27	11060	Slab	1 X 1.5	6.00
28	11150	Slab	1 X 1	7.00
29	11200	Slab	1 X 1	6.00
30	11350	Slab	1 X 1.5	6.00
31	11410	HPC	1 X 0.9	7.00
32	11490	HPC	1 X 0.9	6.00
33	11550	HPC	1 X 0.9	6.00
34	11600	Slab	1 X 1	6.00
35	11650	Slab	1 X 1	7.00

36	11690	HPC	1 X 0.9	6.00
37	11700	HPC	1 X 0.6	6.00
38	11820	Slab	1 X 1.5	5.00
39	11920	HPC	1 X 0.9	6.00
40	12040	Slab	1 X 1	6.00
41	12070	Slab	1 X 1	6.00
42	12220	Slab	1X3	7.00
43	12300	Slab	1X1.5	6.00
44	12470	Slab	1 X 1.5	6.00
45	12580	Slab	1 X 1.5	6.00
46	12780	HPC	1 X 1	6.00
47	13050	HPC	1 X 0.9	6.30
48	13370	HPC	1 X 0.9	5.80
49	13620	HPC	1 X 0.9	6.00
50	13710	Slab	1 X 1.5	7.00
51	13780	Slab	1 X 3.0	7.00
52	13870	HPC	1 X 0.9	6.00
53	14000	HPC	1 X0 .9	6.00
54	14140	Slab	1 X 1.5	7.00
55	14310	HPC	1 X0.9	6.00
56	14350	HPC	1 X 0.9	6.00
57	14400	HPC	1 X 1.20	12.00
58	14750	Box	1 X 2	6.00
59	15050	HPC	1 X 0.9	6.00
60	15180	HPC	1 X 0.9	6.00
61	15480	Slab	1 X 1.50	7.00
62	15650	HPC	1 X 0.9	6.00
63	15830	Slab	1 X 1.50	6.00
64	16080	Slab	1 X 1.50	6.00
65	16120	HPC	1 X 0.9	6.00
66	16200	Slab	1 X 1.50	6.50
67	16420	Slab	1 X 1.50	7.00
68	16650	HPC	1 X 0.9	6.00
69	17000	HPC	1 X 0.6	6.00
70	17150	Slab	1 X 1	7.00
71	17220	HPC	1 X 1.50	7.00
72	17530	HPC	1 X 0.9	6.00
73	17560	HPC	1 X 0.9	6.00
74	18210	Slab	1 X 1.50	7.00

75	18520	Box	1 X 2	6.00
76	18900	Slab	1 X 1.50	7.00

(b) Culverts constructed/partially constructed from the above table are as hereunder -

S.No.	Design Chainage (km)	Type of Culvert)	Span /Opening with span length (m)	Remarks (m)
1	4660	Box	1 X 2	Partial completed
2	4635	HPC	1 X 1.2	Partial completed
3	6430	HPC	1.2 m dia	Partial completed
4	6720	HPC	1.2 m dia	Partial completed
5	7010	HPC	1.2 m dia	completed
6	7445	HPC	1.2 m dia	completed
7	9440	HPC	1.2 m dia	Partial completed
8	9600	HPC	1.2 m dia	Partial completed
9	9760	HPC	1.2 m dia	Partial completed
10	10020	Box	1 X 2	Completed
11	10094	Box	1 X 2	Partial completed
12	10390	HPC	1.2 m dia	Partial completed
13	10645	HPC	1.2 m dia	Partial completed
14	10690	HPC	1.2 m dia	Partial completed
15	10508	Box	1 X 2	Partial completed
16	11150	HPC	1.2 m dia	Completed
17	11040	Box	1 X 2	Partial completed
18	11378	Box	1 X 2	Partial completed
19	11490	HPC	1.2 m dia	Partial completed
20	11740	HPC	1.2 m dia	Partial completed
21	11900	HPC	1.2 m dia	Partial completed
22	12330	Box	1 X 2	Partial completed
23	14790	Box	1 X 2	Partial completed

12. Bus Bay/Truck Lay byes

The details of truck lay byes are as follows:

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

13. Road side drains

(a) The details of the roadside drains are as follows:

S. No.	Location		Type	
	From km	to km	Masonry/cc (Pucca)	Earthen (Kutcha)
1	3+100	7+250		Earthen drain hill side
2	7+250	12+520		Earthen drain hill side
3	12+520	19+100		Earthen drain hill side

(b) Drain already constructed in between above chainages –

S. No.	Design		Type
	From km	to km	
1	7+460	7+940	CC Drain
2	8+250	8+350	CC Drain

14. Major junctions

The details of major junctions are as follows:

S. No.	Location		At grade	Separated	Category of Cross Road			
	From km	to km			NH	SH	MDR	Others
1	18+000		At Grade				MDR	
2	18+200		At Grade				MDR	
3	19+100		At Grade				MDR	

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

15. Minor junctions

The details of the minor junctions are as follows:

S. No.	Location		Type	
	From km	To km	T -junction	Cross road
1	4+560	4+600	Yes	-
2	7+200	7+300	Yes	-
3	12+500	12+600	Yes	-
4	16+500	16+600	Yes	-
5	17+100	17+200	Yes	-

16. Bypasses

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

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

17. Other structures:

(a) RRM Retaining Wall constructed/partially constructed –

Sl. No.	Design Chainage			Length (m)	Remarks
	From	To	Side		
1	4+627	4+645	RHS	18.0	
2	4+660	4+675	RHS	15.0	
3	5+410	5+420	RHS	10.0	
4	6+830	6+840	LHS	10.0	
5	6+840	6+871	LHS	31.0	
6	7+192	7+200	RHS	8.2	
7	7+540	7+552	LHS	12.0	
8	7+660	7+730	LHS	70.0	
9	7+730	7+780	LHS	50.0	
10	7+780	7+821	LHS	41.0	
11	7+940	7+963	LHS	23.0	
12	7+963	7+995	LHS	32.0	
13	8+350	8+396	RHS	46.0	
14	8+396	8+397	RHS	1.0	
15	8+450	8+465	RHS	15.0	
16	8+465	8+497	RHS	32.0	
17	8+717	8+770	RHS	53.0	
18	8+770	8+780	RHS	10.0	
19	8+780	8+790	RHS	10.0	

20	9+500	9+536	RHS	36.0	
21	9+610	9+647	RHS	37.0	
22	9+647	9+651	RHS	4.0	
23	9+658	9+676	RHS	18.0	
24	9+900	9+932	RHS	32.0	
25	9+932	9+940	RHS	8.0	
26	9+975	10+004	RHS	28.5	
27	10+045	10+103	RHS	58.0	
28	10+148	10+171	RHS	23.0	
29	10+420	10+430	RHS	10.0	
30	10+490	10+510	RHS	20.0	
31	10+530	10+540	RHS	10.0	
32	10+564	10+580	RHS	16.0	
33	10+594	10+609	RHS	15.0	
34	10+609	10+610	RHS	1.0	
35	10+619	10+640	RHS	20.5	
36	10+640	10+660	RHS	20.5	
37	10+660	10+666	RHS	6.0	
38	10+666	10+670	RHS	4.0	
39	11+034	11+037	LHS	3.0	
40	11+041	11+045	LHS	4.0	
41	11+131	11+136	RHS	5.0	
42	11+143	11+149	RHS	6.0	
43	11+375	11+386	RHS	11.0	
44	11+460	11+484	LHS	24.0	
45	11+568	11+590	LHS	22.0	
46	11+590	11+634	LHS	44.0	
47	11+634	11+659	LHS	25.0	
48	11+699	11+759	LHS	59.5	
49	11+763	11+783	LHS	20.0	
50	11+800	11+864	LHS	64.0	
51	11+869	11+877	LHS	8.0	
52	11+877	11+880	LHS	3.0	
53	11+922	11+950	LHS	28.0	
54	12+318	12+325	LHS	7.0	
55	12+335	12+352	LHS	17.0	
56	14+130	14+150	RHS	20.0	
57	14+455	14+470	LHS	15.0	
58	14+775	14+780	LHS	5.0	
59	14+790	14+792	LHS	2.0	
TOTAL				**1267.60**	

(b) Breast Wall constructed/partially constructed–

S. No.	Design Chainage			Length	Remarks
	From	To	Side		
1	3+770	3+780	LHS	10	
2	5+622	5+651	LHS	29.0	
3	5+651	5+686	LHS	35.0	
4	5+686	5+700	LHS	14.0	
5	6+310	6+400	LHS	90.0	
6	6+718	6+760	RHS	42.0	
7	6+760	6+778	RHS	18.0	
8	6+782	6+875	RHS	93.0	
9	6+950	7+000	LHS	50.0	
10	7+010	7+020	LHS	10.0	
11	7+020	7+030	LHS	10.0	
12	7+400	7+462	RHS	62.0	
13	7+520	7+586	RHS	66.0	
14	7+600	7+699	RHS	99.0	
15	7+840	7+880	RHS	40.0	
16	7+880	7+952	RHS	72.0	
17	8+375	8+381	LHS	6.0	
18	8+381	8+393	LHS	17.0	
19	8+459	8+465	LHS	6.0	
20	8+472	8+505	LHS	33.0	
21	9+358	9+378	LHS	20.0	
22	9+378	9+393	LHS	15.0	
23	9+393	9+441	LHS	48.0	
24	9+441	9+480	LHS	39.0	
25	9+950	9+994	LHS	43.5	
26	10+125	10+154	LHS	29.0	
27	10+434	10+460	LHS	26.0	
28	10+460	10+478	LHS	18.0	
29	10+478	10+507	LHS	29.0	
30	10+510	10+551	LHS	41.0	
31	10+551	10+600	LHS	49.0	
32	11+069	11+100	RHS	31.0	
33	11+330	11+380	RHS	50.0	
34	11+520	11+552	RHS	31.5	
35	11+552	11+560	RHS	8.0	
36	11+560	11+601	RHS	40.5	
37	11+610	11+664	RHS	53.5	

38	11+760	11+800	RHS	40.0	
39	11+955	12+041	RHS	86.0	
40	12+529	12+560	RHS	31.0	
Upto date Executed Quantity				**1517.00**	

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way

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

Sl. No	**Design Chainage**		**Length (km)**	**Proposed ROW Width(m)**	**Date of providing ROW***
	From	**To**			
Full Right of Way (Full width)	2+000	13+900	11.90	20 m - 24 m	At Appointed Date.
	13+900	16+167	2.64	6.5 m – 10 m	

** The dates specified herein shall in no case be beyond 150 (one hundred and fifty) days afterthe Appointed Date.*

Annex – III

Alignment Plans

(Schedule-A)

Alignment Plans

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

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

(ii) Traffic Signage plan of the Project Highway showing numbers & location of traffic signs. The contractor shall, however, improve/upgrade upon the traffic signage plan based on site/design requirement as per the relevant specifications/IRC Codes/Manual.

Annex – IV

Environment Clearances

(Schedule-A)

Environment Clearances

The project Highway does not require Environment Clearance as per MoEF corrigendum dated 22.08.2013

[To be published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section(ii)]

MINISTRY OF ENVIRONMENT AND FORESTS
NOTIFICATION

New Delhi, the 22nd August, 2013

S.O. 2559 (E).- Whereas by notification of the Government of India in the Ministry of Environment and Forests vide number S.O.1533(E), dated the 14th September, 2006 issued under sub-section (1) and clause (v) of sub-section (2) of section (3) of the Environment (Protection) Act, 1986 read with clause (d) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government directed that on and from the date of its publication, the required construction of new projects or activities or the expansion or modernization of existing projects or activities listed in the Schedule to the said notification entailing the capacity addition with change in process or technology and or product mix shall be undertaken in any part of India only after prior environmental clearance from the Central Government or as the case may be, by the State level Environment Impact Assessment Authority, duly constituted by the Central Government under sub-section (3) of section 3 of the said Act, in accordance with the procedure specified therein;

And whereas the Government of India in the Ministry of Environment and Forests had constituted a High Level Committee under the Chairmanship of Member (Environment and Forests and Science and Technology), Planning Commission, vide OM No.21-270/2008-IA.III dated the 11th December, 2012 to review the provisions of Environmental Impact Assessment Notification, 2006 relating to granting Environmental Clearances for Roads, Buildings and Special Economic Zone projects and provisions under the OM dated the 7th February, 2012 issued by the Ministry of Environment and Forests regarding guidelines for High Rise Buildings;

And whereas one of the terms of reference (ToR) of the Committee was to review the requirement of Environmental Clearance for highway expansion projects upto the right of way of 60 meters and length of 200 kms under Environmental Impact Assessment notification;

And whereas the Committee has submitted its report to the Ministry and on this ToR, the Committee has recommended exempting highway expansion projects from the requirement of scoping and that Environmental Impact Assessment or Environment Management Plan for highway expansion projects may be prepared on the basis of model ToRs to be posted on Ministry's website and in respect of requirement of environmental clearance, the Committee has recommended that expansion of National Highway projects up to 100 kms involving additional right of way or land acquisition upto 40 mts on existing alignments and 60 mts on re-alignments or by-passes may be exempted from the preview of the notification;

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 with paved Shoulder and strengthening of Ranipool to Pakyong (NH 717 A) 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 2 lane highway from Ranipool to Pakyong from new take- off point at km 3+100 (i.e. located at out skirt of Ranipool town toward Pakyong) on Ranipool - Pakyong section of NH-717 A to Pakyong Airport gate in the State of Sikkim in accordance with IRC-SP: 73:2018, IRC-SP: 48:1998 and other relevant codes including standards, good practice of the road construction.

1. WIDENING OF THE EXISTING HIGHWAY

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

(ii) Width of carriageway

(a) The proposed 2-Lane Carriageway starts from Km 3+100 of NH-717 A i.e. Km 2+00 to Pakyong Airport and end at Km 16+167. The paved carriageway shall be 7.0m + 1.5m paved shoulder both side + 1.0 m Earthen shoulder /Parapet / road side drain in accordance with the typical cross sections drawings in the Manual.

Provided that in the built-up areas, the width of the carriageway shall be as specified in the following table:

S. N	Built-up stretch (Township)	Location (km to km)	Width (m)	Typical cross section (Ref. to Manual)
1	Pakyong	13+900 to 15+500	7.5 m + Shoulders as per manual	SP: 73 2018
2		15+500 to 16+167	3.75 m + Shoulders as per manual	SP: 48 - 1998/other relevant code

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

2 GEOMETRIC DESIGN AND GENERAL FEATURES

(i) General

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

(ii) Design speed

The design speed shall be the minimum design speed of 40 km per hr for Mountainous/ Steep terrain.

(iii) Improvement of the existing road geometrics

[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 - 2018 standards. The horizontal alignment of the Project Highway shall be improved as per the standards set out in **Schedule–D.**

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:

S/N	Chainage	Radius	Type of Deficiency	Remarks
1	2913.944	-20	Hair pin bend	Adopted Design Speed of 20 Kmph
2	3243.896	20	Hair pin bend	Adopted Design Speed of 20 Kmph
3	6694.000	- 20	Hair pin bend	Adopted Design Speed of 20 Kmph
4	7402.000	-20	Hair pin bend	Adopted Design Speed of 20 Kmph
5	8144.000	20	Hair pin bend	Adopted Design Speed of 20 Kmph
6	8962.000	-20	Hair pin bend	Adopted Design Speed of 20 Kmph
7	9358.000	20	Hair pin bend	Adopted Design Speed of 20 Kmph
8	10995.000	-20	Hair pin bend	Adopted Design Speed of 20 Kmph
9	12961.000	20	Hair pin bend	Adopted Design Speed of 20 Kmph
10	14051.000	-20	Combine curve	Adopted Design Speed of 20 Kmph
11	14604.000	-25	Combine curve	Adopted Design Speed of 20 Kmph
12	14648.000	25	Combine curve	Adopted Design Speed of 20 Kmph
13	14906.000	-20	Combine curve	Adopted Design Speed of 20 Kmph
14	15610.000	-25	Combine curve	Adopted Design Speed of 20 Kmph
15	16262.000	20	Combine	Adopted Design Speed of

			curve	20 Kmph

(iv) Right of Way

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

(v) Type of shoulders

[Refer to paragraph 2.6 of the Manual and specify]

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

Sl. No.	Stretch (from km to km)	Fully paved shoulders/ footpaths	Reference to cross section
1	2+300 to 2+400	As per Manual	-
2	3+800 to 5+000	As per Manual	-
3	10+900 to 11+100	As per Manual	-
4	12+700 to 13+500	As per Manual	-
5	13+700 to 14+900	As per Manual	-

(b) In open country, paved shoulders of 1.5 m width shall be provided and balance 1.0m width shall be covered with 150 mm thick compacted layer of granular material.

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

(vi) Lateral and vertical clearances at underpasses

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

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

Sl. No.	Location (chainage) (from km to km)	Span/opening (m)	Remarks
Nil			

(vii) Lateral and vertical clearances at overpasses

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

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

Sl. No.	Location (chainage)(from km to km)	Span/opening (m)	Remarks
Nil			

(viii) Service roads

Service roads shall be constructed at the locations and for the lengths indicated below: [Refer to provision of relevant Manual and provide details]

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

(ix) Grade separated structures

(a) Grade separated structures shall be provided as per paragraph 2.14 of the Manual. The requisite particulars are given below:

[Refer to provisions of relevant Manual and provide details]

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

(b) In the case of grade separated structures, the type of structure and the level of the Project Highway and the 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						

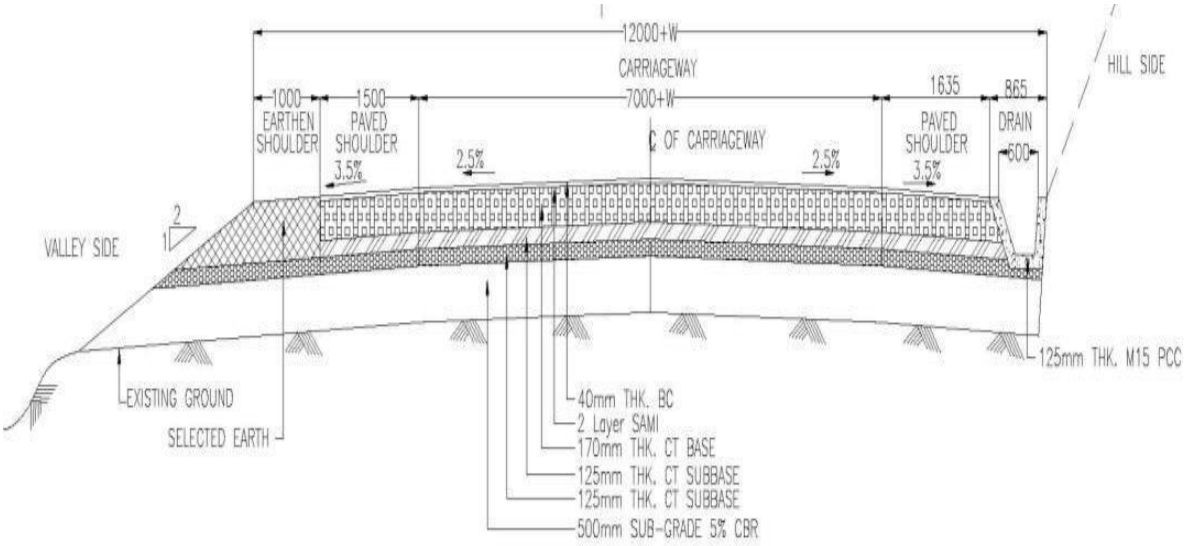
(x) Cattle and pedestrian underpass /overpass

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

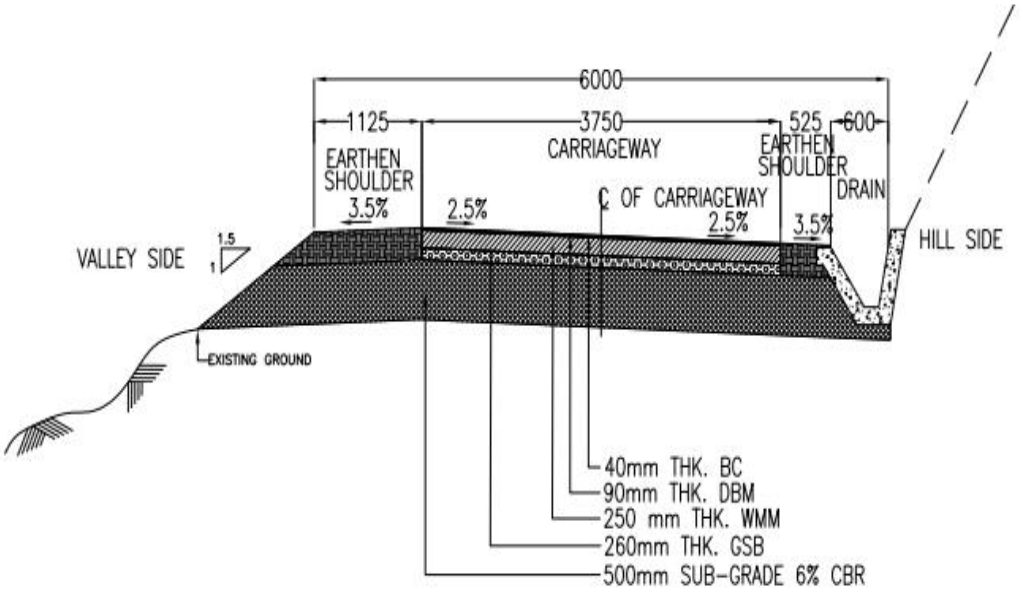
Sl. No.	Location	Type of crossing
Nil		

(xi) Typical cross-sections of the Project Highway

Approximate cross section type (tentative) suitable at various chainages of project highway is as shown below:



TYPICAL PAVEMENT DETAILS FOR MAIN ROAD



TYPICAL PAVEMENT DETAIL FOR AIRPORT LINK ROAD

(ii) 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 FSR. However, the final finished road levels (FRL) will be finalized as per site conditions in consultation with Authority Engineer. The proposed profile of the Project Highway shall be followed by the contractor with minimum FRL as indicated in the alignment plan.

(iii) Built-Up Areas

The following are the Built-up locations on the Project Road.

Sr.No.	Existing Chainage		Village Name	Design Chainage		District
	From	To		From	To	
1	3440	4500	Aho	2350	3350	East
2	5000	6200	Yangtam	3850	5000	East
3	12550	13200	Panchwati	9000	9650	East
4	14460	19100	Pakyong	10900	16359	East

3 INTERSECTIONS AND GRADE SEPARATORS

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

[Refer to the provision of relevant Manual and specify the requirements. Explain where necessary with drawings/sketches/general arrangement]

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

(a) At-grade intersections

The details of major junctions are as follows:

S. No.	Location	Type of intersection	Category of Cross Road			
			NH	SH	MDR	Others
1	14+400	Y- Intersection			MDR	
2	14+600	Y- Intersection			MDR	
3	15+500	Y- Intersection			MDR	

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

Road) The details of minor junctions are as follows:

S. No.	Location	Type of intersection	Category of Cross Road			
			NH	SH	MDR	Others
1	3+450	Y-Intersection	-	-	Yes	-
2	5+800	T- Intersection	-	-	Yes	-
3	6+450	Y-Intersection	-	-	-	Yes
4	7+120	Y-Intersection	-	-	-	Yes
5	7+950	Y-Intersection	-	-	-	Yes
6	9+000	T- Intersection	-	-	Yes	-
7	13+000	Y-Intersection	-	-	-	Yes
8	13+580	Y-Intersection	-	-	-	Yes

(b) Grade separated intersection with/without ramps

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

4 ROAD EMBANKMENT AND CUT SECTION

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

(ii) Raising of the existing road [Refer to provision of relevant Manual and specify sections to be raised]

The existing road shall be raised in the following sections:

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

(iii) Maintenance/Repairs/balance constructions/re-construction of the already executed pavement works by the earlier Contractor shall be undertaken as per Appendix – IX to XI.

5 PAVEMENT DESIGN

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

(ii) Type of pavement

(a) Main Highway: Flexible Pavement with CT Sub-base and Base course shall be designed as per IRC-37.

(b) Airport Link Road : Flexible pavement as per Manual.

(iii) Design requirements

[Refer to paragraph 5.4, 5.9, 5.10 & 5.11 of the Manual and specify design requirements and strategy]

(a) Design Period and strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 15 years as per IRC-37. Stage construction shall not be permitted.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of not less than 20 MSA (million standard

axles)

(iv) Reconstruction of stretches

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

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

Sl. No.	Stretch From km to km	Remarks
Nil		

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:

(i) Road side Drainage Measures

Following measures shall be adopted:

Open side Trapezoidal Lined drains at the hill side for widening at hill sides and both sides in realignment stretches by hill cut. Open side Trapezoidal Lined 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. Trapezoidal cover 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.

Sr. No.	Chainage in m		Length	Remarks
	From	To		
4	2000.00	2350.00	350.0	Trapezoidal open drain
5	2350.00	3350.00	1000.0	Trapezoidal Cover drain
6	3350.00	3850.00	500.0	Trapezoidal open drain
7	3850.00	5000.00	1150.0	Trapezoidal Cover drain
8	5000.00	5800.00	800.0	Trapezoidal open drain
9	5800.00	7950.00	2150.0	Trapezoidal open drain
10	7950.00	9650.00	1700.0	Trapezoidal open drain
11	9650.00	10300.00	650.0	Trapezoidal Cover drain
12	10300.00	11550.00	1250.0	Trapezoidal open drain
13	11550.00	16167.00	4617.0	Trapezoidal Cover drain
14	Box cutting portion		2440	Trapezoidal open drain
15	Catch water drain		1200	Trapezoidal open drain

Note: The above locations and length are indicative only and shall be reviewed in consultation with the Authority Engineer at the time of construction as per the site condition.

(ii) Chutes Drain

Location of culvert outlet required outlet drain to connect with natural nallah

Sr. No	Chainage	Clear Width of Chute	Length of Chute	Remarks
1	2770.00	2.70	20	
2	3410.00	1.85	20	
3	4570.00	1.85	20	
4	5130.00	2.70	20	
5	5990.00	2.70	20	
6	6557.00	3.20	20	
7	6842.00	3.20	20	
8	7700.00	1.85	20	
9	7880.00	1.85	20	
10	9573.00	1.85	20	
11	9701.00	2.70	20	
12	9898.00	1.85	20	
13	12410.00	1.85	20	

Note: The above locations and length are indicative only and shall be reviewed in consultation with the Authority Engineer at the time of construction as per the site condition.

(iii) Maintenance/repair/reconstruction/balance construction of the existing constructed drain shall be undertaken as per Appendix-VIII.

7 DESIGN OF STRUCTURES

(i) General

(a) All bridges and structures shall be designed and constructed in accordance with relevant manual and shall conform to the cross-sectional features and other details specified therein. The culverts shall be designed and constructed in accordance with section 7 of the Manuals.

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 Authority Engineer. 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 Authority's Engineer 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.

(b) Width of the carriageway of new bridges and structures shall be as follows:

[Refer to provisions of the Manual and specify the width of carriageway of new bridges and structures of more than 60 metre length, if the carriageway width is different from 7.5 metres in the table below.]

Sl No.	**Bridge at km**	**Width of carriageway and cross-sectional features@**
NIL		

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

[Refer to provisions of the Manual and provide details of new Structures with footpath.]

Sl. No.	**Location at km**	**Remarks**
Nil		

(d) All bridges shall be high-level bridges.

[Refer to paragraph 7.1 (iii) of the Manual and state if there is any exception]

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

[Refer to paragraph 7.1 (v) of the Manual and provide details]

Sl. No.	**Bridge at km**	**Utility service to be carried**	**Remarks**
1	2+440	OFC, Telephone cable, gas/water pipeline etc	
2	6+140	OFC, Telephone cable, gas/water pipeline etc	

(f) 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.

(ii) Culverts

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

(b) Reconstruction of existing culverts:

The existing culverts at the following locations shall be re-constructed as new culverts:[Refer to provisions of the Manual]

Sr. No.	Culvert location in m	Span /Opening	Remarks, if any*
1	2037	1 X 2	BOX-TYPE-1
2	2281	1 X 2	BOX-TYPE-1
3	3091	1 X 3	BOX-TYPE-2
4	3650	1 X NP4	HPC-TYPE-1
5	4210	1 X 2	BOX-TYPE-1
6	4303	1 X 2	BOX-TYPE-1
7	4660	1 X 2	BOX-TYPE-1
8	4842	1 X NP4	HPC-TYPE-1
9	5050	1 X 2	BOX-TYPE-1
10	5420	1 X 2	BOX-TYPE-1
11	5787	1 X 2	BOX-TYPE-1
12	9700	1 X 2	BOX-TYPE-1
13	9900	1 X NP4	HPC-TYPE-2
14	11411	1 X NP4	HPC-TYPE-2
15	12163	1 X NP4	HPC-TYPE-2
16	12287	1 X NP4	HPC-TYPE-2
17	12735	1 X NP4	HPC-TYPE-1
18	12910	1 X 2	BOX-TYPE-1
19	13146	1 X 2	BOX-TYPE-1
20	13200	1 X NP4	HPC-TYPE-2
21	13270	1 X 2	BOX-TYPE-1
22	13497	1 X 2	BOX-TYPE-1
23	13743	1 X NP4	HPC-TYPE-1
24	14078	1 X NP4	HPC-TYPE-2
25	14214	1 X 2	BOX-TYPE-1
26	14592	1 X NP4	HPC-TYPE-2
27	14717	1 X NP4	HPC-TYPE-2
28	15270	1 X 2	BOX-TYPE-1
29	15884	1 X 2	BOX-TYPE-1
30	15960	1 X 2	BOX-TYPE-1

Note: The size is indicative and shall be estimated by the EPC contractor.

(c) **Widening of existing culverts**

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

Sl. No.	**Culvert location**	**Type, span, height and width of existing culvert** (m)	**Repairs to be carried out [specify]**
Nil			

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

Sr. No.	**Culvert location in m**	**Span /Opening**	**Remarks, if any***
1	2772	1 X 2	BOX-TYPE-1
2	3410	1 X NP4	HPC-TYPE-2
3	4572	1 X NP4	HPC-TYPE-1
4	5132	1 X 3	BOX-TYPE-2
5	5992	1 X 2	BOX-TYPE-1
6	7945	1 X NP4	HPC-TYPE-1
7	8490	1 X NP4	HPC-TYPE-1
8	9360	1 X NP4	HPC-TYPE-1
9	9567	1 X 2	BOX-TYPE-1
10	10313	1 X NP4	HPC-TYPE-2
11	12413	1 X NP4	HPC-TYPE-2

Note: The size & location is indicative and shall be estimated by the EPC contractor.

(e) Maintenance/Repairs/balance constructions of the existing culverts shall be undertaken as follows:

Sl. No.	**Location at km**	**Size**	**Type**	**Remarks**
1	4459	1 X 2	BOX-TYPE-1	Balance Construction to be done
2	4635	1 X 1.2	HPC-TYPE-1	Balance Construction to be done
3	6550	1 X 1.2	HPC-TYPE-1	Balance Construction to be done
4	6720	1 X NP4	HPC-TYPE-1	Balance Construction to be done
5	7010	1 X NP4	HPC-TYPE-1	Required maintenance/repair to be done
6	7445	1 X NP4	HPC-TYPE-1	Required maintenance/repair to be done

7	9370	1 X NP4	HPC-TYPE-1	Balance Construction to be done
8	9660	1 X NP4	HPC-TYPE-1	Balance Construction to be done
9	10360	1 X NP4	HPC-TYPE-1	Balance Construction to be done
10	10645	1 X NP4	HPC-TYPE-1	Balance Construction to be done
11	10661	1 X NP4	HPC-TYPE-1	Balance Construction to be done
12	10695	1 X NP4	HPC-TYPE-1	Balance Construction to be done
13	10816	1 X 2	BOX-TYPE-1	Required maintenance/repair to be done
14	10890	1 X 2	BOX-TYPE-1	Balance Construction to be done
15	11140	1 X NP4	HPC-TYPE-1	Required maintenance/repair to be done
16	11234	1 X 2	BOX-TYPE-1	Balance Construction to be done
17	11450	1 X NP4	HPC-TYPE-1	Balance Construction to be done
18	11503	1 X 2	BOX-TYPE-1	Balance Construction to be done
19	11740	1 X NP4	HPC-TYPE-1	Balance Construction to be done
20	11854	1 X 2	BOX-TYPE-1	Balance Construction to be done
21	11900	1 X NP4	HPC-TYPE-1	Balance Construction to be done
22	12560	1 X 2	BOX-TYPE-1	Balance Construction to be done
23	14292	1 X 2	BOX-TYPE-1	Balance Construction to be done

Note: Maintenance/Repair/Balance construction works shall be reviewed in consultation with the Authority Engineer at the time of construction/execution as per the site condition.

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

(iii) Bridges

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

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

[Refer to paragraph 7.3.2 of the Manual and provide details]

Sl. No.	**Bridge location (km)**	**Salient details of existing bridge**	**Adequacy or otherwise of the existing waterway, vertical clearance, etc***	**Remarks**
Nil				

*Attach GAD

(ii) The following narrow bridges shall be widened:

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

@ Attach cross-section

(b) Additional new bridges

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

Sl. No.	Location (km)	Total length (m)	Remarks, if any
1	2+440 to 2+500	60.00	Voided slab with open foundation, Bridge in curve
2	6+140 to 6+160	20.00	Voided slab with open foundation, Bridge in curve

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

Sl. No.	Location at km	Remarks
Nil		

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

[Refer to paragraph 7.18 (v) the Manual and provide details]

Sl. No.	Location at km	Remarks
Nil		

(e) Drainage system for bridge decks

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

7.3.6 Structures in marine environment

[Refer to paragraph 7.21 of the Manual and specify the necessary measures / treatments for protecting structures in marine environment, where applicable]

(iv) Rail-road bridges

(a) 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]

(b) 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 (chainage km)	Length of bridge (m)
Nil		

(c) Road under-bridges

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

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

(v) 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.

(vi) 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 tobe carried out
Nil		

(b) ROB / RUB

Sl. No.	Location of ROB/RUB (km)	Nature and extent of repairs /strengthening tobe carried out
Nil		

(c) Overpasses/Underpasses and other structures

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

(vii) List of Major Bridges and Structures

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

Sl. No.	Location
1	Km 2+440 to Km 2+500 , Bridge over Aho Khola
2	Km 6+140 to Km 6+160 , Bridge over Andheri Khola

8 TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

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

(ii) Specifications of the reflective sheeting.

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 Contractor.

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 etc.

(iii) Traffic Signs

(i) A complete range of permanent retro-reflective traffic signs as per the requirements defined in but not limited to the CA, 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.

(iv) 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.

II. Delineators bollards and other safety devices shall be provided on entire project Highway and other locations as directed by Authority Engineer.

III. 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.

IV 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

Sr. No.	Traffic Signages, Road Marking and other appurtenances	unit	Quantity
1	90 cm equilateral triangle	each	12.0
2	60 cm equilateral triangle	each	25.0
3	60 cm circular	each	32.0
4	80 mm x 60 mm rectangular	each	28.0
5	60 cm x 45 cm rectangular	each	22.0
6	60 cm x 60 cm square	each	30.0
7	Direction and Place Identification signs upto 0.9 sqm sizeboard.	Sqm	8.0
8	Road Marking with Hot Applied Thermoplastic Compoundwith Reflectorizing Glass	Sqm	4961.7
9	5th kilometer stone (precast)	each	3.0
10	Ordinary Kilometer stone (Precast)	each	13.0
11	Hectometer stone (Precast)	each	67.0
12	Road Delineators	each	56.0
13	Boundary pillar	each	166.0
14	Street Furniture	each	1050.0

Note: The above qty mentioned in the table is tentative. Contractor has to executed the qty required as per site condition in consultation with Authority Engineer and shall not constitute Change of Scope.

9 ROADSIDE FURNITURE

(i) Roadside furniture shall be provided in accordance with the relevant provisions of the Manual.

(ii) Overhead traffic signs: location and size – 02 nos

10 COMPULSORY AFFORESTATION

[Refer to section 11 & 12 of the Manual]

11 HAZARDOUS LOCATIONS

Metal Beam crash barrier length of minimum 1500 m (single runner, heavy duty and Thrie-shape) shall be provided at the locations of bridge approaches, sheep valley side and 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 Authority's Engineer. Typical details of metal crash barrier are given in as per manual.

12 SPECIAL REQUIREMENTS FOR HILL ROADS

In accordance with section 13 of the manual (from IRC SP 73: 2018), IRC: SP 48:1998 and Recommended Practices for the Treatment of Embankment and Roadside slopes for Erosion control (First Revision) IRC: 56 :2011 and relevant

(i) Spreading & Compaction of Roadway cutting and excavation from drain and foundation of other structures surplus material in layers not exceeding 300mm thickness at selected disposal location by Dozer at least four passes including construction of approach road to dumping site.

(ii) Land Slide & Sinking stretches need to be restoration & rehabilitated

Sr.No.	Landslide Location		Disaster Type	Soil/Rock Condition	Landslide Size	
	Start	End			Length	Width
1	6300	6340	Sinking Portion	Soil	40	30
2	7950	8000	Sliding Portion	Soft rock	50	30
3	8500	8700	Sliding Portion	Soft rock	200	30
4	16000	16167	Sinking Portion	Soft rock	167	30

Note: The above requirement is tentative. The exact location and length will be finalized in consultation with Authority Engineer and variation shall not constitute a change of scope.

(iii) Mitigation measure for Land slide & sinking portion

Sr. No.	Description	Unit	Quantity
1	Seeding and Mulching (Soil Cut Slope)	Sqm	30000
2	Vegetation Mat (Steep Slope)	Sqm	1400
3	Crib Work (F300)	Sqm	300
4	Crib Work (F500)	Sqm	400
5	Groundwater Drainage Work	metre	1500
6	Anchor Work	Rm	200
7	Rock-bolt Work	Rm	150
8	Turfing with Sods	Sqm	25000

Note: The above requirement is tentative. The exact location and length will be finalized in consultation with Authority Engineer and variation shall not constitute a change of scope.

(iv) (a) Slope Protection

S.N	Description of Item	Length in m	Height in m	Type of structure	Remarks
1	Retaining Wall	380.00	3 to 5	RRM Retaining wall	As per Appendix-I of Schedule B
2	Retaining Wall	410.00	5 to 12	RCC Retaining wall	As per Appendix-II of Schedule B
3	Breast wall	7040.00	2 to 3	RRM Breast wall	As per Appendix-III of Schedule B
4	Gabion Wall	1280.0	2 to 3	Gabion Wall	As per Appendix-IV of Schedule B
5	Toe Wall	1445.00	2 to 3	RRM Toe wall	As per Appendix-V of Schedule B

(b) Maintenance/Repairs/balance constructions/reconstruction of the existing protection walls shall be undertaken as per the Appendix-VI & VII.

(c) Cut Slope wall: Slope protection along hill side to protect the public properties and soil exposed face on hill side Height of wall varies from 3.0 m to 5.0m and shall be constructed with M 15 PCC.
Length of wall – 3000 m. Location will be finalized during construction stage as per site conditions and in consultation with AE

(d) Vetiver Plantation, Hydro Seeding and Hydro Mulching etc or similar works is to be done for slope protection and site mitigation measure upto a height of 12-15 m all along the slopes in each cutting locations except hard rock location which needs to be protected with appropriate applicable technologies, if required.

Note:

- The contractor shall be responsible for accurate assessment of the actual requirement as per site situation and prepare design for slope protection and stabilization as per specification and standards stipulated in schedule-D and submit the same to the Authority's Engineer/Authority for review through the Proof Consultant and implement it accordingly thereafter

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

- For executing any of the above type of slope protection works, the contractor should have the experience of having executed, in last 5 (five) financial years from the date of signing of Agreement, at least 40% quantity of that type of slope protection works and provide requisite certificates/documents to verify the same to the Authority/ Authority engineer.

- If the Contractor does not have requisite experience for any/some of the above type of slope protection works, then he has to engage specialized firm(s) as sub-contractor(s) who has/have successfully completed in last 5(five) financial years

atleast 40% quantity of such works. The contractor shall submit the credentials and the qualifying experience of the specialized sub-contractor(s) for approval of Authority before the commencement of such slope protection works.

(v) Dismantling of Structures

Dismantling of existing structures like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and lead.

Tentative nos of culvert & other cross drainage structure	-	38
Tentative nos of retaining wall, breast wall & other protection structure	-	204
Tentative nos of structures (Residential/commercial/other)	-	95

(vi) Dismantling of Flexible Pavements

Dismantling of flexible pavements and disposal of dismantled materials, stacking serviceable and unserviceable materials separately

Tentative length of existing pavement - 14.167 Km

(vii) Removal of landslide

Clearance of landslides in soil, ordinary rock and rock disposal of the same on the valley side/selected disposal side.

(viii) Disposal of cut material

Disposal of cut material at designed disposal area. Spreading & Compaction of Roadway cutting and excavation from drain and foundation of other structures surplus material in layers not exceeding 300mm thickness at selected displosal location by Dozer at least four passes including construction of approach road to dumping site.

13 CHANGE OF SCOPE

The length of Structures, bridges and slope protection works whatsoever in terms of retaining wall, breast wall and gabion wall or under special requirement of hill slope specified herein above shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the specification and standards. Any variations in the lengths, quantities and specifications given in the schedule–B shall not constitute a change of Scope.

Appendix-I of Schedule B

Sr. No.	Chainage		Length in m	Height in m	Remarks
	From	To			
1	2025	2035	10	3	RHS
2	2035	2045	10	3	RHS
3	2045	2055	10	3	RHS
4	2055	2065	10	3	RHS
5	2065	2075	10	4	RHS
6	2075	2085	10	4	RHS
7	2085	2095	10	4	RHS
8	2095	2105	10	3	RHS
9	2105	2115	10	4	RHS
10	2115	2125	10	3	RHS
11	2125	2135	10	3	RHS
12	2135	2145	10	3	RHS
13	2145	2155	10	4	RHS
14	2155	2165	10	3	RHS
15	2165	2175	10	3	RHS
16	2175	2185	10	3	RHS
17	2185	2195	10	3	RHS
18	2195	2205	10	4	RHS
19	2205	2215	10	4	RHS
20	2215	2225	10	4	RHS
21	2225	2235	10	4	RHS
22	2265	2275	10	3	RHS
23	2285	2295	10	4	RHS
24	2295	2305	10	3	RHS
25	2305	2315	10	3	RHS
26	2315	2325	10	3	RHS
27	2325	2335	10	3	RHS
28	2335	2345	10	3	RHS
29	2345	2355	10	3	RHS
30	2355	2365	10	3	RHS
31	2505	2515	10	4	RHS
32	2585	2595	10	3	RHS
33	2875	2885	10	3	RHS
34	2935	2945	10	3	RHS
35	3165	3175	10	3	LHS
36	3175	3185	10	4	LHS
37	3185	3195	10	5	LHS
38	3195	3205	10	5	LHS
39	3205	3215	10	5	LHS
40	3215	3225	10	5	LHS
41	3225	3235	10	4	LHS
42	3395	3405	10	3	RHS
43	3405	3415	10	3	RHS
44	3555	3565	10	3	RHS
45	3565	3575	10	3	RHS

S.N	Chainage		Length in m	Height in m	Remarks
	From	To			
46	3625	3635	10	3	RHS
47	3635	3645	10	4	RHS
48	3645	3655	10	4	RHS
49	4475	4485	10	4	RHS
50	4655	4665	10	4	RHS
51	4875	4885	10	3	RHS
52	4905	4915	10	5	RHS
53	4925	4935	10	3	RHS
54	5115	5125	10	4	RHS
55	5135	5145	10	3	RHS
56	5225	5235	10	3	RHS
57	6705	6715	10	4	RHS
58	8475	8485	10	3	RHS
59	8495	8505	10	3	LHS
60	8505	8515	10	3	LHS
61	9495	9505	10	3	RHS
62	9505	9515	10	3	RHS
63	9515	9525	10	3	RHS
64	9525	9535	10	4	RHS
65	9535	9545	10	5	RHS
66	9585	9595	10	5	LHS
67	9595	9605	10	3	LHS
68	9605	9615	10	5	RHS
69	9965	9975	10	4	LHS
70	9975	9985	10	5	LHS
71	10015	10025	10	4	LHS
72	10315	10325	10	4	RHS
73	10725	10735	10	3	RHS
74	10875	10885	10	3	RHS
75	11095	11105	10	3	RHS
76	11225	11235	10	4	RHS
77	11235	11245	10	3	RHS
78	11315	11325	10	3	RHS
79	11405	11415	10	4	RHS
80	11415	11425	10	4	RHS
81	11435	11445	10	3	RHS
82	11445	11455	10	3	RHS
83	11455	11465	10	3	RHS
84	11505	11515	10	3	RHS
85	11525	11535	10	3	RHS
86	11605	11615	10	3	RHS
87	11615	11625	10	4	RHS
88	11625	11635	10	5	RHS
89	11645	11655	10	5	RHS
90	11865	11875	10	3	LHS
91	11935	11945	10	3	LHS
92	11945	11955	10	4	LHS

Sr.No.	Chainage		Length in m	Height in m	Remarks
	From	To			
93	12385	12395	10	3	LHS
94	12395	12405	10	4	LHS
96	12405	12415	10	4	LHS
97	12415	12425	10	3	LHS
98	12595	12605	10	5	LHS
99	12605	12615	10	3	LHS
100	12655	12665	10	3	LHS
101	12665	12675	10	3	LHS
102	12775	12785	10	4	LHS
103	12895	12905	10	3	LHS
104	12905	12915	10	3	LHS
105	13535	13545	10	3	LHS
106	13905	13915	10	3	RHS
107	14165	14175	10	3	RHS
108	14175	14185	10	3	RHS
109	14185	14195	10	3	RHS
110	14565	14575	10	4	RHS
111	14665	14675	10	3	RHS
112	15565	15575	10	4	LHS
113	15875	15885	10	4	LHS
114	15935	15945	10	5	LHS

Note: The length is indicative and shall be estimated by the EPC contractor.

Appendix-II of Schedule B

Sr.No.	Chainage		Length in m	Height in m	Remarks
	From	To			
1	2275	2285	10	10	RHS
2	2575	2585	10	7	RHS
3	2865	2875	10	7	RHS
4	8465	8475	10	7	LHS
5	8475	8485	10	10	LHS
6	9545	9555	10	7	RHS
7	9555	9565	10	10	RHS
8	9565	9575	10	10	LHS
9	9565	9575	10	10	RHS
10	9575	9585	10	7	LHS
11	9575	9585	10	10	RHS
12	9585	9595	10	10	RHS
13	9595	9605	10	10	RHS
14	9985	9995	10	7	LHS
15	9995	10005	10	10	LHS
16	10005	10015	10	10	LHS
17	11515	11525	10	7	RHS
18	11635	11645	10	7	RHS
19	15575	15585	10	7	LHS
20	15955	15965	10	7	LHS

Note: The length is indicative and shall be estimated by the EPC contractor.

Appendix-III of Schedule B

Sr.No.	Chainage		Length in m	Height inm	Side
	From	To			
1	2170	2190	20.00	2.00	LHS
2	2330	2400	70.00	2.00	LHS
3	2640	2760	120.00	2.00	LHS
4	2790	2850	60.00	3.00	LHS
5	2950	3080	130.00	2.00	RHS
6	3260	3370	110.00	2.00	LHS
7	3460	3640	180.00	3.00	LHS
8	3910	3935	25.00	2.00	LHS
9	3985	4040	55.00	2.00	LHS
10	4150	4180	30.00	2.00	LHS
11	4240	4280	40.00	2.00	LHS
12	4330	4380	50.00	3.00	LHS
13	4460	4480	20.00	3.00	LHS
14	4590	4645	55.00	3.00	LHS
15	4700	4790	90.00	3.00	LHS
16	4935	4985	50.00	3.00	LHS
17	5250	5280	30.00	3.00	LHS
18	5380	5405	25.00	2.00	LHS
19	5520	5700	180.00	2.00	LHS
20	5900	6080	180.00	2.00	LHS
21	6135	6320	185.00	2.00	LHS
22	6450	8440	1990.00	2.00	LHS
23	6450	8440	1990.00	3.00	RHS
24	9715	9730	15.00	2.00	RHS
25	9835	9870	35.00	2.00	RHS
26	10045	10080	35.00	2.00	LHS
27	10180	10270	90.00	3.00	LHS
28	10380	10425	45.00	2.00	LHS
29	10510	10560	50.00	2.00	LHS
30	10750	10780	30.00	3.00	LHS
31	10920	10950	30.00	3.00	LHS
32	11160	11220	60.00	3.00	LHS
33	11260	11300	40.00	3.00	LHS
34	11345	11390	45.00	3.00	LHS
35	11690	11760	70.00	2.00	RHS
36	11910	11930	20.00	2.00	RHS
37	12030	12080	50.00	2.00	RHS
38	12170	12210	40.00	2.00	RHS
39	12415	12480	65.00	2.00	RHS
40	12820	12880	60.00	2.00	RHS
41	12990	13050	60.00	2.00	RHS

Sr.No.	Chainage		Length in m	Height inm	Side
	From	To			
42	13270	13290	20.00	2.00	RHS
43	13335	13470	135.00	2.00	RHS
44	13530	13580	50.00	3.00	RHS
45	13650	13720	70.00	2.00	LHS
46	13750	13795	45.00	2.00	LHS
47	13830	13920	90.00	2.00	LHS
48	13960	14060	100.00	2.00	LHS
49	14090	14210	120.00	2.00	LHS
50	14390	14400	10.00	3.00	LHS
51	14590	14640	50.00	2.00	LHS
52	14810	14850	40.00	2.00	LHS
53	15080	15190	110.00	3.00	LHS
54	15150	15205	55.00	3.00	RHS
55	15335	15350	15.00	2.00	RHS
56	15420	15495	75.00	3.00	RHS
57	15595	15660	65.00	2.00	RHS
58	15695	15715	20.00	3.00	RHS
59	15835	15900	65.00	3.00	RHS
60	16060	16110	50.00	3.00	RHS

Note: The length is indicative and shall be estimated by the EPC contractor.

Appendix-IV of Schedule B

SR.NO.	CHAINAGE		LENGTH in m	HEIGHT in m	REMARKS
	FROM	TO			
1	2235	2245	10	3	RHS
2	2245	2255	10	3	RHS
3	2255	2265	10	3	RHS
4	2365	2375	10	3	RHS
5	2375	2385	10	3	RHS
6	2385	2395	10	2	RHS
7	2515	2525	10	3	RHS
8	2805	2815	10	3	RHS
9	3055	3065	10	3	LHS
10	3065	3075	10	3	LHS
11	3075	3085	10	3	LHS
12	3085	3095	10	3	LHS
13	3135	3145	10	3	LHS
14	3195	3205	10	2	RHS
15	3205	3215	10	2	RHS
16	3225	3235	10	2	RHS
17	3245	3255	10	2	LHS
18	3255	3265	10	2	RHS
19	3265	3275	10	3	RHS
20	3275	3285	10	3	RHS
21	3285	3295	10	2	RHS
22	3315	3325	10	3	RHS
23	3325	3335	10	3	RHS
24	3335	3345	10	3	RHS
25	3345	3355	10	3	RHS
26	3355	3365	10	3	RHS
27	3365	3375	10	3	RHS
28	3375	3385	10	3	RHS
29	3385	3395	10	3	RHS
30	3715	3725	10	3	RHS
31	3735	3745	10	2	RHS
32	3775	3785	10	2	RHS
33	3785	3795	10	2	RHS
34	4105	4115	10	3	RHS
35	4215	4225	10	2	RHS
36	4305	4315	10	3	RHS
37	5205	5215	10	2	RHS
38	5215	5225	10	3	RHS
39	5315	5325	10	2	RHS
40	6715	6725	10	3	RHS
41	8485	8495	10	3	LHS
42	9435	9445	10	3	RHS
43	9445	9455	10	3	RHS
44	9455	9465	10	3	RHS
45	9465	9475	10	3	RHS
46	9475	9485	10	3	RHS
47	9485	9495	10	3	RHS

SR.NO.	CHAINAGE		LENGTH in m	HEIGHT in m	REMARKS
	FROM	TO			
48	9795	9805	10	2	LHS
49	9955	9965	10	3	LHS
50	10305	10315	10	3	RHS
51	10325	10335	10	3	RHS
52	10365	10375	10	3	RHS
53	10485	10495	10	3	RHS
54	10495	10505	10	3	RHS
55	10735	10745	10	3	RHS
56	10805	10815	10	3	RHS
57	10815	10825	10	3	RHS
58	10865	10875	10	3	RHS
59	10885	10895	10	3	LHS
60	10955	10965	10	3	RHS
61	10965	10975	10	3	RHS
62	10975	10985	10	2	RHS
63	11015	11025	10	2	RHS
64	11025	11035	10	2	RHS
65	11035	11045	10	2	RHS
66	11045	11055	10	2	RHS
67	11055	11065	10	2	RHS
68	11085	11095	10	2	RHS
69	11215	11225	10	3	RHS
70	11245	11255	10	3	RHS
71	11365	11375	10	3	RHS
72	11485	11495	10	3	RHS
73	11755	11765	10	2	LHS
74	11775	11785	10	2	LHS
75	11805	11815	10	2	LHS
76	11845	11855	10	3	LHS

SR.NO.	CHAINAGE		LENGTH in m	HEIGHT in m	REMARKS
	FROM	TO			
77	11855	11865	10	3	LHS
78	11925	11935	10	2	LHS
79	11985	11995	10	2	LHS
80	12035	12045	10	3	LHS
81	12195	12205	10	2	LHS
82	12205	12215	10	3	LHS
83	12215	1222	10	2	LHS
84	12355	12365	10	2	LHS
85	12365	12375	10	3	LHS
86	12485	12495	10	3	LHS
87	12495	12505	10	2	LHS
88	12515	12525	10	3	LHS
89	12525	12535	10	3	LHS
90	12535	12545	10	2	LHS
91	12545	12555	10	3	LHS
92	12555	12565	10	3	LHS
93	12585	12595	10	2	LHS
94	12685	12695	10	2	LHS
95	12755	12765	10	3	LHS
96	12765	12775	10	3	LHS
97	12785	12795	10	3	LHS
98	12845	12855	10	2	LHS
99	12865	12875	10	2	LHS
100	12885	12895	10	3	LHS
101	12915	12925	10	3	LHS
102	13305	13315	10	2	LHS
103	13325	13335	10	2	LHS
104	13345	13355	10	2	LHS
105	13485	13495	10	2	LHS

SR.NO.	CHAINAGE		LENGTH in m	HEIGHT in m	REMARKS
	FROM	TO			
106	13775	13785	10	3	RHS
107	13895	13905	10	3	RHS
108	14275	14285	10	3	RHS
109	14285	14295	10	2	RHS
110	14385	14395	10	3	RHS
111	14495	14505	10	3	RHS
112	14555	14565	10	3	RHS
113	14575	14585	10	3	RHS
114	14585	14595	10	2	RHS
115	14695	14705	10	2	RHS
116	14725	14735	10	3	RHS
117	14855	14865	10	3	RHS
118	14955	14965	10	2	RHS
119	14975	14985	10	2	RHS
120	15215	15225	10	2	LHS
121	15245	15255	10	2	LHS
122	15255	15265	10	3	LHS
123	[156] 15265	15275	10	3	LHS
124	15285	15290	10	3	LHS
125	15595	15605	10	3	LHS
126	15665	15675	10	3	LHS
127	15925	15935	10	3	LHS
128	15945	15955	10	3	LHS

Note: The length is indicative and shall be estimated by the EPC contractor.

Appendix-V of Schedule B

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Sr.No.	Chainage		Length in m	Height in m	Remarks
	From	To			
1	2005	2015	10	3	RHS
2	2015	2025	10	3	RHS
3	2355	2365	10	3	LHS
4	2405	2415	10	2	RHS
5	2415	2425	10	2	RHS
6	2795	2805	10	2	RHS
7	2985	2995	10	2	LHS
8	3035	3045	10	3	LHS
9	3045	3055	10	2	LHS
10	3095	3105	10	3	LHS
11	3105	3115	10	3	LHS
12	3115	3125	10	3	LHS
13	3215	3225	10	3	RHS
14	3425	3435	10	3	RHS
15	3435	3445	10	2	RHS
16	3445	3455	10	2	RHS
17	3455	3465	10	2	RHS
18	3465	3475	10	2	RHS
19	3475	3485	10	2	RHS
20	3485	3495	10	2	RHS
21	3495	3505	10	3	RHS
22	3505	3515	10	3	RHS
23	3515	3525	10	3	RHS
24	3535	3545	10	3	RHS
25	3545	3555	10	3	RHS
26	3575	3585	10	3	RHS
27	3605	3615	10	3	RHS
28	3615	3625	10	3	RHS
29	3645	3655	10	2	LHS
30	3655	3665	10	3	RHS
31	3665	3675	10	3	RHS
32	3675	3685	10	2	RHS
33	3725	3735	10	3	RHS
34	3875	3885	10	2	RHS
35	4115	4125	10	3	RHS
36	4645	4655	10	3	RHS
37	4665	4675	10	3	RHS
38	4865	4875	10	3	RHS
39	4895	4905	10	2	RHS
40	4915	4925	10	3	RHS
41	5035	5045	10	2	RHS
42	5045	5055	10	2	RHS
43	5075	5085	10	2	RHS
44	5105	5115	10	3	RHS
45	5125	5135	10	3	RHS
46	5145	5155	10	3	RHS
47	5175	5185	10	2	RHS

Sr.No.	Chainage		Lengt hin m	Height in m	Remarks
	From	To			
48	5255	5265	10	2	RHS
49	5275	5285	10	3	RHS
50	5285	5295	10	3	RHS
51	5295	5305	10	3	RHS
52	5305	5315	10	3	RHS
53	6725	6735	10	3	RHS
54	9605	9615	10	2	LHS
55	9745	9755	10	3	LHS
56	10125	10135	10	2	RHS
57	10135	10145	10	2	RHS
58	10145	10155	10	3	RHS
59	10155	10165	10	2	RHS
60	10385	10395	10	3	RHS
61	10425	10435	10	2	RHS
62	10435	10445	10	3	RHS
63	10715	10725	10	3	RHS
64	11135	11145	10	2	RHS
65	11145	11155	10	2	RHS
66	11155	11165	10	3	RHS
67	11165	11175	10	2	RHS
68	11255	11265	10	3	RHS
69	11275	11285	10	3	RHS
70	11325	11335	10	3	RHS
71	11465	11475	10	3	RHS
72	11495	11505	10	3	RHS
73	11765	11775	10	2	LHS
74	11835	11845	10	3	LHS
75	11895	11905	10	2	LHS
76	11915	11925	10	2	LHS
77	11955	11965	10	3	LHS
78	11995	12005	10	3	LHS
79	12275	12285	10	3	LHS
80	12505	12515	10	3	LHS
81	12645	12655	10	3	LHS
82	12675	12685	10	3	LHS
83	12795	12805	10	2	LHS
84	12875	12885	10	3	LHS
85	13115	13125	10	2	LHS
86	13135	13145	10	2	LHS
87	13145	13155	10	2	LHS
88	13195	13205	10	3	LHS
89	13245	13255	10	2	LHS
90	13255	13265	10	3	LHS
91	13265	13275	10	3	LHS
92	13475	13485	10	3	LHS
93	13495	13505	10	2	LHS
94	13545	13555	10	3	LHS
95159	14675	14685	10	3	RHS
96	14685	14695	10	3	RHS
97	14805	14815	10	2	RHS

Sr.No.	Chainage		Length in m	Height in m	Remarks
	From	To			
98	14835	14845	10	2	RHS
99	14865	14875	10	3	RHS
100	14965	14975	10	2	RHS
101	15275	15285	10	3	LHS
102	15295	15305	10	2	LHS
103	15585	15595	10	3	LHS
104	15705	15715	10	3	LHS
105	15715	15725	10	3	LHS
106	15765	15775	10	3	LHS
107	15865	15875	10	2	LHS
108	15915	15925	10	2	LHS
109	15975	15985	10	3	LHS

Note: The length is indicative and shall be estimated by the EPC contractor.

Appendix-VI of Schedule-B

Sr.No..	Retaining wall Chainage		Length (in m)	Remarks
	From	To		
1	4627	4645		RHS
2	4660	4675	15	RHS
3	5410	5420	10	RHS
4	6830	6871	41	LHS
5	7192	7200	8	RHS
6	7540	7552	12	LHS
7	7660	7821	161	LHS
8	7940	7995	55	LHS
9	8350	8397	47	RHS
10	8450	8497	47	RHS
11	8717	8790	73	RHS
12	9500	9536	36	RHS
13	9610	9651	41	RHS
14	9658	9676	18	RHS
15	9900	9940	40	RHS
16	9975	10004	29	RHS
17	10045	10103	58	RHS
18	10148	10171	23	RHS
19	10420	10430	10	RHS
20	10490	10510	20	RHS
21	10530	10540	10	RHS
22	10564	10580	16	RHS
23	10594	10609	15	RHS
24	10609	10610	1	RHS
25	10619	10670	51	RHS
26	11034	11037	3	LHS
27	11041	11045	4	LHS
28	11131	11136	5	RHS
29	11143	11149	6	RHS
30	11375	11386	11	RHS
31	11460	11484	24	LHS
32	11568	11590	22	LHS
33	11590	11659	69	LHS
34	11699	11759	60	LHS
35	11763	11783	20	LHS
36	11800	11864	64	LHS
37	11869	11877	8	LHS
38	11877	11880	3	LHS
39	11922	11950	28	LHS
40	12318	12325	7	LHS
41	12335	12352	17	LHS
42	14130	14150	20	RHS
43	14455	14470	15	LHS
44	14775	14780	5	LHS
45	14790	14792	2	LHS

Note : The contractor shall be responsible for accurate assessment of the actual requirement as per site situation and prepare design as per specification and standards and submit the same to the Authority's Engineer/Authority for review and implement it accordingly thereafter.

Appendix-VII of Schedule-B

Sr.No..	Breast Wall Chainage		Length (in m)	Remarks
	From	To		
1	3770	3780	10	LHS
2	5622	5700	78	LHS
3	6310	6400	90	LHS
4	6718	6778	60	RHS
5	6782	6875	93	RHS
6	6950	7000	50	LHS
7	7010	7030	20	LHS
8	7400	7462	62	RHS
9	7520	7586	66	RHS
10	7600	7699	99	RHS
11	7840	7952	112	RHS
12	8375	8393	18	LHS
13	8459	8465	6	LHS
14	8472	8505	33	LHS
15	9358	9480	122	LHS
16	9950	9993.5	44	LHS
17	10125	10154	29	LHS
18	10434	10507	73	LHS
19	10510	10600	90	LHS
20	11069	11100	31	RHS
21	11330	11380	50	RHS
22	11520	11601	81	RHS
23	11610	11663.5	54	RHS
24	11760	11800	40	RHS
25	11955	12041	86	RHS
26	12529	12560	31	RHS

Note : The contractor shall be responsible for accurate assessment of the actual requirement as per site situation and prepare design as per specification and standards and submit the same to the Authority's Engineer for review and implement it accordingly thereafter.

Appendix-VIII of Schedule-B

Sr.No..	Drain Chainage		Length (in m)	Remarks
	From	To		
1	7460	7940	480	RHS
2	8250	8350	100	LHS

Note : The contractor shall be responsible for accurate assessment of the actual requirement as per site situation and prepare design as per specification and standards and submit the same to the Authority's Engineer/Authority for review and implement it accordingly thereafter.

Appendix-IX of Schedule-B

Sr.No.	SG Chainage		Side	Length(m)	Realignment/ Existing
	From	To			
1	3600	3736	LHS	136.00	Existing
2	3736	3753	BHS	17.00	Existing
3	3800	3842	BHS	42.00	Existing
4	4650	4671	BHS	21.00	Existing
5	4800	4838	BHS	38.00	Existing
6	5250	5330	BHS	80.00	Existing
7	5380	5800	BHS	420.00	Existing
8	5800	5950	BHS	150.00	Realignment
9	6170	6450	BHS	280.00	Realignment
10	6580	6680	BHS	100.00	Realignment
11	6680	6720	BHS	40.00	Realignment
12	6720	6920	BHS	200.00	Realignment
13	6920	6970	BHS	50.00	Realignment
14	6970	7200	BHS	230.00	Realignment
15	7380	7430	BHS	50.00	Realignment
16	7430	7550	BHS	120.00	Realignment
18	7650	7810	BHS	160.00	Realignment
19	7810	8000	BHS	190.00	Realignment
20	8050	8200	BHS	150.00	Realignment
21	8200	8300	BHS	100.00	Realignment
22	8300	8350	BHS	50.00	Realignment
23	8350	8400	BHS	50.00	Realignment
24	8400	8600	BHS	200.00	Realignment
25	8600	8627	BHS	27.00	Realignment
27	8960	9060	BHS	100.00	Existing
28	9060	9110	BHS	50.00	Existing
29	9110	9128	BHS	18.00	Existing
30	9128	9140	BHS	12.00	Existing
31	9140	9200	BHS	60.00	Existing

34	9320	9520	BHS	200.00	Existing
35	9520	9564	BHS	44.00	Existing
36	9564	9590	BHS	26.00	Existing
38	9610	9625	BHS	15.00	Existing
39	9625	9660	BHS	35.00	Existing
41	9755	9820	BHS	65.00	Existing
43	9900	10225	BHS	325.00	Existing
46	10430	10505	BHS	75.00	Existing
48	10508	10510	BHS	2.00	Existing
49	10510	10530	BHS	20.00	Existing
50	10530	10565	BHS	35.00	Existing
51	10565	10592	BHS	27.00	Existing
52	10592	10609	BHS	17.00	Existing
54	10629	10665	BHS	36.00	Existing
55	10665	10679	BHS	14.00	Existing
56	10680	10703	BHS	23.00	Existing
57	11063	11101	BHS	38.00	Existing
58	11124	11134	BHS	10.00	Existing
59	11134	11144	BHS	10.00	Existing
60	11164	11180	BHS	16.00	Existing
61	11180	11200	BHS	20.00	Existing
62	11215	11230	BHS	15.00	Existing
63	11230	11260	BHS	30.00	Existing
64	11260	11350	BHS	90.00	Existing
65	11350	11380	BHS	30.00	Existing
66	11480	11490	BHS	10.00	Existing
67	11490	11700	BHS	210.00	Existing
68	11700	11740	BHS	40.00	Existing
69	11740	11940	BHS	200.00	Existing
71	11960	12020	BHS	60.00	Existing
72	12020	12078	BHS	58.00	Existing
73	12078	12104	BHS	26.00	Existing

74	12515	12688	BHS	173.00	Existing
75	14005	14055	LHS	50.00	Existing

Note : The contractor shall be responsible for accurate assessment of the actual requirement as per site situation and prepare design as per specification and standards and submit the same to the Authority's Engineer/Authority for review and implement it accordingly thereafter.

Appendix-X of Schedule-B

Sr.No.	CTSB Chainage		Side	Length(m)	Realignment/ Existing
	From	To			
1	7430	7670	BHS	240.00	Existing
2	7740	8000	BHS	260.00	Existing
1	7430	7740	BHS	310.00	Realignment
2	7740	7940	BHS	200.00	Realignment
3	8250	8350	BHS	100.00	Realignment
4	8350	8430	LHS	80.00	Realignment
5	8430	8560	LHS	130.00	Realignment
6	9370	9450	LHS	80.00	Existing
7	9450	9500	BHS	50.00	Existing
8	9500	9565	BHS	65.00	Existing
9	11700	11845	LHS	145.00	Existing
10	14010	14052	LHS	42.00	Existing

Note : The contractor shall be responsible for accurate assessment of the actual requirement as per site situation and prepare design as per specification and standards and submit the same to the Authority's Engineer/Authority for review and implement it accordingly thereafter.

Appendix-XI of Schedule-B

Sr.No.	CTB Chainage		Side	Length(m)	Realignment/ Existing
	From	To			
1	7460	7+790	LHS	165	Realignment
2	7790	7+890	BHS	100	Realignment
3	7890	7+940	BHS	50	Realignment
4	14+010	14+052	LHS	21	Existing

Note : The contractor shall be responsible for accurate assessment of the actual requirement as per site situation and prepare design as per specification and standards and submit the same to the Authority's Engineer/Authority for review and implement it accordingly thereafter.

Annex - I

(Schedule-C) PROJECT FACILITIES

1 **Project Facilities**

The EPC Contractor shall construct the Project Facilities described in this Annex-I to form part of the Two-Lane Project Highway. The Project Facilities shall include:

(a) Toll plazas;

(b) Roadside furniture;

(c) Pedestrian facilities;

(d) Landscaping and tree plantation;

(e) Truck lay-byes;

(f) Bus-bays and bus shelters;

(g) Rest areas

(h) Street lighting;

(i) Traffic aid posts;

(j) Medical aid posts;

(k) Vehicle rescue posts; and

(l) Others

(m) Slope Protection work

2 Description of Project Facilities

Each of the Project Facilities is briefly described below:

(a) Toll Plazas

Toll Plaza shall be provided at following one location in accordance with Section 10 of Manual. The pavement shall be concrete pavement, the requirements and equipment's shall be provided in accordance with Clause 10.4.9 of Manual of Standards and Specifications. The Toll Plaza complex shall be provided at the Toll Plazas or at any other location along the highway in accordance with Clause 10.4.20 of the Manual of Standards and Specifications.

Design Chainage	Toll Lanes
Nil	

Note: The location may be suitably modified as per the site condition and as decided by Authority / Authority Engineer.

(b) Road side Furniture

Road side furniture shall be provided in accordance with relevant section of the Manual of Standards and Specifications.

(c) Pedestrian Facilities

Pedestrian crossing Facilities shall be provided in accordance with relevant provisions of the Manual of Standards and Specifications.

(d) Landscaping and Tree Plantation

Highway landscaping and tree plantation shall be provided in accordance with Section 11 of the Manual of Standards and Specifications.

(e) Truck Lay-byes - Nil

(f) Bus-bays and Bus Shelter

Bus-bays and shelters shall be provided in accordance with relevant provisions of the Manual of Standards and Specifications at following locations.

S. No	Design Chainage (km)	Village	Side
1	Km 15+500 to Km 15+600	Pakyong	LHS

Note: * refer IRC SP-73:2018

(g) Rest areas - 01 nos
(location to be finalized in consultation with AE)

(h) Lighting

The Contractor shall provide lighting as per Schedule - D at following locations of the Project.

- Major Junctions
- Major Bridge, Minor Bridge including Approaches
- Yellow Flashing Light to alert Drivers

Minimum level illumination on locations of the Project Highway where exterior lighting is provided shall be 40 lux. In general, 'code of practice for lighting of public thoroughfare IS 1944 shall be followed.

The lighting fittings (with LED features) shall be powered by solar system with back up facilities (power and battery both) at all locations.

The solar system will be used for the entire highway. The solar panel at junction, and grade separator shall be battery backup. The electrical connection with all its infrastructures shall be done by the Contractor. Additional battery backup, if required, shall be provided

(i) Traffic aid posts - Nil

(j) Emergency Medical Services - Nil

Emergency medical Services shall be provided at the Toll Plazas in accordance with Clause 12.12 of the 2 Lane Manual of Standards and Specifications with the provisions of the Contract.

(k) **Highway Patrol Unit - Nil**

Highway Patrol unit shall be provided at the Toll Plazas in accordance with Clause
12.11 of the 2 Lane Manual of Standards and Specifications with the provisions of the Contract.

(l) **Crane Services - Nil**

(m) **Advanced Traffic Management System (ATMS) – Nil**

(n) **Utilities.**

Provision of accommodating utilities shall be made within utility corridor on either side of Project Highway. Box culverts proposed in Schedule B shall be used for crossing of underground utilities, wherever required. However, in location where the distance between two adjacent box culverts is more than 1 km, Utility ducts in form of NP-4 Hume Pipe 1.2m diameter shall be provided across the Project Highway and along with inspection chamber as per IRC:SP:99-2013 requirements. Location for such utility crossing shall be finalized in consultation with Authority Engineer.

(o) **Rainwater harvesting; and**

It is not possible to provide/construct it as alignment is passing through Urban / Semi Urban Area with restricted RoW where width of Median is 0.5 mtr

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 ofthis Schedule-D for construction of the Project Highway.

2 Design Standards

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

Manual of Specifications and Standards for Two Laning of Highways (IRC: SP: 73-2018)

Annex - I

(Schedule-D)

Annex-I: Specifications and Standards for Construction

1 Specifications and Standards

All Materials, works and construction operations shall conform to the Two lane Manual (IRC:SP:73-2018) of Specifications and Standards for Two-Laning (IRC:SP:73-2018) and MORTH Specifications for Road and Bridge Works(Fifth Revision) 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.

Soil Nails :

Soil Nail shall be fully threaded solid hot laminated geotechnical bars which are hot – dip galvanized conforming to IS 4759:1996 / relevant BS code requirements.

Ground Anchors :

Depending on the soil strata, height of the structure and slope stability design, the excavated slope surface needs to be strengthened by Permanent Ground Anchors as per MORTH / BS code specifications.

Special Report 23, State of the Art: Design, Construction of Rockfall Mitigation System, Published by IRC Highway Research Board, 2014 and European Technical Approval Guidelines (ETAG)-27.

Specification for Monitoring Instruments shall be in accordance with IS 14395 and IRC 75.

1.5 Rock Bolting:

As per IS code 13517 (1992), IS 14448 (1997) , IS 11309 (1985) & IS 4000 (1992)

Mechanically Stabilized earth (Vol-1: FHWA-NHI-10-024 & Vol-2: FHWA-NHI-10-025)

In case of any conflict or inconsistency in the provisions of the applicable IRC Codes, Standards or MORTH Specifications, the provisions contained in this Manual shall apply.

2 Deviations from the Specifications and Standards

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

Sl. No.	Clause No.	Description	Deviation
1	Clause 2.2	Design Speed: Ruling or minimum Design speed shall be followed	Design speed shall be adopted as mentioned in the Plan & Profile drawings given **in Schedule B and clause 2.2**

2	Clause 2.3	Super-elevation Shall belimited to 7 Percent	Super-elevation shall be limited to 10**% (Ten Percent).**
3	Clause 2.3	Radius of Horizontal Curves	Radius of Horizontal curves shall be as per the alignment plan shown in Plan & Profile drawings given in **Schedule B.**
4	Clause 2.3	Sight Distance: On two- lane roads, normally intermediate sigh tdistance should be available throughout.	Stopping sight distance shall be provided as a minimum, where ever possible intermediate and over taking sight distance shall be provided.

ATTACHMENT-DI

TECHNICAL SPECIFICATIONS FOR ROAD & BRIDGE

Table of Contents

CLAUSE 202 DISMANTLING CULVERTS, BRIDGES AND OTHER STRUCTURES/ PAVEMENTS

SECTION 300 Earthwork, Erosion Control and Drainage

CLAUSE 301 EXCAVATION FOR ROADWAY AND DRAINS

CLAUSE 304 EXCAVATION FOR STRUCTURES

CLAUSE 305 EMBANKMENT CONSTRUCTION

Sub-Clause 305.2.2.2 Borrow Materials

Sub-Clause 305.2.2.4 Compaction Requirements

Sub-Clause 305.3 Construction Operations

Sub-Clause 305.8 Measurement for Payment

CLAUSE 306 SOIL EROSION AND SEDIMENTATION CONTROL

SECTION 400 Sub-Bases, Bases (Non-Bituminous) and Shoulders

CLAUSE 401 GRANULAR SUB -BASE

Sub-Clause 401.2.2 Physical Requirements

CLAUSE 406 WET MIX MACADAM SUB -BASE/BASE

Sub-Clause 406.4 Opening to Traffic

SECTION 500 Base and Surface Courses (Bituminous)

Sub-Clause 501.2 Materials

Sub clause 501.2.1 Binder

Binder of VG-40 grade shall be used or if available viscosity grade of bitumen shall be used in accordance with IS: 73

CLAUSE 505 DENSE BITUMINOUS MACADAM

CLAUSE 507 BITUMINOUS CONCRETE

Binder of CRMB-60 grade shall be used.

SECTION 800 Traffic Signs, Markings and Other Road Appurtenances

CLAUSE 803 ROAD MARKINGS

CLAUSE 806 ROAD DELINATORS

TECHNICAL SPECIFICATIONS

1 The Technical Specifications contained herein shall be read in conjunction with the other Bidding Documents as specified in DPR Volumes.

1.1 Site Information General

1.1.1 The information given hereunder and provided elsewhere in these documents is given in good faith by the Employer, but the Contractor shall satisfy himself regarding all aspects of site conditions and no claim will be entertained on the plea that the information supplied by the Employer is erroneous or insufficient.

1.1.2 Climatic Conditions

1.1.2.1 The temperature in this region is as under:

i) During summer months, the temperature varies from mean minimum temperature 20°C to mean maximum temperature 35 °C

ii) During winter months, the temperature varies from mean minimum temperature 9°C to mean maximum temperature 18 °C

1.1.3 Seismic Zone

The stretch lies in Seismic Zone-IV as defined in Fig. 18 of IRC: 6 - 2017.

2 GENERAL REQUIREMENTS

The Technical Specifications in accordance with which the entire work described hereinafter shall be constructed and completed by the Contractor shall comprise of the following:

2.1 Part-I: General Technical Specifications

The General Technical Specifications shall be the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS" (Fifth Revision, April 2013), issued by the Ministry of Road Transport and Highways, Government of India and published by the Indian Roads Congress, henceforth called MORT&H Specifications and deemed to be bound into this document.

2.2 Part-II: Supplementary Technical Specifications

The Supplementary Technical Specifications shall comprise of various Amendments/Modifications/ Additions to the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS" referred to in Part-I above and Additional Specifications for item of works which are not covered in Part-I.

2.3 A clause or a part thereof in "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (Fifth Revision April 2013",), referred in Part-I above, where Amended/Modified/Added upon, and incorporated in Part-II, referred to above, such Amendment/Modification/ Addition supersedes the relevant Clause or part of the Clause.

2.3.1 The Additional Specifications shall comprise of specifications for item of works which not covered in Part-I.

2.3.2 When an Amended/Modified/Added Clause supersedes a Clause or part thereof in the said Specifications, then any reference to the superseded Clause shall be deemed to refer to the Amended/Modified/Added Clause or par thereof.

2.3.3 In so far as Amended/Modified/Added Clause may come in conflict or be inconsistent with any of the provisions of the said MORT&H Specifications under reference; the Amended/Modified/Added Clause shall always prevail.

2.3.4 The following Clauses in the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (Fifth Revision April 2013",) have been Amended/Modified/Added upon

Sr. No.	Section No.	Section Title	Clause No.
1.	100	General	102,106,108,109, 111,112,114,115 and 120
2.	200	Site Clearance	201 and 202
3.	300	Earthwork, Erosion Control and Drainage	301,304,305 and 306
4.	400	Sub-base, Bases (Non-Bituminous) and Shoulder	401and 406
4.	500	Bases and Surface Courses (Bituminous)	501,505 and 507
5.	800	Traffic signs, Markings and other Road Appurtenances	803 and 806
6.	2100	Open Foundations	2104

2.4 PART-III Specifications for Miscellaneous Works

Technical Specifications for Miscellaneous works shall be the latest "Specifications volume I to VI, 1996 for Civil Works and General Specifications for Electrical Works PART I – INTERNAL, PART – II, EXTERNAL for electric work 1994 as published by the Central Public Works Department (CPWD), Government of India" and deemed to be bound into this document.

2.5 The latest edition till60 days before the final date of submission of the bid of all specifications / standard shall be applicable.

SCOPE OF WORKS

Road Works

Site clearance; setting-out and layout; widening of existing carriageway and strengthening including camber corrections; construction of new road/ parallel service road; bituminous pavements remodelling/construction of junctions, intersections, bus bays, lay byes; supplying and placing of drainage channels, flumes, guard posts, guard rails and other related items; construction/extension of cross drainage works, bridges, approaches and other related works; road markings, road signs and kilometer/ hectometre stones; protective works for roads/ bridges; all aspects of quality assurance of various components of works; rectification of the defects in the completed works during the Defect Liability Period; submission of "As built" drawings and any other related documents; and other items of work as may be required to be carried out for completing the works in accordance with the drawings and provisions of the Contractor insure safety.

Other Items

Execution of any other items of work for the construction and completion of the Works in accordance with the provisions of the Contract including all incidental items as well as preparation and submittal of reports, plans as may be required.

During the period of the Contract the right of way and all existing roads shall be kept open for traffic and maintained in a safe and usable condition. Residents along and adjacent to the works are always to be provided with safe and convenient access to their properties. Traffic control and traffic diversions shall be used as necessary to protect the works and maintenance will be carried out as directed by the Engineer and provided in the Contract.

Any other items as required to fulfil all contractual obligations as per the Bid Documents.

PART II

SUPPLEMENTARY TECHNICAL SPECIFICATION

AMENDMENTS/MODIFICATIONS/ADDITIONS TO EXISTING CLAUSES OF GENERAL TECHNICAL SPECIFICATIONS

SECTION100 General

CLAUSE 102 DEFINITIONS

The following abbreviations shall be added in this Clause: "MORT&H" : Ministry of Road Transport & Highways

(Previously known as 'MOST', Ministry of Surface Transport)

"NHIDCL" : National Highways Infrastructure Development Corporation Ltd.

CLAUSE 106 CONSTRUCTION EQUIPMENT

Add the following sub para (g) and (h) after sub para (f)

- Adequate standby equipment including spare parts shall be available.
- All measuring devices and gauges shall be in good working condition. Measuring devices that can affect product quality shall be calibrated prior to use and at prescribed intervals against certified equipment. Calibration procedures shall be established, maintained and documented and corrective actions taken when results are unsatisfactory. Accuracy and fitness of measuring devices shall be ensured by proper maintenance.

CLAUSE 108 SITE INFORMATION

Sub-Clause108.4 This clause shall be as follows:

"Identification of quarry sites and borrow areas shall be the responsibility of the Contractor. Materials procured from quarry sites and borrow areas identified by Contractor and to be used in Works must comply with the requirements of quality as stipulated in the Technical Specification for particular items of work."

CLAUSE 109 SETTING OUT

Sub-Clause109.8 Delete the 2nd and 3rd sentences in Clause 109.8 and substitute the following: "Setting out of the road alignment and measurement of angles shall be done by using Total Station."

CLAUSE 111 PRECAUTIONS FOR SAFEGUARDING THE ENVIRONMENT

Sub-Clause 111.1 General

Delete the text of Clause 111.1 in its entirety and substitute the following:

"The Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the Works and all associated operations on site or off-site are carried out in conformity with statutory and regulatory requirements including those prescribed elsewhere in this document.

The Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising for the execution of the Works. This shall wherever possible be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated. All vehicles deployed for material haulage shall be spillage proof.

Haul roads shall be inspected at least once daily to clear any accidental spillage. In the event of any spoil, debris, wastes or any deleterious substance from the Site being deposited on any adjacent land, the Contractor shall immediately remove all such material at no cost to the Contract and restore the affected area to its original state to the satisfaction of the Engineer."

Sub-Clause 111.2 Borrow Pits for Embankment Construction

Delete the text of Clause 111.2 and substitute the following:

"Prior approval shall be sought from the concerned State Authorities, and the Contractor shall comply with all local environmental regulations. For all borrow areas, the actual extent of area/zones to be excavated shall be demarcated with the signboards and the operational areas shall be access controlled.

In the case of borrow from tank beds, a regrade/improvement of the inlet channels (at least up to 100m stretch) shall be undertaken in consultation with the concerned state government departments (the Minor Irrigation department of the State PWD) and local bodies. The Contractor shall ensure that excavation of tank beds is uniform over the entire area and that the finished profile of the bed is smooth.

In the case of borrow from the dry highlands, all borrow areas shall be reinstated by the formation gentle side slopes, re-vegetated and connected to the nearest drainage channel to avoid the formation of pools during/after the rainy seasons.

Plant and machinery used in the borrow areas shall conform to State noise emission regulations. All operation areas shall be water sprinkled to contain dust levels to the National Ambient Air Quality Standards."

Sub-Clause 111.3 Quarry Operations

Delete the text of Clause 111.3 and substitute the following:

"Aggregates shall be sourced only from quarry sites that comply with the local/state environmental and other applicable regulations. Occupational safety procedures/practices for the work force in all quarries shall be in accordance with applicable laws. Quarry and crushing units shall have adequate dust suppression measures, such as sprinklers, in work areas and along all approach roads to the quarry sites. These shall preferable be located on the upwind side."

Sub-Clause 111.5 Pollution from Hot-Mix Plant and Batching Plants

Delete the 1st sentence of Clause 111.5 and substitute the following:

"Bituminous hot mix plant and concrete batching plants shall be located at least one(1)km away from the sensitive receptors(schools, hospitals, etc.)and atleast 500m from urban settlements, unless otherwise required by the statutory requirements."

Sub-Clause 111.8.1 Environmental Protection:

Add the following sentences in the first paragraph of Sub Clause 111.8.1:

Water tankers with suitable sprinkling system shall be deployed along the haulage roads and in the work sites. Water shall be sprinkled regularly all along the routes to suppress airborne dusts from truck/dumper movements particularly on unpaved roads. Actual frequency will be agreed with the Engineer to suit site conditions."

Sub-Clause 111.8.2 Air Quality

The Contractor shall device and implement methods of working to minimize dust, gaseous and other air-borne emissions and carry out the Works in such a manner as

to minimize adverse impacts on the air quality. Construction camps shall have facilities for LPG fuel. The use of firewood shall not be permitted.

The Contractor shall utilize effective water sprays during delivery, manufacture, processing and handling of materials when dust is likely to be created, and to dampen stored materials during dry and windy weather. Stockpiles of friable materials shall be covered with clean tarpaulins, with applications of sprayed water during dry and windy weather. Stockpiles of materials or debris shall be dampened prior to their movement, except where this is contrary to the Specification.

Any vehicle with an open load-carrying area used for transporting potentially dust-producing material shall have properly fitting side and tail boards. Materials having the potential to produce dust shall not be loaded to a level higher than the side and tail boards and shall be covered with clean tarpaulins in good condition. The tarpaulin shall be properly secured and extend at least 300mm over the edges of the side of the side and tailboards.

The Contractor shall monitor air-quality once weekly in all operational areas under the project and take the necessary steps to comply with the specified requirements. Air quality parameters will include SPM, RPM, SO_2, NO_X, HC and CO. operational areas include work sites, haulage roads, hot mix plants, quarries, crushing plants, stockpiles, borrow sites and spoil disposal sites.

Sub-Clause 111.8.3 Water Sources and Water Quality

The Contractor shall provide independent sources of water supply, such as bore wells, for use in the Works and for associated storage, workshop and work force compounds. Prior approval shall be obtained from the relevant State Authorities and all installations shall follow local regulations. Bore wells installed and used for the project shall be left in good operating condition for the use of NHAI and local communities. The Contractor shall prevent any interference with the supply to or abstraction from and prevent any pollution of water resources (including underground percolating water)as a result of the execution of the Works.

Areas where water is regularly or repetitively used for dust suppression purposes shall be laid to fall to specially constructed settlement tanks to permit sedimentation of particulate matter. After settlement, the water may be re-used for dust suppression and rinsing. The Contractor shall protect all watercourses, waterways, ditches, canals, drains, lakes and the likes from pollution as a result of the execution of the Works.

All water and other liquid waste products arising on the Site shall be collected and disposed of at a location on or off the Site and in a manner that shall not cause either nuisance or pollution.

The Contractor shall at all times ensure that all existing stream courses and drains within, and adjacent to, the Site are kept safe and free from any debris and any materials arising from the Works. The Contractor shall not discharge or deposit any matter arising from the execution of the Works into any water except with the permission of the Engineer and the regulatory authority concerned.

Work force camps shall have septic tank and soak away pits. Operational areas like POL storage areas/hot mix plant areas shall comply with local/state environmental regulations and safety procedures. Storage and handling areas shall be impervious and surrounded by an impervious lined drain to catch any accidental spills. Storm water shall be stored in lined holding tanks with oil, grease-tapping facility prior to disposal in to nearby watercourses. The trappings and sludge of holding tanks shall be disposed off in accordance with the procedures approved by the local regulatory

authority.

Sub-Clause 111.20 Control and Disposal of Wastes

The Contractor shall control the disposal of all forms of waste generated by the construction operations and in all associated activities. No uncontrolled deposition or dumping shall be permitted. Wastes to be so controlled shall include, but shall not be limited to, all forms of fuels and engine oils, all types of bitumen, cement, and surplus aggregates, gravels, bituminous mixtures etc. The Contractor shall make specific provision for the proper disposal of these and any other waste products, conforming to local regulations and acceptable to the Engineer.

Spilling of oil and bituminous products during construction and transport shall be avoided to reduce the chances of contamination of surface as well as ground water.

Degraded materials shall be disposed of in a manner as approved by the Engineer and wastewater shall be disposed into septic tanks and soak pits etc. The Contractor shall make arrangements to clean-up spoil as soon as the work finishes in a stretch. If such sites are located outside the ROW, restoration of the site to a level acceptable to the land owner(s) will be carried out within a time period agreed between landowner(s) and the Contractor. Separators shall be used to separate POL materials from wastewater prior to discharging to the watercourses or as approved by the Engineer in conformance with directives and guidelines.

Disposal of solid waste materials shall be outlined in a plan for which environmental clearances shall be obtained from State environmental regulatory authorities. Potential locations for solid waste disposal are the natural depressions and borrow areas. The areas used for dumping of uncontaminated debris shall be covered with 300mm soil and shall be planted. Contaminated debris shall be dumped in depressions whose bed must be impervious e.g., stone quarry sites or depressions made impervious with 450mm thick impervious floor apron as per MORT&H Technical Specifications. Each successive1.0m layers shall be covered with 500mm thick soil layer, and the area will be covered with 300mm thick layer and planted.

After Clause 111.12 add the following new Clauses 111.13 to 111.17

Sub-Clause 111.13 Haulage Roads

Existing roads used for hauling shall be strengthened and/ or widened by the Contractor in accordance with the requirements for normal and construction traffic.

Where such roads are not existing, the Contactor shall construct project specific single lane paved roads in settlement areas and gravel roads in open areas conforming to the Ministry of Road Transport and Highways (MORT&H) specifications.

The alignment of the haulage roads shall be fixed to avoid agricultural land to the extent possible. In unavoidable circumstances, suitable compensation shall be paid to the people whose land will be temporarily acquired for the duration of the operations. The compensation shall cover for loss of income for the duration of temporary acquisition and land restoration. Prior to the construction of the haul roads, topsoil shall be stripped and stockpiled for re-use.

Material dumping sites shall be access controlled to prevent the unauthorized entry of the people, grazing cattle and stray animals.

Haulage roads shall be reinstated upon completion of hauling for the use of local communities.”

Sub-Clause 111.14 Equipment and Vehicles used for the Works

Equipments and vehicles deployed for the construction activities shall not be older than 5 years. Equipments used for road and bridge works shall be based on new technology and shall generate noise and pollutants not exceeding the limits specified by the relevant State Authorities. Vehicles and machineries used for road and bridge works are to be regularly maintained to conform to the National Air Quality Standards. Blasting, if any, will be carried out using small charges.

Sub-Clause 111.15 Noise Control

The Contractor shall consider noise as an environmental constrain in the planning and execution of the Works.

The Contractor shall take all necessary measures so that the operation of all mechanical equipment and construction processes on and off the site shall not cause any unnecessary or excessive noise, taking in to account applicable environmental requirements. The Contractor shall use all necessary measures and shall maintains all plant and silencing equipment in good conditions so as to minimize the noise emission during construction works.

Any member of the work force likely to be exposed to beyond their threshold noise levels shall be provided with protective equipment, such as earplugs, and shall be rotated every four hours.

Construction operations shall be limited to daytime hours only, particularly in the settlement areas.

Sub-Clause 111.16 Vibration Control

The Contractor shall take measures during construction activities to control the movement of the work force and construction machinery/equipment, and to avoid/ minimize activities, which produce vibrations.

Sub-Clause 111.17 Measurement

Monitoring of Air/Water/Noise and Soil quality shall be paid as per numbers of samples tested. For Compliance of all other provisions made in this Clause 111, it shall be deemed to be incidental to the work and no separate measurement shall be made. The Contractor shall be deemed to have made allowance for such compliance with these provisions in the preparations of his prices for items of work included in the Bills of Quantities and full compensation for such compliance shall be deemed to be covered by them."

CLAUSE 112 ARRANGEMENT FOR TRAFFIC DURING CONSTRUCTION

Sub-Clause 112.4 Traffic Safety and Control

Last line of Para 5 shall be read as under:

"The signs shall be of approved design and of reflector type." **Add the following paragraph at the end of the clause:**

"Before commencement of any construction, the Contractor shall prepare and submit details of the arrangements for passing traffic during construction, design of barricades, signs, markings, lights, flags etc. conforming and satisfying the requirements of the "Guidelines on Safety in Road Construction Zones" of IRC: SP 55-2001 and get the same approved by the Engineer.

Sub-Clause 112.6 Measurement for Payment and Rates

a) The provision of treated shoulder including construction of temporary cross drainage structures, if required, as described in Clause 112.2 including their maintenance, dismantling and clearing debris, where necessary, shall be considered as incidental to the works and shall be Contractor's responsibility.

b) The Construction of temporary diversion including temporary cross drainage structures as described in subclause112.3, shall be measured in linear meter and the unit contract rate shall be inclusive of full compensation for construction (including supply of material, labour, tools, etc.), maintenance as per sub clause 112.5, final dismantling, and disposal.

c) All Traffic safety and control devices during construction as per sub clause 112.4including providing, erecting and maintaining barrier, signs, markings, flags, lights and providing flag men etc. is included in item rate.

CLAUSE 114 SCOPE OF RATES FOR DIFFERENT ITEMS OF WORK

Sub-Clause114.2 Item (ii) of Clause 114.2 shall read as follows:

A detailed resource-based construction programme including resources planning using computerized critical path network method/PERT in a form, which facilitates control of the progress of the works and consequences of any changes in terms of time. The programme shall also include detailed network, activities for the submission and approval of materials, procurement of critical materials and equipment, fabrication of special products/ equipment and their installation and testing and for all activities of the Contractor that are likely to affect the progress of work etc. including updating all such activities on the basis of decisions taken at the periodic site review meetings or as directed by the Engineer. The Contractor shall submit data via electronic media to the Engineer in a form readily compatible with Engineer's planning system.

The first issue of the detailed construction programme including the detailed description of the system and the procedures shall be submitted to the Engineer for acceptance not later than 28 days after the date of receipt of the letter of acceptance.

The contractor shall submit to the Engineer for approval & consent, the updated & revised programme at every three months interval or as such as directed by the Engineer. The updated & revised programme shall be submitted showing the actual progress achieved (physical & financial) and the effects of the progress achieved on the timing of the remaining work including any change to the sequence of the activities

CLAUSE 115 METHODOLOGY AND SEQUENCE OF WORK

The Clause shall be substituted as follows:

Sub-Clause115.1 Submission of Method Statement

The Contractor shall submit methods statement within 28 days after the date of letter of acceptance. The methods statement shall be submitted in two parts.

The General part of the methods statement shall describe the Contractor's proposals regarding preliminary works, common facilities, and items that require consideration at the early stage of the Contract. The General part shall be furnished along with the first issue of the construction programme (refer clause 114.2) and shall include information on:

a) Sources of materials like coarse aggregate and fine aggregate, quantity and quality of materials available in different sources;

b) Sources of manufactured materials like cement, steel, bitumen reinforcement, pre

stressing strands and bearings. Wherever possible the Contractor shall identify at least two sources for each of the items; he shall also submit test certificates of recently manufactured materials for the consideration of the Engineer.

c) Locations of site facilities like batching plant, hot mix plant, aggregate processing plant, crushing plant etc.

d) Details of facilities/approaches for transportation of men, equipment and materials for construction of pavements, foundations and substructure in riverbed, and plan for free traffic flow and safe drainage.

e) Information on procedures to be adopted by the Contractor for prevention and mitigation of negative environmental impact due to construction activities.

f) Any other information required by the Engineer subsequent to the scrutiny of method statement

The General part of the Q.A. Programme shall accompany the methods statement under sub-clause105.3.

The Special part of the methods statement shall be submitted to the Engineer by the Contractor for each important item of work like construction of embankments and sub grade, pavements, pile/well foundations, concreting, pre stressing, repair and rehabilitation of existing structures, concrete superstructure, dismantling of structures and pavement and for any other item as directed by the Engineer.

These statements shall give information on

i) Details of personnel both for execution and quality control of the work.

ii) Equipment deployment with details of number of units, capacity, standby arrangements

iii) Sequence of construction, details of temporary or enabling works like, diversions, cofferdams, formwork including specialized formwork for superstructure, details of borrow areas, method of construction of embankment and sub grade, pavements, piles, wells, concreting procedures, details of proprietary process and products (e.g. details of pre stressing systems, proprietary piling systems, bearings, expansion joints etc.) and details of equipment to be deployed. Wherever necessary, technical literature, design calculations and drawings shall be included in the methods statement.

iv) Testing and acceptance procedures including documentation.

v) Special part of the Q.A. Programme referred in clause 105.3 for the particular item of work shall be submitted along with the methods statement for the concerned activity.

vi) Engineer shall examine and approve the methods statement or direct the Contractor to resubmit the statement with required modifications. The modified statement shall be submitted within 14 days of receipt of Engineer's comments.

The sole responsibility for the safety and adequacy of the methods adopted by the Contractor shall rest on the Contractor irrespective of any approval given by the Engineer.

Sub-Clause115.2 Approval of Proprietary Product/Process/System

Only proprietary products proven by International usage in comparable projects shall be permitted to be used. Fully authenticated details of licensing and collaboration

arrangement shall be submitted by the manufacturer, where relevant.

Within 90 days of award of work the Contractor shall submit the following information for all proprietary products for approval by the Engineer.

i) Name of manufacturer and name of product/ process/system.

Complete details of the manufacturer of the product/ process/ system shall be furnished. Details of projects where similar product/process/system has been successfully used shall be furnished. Authenticated copies of license/collaboration agreement shall be furnished.

ii) General features of the product/product process/system.

Detailed write up with methods statements shall be furnished for each product/ process/ system. This shall include complete working drawings & installation drawings, technical specifications covering fabrication, materials, system of corrosion protection etc.

i) Details of product development and development testing.

ii) Acceptance test and criteria.

Manufacturer shall submit a quality assurance system document. Details of acceptance test and criteria of acceptance shall be furnished in this document.

i) Installation Procedure.

ii) Maintenance procedure and schedule.

iii) Warranty proposal.

The Engineer may instruct any additional tests for the purpose of accepting the product. The charges of these additional tests shall be borne by the Employer only in case the product satisfies the specifications.

CLAUSE 120 FIELD LABORATORY

Sub-Clause 120.2 Description

Replace the words “indicated in the drawings” in the first sentence of second paragraph of this Clause with the words “per provisions indicated in this Clause and at a location approved by the Engineer.”

Replace “electric supply etc.” to the second sentence of first paragraph by “including uninterrupted power supply etc.”

Delete the first sentence of second paragraph “The floor space in the drawing” and substitute the following:

“The floor space required for the field laboratory shall be not less than 200 sq.m.

“The fourth sentence of second paragraphs “The furnishing In Table100-2”shall read as under.

“A good semi furnished office accommodation shall be provided to the Material Engineers of the Supervision Team as per the direction of the Engineer.”

Add the following at the end of this Clause:

“There shall also be provided a concrete paved area, for storing samples adjacent to the laboratory, of about 100 sq.m and another 75 sq.m shall be suitably roofed with open sides giving protection against sun and rain.

Within 14 (fourteen) days of the commencement date, the Contractor shall prepare and submit a layout plan and details of the laboratory building and make/supplier of the equipment to the Engineer for his approval.

The field laboratory to be provided under the Contract shall be handed over to the Engineer in finished and fully equipped condition not later than 2 months after the receipt of Notice to Commence Work, and the field laboratory with all equipment/ instrument shall be to the entire satisfaction of the Engineer. During the 2-monthperiod starting from the Notice to Commence work, the laboratory tests shall be performed in another laboratory proposed by the Contractor and approved by the Engineer.

Laboratory Equipment

General

The items of laboratory equipment shall be provided in the field laboratory depending upon the items to be executed as per Table mentioned below instead of Table 100-2 shown in MORTH:

The following items of laboratory equipment shall be provided in the field laboratory:

The equipment and instruments shall be new and shall be quality certified by Bureau of Indian Standards (BIS).

Sr. No.	Sub No.	Item, Specifications	Nos. required
A: General			
(i)	**Balance**		
	(a)	7 kg to 10 kg capacity semi -self indicating Electronic Type –Accuracy 1 gm	2
	(b)	500 gm capacity semi-self-indicating Electronic Type – Accuracy 0.01 gm	2
	(c)	Chemical balance 100gm capacity - Accuracy 0.0001gm	1
	(d)	Pan balance 5 kg capacity - Accuracy 0.5 gm	2
	(e)	Platform Scale – 300 kg capacity	1
	(f)	Triple Beam balance-25kg capacity Accuracy 1gm	2
(ii)	**Ovens – Electrically operated, thermostatically controlled**		
	(a)	From 100^{o}C to 220^{o}C – Sensitivity	2
(iii)	**Sieves, as per IS 460-1962**		
	(a)	IS Sieves 450 mm internal dia. of sieve sets as per BIS of required sieve sizes complete with lid and pan	2 set
	(b)	IS sieve 200 mm internal dia. (brass frame and steel or brass wire cloth mesh) consisting of sieve sets of required sieve sizes complete with lid and pan	2 set
(iv)	Sieve shaker capable of taking 200 mm and 450 mm dia. Sieves electrically operated with time switch assembly (As per BIS)		1
(v)	200 tones compression testing machine		1
(vi)	Stop watches 1/5 sec. Accuracy		2
(vii)	Glassware comprising of Beakers, Pipettes, dishes, measuring cylinders (100 to 1000 cc capacity) glass rods and funnels, glass thermometers range 0^{o}C to 100^{o}C and metallic thermometers range 300^{o}C		1 Dozen each
(viii)	Hot plates 200 mm dia (1500 watt)		6
(ix)	**Enamel trays**		
	(a)	600 mm x 450 mm x 50 mm	10

	(b)	450 mm x 300 mm x 40 mm	10
	(c)	300 mm x 250 mm x 40 mm	6
	(d)	Circular plates of 250 mm dia.	6
(x)	Water Testing Kit		1
(xi)	First Aid Box		1
(xii)	Spatula Set of 100 and 200 long		3
(xiii)	Digging Tools (pixels, shovel, fork etc.)		As reqd.
(xiv)	Miscellaneous tools (sledge hammer, lump hammer, wooden pegs etc.)		As reqd.
(xv)	Maximum and Minimum Thermometer		2 Set
(xvi)	Rain Gauge		1 Set
(xvii)	Timer 0-60 minutes with alarm & 1/5 sec accuracy.		3 Sets

B: For Soils and Aggregates			
(i)	Water still, 3 litre/hr with fittings and accessories		1
(ii)	Liquid limit device with Casagrande and ASTM grooving tools as per IS: 2720		1
(iii)	Sampling pipettes fitted with pressure and suction inlets, 10 ml Capacity		2 set
(iv)	Compaction apparatus (Proctor) as per IS: 2720 (Part 8) complete with collar, base plate and hammer		1 set
(v)	Modified AASHTO compaction apparatus as per IS. 2720 (Part 7) 1980 or Heavy Compaction Apparatus as per IS complete with collar, base plate and hammer		1 set
(vi)	Sand pouring cylinder with conical funnel and tap and complete as per IS 2720 (Part 28) 1980 including modified equipment		4
(vii)	Sampling tins with lids 100 mm dia x 75 mm ht ½ kg capacity and miscellaneous items like moisture, tins with lid (50 grams) etc.		12
(viii)	Lab CBR testing equipment for conducting CBR testing, load frame with 5 Ton capacity, electrically operated with speed control as per IS: 2720 (Part 16), and consisting of following:		**1 set**
	(a)	CBR moulds 150-mm dia – 175-mm ht complete with collar, base plate etc.	**24**
	(b)	Tripod stands for holding dial gauge holder	**24**
	(c)	CBR plunger with settlement dial gauge holder	**1**
	(d)	Surcharge weight 147-mm dia 2.5 kg weight with central hole	48
	(e)	Spacer disc 148-mm dia, 47.7-mm ht. With handle	3
	(f)	Perforated plate (Brass)	24
	(g)	Soaking tank for accommodating 24 CBR moulds	
	(h)	Provingringsof1000kg,2500kgand5000kgcapacity	1 each
	(i)	Dial gauges, 25 mm travel- 0.01 mm/division	10
	(j)	**Aluminium Tis**	
	50x30m		36 nos
	55x35m		36 nos
	70x45m		36 nos
	70x50m		36 nos
	80x50m		36 nos
(ix)	Standard Penetration test equipment		1
(x)	Nuclear Moisture Density Meter or equivalent		2

(xi)	Speedy moisture meter complete with chemicals	2
(xii)	Unconfined compression test apparatus	1 set
(xiii)	Aggregate Impact Test Apparatus	1
(xiv)	Aggregate Impact Test Apparatus as per IS 2386 (Part 4)1963	1
(xv)	Los Angeles abrasion Test Apparatus as per IS 2386 (Part 4)1963	1
(xvi)	Riffle Box of Slot size of 50mm as per ASTM C-136	1

C: For Bitumen and Bituminous Mixes		
(i)	Constant temperature bath for accommodating bitumen	2
	Test specimen electrically operated and thermostatically controlled, 50-liter capacity temp. range ambient 80o C	
(ii)	Penetrometer automatic type, adjustable weight arrangement and needles as per IS. 1203 – 1978	2
(iii)	Solvent extraction or centrifuge type apparatus complete (AASHTO, T-164) with extraction thimbles with stocks of solvent and filter paper	1
(iv)	Laboratory mixer including required accessories about .02 cum capacity electrically operated fitted with heating jacket	1
(v)	Marshall compaction apparatus automatically operated as per ASTM 1559-62 T and complete with electrically operated loading unit, compaction pedestal heating head assembly, dial micrometre and bracket for flow measurement, load transfer bar, specimen mould 100 mm dia. (4 in) with base plate, collars, specimen extractor, compaction hammer 4.53 kg (10 lb.) x457 mm (18 in) fall	1 set
(vi)	Distant Reading Digital Thermometer for Measuring Temperatures in Asphaltic Mixes	As required
(vii)	Riffle Box	1
(viii)	Automatic Asphalt Content Gauge [Nuclear are equivalent]	1
(ix)	Thin film Oven test apparatus to the requirement of AASHTO T 179, including accessories	1
(x)	Ring Ball Apparatus as per IS 1205- 1978	1
(xi)	Asphalt Institute Vacuum Viscometer as per IS 1206(part II) – 1978	1
(xii)	BS U- Tube Modified Reverse Floro Viscometer IS 1206(Part III) – 1978	1
(xiii)	Apparatus for Determination of Ductility Test as per IS 1208 – 1978	1
(xiv)	Pen Sky – Martars closed Tester for testing flashandfire point as per IS 1209 – 1978.	1
(xv)	Apparatus for Float Test – IS – 1210 – 1978	1
(xvi)	Apparatus for Determination of water content (Deanand Shark Method) IS – 1211 – 1978	1
(xvii)	Apparatus for Determination of Loss on Heading IS– 1212-1978.	1
(xviii)	Apparatus of Determination of specified Gravity IS- 1202-1978	1
(xix)	Core cutting machine with 100mm dia. Diamond cutting Edge	1
(xx)	Apparatus for Elastic Recovery test for Modified Bitumen	1
(xxi)	Apparatus for Storage Stability test for Modified Bitumen	1
(xxii)	Apparatus for Separation test for modified bitumen	1

D: For Cement, Cement Concrete and Materials			
(i)	Water still		1
(ii)	Vicat needle apparatus for setting time with plungers, as per IS. 269-1967		1
(iii)	Moulds		
	(a)	150 mm x 300 mm ht cylinder with capping component	As required
	(b)	150mmx150 mm x150mm cubical for compressive strength	As required
	(c)	150mmx100 mm x600mm beam for flexural strength	As required
(iv)	Concrete permeability apparatus		1
(v)	High frequency mortar cube vibrator for cement testing		1
(vi)	Concrete mixer power driven, 1 cu ft. capacity		1
(vii)	Variable frequency and amplitude vibrating table size 1 metre x 1 metre, as per the relevant British Standard		1
(viii)	Flakiness & Elongation test apparatus		2each
(ix)	Aggregate impact test apparatus as per IS 2386 (Part 4) 1963		2
(x)	Los Angeles abrasion apparatus as per IS. 2386 (Part 4) 1963		1
(xi)	Flow table as per IS 712-1973		1
(xii)	(a)	Equipment for slump test	2
	(b)	Compaction factor test equipment	1
(xiii)	Equipment for determination of specific gravity for fine and coarse aggregate as per IS 2386 (Part 3) 1963		2
(xiv)	Flexural attachment to compression testing machine		1
(xv)	Core cutting machine with 150 mm dia. Diamond cutting edge		1
(xvi)	Needle vibrator		1
(xvii)	Vibrating hammer as per BS specification		1
(xviii)	Air entrainment meter ASTM C - 231		1
(xix)	0.5 Cft, 1 Cft cylinder for checking bulk density of aggregate with tamping rod		1
(xx)	Soundness testing apparatus for cement		1
(xxi)	Flexural Beam testing machine with accessories		1
(xxii)	Chemicals solutions and consumable		As reqd.
(xxiii)	Chloride Testing kit for chemical analysis of chloride content.		1
(xxiv)	ION Exchange kit for rapid determination of sulphate content.		1

E: For Control of Profile and Surface Evenness		
Digital Level complete with all accessories		2 sets
Distomat or equivalent		2 Nos.
Theodolite – Electronically operated with computerized output attachment		2 sets
Total Station with all accessories		2 sets
Towed Fifth Wheel Bump Indicator		1 set
3meter straight edge and measuring wedge		2 sets
Camber templates 2 lane		
String line Arrangement with paver and sensor powers		1
(a)	Crown type cross-section	2 sets
(b)	Straight run cross-section	2 sets
Steel tape		
(a)	5 m long	as reqd
(b)	10 m long	as reqd
(c)	20 m long	as reqd
(d)	30 m long	as reqd
(e)	50 m long	As reqd
(e)	50 m long	As reqd
Precision Staff		3 Sets

Note: The laboratory set-up must be complete including a set of reference standards, adequately staffed and operational to the satisfaction of the Engineer not later than 2 months from the date of receipt of Notice to commence the works.

Sub-Clause 120.3 Ownership

This Clause shall read as under:

"Land for the laboratory shall be provided by the Contractor."

Sub-Clause 120.4 Maintenance

This Clause shall read as under:

"The Contractor shall arrange to maintain the field laboratory including sample store yards in a satisfactory manner until the issue of Taking over Certificate for the whole work. Maintenance includes all activities described in Clause 120.4 and maintenance of equipment and running of the same including chemicals and consumables."

Sub-Clause 120.5 Rate

The construction, supply, installation, maintenance, and operation including all consumables like chemicals &reagents etc., and all other expenses involved in connection thereto for the field laboratory shall be incidental to the work, and shall not be paid for separately.

SECTION 200 Site Clearance

CLAUSE 201 CLEARING AND GRUBBING

Sub-Clause 201.1 Scope

Replace with following Para:

This work shall consist of cutting, excavating, removing, and disposing of all materials

such as trees of girth up to 300 mm, bushes, shrubs, stumps, roots, grass weeds, rubbish etc. and top soil up to 150 mm, which in the opinion of Engineer is unsuitable for incorporation in the work including draining out stagnant water if any from the area of road land, drain, cross drainage structure and other area as specified in the drawing or instructed by Engineer. It shall include necessary excavation by harrow discs or any other suitable equipment, backfilling of the pits by suitable soil, resulting from uprooting of trees & stumps and making the surface in proper grade by suitable equipment and compacted by power roller to required compaction as per Clause 305.3.4. The work also includes handling, salvaging and disposal of cleared material. Clearing and grubbing shall be performed less than one month in advance of earthwork operation and in accordance with requirement of the specifications.

CLAUSE 202 DISMANTLING CULVERTS, BRIDGES AND OTHER STRUCTURES/ PAVEMENTS

Sub-Clause 202.5 Disposal of Materials

The first paragraph of the sub clause shall read as below:

All materials obtained of dismantling/milling shall be the property of the Contractor for which he shall quote a rate for rebate in BOQ Bill No. 1, and the Contractor shall be free to use this material in work, or he may sell/dispose the material to as desired / deemed fit by him.

The existing pavement crust shall be reused as indicated below:

Contractor shall be free to use dismantled / milled material, as is where basis is, or by suitably modifying the material, or by crushing the material, or by breaking the material, and screening the same, provided it meets the specifications and is approved by the Engineer.

SECTION 300 Earthwork, Erosion Control and Drainage

CLAUSE 301 EXCAVATION FOR ROADWAY AND DRAINS

Sub-Clause 301.1 Scope

Add the following as second paragraph under this clause:

"The work shall also include excavation for channel training at culverts/bridges, excavation of existing shoulders and medians for purposes of widening the pavement and excavation of existing embankment for reconstruction to specification."

CLAUSE 304 EXCAVATION FOR STRUCTURES

Sub-Clause 304.3.2 Excavation

At the end of 1st paragraph of Clause 304.3.2 inserts the following additional sentences:

"The Contractor shall ensure the stability and structural integrity of adjacent existing foundations and structures and if necessary shall, at his own expense, install temporary or permanent sheet piles, coffer dams, shoring or similar as support or protection to the satisfaction of the Engineer."

CLAUSE 305 EMBANKMENT CONSTRUCTION

Sub-Clause 305.2 Material and General Requirements

Sub-Clause 305.2.1 Physical Requirements:

Sub-Clause 305.2.1.2 Add the following after second paragraph:

"Soils having medium and high swelling potential shall be defined based on Liquid Limit, Plastic Limit, Shrinkage Limit, Gradation, Free swelling Index, Field dry Density and Field

Moisture Content and types of Clay minerals present in the soil and as directed by the Engineer. The location and the extent of these soils with medium to high swelling potential should be defined as directed by the Engineer."

Sub-Clause 305.2.2.2 Borrow Materials

Para 1 of this Clause shall read as under:

" No borrow area shall be made available by the Employer for this work. The arrangement for the source of supply of the material for embankment and sub-grade as well as compliance to the different environmental requirements in respect of excavation and borrow areas as stipulated, from time to time, by the Ministry of Environmental and Forest, Government of India and the local bodies, as applicable, shall be the sole responsibility of the Contractor."

Sub-Clause 305.2.2.4 Compaction Requirements

In Clause 305.2.2.4 delete Table 300-2 and substitute the following:

Table 300-2

Compaction Requirements of Embankment and Subgrade

Sr. No.	Type of Work/Material	Relative Compaction as %age of maximum laboratory dry density as per IS 2720 (Part 8)
1	Subgrade and earthen shoulders	Not less than 97%
2	Embankment	Not less than 95%
3	Expansive clays	Not allowed
4	Design CBR of Subgrade & Shoulder has been taken 8. The borrow earth used for sub grade material must satisfied the requirement of the design CBR of 8 %	

Para 2 of this Clause given below Table 300-2 shall read as under:

The contractor shall at least 21 working days before commencement of construction of embankment and the sub grade; submit the following to the Engineer for approval:

(i) The values of maximum dry density and optimum moisture content obtained in accordance with IS: 2720 (Part 8) for each fill material proposed to be used in the construction of embankment and sub grade.

(ii) The graphs of Density plotted against moisture content from which each of the values in (i) above of maximum dry density and optimum moisture content were determined.

(iii) The dry density-moisture content-CBR relationships, heavy comp active efforts conforming to theIS2770(part 8)for each of the fill material proposed to be used in the subgrade.

The above information shall form the basis for compaction only upon its approval by the Engineer."

Sub-Clause 305.3 Construction Operations

Sub-Clause 305.3.4 Compacting Ground Supporting Embankment/Subgrade

Para 1 of this clause shall be read as

"Where necessary the original ground shall be levelled, scarified, mixed with water and then compacted by rolling to facilitate placement of first layer of embankment so as to achieve minimum dry density as given in Table300-2.

Sub-Clause 305.8	Measurement for Payment
	Substitute Clause 305.8.1 shall be read as
	"Earth embankment/sub-grade construction shall be measured separately by taking cross sections at intervals after clearing and grubbing and if necessary compaction of original ground before the embankment work starts and after its completion and computing the volumes of earthwork in cubic metres by the method of average and areas."
CLAUSE 306	SOIL EROSION AND SEDIMENTATION CONTROL
Sub-Clause 306.4	Measurements for Payment
	Substitute Clause 306.4 as follows:
	"All temporary sedimentation and pollution control works shall be deemed as incidental to the earthwork and other items of work and as such no separate payment shall be made for the same."
SECTION 400	Sub-Bases, Bases (Non-Bituminous) and Shoulders
CLAUSE 401	GRANULAR SUB BASE
Sub-Clause 401.1	Scope
	Add the following at the end of this Clause:
	“A site trial shall be performed in accordance with Clause 901.16.”
Sub-Clause 401.2.2	Physical Requirements
	Add at the end of this clause as under:
	The Contractor shall, at least 21 working days before the commencement of the construction of the sub-base course, submit to the Engineer, the results for approval of the laboratory testing on the physical properties defined above. The construction of the sub-base course shall be taken up only upon the Engineer’s approval of the material.
	Grading-I of table 400-1 shall be adopted at site.
CLAUSE 406	WET MIX MACADAM SUB BASE/BASE
Sub-Clause 406.4	Opening to Traffic
	The Clause shall be read as follows:
	No vehicular traffic of any kind shall be allowed on the finished wet mix macadam surface.
SECTION 500	Base and Surface Courses (Bituminous)
Sub-Clause 501.2	Materials
Sub clause 501.2.1	Binder
	Binder of VG-40 grade shall be used or if available viscosity grade of bitumen shall be used in accordance with IS: 73
Sub-Clause 501.2.2	Delete “Crushed gravel or other hard material” from first Line of Para 1.”
	Para 3 is deleted.
CLAUSE 505	DENSE BITUMINOUS MACADAM
Sub-Clause 505.2.1	Bitumen

Binder of VG-40 grade shall be used or if available viscosity grade of bitumen shall be used in accordance with IS: 73.

CLAUSE 507 BITUMINOUS CONCRETE

Sub-Clause 507.2.1 Bitumen

Binder of CRMB-60 grade shall be used.

SECTION 800 Traffic Signs, Markings and Other Road Appurtenances

CLAUSE 803 ROAD MARKINGS

Sub-Clause 803.2 Materials

This clause shall read as under:

"Road markings shall be hot applied thermoplastic compound and the materials shall meet the requirements as specified in Clause 803.4.

The road markings shall be laid in one layer with appropriate road marking machine approved by the Engineer. Before the road-marking machine is used on the permanent works, the satisfactory working of the machine shall be demonstrated on a suitable site, which is not part of the permanent works. The rate of application shall be checked and adjusted as necessary before application on a large scale is commenced, and the reafterdaily."

CLAUSE 806 ROAD DELINATORS

Sub-Clause806.2 This clause shall read as follows:

a) Triangular Object Marker shall be 300mm side with four red reflectors, made out of 2mm thick aluminium sheet, face to be fully covered by high intensity grade white retro reflective sheeting of encapsulated lens type as per clause 801. The background/border/symbols shall be made by screen-printing of desired colour as per sign details. The sign plate shall be fixed with 6mm dia. aluminium rivets on MS angle iron frame. The angle iron frame shall be made with angle of size 40mmx40mmx5mm. The sign shall be fixed with nut-bolts & welding on MS pipe 50mm dia (NB-MW) and 500mmhigh.

b) Rectangular hazard marker 600mm x 300mm made out of 2mm thick aluminium sheet, face to be fully covered by high intensity grade white retro reflective sheeting of encapsulated lens type. The background/ border/ symbols shall be made by screen-printing of desired colour as per sign details. The sign plate shall be fixed with 6mm dia aluminium rivets on MS angle iron frame. The angle iron frame shall be made with angle of size 40mmx40mmx5mm. The sign shall be fixed to 80mm dia (NB-MW) MS pipe.

c) Roadway Indicators shall be 1000mm high made with 100 mm dia. NB medium weight MS pipe. One reflector of high intensity grade retro reflective sheeting with encapsulated lens shall be provided on top of the reflector. The white & red reflector shall be provided alternatively of 40mm width, so that total width of reflector shall be 120mm. A wire mesh cover of 150mm height shall be provided on top.

d) All components of signs & supports shall be thoroughly de scaled, cleaned, primed and painted with two coats of epoxy paint. The sign backside shall be with grey colour and post shall be white colour/ alternate white & black bands. The post below ground shall be painted with three coats of red lead.

Clause 2100	Open Foundation
Sub-Clause 2104.1	Preparation of Foundation

Please add the following as a last para-

Considering the soil SBC as per Geotechnical report, 1 m of depth below the founding level of bridges shall be removed and replaced with granular sand. The cost of the excavation and sand shall be made from respective items.

SCHEDULE - E

(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

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

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

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

2 Repair/rectification of Defects and deficiencies

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

3 Other Defects and deficiencies

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

4 Extension of time limit

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

5 Emergency repairs/restoration

Notwithstanding anything to the contrary contained in this Schedule-E, if any

Defect, deficiency or deterioration in the Project Highway poses a hazard to safety or risk of damage to property, the Contractor shall promptly take all reasonable measures for eliminating or minimizing such danger.

6 Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex - I

(Schedule-E)

Annex-I: Repair/rectification of Defects and deficiencies

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

Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, Approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	< 0.1 %of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA2003(http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 %subject to limitof0.5 sq.m for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1% ofarea	Daily	Length Measurement Unit like		2-7 days	IRC:82-2015
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling/Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width <0.1 matanylocation,restricted to 30 cm from the edge	Daily			7- 15 days	IRC:82-2015
	Roughness BI	2000mm/km	2400mm/km	Bi-Annually	Class I Profilometer SCRIM(Sideway-force Co efficient Routine Investigation Machine or equivalent)	Class I Profilo meter: ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 - 94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway- force	IRC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN		**traffic Speed**	Coefficient Routine			

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
of connecting road, slip roads, lay byes etc. as applicable)		36 33 32 31 31		**(Km/h)** 50 65 80 95 110	Investigation Machine or equivalent)			
Embankment/ Slope	Edge drop at shoulders	Nil	40m m	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/c ross fall	Nil	<2%variation inprescribed slope of camber/cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 %variation inprescribe side slope	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	DailySpecially During Rainy Season	NA		7-15 days	MORT&H Specification

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

Table -2:Maintenance Criteria for Rigid Pavements:

Sr.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
CRACKING						
1	**SingleDiscreteCracksNotintersecting with any joint**	w = width of crack L = length of crack d = depth of crack D = depth ofslab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-movingcar	Seal without delay	Seal, and stitch if L > lm. Within 7days
			3	w = 0.5 - 1.5 mm, discernible from fast-movingcar		
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or morejoints**	w = width of crack L = length of crack d = depth of crack D = depth ofslab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1m. Within 7 days	
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstructaffected. Portion with norms and specifications - See Para 5.5 & 9.2Within 15days
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may befull depth	
3	**Single Longitudinal Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth ofslab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow movingvehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, ifL> l m.	

Sr.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
					Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair withstapling.Within 15 days
			4	w = 6.0 - 12.0 mm, usually associated withspalling	Not Applicable, as it may befull depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as pernorms And specifications - See Para 5.6.4 Within 15 days
4	**MultipleCracks intersecting with one or morejoints**	**w = width of crack**	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3pieces		
			5	w > 6 mm and/or panelbroken into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal withepoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one cornerbroken		
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC: SP: 83-2008) Within 15 days	Full depth repair Reinstate sub-base, and reconstructthe slab as per norms and specifications
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	three or four corners broken		

Sr.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
						within 30days
6	**Punch out (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w = width of crack L = length(m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m^2	Applicable, as it may be fulldepth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3 m/m^2		
			3	w > 1.5 mm and L < 3 m/m^2		
			4	w > 3 mm, L < 3 m/m^2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within30days
			5	w > 3 mm, L > 3 m/m^2 and deformation		
7	RavellingorHoneycombtype surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	Short Term	Long Term
					No action.	Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting. Within 30 days	
			4	r = 25 - 50 %		
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs ifaffecting. Within 30 days	
8	**Scaling**	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	r <**2 %**	Local repair ofareas damagedandliable to be	
			2	r = 2 - 10 %		

Sr.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
					damaged. Within 7days	
			3	r = 10 - 20%	Bonded Inlay within 15 days	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 mm	Reconstruct slab within 30 days	
9	**Polished Surface/Glazing**	t = texture depth, sand patchtest	0		No action.	Not Applicable
			1	t > 1 mm		
			2	t = 1 - 0.6 mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		
			5	t < 0.1 mm	DiamondGrindingif affecting50% or more slabs ina continuousstretch of minimum 5 km. Within 30 days	
10	**Pop out (Small Hole), Pothole Refer Para 8.4**	n = number/m^2 d = diameter h = maximumdepth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d=50-100mm;h<50mm;n<1 per 5 m^2	Partial depth repair 65 mm deep. Within 15 days	
			2	d=50-100mm;h>50mm;n<1 per 5 m^2		
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5m^2		
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5m^2		
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2		
Joint Defects						
11	**Joint Seal Defects**	loss or damage L =	0	Difficult to discern.	**Short Term**	**Long Term**
						Not Applicable

Sr.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
		Length as % total jointlength			No action.	
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water andtrappingincompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligibleprotection against ingress ofwater and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	**Spalling of Joints**	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in crackedportion. Within 7 days	
			2	w = 10 - 20 mm, L < 25%		
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	**Faulting (orStepping) in Cracks or Joints**	f = difference of level	0	not discernible, < 1 mm	No action.	No action.
			1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take	Replace the slab as appropriate.

Sr.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
					action for diamondgrinding	Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate.
			5	f> 18 mm	Strengthen subgrade and sub-base by groutingand raising sunken slab	Within 30days
14	**Blow-up or Buckling**	H =vertical displacement from normalprofile	0	Nil, not discernible	**Short Term**	**Long Term**
					No Action	
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic	
			3	h = 12 - 25 mm	within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, i.e. 4 or morepieces	Replace broken slabs. Within 30 days	
15	**Depression**	H =negative vertical displacement from normal profile L=length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos<20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstate pavement at normal level	
			5	h > 100 mm	If L < 20 m. Within 30 days	
16	**Heave**	h = positive vertical displacement	0	Not discernible. h < 5 mm	**Short Term**	**Long Term**
					No action.	
			1	h = 5 - 15 mm	Follow up.	

Sr.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
		from normal profile. L = length	2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Trafficwithin 7 days	scrabble
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
17	**Bump**	H =vertical displacement from normalprofile	0	h < 4 mm	No action	
			1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane toShoulder Drop-off**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term**	**Long Term**
					No action.	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder within 7 days	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more ofstretch. Within 30days
			4	f = 50 - 75 mm		
			5	f > 75 mm		
Drainage						
19	**Pumping**	quantity of fines and water	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and	Inspect and repair

Sr.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
		expelled through open joints and cracks Nos Nos/100 m stretch			joints Without delay.	sub-drainage at distressed sections and upstream.
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	
			5	abundant,crack development >25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	
20	**Ponding**	Ponding on slabs due to blockage of drains	0-2	Nodiscernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc. within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do-	

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

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP: 84-2014, a minimum of safe stopping sight distance shall be available throughout.			Monthly	Manual Measurements with Odometer along with video/image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments. In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers,		IRC: SP 84-2014
		Design Speed, kmph	**Desirable Minimum Sight Distance**	**Safe Stopping Sight Distance (m)**					

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="3">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td></td><td></td><td></td><td>(m)</td><td></td><td></td><td></td><td colspan="2">etc. shall be applied during the period of rectification.</td><td></td></tr>
<tr><td></td><td></td><td>100</td><td>360</td><td>180</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>80</td><td>260</td><td>130</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td colspan="3"><70% of marking remaining</td><td>Bi- Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours Cat-2 Defect within 2months-</td><td>IRC:35-2015</td></tr>
<tr><td></td><td>Day time Visibility</td><td colspan="3">During expected life Service Time Cement Road - 130mcd/m2/lux Bituminous Road-100mcd/m2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months</td><td>IRC:35- 2015</td></tr>
<tr><td></td><td rowspan="4">Night Time Visibility</td><td colspan="3">Initial and Minimum Performancefor Dry Retro reflectivity during nighttime:</td><td rowspan="4">Bi-Annually</td><td rowspan="4">As per Annexure-E of IRC:35-2015</td><td rowspan="4">Re - painting</td><td rowspan="4">Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months</td><td rowspan="4">IRC:35-2015</td></tr>
<tr><td>Design Speed</td><td colspan="2">(RL)RetroReflectivity (mcd/m2/lux)</td></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) &warranty period required up to 2 years</td></tr>
<tr><td>Up to</td><td>200</td><td>80</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		65							
		65 - 100	250	120					
		Above 100	350	150					
		Initial and Minimum Performance for Night Visibility under wet condition(Retro reflectivity):							
		Initial 7 days Retro reflectivity: 100 mcd/m^2/lux Minimum Threshold Level: 50 mcd/m^2/lux							
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc.			Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
Road Signs	Shape Position and	Shape and Position as per IRC: 67- 2012. Signboard should be clearly visible for the design speed of the section.			Daily	Visual with video/image backup	Improvement of shape, in case if shapeis Damaged. Relocation as per requirement change of	48 hours in case of Mandatory Signs, Cautionary and Informatory	IRC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each Signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	signboard	Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards 48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual postsigns) 1 Month in case of Gantry/Cantilever Sign boards	RC:67-2012
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Pavement	Numbers and Functionality as per specifications in	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014,IRC:35-

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Markers (Road Studs)	IRC:SP:84-2014 and IRC: 35-2015, unless specified in Schedule-B.					2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail asintended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of	Functionality: Functioning ofEnd Treatment as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84-2014,
	Traffic Safety Barriers			backup			IRC:119- 2015
	Attenuators	Functionality: Functioning of Attenuators asintended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119- 2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
Highway Lighting	Highway Lights	Illumination: Minimum 40 Lux	Daily	The illumination	Improvement in Lighting System	24 hours	IRC:SP:84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
System		illumination on the road surface		level shall be measured with luxmeter			
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting	Sight line shall be	Daily	Visual wit	Removal of Trees	Immediate	IRC:SP 84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	sight line and road structures	free from obstruction by vegetation		h video/image backup			
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays,bus-shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014
	Free waterway/ unobstructed flowsection	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrelbefore rainy season.	15 days before onset of monsoon and within 30 days after end ofrainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion	No leakage through expansionjoints	Bi-Annually	Physical inspection of expansion	Fixing with sealant	30 days or before onset of rains	IRC SP:40-1993 and IRC

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pipe/box/slab culverts	joints if any			joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	suitably	whichever comes earlier	SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording	Repairs to spalling, cracking, delamination, rusting shall be followed as perIRC:SP:40-1993.	15 days	IRC SP 40-1993 and MORTH Specification s clause 2800
		Delamination of concrete not more than 0.25 sq.m.					
		Cracks wider than 0.3 mm not more than 1m aggregatelength					
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons andpitching	30 days after defect observation or 2 weeks before onset ofrainy season whichever is earlier.	IRC: SP 40-1993and IRC:SP:13-2004.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
	Bumps	No bump at expansionjoint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of	15 days	MORT&H Specification 3004 &

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Bridge - Super Structure					settlement to approach embankment		2811.
	User safety (condition of crash barrier andguardrail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection anddetailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014and IRC SP: 40-1993.
	Rusted reinforcement Spalling of concrete Delamination	Not more than 0.25 sq.m Not more than 0.50 sq.m Not more than 0.50 sq.m	Bi- Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portionwith epoxy mortar / concrete.	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	Grouting with epoxy mortar, investigatingcauses for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using	Grouting of deck slab at leakageareas,waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				Mobile Bridge InspectionUnit			
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry outmajor rehabilitation works on bridge to retain original design loadscapacity	6 months	IRC SP: 51-1999.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening structure of super	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper stripjoint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge InspectionUnit	Replace of expansionjoint seal in	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust debris expansion or in joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using	Cleaning of expansion joint gapsthoroughly	3 days	MORTH specification s 2600 and IRC SP: 40-1993.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				Mobile Bridge InspectionUnit			
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainagespout if any leakages observed.	3 days	MORTH specification 2700.
Bridge-substructure	Cracks/spalling of concrete/ rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs tosubstructureby grouting/guniting and micro concretingexpending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture ofreinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on tobearings.	3 months	MORTH specification 2810andIRC SP: 40-199.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visualinspection as per IRC SP:35-1990 UsingMobile Bridge Inspection Unit. In case of doubt, use Underwater camera Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993,IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs todamaged aprons andpitching.	30 days after defect observation or 2	IRC: SP 40-1993 and IRC: SP: 13-2004.
		sq.m, damage to solidapron (concrete apron) not morethan1 sq.m				weeks before onset of rainy season whicheveris earlier.	
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of thecontractor.							

Table 4: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

	Nature of Defect or deficiency	**Time limit for repair/ rectification**
(b)	**Granular earth shoulders, side slopes, drains and culverts**	
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban areas	24 (twenty-four) hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Roadside furniture including road sign and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	48 (forty-eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road lighting**	
(i)	Any major failure of the system	24 (twenty-four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty-four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f)	**Rest area**	
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty-four) hours
(g)	**[Toll Plaza]**	
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days

(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a)	**Superstructure**	
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty-eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(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

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 ofcrushers;

(c) Licence for use of explosives;

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

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

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

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

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

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

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

SCHEDULE – G

(See Clauses 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

(See Clause 7.1.1)

Annex-I : Performance Security/Additional Performance Security

To,

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 [name and address of the authority], (hereinafter called the "Authority") have entered into an agreement (hereinafter called the "Agreement") for "**Construction and upgradation of existing road to two lane with paved shoulder from Km 2.00 to Km 16.167 of Ranipool - Pakyong of NH-717-A (Balance Work) on EPC basis under SARDP-NE in the State of Sikkim."** on Engineering, Procurement and Construction (the "EPC") basis, subject to and in accordance with the provisions of the Agreement

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

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

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

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

and/or for the sum specified therein.

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

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

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

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

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

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will

remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

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

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

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

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

12. This guarantee shall also be 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	CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

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

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code

Number)

(Address)

NOTES:

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

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

Annex – II
(Schedule - G)
(See Clause 7.5.3)

Annex-II: 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 [name and address of the authority], (hereinafter called the "**Authority**") for "**Construction and upgradation of existing road to two lane with paved shoulder from Km 2.00 to Km 16.167 of Ranipool - Pakyong of NH-717-A (Balance Works) on EPC basis under SARDP-NE in the State of Sikkim."** on Engineering, Procurement and Construction (the "**EPC**") basis, 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 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:-

S.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	CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank

by: (Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Annex – III

(Schedule - G) (See Clause 19.2)

Annex-III: 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 [name and address of the authority], (hereinafter called the "**Authority**") for the **"Construction and upgradation of existing road to two lane with paved shoulder from Km 2.00 to Km 16.167of Ranipool - Pakyong of NH-717-A (Balance Work) on EPC basis under SARDP-NE in the State of Sikkim."** on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement.

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

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

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid instalment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

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.

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.

$ 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).

12 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	CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the

Bank by: (Signature)

(Name)

(Designation)

(Code

Number)

(Address)

NOTES:

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

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

SCHEDULE-H

(See Clauses10.1.4 and 19.3)

Contract Price Weightages

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

Proportions of the Contract price for different stages of Construction of the Project Highway shall be specified below:

Item	Weightage in percentage to the contract Price (%)		Stage for Payment	Percentage Weightage (%)	Percentage Weightage vis a vis Overall Project (%)
1	2		3	4	5
Roadworks Including culverts, Widening and repair Of culverts.	**61.64%**	**A**	**Widening and strengthening of Existing road**		
		1	Earthwork upto top of the sub-grade	30.12%	18.57%
		2	Sub-Basecourse	14.10%	8.69%
		3	Non Bituminous Base Course	8.68%	5.35%
		4	Bituminous Base Course	4.97%	3.06%
		5	Wearing Coat	9.11%	5.61%
		B. 1	**Reconstruction/ New 2-Lanerealignment/ bypass (Flexible pavement)**		
		1	Earthwork upto top of the sub-grade	9.49%	5.85%
		2	Sub-Basecourse	5.43%	3.35%
		3	Non Bituminous Base Course	3.56%	2.19%
		4	Bituminous Base Course	2.18%	1.34%
		5	Wearing Coat	3.97%	2.45%
		a	Pipe culvert	1.88%	1.16%
		b	RCC Box Culvert	6.51%	4.01%
Minor Bridges/underpasses/ Overpasses	**6.27%**	**A1**	**Widening and Repair of Minor bridges(length<6mand<60m)**		
			Minor bridges		
		A2	**New Minor bridges(length<6and>60m.)**		

		1	**Foundation + Sub- Structure:** On completion of the foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	67.76%	4.25%
		2	**Super-Structure:** On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, handrails, crashbarriers, road signs & markings, tests on completion etc. complete in all respect.	32.24%	2.02%
		A2	**New Major Bridges**	0.00%	0.00%
		1	Foundation		
		2	Sub-structure		
		3	Super-structure(including bearings)		
		4	Wearing Coat including expansion joints		
		5	Miscellaneous items like handrails, crash barriers, roadmarkings etc.)		
		6	Wingwalls/return walls		
		7	Guide Bunds, River Training work etc.		
		8	Approaches(including Retaining walls, stone pitching and protection works)		
		B1	**Widening and repair of**	0.00%	0.00%
			(a)ROB	0.00%	0.00%
			(b)RUB	0.00%	0.00%
		1	Foundation		
		2	Sub-structure	0.000%	0.000%
		3	Super-Structure(including bearings)	0.000%	0.000%
		4	Wearing Coat:	0.000%	0.000%
			(a)In case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.	0.000%	0.000%

		5	Miscellaneous items like handrails, crash barriers, road markings etc)	0.000%	0.000%
		6	Wingwalls/return walls	0.000%	0.000%
		7	Approaches(including Retaining walls, stone pitching and protection works)	0.000%	0.000%
		B 2	**New ROB/RUB**		
			(a)ROB		
			(b)RUB		
		1	Foundation	0.000%	0.000%
		2	Sub-structure	0.000%	0.000%
		3	Super-Structure(including bearings)	0.000%	0.000%
		4	Wearing Coat:	0.000%	0.000%
			(a)In case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.	0.000%	0.000%
		5	Miscellaneous items like handrails, crash barriers, road markings etc)	0.000%	0.000%
		6	Wingwalls/return walls	0.000%	0.000%
		7	Approaches(including Retaining walls, stone pitching and protection works)	0.000%	0.000%
		C 1	**Widening and repair of Elevated Section/ Flyovers/ Grade Separators**		
		1	Foundation	0.000%	0.000%
		2	Sub-structure	0.000%	0.000%
		3	Super-Structure(including bearings)	0.000%	0.000%
		4	Wearing Coat including expansion joints	0.000%	0.000%
		5	Miscellaneous items like hand rails, crash barriers, road markings etc.)	0.000%	0.000%
		6	Wingwalls/return walls	0.000%	0.000%

		7	Approaches(including Retaining walls, stone pitching and protection works)	0.000%	0.000%
Otherworks	**32.09%**	(i)	Toll plaza	0.0%	0.0%
		(ii)	Road side drains	8.76%	2.81%
		(iii)	Road signs markings, km stones, safety devices,…		
		a	Traffic Sign	0.29%	0.09%
		b	Pavement marking	1.67%	0.54%
		c	Crash barrier/"W/Thrie" Metal Beam Crash Barrier	1.77%	0.57%
		d	Boundary stone, km stone,5thkm stone,& hecto metre stones	0.05%	0.02%
		e	Traffic blinker LED Delineator, stud ,reflective payment marker, tree reflector	0.05%	0.02%
		f	Direction and Place Identification signs upto 0.9sqmsize board	0.05%	0.02%
		g	Minor junction	6.03%	1.94%
		h	Major Junction	6.90%	2.21%
		j	Road furniture	0.29%	0.09%
		k	Dismantling of Structures	0.18%	0.06%
		l	Dismantling of Flexible Pavements	0.87%	0.28%
		m	Site Clearance	0.15%	0.05%
		n	Chute drain	0.72%	0.23%
		o	LandSlide Clearance	1.78%	0.57%
		(iv)	Project Facilities		
		(a)	Bus bays	0.50%	0.16%
		(b)	Truck lay-byes	0	0
		(c)	Rest areas	0.19%	0.06%
		(d)	other		
		(v)	Road side plantation		
		a	Road side plantation & medium Plantation.	0.47%	0.15%

		(viii)	**Protection works**		
		a	Breast wall	31.91%	10.24%
		b	Retaining wall	2.32%	0.74%
		c	Cut Slope Wall	8.87%	2.85%
		d	Gabion wall	5.53%	1.77%
		e	Toe wall	5.94%	1.91%
		f	Seeding and Mulching (Soil Cut Slope)	1.72%	0.55%
		g	Vegetation Mat (Steep Slope)	0.39%	0.12%
		h	Crib Work(F300)	0.39%	0.12%
		i	Crib Work(F500)	0.89%	0.29%
		j	Ground water Drainage Work	6.64%	2.13%
		k	Anchor Work	1.45%	0.47%
		l	Rock-bolt Work	0.06%	0.02%
		(ix)	**Rectification/Maintenance/Re-Construction works**		
		a	Rectification of executed works upto Top of subgrade including Sub base course and Base Course (in existing alignment)	0.83%	0.27%
		b	Rectification of executed works upto Top of subgrade including Sub base course and Base Course(in Realignment)	0.81%	0.26%
		c	Rectification/ Reconstruction of Pipe Culverts	0.15%	0.05%
		d	Rectification/ reconstruction of Box Culverts	0.12%	0.04%
		e	Rectification/ reconstruction of Road Side Drains	0.02%	0.01%
		f	Breast Wall	0.39%	0.13%
		g	Retaining Wall	0.85%	0.27%

Note: The above list is illustrative and may require modification as per the scope of the work. Procedure of estimating the value of work done.

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

Table 1.3.1

	Stage of Payment	**Percentage-weightage**	
A	**Widening and strengthening of existing road**		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (Five) percent of the total length.
1	Earthwork upto top of the sub-grade	30.12%	
2	Sub-Base Course	14.10%	
3	Non Bituminous Base Course	8.68%	
4	Bituminous Base Course	4.97%	
5	Wearing Coat	9.11%	
6	Widening and repair of culverts	0.00%	Cost of completed culverts shall be determined pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least one culverts.
B.1	**Reconstruction/New2-lane realignment/ bypass (Flexible pavement)**		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5(Five) percent of the total length.
1	Earthwork upto top of the sub-grade	9.49%	
2	Sub-Base Course	5.43%	
3	Non Bituminous Base Course	3.56%	
4	Bituminous Base Course	2.18%	
5	Wearing Coat	3.97%	
B.2	**Reconstruction/New2-lane realignment/bypass (Rigid pavement)**		Unit of measurement is linear length. Payment of each stage shall be made on pro Rata basis on completion of a stage in full length or 0.5(Zero Point five) km. length , whichever is less..
1	Earthwork up to top of the sub-grade	0.00%	
2	Sub Base Concrete (DLC)Course	0.00%	
3	Dry lean Concrete(DLC)Course	0.00%	
4	Pavement Quality Control (PQC) Course	0.00%	
C.1	**Reconstruction/New service road (Flexible pavement)**		Unit of measurement is linear length. Payment of each stage shall be made on prorate basis on completion of a stage in full length or 0.5(Zero Point five) km. length, whichever is less.
1	Earthwork upto of the sub-grade	0.00%	
2	Sub Base Course	0.00%	
3	Non-Bituminous Course	0.00%	
4	Bituminous Base Course	0.00%	
5	Wearing Coat	0.00%	
C.2	**Reconstruction/New service Road (Rigid pavement)**		(Unit of measurement is linear length. Payment of each stage shall be made on prorate basis on completion of a stage in full length or 0.5(Zero Point five) km. length, whichever is less
1	Earthwork upto top of the sub-grade	0.00%	
2	Sub Base Course	0.00%	

3	Dry Lean Concrete (DLC)Course	0.00%	
4	Pavement Quality Concrete(PQC)Course	0.00%	
D	**Re-Construction and New culverts on existing road, realignments, bypasses,:** (1) Culverts (length,6m)		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 at least one culverts.
	(a)Pipe Culvert	1.88%	
	(b)RCC Box culvert	6.51%	

@. For example, if the total length of bituminous work to be done is100 km, the cost per km of bituminous work shall be determined as follows:

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

Where,

P=Contract Price

L =Total length in km

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

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

Minor Bridges and Underpasses/Overpasses.

Procedure for estimating the value of Minor Bridge works and Underpasses/shall be as stated in table 1.3.2:

Table1.3.2

	Stage of Payment	Percentage-weightage	Payment Procedure
	1	2	3
A.1	**Widening and repair of minor bridges (length<6,and>60m)**	**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 widening & repair works of a minor bridge.
A.2	**New minor bridges**		
(i)	**Foundation +sub-Structure:** On completion of the foundation for wing and return walls, abutments, piers upto the abutment/pier cap.	67.76%	**(i)Foundation + sub-structure:** Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation+ sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation +sub-structure of each bridge subject to completion of atleast two foundations alongwith sub-structure upto abutment/pier cap level of each bridge. In case where load testing is required for foundation, the trigger of first payments shall include load testing also where specified.
(ii)	**Super-structure:**Oncompletionofthesuper-structureinallrespectsincludingwearingcoat,bearings,expansionjoints, handrails, crash barriers, road signs & marking, tests on completion etc. complete in all respect.	32.24%	(ii)**Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e completion of super-structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(iii)	**Approaches:** On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	[**]	**(iii)Approaches:** payment shall be made on pro-rata basis on completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause.

(iv)	**Guide Bunds and River Training Works:** OncompletionofGuideBunds andriverTrainingWorkscompl eteinallrespects	**0.00%**	**(iv) Guide Bunds and River Training Works:** payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training Works in all respects as specified.
B.1	**Widening and repair of under passes/overpasses**	**0.00%**	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length underpasses/overpasses. Payment shall be made on the completion of widening & repair works of a underpass/overpass.
B.2	**NewUnderpasses/ overpasses:**		
(i)	**Foundation +Sub-Structure:** On completion of the foundation work including foundations for wing and return walls ,abutments ,piers upto the abutment/pier cap.	**0.00%**	**(i) Foundation + Sub-Structure:** Cost of each Underpass/Over pass shall be determined on pro rata basis with respect to the total linear length (m) of the Underpasses/Overpasses. Payment against foundation+Substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of each underpasses/Overpasses subject to completion of atleast two foundations alongwith sub-structure upto abutment/pier cap level each underpass/overpass.Incasewhereloadtestingi srequiredforfoundation,thetriggeroffirstpaymentsh allinclude load testing also where specified.
(ii)	**Super-structure:** Oncompletionofthesuper-structureinallrespectsincluding wearingcoat,bearings,expansi onjoints,hand rails, crash barriers, road signs &marking, tests on completion etc. complete in all respect. Wearing Cost(a) incase of Over pass - wearing coa t including expansion joints complete in all respects as specified and (b) incase of under pass-rigid pavement including drainage facility complete in all respects as specified as specified as specified.	**0.00%**	**(ii)Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. super-structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.

(iii)	**Approaches:**OnCompletionof approaches includingRetaining Walls/ ReinforcedEarth walls,stonepitching, protectionworkscompleteinal lrespectandfituse.	**0.00%**	(iii) **Approaches :** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified.

1.3.3 Major Bridge works, ROB/RUB and Structures

Procedure for estimating the value of Major Bridge works, ROB/RUB and structures shall be as stated in table1.3.3:

	Table 1.3.3		
	Stage of Payment	**Percentage-weightage**	**Payment Procedure**
	1	2	3
A.1	**Widening and repairs of major Bridges**		
(i)	Foundation	[**]	**(i)Foundation:**CostofeachMajorBridgeshallbedetermined on pro rata basis with respect to the totallinear length (m) of the Major Bridge. Payment againstfoundationshallbemadeonpro-ratabasisoncompletionofastagei.e.notlessthan25%ofthescopeoffoundationofthemajorBridgesubjecttocompletionofatleasttwofoundationsofthemajorBridge. Incasewhereloadtestingisrequiredforfoundation,the trigger of first payment shall including load testingalsowherespecified.
(ii)	Sub-structure	[**}	**(ii) Sub-structure:** Payment against Sub-structure shallbe made on pro-rata basis on completion of a stage i.e.not less than 25% of the scope of sub-structure of themajorbridgesubjecttocompletionofatleasttwosub-structures of abutments, piers upto abutment/pier caplevelofthemajorbridge.
(iii)	Super-structure (includingbearings)	[**]	**(iii)Super-structure:**Paymentshall bemadeonpro-ratabasisoncompletionofastagei.ecompletionof super-structure includingbearingsof atleast one spaninallrespectsasspecified.
(iv)	WearingCoatincludingexpansionjoints	[**]	**(iv)WearingCoat:**Paymentshallbemadeoncompletionofwearingcoatincludingexpansionjointscompleteinallrespectsspecified.
(v)	MiscellaneousItemslikeh and rails, crash barriers,roadmarkingetc.	[**]	**(v)Miscellaneous:**Paymentsshallbemadeoncompletionofallmiscellaneousworkslikehandrails,crashbarriers,roadmarkingsetc.completeinallrespectsasspecified.
(vi)	Wingwalls/returnwalls	(**)	**(vi) Wing walls/return walls:** Payments shall be madeoncompletionofallwingwalls/returnwallcompleteinallrespectsas specified.
(vii)	GuideBunds, RiverTrainingWorksetc.	[**]	**(vii) Guide Bunds, River Training works:** Paymentsshall be made on completion of all guide bunds/rivertrainingworksetc.completeinallallrespectsas specified.
(viii)	Approaches (IncludingRetaining walls, stonepitching and protectionworks)	[**]	**(viii)Approaches:**Paymentsshallbemadeoncompletionofboth approaches including stonepitching,protectionworks,etc.completeinallrespectsasspecified.

A.2	**NewmajorBridges**		
(i)	Foundation	[**]	**(i)Foundation:**CostofeachMajorBridgeshallbedetermined on pro rata basis with respect to the totallinear length (m) of the Major Bridge. Payment againstfoundationshallbemadeonpro-ratabasisoncompletionofastagei.e.notlessthan25%ofthescopeoffoundationofthemajorBridgesubjecttocompletionofatleasttwofoundationsofthemajorBridges. In case where load testingis requiredfor foundation,the trigger of first payment shall include load testingalsowherespecified.
(ii)	Sub-structure	[**]	**(ii)Sub-Structure:**PaymentagainstSub-structureshall be made on pro-rata basis on completion of a pro-rata basis on completion of a stagei.e.notless than25% of the scope of sub-structure of the major bridgesubjecttocompletionofatleasttwosub-structures of abutment/pier cap level of the majorbridge.
(iii)	Super-structure (includingbearings)	[**]	**(iii) Super-structure:**Paymentshallbemadeonpro-ratabasisoncompletionofa stageI.e.completionof super-structureincludingbearingsofatleastonespaninllrespectsasspecified.
(iv)	WearingCostincluding expansionjoints	[**]	**(iv) Wearing Coat:**Payment shall be made oncompletionofwearingcoatincluding Expansionjointscompleteinallrespectsasspecified.
(v)	Miscellaneous item likehandrails,crashbarriers,roadmarkingsetc.	[**]	**(v)Miscellaneous:**Payments shall be made on completion of allmiscellaneousworkslikehandrails, crash barriers,road marking etc.complete in allrespectsasspecified.
(vi)	Wingwalls/returnwells	[**]	**(vi) wingwalls/returnwalls:**PaymentsshallbemadeOn completion ofall wingwalls/returnwalls completeinallrespectsasspecified.
(vii)	GuideBunds, River,Trainingworksetc.	[**]	**(vii)GuideBunds,RiverTrainingworks:**Paymentshallbemadeoncompletionofallguidebundsrivertrainingworksetcompleteinallrespectsasspecified.
(viii)	Approaches(including Retaining walls, stonepitching and protectionworks)		**(viii)Approaches:**Paymentsshallbemadeoncompletionofbothapproachesincludingstonepitchingprotection works,etc.Completeinallrespectsasspecified.
B.1	**Wideningandrepairsof** **(a) ROB** **(b) RUB**		

(i)	Foundation	[**]	**(i)Foundation:**CostofeachROB/RUBshallbedetermined on pro rata basis with respect o the totallinear(m)oftheROBs/RUBsPaymentagainstfoundationshallbemadeonpro-ratabasisoncompletionofastagei.e.notlessthan25%ofthescopeoffoundationoftheROB/RUBsubject,tocompletionofatleasttwofoundationsoftheROB/RUB. Incasewhereloadtestingisrequireforfoundation,the triggeroffirst paymentshall including load testingalsowherespecified.
(ii)	Sub-structure	[**]	**(ii) Sub-Structure:** PaymentagainstSub-structureshallbemadepro-ratabasisoncompletionofastage i.e.notnotlessthan25%ofthescopeofsubstructureoftheROB/RUBsubjecttocompletionofatleasttwo sub sub-structure of abutments/piers uptoabutment/piercaplevelofftheROB/RUB.
(iii)	Super-structure (includingbearings)	[**]	**(iii)Super-structure:**PaymentshallbemadeonpropratabasisoncompletionofastagI.e.completionof super-structureincludingbearingsofatleastonespaninallrespectsasspecified.
(iv)	Wearingcostincludingexpansionjointsincaseof ROB. IncaseofRUB,rigidpavement underRUB.Including drainage facilityasspecified.	[**]	**(vi)WearingCoat:**PaymentshallbemadeoncompletionOf(a)incaseofROB-wearingcoatincluding expansion joints complete in all respect asspecifiedand(b)incaseofRUB-rigid pavementunder RUB including drainage facility complete in allrespectsasspecifiedasspecified.
(v)	Miscellaneousitemslikeh and rails, crash barriers,roadmarkingsetc.	[**]	**(v)Miscellaneous:** Paymentshallbemadeoncompletionofallmiscellaneous workslikehandrails,crash barriers, road markings etc. complete in allrespectsasspecified.
(vi)	Wingwalls/returnwalls	[**]	**(vi)Wing walls/return walls:** Payments shall be madeon completion shall be made on completion of all wingwalls/returncompleteinallrespectsasspecified.
(vii)	Approaches(including Retaining walls, stonepitching and protectionworks)	[**]	**(vii)Approaches:**PaymentsshallbemadeoncompletionofbothapproachesincludingstonepitchingProtection works, etc. complete in all respectsasspecified.
B.2	**New** (a) **ROB** (b) **RUB**		

(i)	Foundation	[**]	**(i)Foundation:**CostofeachROB/RUBshallbedetermined on pro rata basis with respect to the totallinearlength(m)oftheROBs/RUBsPaymentagainstfoundationshallbemadeonpro-ratabasisoncompletionofastagei.e.notlessthan25%ofthescopeoffoundationoftheROB/RUBsubjecttocompletion of atleasttwo foundation of the ROB/RUB. In case where load testingis required for foundation,the trigger of first payment shall include load testingalsowherespecified.
(ii)	Sub-structure	[**]	**(ii)Sub-Structure:**PaymentagainstSUB-structureshallbemadeonpro-ratabasisoncompletionofastagei.e.notlessthan25%ofthescopeofsub-structureoftheROB/RUBsubjecttocompletionof atleasttwosub-structureofabutments/piersuptoabutment/piercapleveloftheROB/RUB.
(iii)	Super-structure (includingbearings)	[**]	**(iii)Super-structure:**Paymentshallbemadeonproratabasisoncompletionofastagei.e.completionofa super- structureincludingbearingsof atleast one spaninallrespectasspecified.
(iv)	WearingCost includingexpansionjointsincaseofROB. IncaseofRUB, Rigidpavement underRUBincluding drainage facilityas specified.		**(iv)WearingCoat:**Paymentshallbemadeoncompletionof(a)incaseofRIB-wearingcoatincludingexpansionjointscompleteinallrespectsasspecified and (b) in case of RUB rigid pavement underRUBincluding drainage facility complete in allrespectasspecifiedasspecified.
(v)	MiscellaneousItemslikehand rails ,crase barriers,roadmarkingetc.	[**]	**(v)Miscellaneous:**Paymentshallbemadeoncompletion ofall miscellaneous workslike handrails,crashbarriers,roadmarkingetc.completeinall respectsasspecified.
(vi)	Wingwalls/returnwalls	[**]	**(vi)Wing walls/returnwalls:**Paymentshallbemadeon completion ofall wingwalls/returnwalls completeinallrespectsasspecified.
(vii)	Approaches(includingRetaining walls/ReinforcedEarth wall, stone pitchingandprotectionworks)	[**]	**(vii)Approaches:**Paymentsshallbemadeoncompletionofboth approaches including stonepitching,protectionworks,etc.completeinallrespectsasspecified.
C.1	**Wideningandrepairsof ElevatedSection/Flyovers/Grade separators**		

(i)	Foundation	[**]	**(i)Foundation:**Costofeachstructureshallbedetermined on pro rata basis with respect to the totallinearlength(m)ofthestructure.Paymentagainstfoundationshallbemadeon pro-ratabasisoncompletionofastagei.e.notless25%ofthescopeoffoundation of the structuresubjecttocompletion ofatleast two foundations of the structure.In casewhereloadtestingisrequiredforfoundation,thetriggeroffirstpaymentshallincludingloadtestingalsowherespecified.
(ii)	Sub-structure	[**]	**(ii)Sub-Structure:**Paymentagainstsub-structureshallbemadeonpro-ratabasisoncompletionofastage i.e. not less then 25% of scope of sub-structure ofthestructuresubjecttocompletionofatleasttwosub-structure of abutments/piers up to abutment/pier caplevelofthestructure.
(iii)	Super-structure (includingbearings)	[**]	**(iii)Super-structure:**Paymentshallbemadeonpro-ratabasisoncompletionofastagei.e.completionofasuper-structureincludingbearing ofatleastonespan Inallrespects asspecified.
(iv)	WearingCoatincludingexpansionjoints	[**]	**(iv) Wearing Coat:** Payment shall be made oncompletionofwearingcoatincludingexpansionjoints completeinallrespectsasspecified.
(v)	Miscellaneousitemslikeh and rails, crash barriers,roadmarkingsetc.	[**]	**(v)Miscellaneous:**Paymentsshallbemadeoncompletionofallmiscellaneousworkslikehandrails,crashbarriers,roadmarking etc.completeinall respectsasspecified.
(vi)	Wingwalls/returnwalls	[**]	**(vi) Wing walls/ return walls:** Payment shall be madeon completion of all wingwalls/return walls completeinallrespectsasspecified.
(vii)	Approaches(includingRetaining walls/ReinforcedEarth wall, stone pitchingandprotectionworks)	[**]	**(vii)Approaches:**Paymentsshallbemadeoncompletionofbothapproachesincludingstonepitching protection works,etc. complete in all respectsasspecified.
C.2	**NewElevatedSection/Flyovers/Grade Separators**		
(i)	Foundation	[**]	**(i) Foundation:**Costoeachstructureshallbedeterminedonproratabasiswithrespecttothetotallinearlength(m)ofthestructurepaymentagainstfoundationshallbemadeonpro-ratabasisoncompletionofastagei.e.notlessthan25%ofthescope offoundationofthestructuresubjecttocompletionofatleasttwofoundationofthestructure.In case where load testing is required for foundation,the trigger of first payment shall include load testingalsowherespecified.

(ii)	Sub-Structure	[**]	**(ii)Sub-Structure:**PaymentagainstSub-structureshallbemadeonpro-ratabasisoncompletionofastagei.e.notlessthan25%ofthescopeofsub-structureofabutments/piersuptoabutment/piercaplevelcaplevelofthestructure.
(iii)	Super-Structure (includingbearings)	[**]	**(iii)Super-Structure:** Paymentshallbemadeonpro-ratabasisoncompletion of a stage completion of super-structureincludingbearingsofatleastonespaninallrespectsasspecified.
(iv)	WearingCoatincludingexpansionjoints	[**]	**(vi)WearingCoat:**paymentshallbe madebeoncompletionofwearingcoatincludingexpansionjointscomplete.
(v)	Miscellaneous item likehandrails,crashbarriers,roadmarkingsetc.	[**]	**(v)Miscellaneous:**Paymentsshallbemadeoncompletionofallmiscellaneousworkslikehandrails, crash barriers,road markings etc. completein allrespectsasspecified,
(vi)	Wingwalls/returnwalls	[**]	**(vi)Wingwalls/returnwalls:** Paymentshallbemadeoncompletionofallwingwalls/returnwallscompletein all respectsasSpecified.
(vii)	Approaches(includingRetaining walls/ReinforcedEarth wall, stone pitchingandprotectionworks	[**]	**(vii)Approaches:**paymentsshallbemadeoncompletionofboth approaches including stonepitching,protectionworks,etc.completeinallrespectsasspecified.

1.3.4 Other works.

1.3 Procedure of estimating the value of work done shall be as stated in table1.3.4

	Table 1.3.4		
	Stage of Payment	weightage	Payment Procedure
(i)	Toll plaza	0.00%	Unit of measurement is each completed tollplaza. Payment of each tollplazashallbe madeonproratabasiswithrespecttothetotalofalltollplazas.
(ii)	Road side drains	8.76%	Unit of measurement is linear in Km .Payment shall be made on prorate basis on completion of a stage in a length on not less than 5% (five percent) of the total length.
(iii)	Road signs markings, km stones, safety devices,…		
a	Traffic Sign	0.29%	Unit of measurement is linear in km. Payment shall be made on prorate basis on completion of a stage in a length on not less than 5% (five percent) of the total length.
b	Pavement marking	1.67%	
c	Crash barrier/"Thrie" Metal Beam Crash Barrier	1.77%	
d	Boundary stone, kmstone,5th km stone ,& hectometer stones	0.05%	
e	Traffic blinker LED Delineator, stud, reflective payment marker, tree reflector	0.05%	
f	DirectionandPlaceIdentificationsignsupto0.9sqmsizeboard	0.05%	
g	Minor junction	6.03%	
h	Major Junction	6.9%	
i	Traffic diversion, Safety and traffic management during construction	0.000%	
j	Road furniture	0.29%	
k	Dismantling of Structures	0.18%	
l	Dismantling of Flexible Pavements	0.87%	
m	Site Clearance	0.15%	
n	Chute drain	0.72%	
o	Landslide Clearance	1.78%	
(iv)	Project Facilities		
(a)	Bus bays	0.50%	Payment shall be made on pro rata basis for completed facilities.
(b)	Truck lay-byes	0.00%	
(c)	Rest areas	0.19%	
(v)	Road side plantation		
a	Road side plantation & medium Plantation etc.	0.47%	Unit of measurement is linear in km. Payment shall be made on prorate basis on completion of a stage in a length on not less than 5% (five percent) of the total length.

(vi)	Repair of protection works other than approaches to the bridges, elevated section/ flyovers/grade separators and ROBs.	0.00%	Unit of measurement is linear in km. Payment shall be made on prorate basis on completion of a stage in a length on not less than 5% (five percent) of the total length.
(vii)	Safety and traffic management during construction	0.00%	Payment shall be made on prorate basis every six months.
(viii)	Protection works		
a	Breast wall	31.91%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5(five) percent of the total length.
b	Retaining wall	2.32%	
c	Cut Slope Wall	8.87%	
d	Gabion wall	5.53%	
e	Toe wall	5.94%	
f	Seeding and Mulching(Soil Cut Slope)	1.72%	
g	Vegetation Mat(Steep Slope)	0.39%	
h	Crib Work(F300)	0.39%	
i	Crib Work(F500)	0.89%	
j	Ground water Drainage Work	6.64%	
k	Anchor Work	1.45%	
l	Rock-bolt Work	0.06%	
(ix)	Rectification/Maintenance/Re-Construction works		
a	Rectification of executed works upto Top of subgrade including Sub base course and Base Course (in existing alignment)	0.83%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5(five) percent of the total length.
b	Rectification of executed works upto Top of subgrade including Sub base course and Base Course(in Realignment)	0.81%	
c	Rectification/ Reconstruction of Pipe Culverts	0.15%	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 at least one culverts.
d	Rectification/ reconstruction of Box Culverts	0.12%	
e	Rectification/ reconstruction of Road Side Drains	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 5(five) percent of the total length.
f	Breast Wall	0.39%	
g	Retaining Wall	0.85%	

2. Procedure for payment for Maintenance

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

Payment 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 : List of Drawings

(Schedule - I)

List of Drawings

(a) Working Drawings of all the components/elements of the Project Highway as determined by Authority Engineer/NHIDCL, and

(b) As-built drawings for the Project Highway components/elements as determined by Authority Engineer /NHIDCL. As-built drawings shall be duly certified by Authority Engineer.

A broad list of the drawings of the various components/elements of the Project Highway and project facilities required to be submitted by the Contractor is given below:

1. Index Map
2. Alignment Plan, Drawing of Horizontal Alignment, Vertical profile,
3. Typical Cross Section
4. General Arrangement Drawing
5. Dimension detailed drawing
6. Misc
   - (i) Road Signs & Road Delineators
   - (ii) Road/Kerb Markings
   - (iii) Typical Details of Drain
   - (iv) Typical Details of Metal Beam Crash Barrier
   - (v) Attainment of Super-elevation

SCHEDULE - J

(See Clause 10.3.2)

PROJECT COMPLETION SCHEDULE

1 Project Completion Schedule

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

2 Project Milestone-I

Project Milestone-I shall occur on the date falling on the 90th day from the Appointed Date (the "**Project Milestone-I**").

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

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

Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 30% (thirty per cent) of the Contract Price.

4 Project Milestone-III

Project Milestone-III shall occur on the date falling on the 384th day from the Appointed Date (the "**Project Milestone-III**").

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 60% (sixty per cent) of the Contract Price.

5 Scheduled Completion Date

The Scheduled Completion Date shall occur on the 548th day from the Appointed Date.

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

6 Extension of time

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

SCHEDULE - K
(See Clause 12.1 (ii))

Tests on Completion

1 Schedule for Tests

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

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

2 Tests

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

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

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

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

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

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

3 Agency for conducting Tests

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

4 Completion Certificate

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

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

S. N.	Key metrics ofAsset	Equipment to be used	Frequency of condition survey
1	Surface defects of pavement	Network SurveyVehicle (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
2	Roughness ofpavement	Network SurveyVehicle (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
3	Strength of pavement	Falling Weight Deflectometer (FWD)	At least once a year
4	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey months defined for the state basisrainy season)
5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basisrainy season)

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

Schedule – L
(See Clause
12.2)
Completion Certificate

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated …… (the "**Agreement**"), for **Construction/Upgradation of Existing road to 2 lane with paved shoulder including Geometric Improvement from Ranipool to Pakyong from km 2.000 to km 16.167 (Balance Work) of NH- 717-A on EPC basis under SARDP-NE Phase 'A' "** (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through..... (Name of Contractor), hereby certify that the Tests in
accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

For and on behalf of

the Authority's Engineer by:

(Signature

)(Name)

(Designation

)(Address)

SCHEDULE - M

(See Clauses 14.6, 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

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

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

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

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

2. Percentage reductions in lump sum payments

- The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate crossfall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearingsand 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 roadsigns, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, roadblockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

$$R=P/100 \times (M_1 \text{ or } M_2) \times L1/L$$

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

deductionM = 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 kilometer, the non-conforming length shall be taken as onekilometer.

SCHEDULE - N
(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

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

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

2 Terms of Reference

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

3 Appointment of Government entity as Authority's Engineer

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

Annex – I
(Schedule - N)

TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

1 Scope

(i) These Terms of Reference (the "TOR") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "Agreement), which has been entered into between the NHIDCL(the "Authority") and ..... (the "Contractor")# **Construction/Upgradation of Existing road to 2 lane with paved shoulder includingGeometric Improvement from Ranipool to Pakyong from km 2.000 to km 16.167(Balance Work) of NH-717-A on EPC basis under SARDP-NE Phase"** and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

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

2 Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time Extension;
(b) any additional cost to be paid by the Authority to the Contractor;
(c) the Termination Payment; or
(d) 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).

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

(iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and

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

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

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

4 **Construction Period**

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

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

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

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

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

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

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

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

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance

with Good Industry Practice for quality assurance. For purposes of this Paragraph 4.9, 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.

(x) 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.

(xi) 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.

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

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

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

(xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor'squality control records and documents before the Completion Certificate is issued pursuant to Clause 12.4.

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

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

(xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate 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

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

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

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

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

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

6 Determination of costs and time

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

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

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

7. Payments

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

(ii) Authority's Engineer shall –

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

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

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

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

8. Other duties and functions

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

9 Miscellaneous

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

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

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

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

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

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with Clause19.3

(i) subsequent to the last claim;

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

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

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

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

(f) Deductions:

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

ii. Any amount towards deduction of taxes; and

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

(g) Net claim: (e) – (f)(iii);

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

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

ii. For Change of Scope Orders, and

iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause 20.1)

Insurance

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to Property

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

The insurance cover shall be not less than: Rs. 2,00,00,000/- (Two Crore only)

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality Test

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

2. Visual and physical test

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, …….. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …… (the "**Agreement**"), for Upgradadtion of Existing 2-lane Highway to 4 lane with Paved Shoulder configuration from Km 26.350 (Design Chainage 26+615) (Khati Chowk) to Km 30.097 (Design Chainage 30+359) (Hanuman Chowk) of Jammu – Akhnoor Section of NH 144A in the Union Territory of Jammu & Kashmir on EPC basis. (Pkg - IIIB). (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor),hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED ANDDELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

SCHEDULE [S]
(See Clause 26.1(iii))
Procedure for Dispute Resolution Board

The parties to the Contract Agreement mutually agree as follows:

(1) The Board shall comprise of three Members having experience in the field of construction or have been involved in the Works related to construction and with the interpretation of contractual documents. One Member shall be selected by each of the Employer and the Contractor from the list maintained by NHAI hosted on its website (www.nhai.gov.in). In the event the parties fail to select the member within 28 days of the date of the signing of Contract Agreement, in that eventuality, upon the request of either or both parties such Member shall be selected by SAROD within 14 days. The third Member shall be selected by the other two members from the same list. If the two Members selected by or on behalf of the parties fail to select the third Member within 14 days after the later of their selections, then upon the request of either or both parties such third Member shall be selected by SAROD within 14 days. The third Member shall serve as Chairman of the Board.

(2) The Board shall be constituted when each of the three Board Members has signed a Board Member's declaration of Acceptance as required by the DRB's rules and procedures (which, along with the declaration of acceptance form, are attached as Annexure herewith).

(3) In the event of death, disability, or resignation of any Member, such Member shall be replaced in the same manner as the Member being replaced was selected. If for any other reason, a Member fails or is unable to serve, the Chairman (or failing the action of the Chairman then either of the other Members) shall inform the Parties and such non-serving Member shall be replaced in the same manner as the Member being replaced was selected. Any replacement made by the parties shall be completed within 28 days after the event giving rise to the vacancy on the Board, failing which the replacement shall be made by SAROD in the same manner as described above. Replacement shall be considered complete when the new Member signs the Board Member's Declaration of Acceptance. Throughout any replacement process, the Members not being replaced shall continue to serve and the Board shall continue to function and its activities shall have the same force and effect as if the vacancy had not occurred, provided, however, that the Board shall not conduct a hearing nor issue a decision until the replacement is completed.

(4) If either the Employer or the Contractor is dissatisfied with any decision of the Board, and/or if the Board fails to issue its decision within 56 days after receipt of all the pleadings (along with the supporting documents) of the parties by the Chairman of the Board or any extension mutually agreed upon by the Employer and the Contractor, in such a case, either the Employer or the Contractor may, within 28 days after his receipt of the decision, or within 28 days after the expiry of the said period, as the case may be, give notice to the other party, with a copy for information to the Authority engineer, of his intention to refer the matter to the Conciliation Committee of Independent Experts (CCIE) of the Authority for Conciliation/amicable settlement.

(5) It is mandatory to refer all the disputes to DRB before issuance of completion certificate and satisfactory completion of punch list items. No dispute shall be entertained after completion of aforementioned date.

(6) If the Board has issued a decision to the employer and the Contractor within the said 56 days or any extension mutually agreed upon by the Employer and the Contractor and no notice of intention to commence Conciliation by the Conciliation Committee of Independent Experts (CCIE) of the Authority for Conciliation/amicable settlement as to such dispute has been given by either the Employer or the Contractor within 28 days after the parties received such decision from the Board, the decision shall become final and binding upon the employer and Contractor.

(7) Whether or not it has become final and binding upon the Employer and the Contractor, a decision shall be admissible as evidence in any subsequent dispute resolution procedure, including any arbitration or litigation having any relation to the dispute to which the decision relates.

(8) All decision of DRB which have become final and binding or till they have been reversed in subsequent conciliation/Arbitration process shall be implemented by the parties forthwith. Such implementation shall also include any relevant action of the Authority engineer.

(9) If during the Contract Period, the Employer and the Contractor are of the opinion that the Disputes Resolution Board is not performing its functions properly, the Employer and the Contractor may together disband the Disputes Resolution Board and reconstitute it. In that case, a new board shall be selected in accordance with the provisions applying to the selection of the original Board as specified above, except that words "within 28 days after the signing of this Contract Agreement" shall be replaced by the words "within 28 days after the date on which, the notice disbanding the original Board became effective".

(10) The Employer and the Contractor shall jointly sign a notice specifying that the Board shall stand disbanded with effect from the date specified in the notice. The notice shall be posted by email to each Member of the Board. A Member shall be deemed to have received the e mail even if he refuses to have received the same.

(11) All other terms and conditions of the original Contract Agreement shall remain unaltered/unaffected and the parties shall remain bound by terms and conditions as contained therein.

Disputes Resolution Board's Rules and Procedures

1. Except for providing the services required hereunder, the Board Members shall not give any advice to either party or to the Authority engineer concerning conduct of the Works.The Board Members:

   (a) Shall have no financial interest in any party to the Contract, or the Authority engineer, or a financial interest in the contract, except for payment for services on the Board.

   (b) Shall have had no previous employment by, or financial ties to, any party to the Contract Agreement, or the Authority engineer, except for fee based consulting services/advisers on other projects, and/or be Retired Government Officers (not connected in whole or part with the project), all of which must be disclosed in writing to both parties prior to appointment to the Board.

   (c) Shall have disclosed in writing to both parties prior to appointment to the Board any and all recent or close professional or personal relationships with any director, officer, or employee of any party to the Contract, or the Authority engineer, and any and all prior involvement in the project to which the Contract relates;

   (d) Shall not, while Board member, be employed whether as a consultant or adviser or otherwise by either party to the Contract, or the Authority engineer, except as a Board Member, without the prior consent of the parties and the other Board Members;

   (e) Shall not, while a Board Member, engage in discussion or make any agreement with any party to the Contract, or with the Authority engineer, regarding employment whether as a consultant or otherwise whether after the Contract is completed or after service as a Board Member is completed.

   (f) Shall remain and be impartial and independent of the parties and shall disclose in writing to the Employer, the Contractor and one another any fact or circumstance which might be such as to cause either the Employer or the Contractor to question the continued existence of the impartiality and independence required of Board Members; and

   (g) Shall be fluent in the language of the Contract.

2. Except for its participation in the Board's activities as provided in the Contract Agreement and in this Agreement none of the Employer, the Contractor, and or the Authority engineer shall solicit advice or consultation from the Board or the Board Members on matters dealing with the conduct of the Works.

3. The Contractor shall :

   (a) Furnish to each Board member one copy of all documents which the Board may request including Contract Agreement, progress reports and other documents pertinent to the performance of the Contract Agreement.

   (b) In cooperation with the Employer, coordinate the site visits of the Board, including conference facilities, and secretarial and copying service.

4. The Board shall begin its activities following the signing of a Board Member's Declaration of Acceptance by all three Board Members, and it shall terminate these activities as set forth below

(a) The Board shall terminate its regular activities when either (i) issuance of completion certificate and completion of punch list items or (ii) the parties have terminated the contract and when, in either case, the Board has communicated to the parties and the Authority engineer its decision on all disputes previously referred to it.

(b) Once the Board has terminated its regular activities as provided by the previous paragraph, the Board shall remain available to process any dispute referred to it by either party. In case of such a referral, Board Members shall receive payments as provided in paragraphs 7(a)(ii), (iii) and (iv).

5. Board Members shall not assign or subcontract any of their work under these Rules and Procedures.

6. The Board Members are Independent and not employees or agents of either the Employer or the Contractor.

7. Payments to the Board Members for their services shall be governed by the following provisions :

(a) Each Board Member will receive payments as follows :

i. A retainer fee per calendar month as specified in the schedule of fee made part of this Schedule and its revision from time to time. This retainer fee shall be considered as payment in full for :

(A) Being available, on 7 days' notice, for all hearings, Site Visits, and other meetings of the Board.

(B) Being conversant with all project developments and maintaining relevant files.

(C) All offices and overhead expenses such as secretarial services, photocopying and office supplies (but not include telephone calls, faxes and telexes) incurred in connection with the duties as a Board Member.

ii. A daily fee as specified in the schedule of fee in respect of fee for site visit & meeting, fee for meeting/ hearing not at site and extra charges for days (max. of 02 days for travel on each occasion) other than hearing / meeting days.

iii. Expenses, in addition to the above, all reasonable and necessary travel expenses (including economy class air fare, subsistence, and other direct travel expenses). Receipts for all expenses in excess of Rs. 2000/- (Rupees Two Thousand only) shall be provided.

iv. Reimbursement of any taxes that may be levied on payments made to the Board Member pursuant to this paragraph 7.

(b) The retainer fee and other fees shall remain fixed for the period of each Board Member's term until revised by NHAI.

(c) Phasing out of monthly retainer fee. Beginning with the next month after the completion certificate (or, if there are more than one, the one issued last) has been issued, the Board members shall receive only one-third of the monthly retainer fee till next one year. Beginning with the next month after the Board has terminated its regular activities pursuant to paragraph 4(a) above, the Board members shall no longer receive any monthly retainer fee.

(d) Payments to the Board Members shall be shared equally by the Employer and the Contractor. The concerned Project Implementation Unit (PIU) of Employer shall pay members' invoices within 30 calendar days after receipt of such invoices and shall invoice the Contractor for one-half of the amounts of such invoices. The Contractor shall pay such invoices within 30 days' time period after receipt of such invoices.

8. Board Site Visits :

(a) The Board shall visit the Site and meet the representatives of the Employer, the Contractor and the Authority engineer at regular intervals, at times of critical construction events, at the written request of either party, and in any case not less than 6 times in any period of 12 months. The timing of Site visits shall be as agreed among the Employer, the Contractor and the Board, but failing agreement shall be fixed by the Board.

(b) Site visits shall include an informal discussion of the status of the construction of the Works. Site visits shall be attended by personnel from the Employer, the Contractor and the Authority engineer.

(c) At the conclusion of each Site visit, the Board shall prepare a report covering its activities during the visit and shall send copies to the parties and to the Authority engineer.

9. Procedure for Dispute Referral to the Board :

(a) If either party objects to any action or inaction of the other party or the Authority engineer, the objecting party may file a written Notice of Dispute to the other party with a copy to the Authority engineer stating that it is given pursuant to the Agreement and state clearly and in details the basis of the dispute.

(b) The party receiving the Notice of Dispute will consider it and respond to it in writing within 14 days after receipt.

(c) This response shall be final and conclusive on the subject, unless a written appeal to the response is filed with the responding party within 10 days after receiving the response and call upon Authority engineer to mediate and assist the parties in arriving an amicable settlement thereof. Both parties are encouraged to pursue the matter further to attempt to settle the dispute.

(d) If the Authority engineer receiving the Notice of Dispute fails to provide a written response within 14 days after receipt of such Notice or failing mediation by Authority engineer, either party may require such dispute to be referred to the Board, either party may refer the dispute to the Board by written Request to the Board. The Request for decision shall state clearly and in full detail the specific issues of the dispute (s) to be considered by Board and shall be addressed to the Chairman of the Board, with copies to the other Board Members, the other party, and the Authority engineer, and it shall state that it is made pursuant to this Agreement.

(e) When a dispute is referred to the Board, and the Board is satisfied that the dispute requires the Board's assistance, the Board decide when to conduct a hearing on the dispute. The Board may request that written documentation and arguments from both parties be submitted to each Board Member before the hearing begins. The parties shall submit insofar as possible agreed statements of the relevant facts.

(f) During the hearing, the Contractor, the Employer, and the Authority engineer shall each have ample opportunity to be heard and to offer evidence. The Board's decision for resolution of the dispute will be given in writing to the Employer, the Contractor and the Authority engineer as soon as possible, and in any event not more than 56 days or any mutually extended period

between the Employer and the Contractor. The time period of 56 days of issuance of DRB decision will reckon/start from the day of first hearing that begins after submission of complete pleadings (including supporting documents, if any) by the parties.

10. Conduct of Hearings :

(a) Normally hearings will be conducted at the Site, but any location that would be more convenient and still provide all required facilities and access to necessary documentation may be utilized by the Board. Private session of the Board may be held at any cost effective location convenient to the Board. Video recordings of all hearings shall invariably be made.

(b) The Employer, the Authority engineer and the Contractor shall be given opportunity to have representatives at all hearings. Parties should restrain to bring any Advocate/Law Firm during DRB hearings.

(c) During the hearings, no Board Member shall express any opinion concerning the merit of the respective arguments of the parties.

(d) After the hearings are concluded, the Board shall meet privately to formulate its decision. The private meeting (s) of the Board shall not exceed 3 sittings. All Board deliberations shall be conducted in private, with all Members' individual views kept strictly confidential. The Board's decisions, together with an explanation of its reasoning shall be submitted in writing to both parties and to the Authority engineer. The decision shall be based on the pertinent contract provisions, applicable laws and regulations and the facts and circumstances involved in the dispute.

(e) The Board shall make every effort to reach a unanimous decision. If this proves impossible the majority shall decide and the dissenting Member may prepare a written minority report together with an explanation of its reasoning for submission to both parties and to the Authority engineer.

11. In all procedural matters, including the furnishing of written documents and arguments relating to disputes, site visits and conduct of hearings, the Board shall have full and the final authority. If a unanimous decision on any such matter proves impossible, the majority shall prevail.

12. After having been selected and where necessary approved each Board Member shall sign two copies of the following declaration and make one copy available each to the Employer and to the Contractor.

"BOARD MEMBER'S DECLARATION OF ACCEPTANCE"

WHEREAS

(a) A Contract agreement (the Contract) for the _____ project [fill in the name of project] has been signed on _____ [fill in date] between _____ [name of Employer] and _____ [name of Contractor] (the Contractor).;

(b) The provisions of Agreement and Dispute Resolution Board's rules and procedure provided for establishment and operation of Dispute Resolution Board (DRB).

(c) The undersigned has been selected to serve as a Board Member on said Board;

NOW THEREFORE, the undersigned Board Member hereby declares as follows :

1. I accept the selection as a Board Member and agree to serve on the Board and to be bound by the provisions of Contract agreement and rules and procedure provided for establishment and operation of Dispute Resolution Board (DRB).

2. With respect to paragraph 1 of Dispute Resolution Board's Rules and Procedure. said Annex A, I declare

   (a) that I have no financial interest of the kind referred to in subparagraph (a):

   (b) that I have had no previous employment nor financial ties of the kind referred to in subparagraph (b); and

   (c) that I have made to both parties any disclosures that may be required by sub-paragraphs (b) and (c).

3. I declare that I have ___ no. of Arbitrations (list enclosed) and ___ no. of DRBs (list enclosed) in progress and that I will give sufficient time for the current assignment.

BOARD MEMBER

_____

_____ [*insert name of Board Member)*

Date : _____.

Schedule of expenses and fees payable to the Member (s) of Dispute Resolution Board (DRB)

The fee and other expenses payable to the Members of DRB shall be as under :-

S. No.	PARTICULAR	AMOUNT PAYBLE
1	Retainer-ship fee, secretarial assistance and incidental charges (telephone, fax, postage etc.)	Rs. 50,000/- per month for one package and maximum of Rs. 75,000/- per month for 2 or more packages
2(i)	Fee for site visit or meetings at site	Rs. 25,000/- per day
(ii)	Fee for meetings/hearings not at site	Rs. 10,000/- per day
3	Traveling expenses	Economy class by air, AC first class by train and AC taxi by road
4	Lodging & Boarding	Rs.15,000/- per day (Metro Cities) ; or Rs. 10,000/- per day (in other cities); or Rs. 5,000/- per day (own arrangement)
5	Extra charges for days other than hearing/meeting days (travel days maximum of 2 days on each occasion)	Rs.5,000/-
6	Local conveyance	Rs.2,000/-

Notes:

(i) Lodging, boarding and travelling expenses will be allowed only for those members who are residing 100 kms away from the place of meeting.

(ii) Delhi, Mumbai, Chennai, Kolkata, Bangalore and Hyderabad shall be considered as Metro Cites.

(iii) The above schedule of fee and expenses shall be applicable on or after the date of issue of this circular.

(iv) The expenses are to be shared equally by the parties i.e. Employer and Contractor.

Appendix-III: Arbitration Rules of the Society for Affordable Redressal of Disputes (SAROD)(SAROD'ARBITRATION RULES)

Under Clause 44.3.1

ARBITRATION RULES OF SAROD

INDEX

Rule

PREAMBLE

In order to seek speedy, affordable, just and reasonable Redressal of Dispute/Differences between NHAI and Concessionaire/Contractor arising out of and during the course of execution of various contracts, a Society for Affordable Redressal of Disputes (SAROD) has been formed as a Society under Societies Registration Act, 1860 with registration No.S/RS/SW/0044/2013. It has been formed by National Highways Authority of India (NHAI) and National Highways Builders Federation (NHBF) with founding members as mentioned in the Memorandum of Association of SAROD.

SAROD ARBITRATION RULES

Rule 1 - Scope of Application

1.1 Where any agreement, submission or reference provides for arbitration at the Society for Affordable Redressal of Disputes ("SAROD"), or under the Arbitration Rules of the SAROD and where the case is a domestic arbitration shall be conducted in accordance with the following Rules, or such Rules as amended by the SAROD where the amendments take effect before the commencement of the Arbitration. Parties may adopt following clause for inclusion in the contract:-

"Any dispute or difference whatsoever arising between the parties and of or relating to the construction, interpretation, application, meaning, scope, operation or effect of this contract or the validity or the breach thereof, shall be settled by arbitration in accordance with the rules of arbitration of the "SAROD" and the award made in pursuance thereof shall be final and binding on the parties subject to Provisions of The Arbitration and Conciliation Act, 1996".

1.2 These rules shall come into effect from the day of approval by Governing Body of SAROD.

Rule 2 - Definitions

2.1 These Rules shall be referred to as "the SAROD Arbitration Rules".

2.2 In these Rules:

"Act" means the 'Arbitration and Conciliation Act 1996' of India and any statutory modifications or re-enactments thereof.

"SAROD" means the Society for Affordable Redressal of Disputes.

"SAROD Arbitrator Panel" means the list of persons admitted to serve as arbitrators under these Rules.

"NHAI" means National Highways Authority of India.

"NHBF" means the National Highways Builders Federation.

"GOVERNING BODY" means Governing Body of SAROD as defined in Article 9 of Memorandum of Association.

"PRESIDENT" means President of Governing Body of SAROD as defined in Rules & Regulation of SAROD.

"SECRETARY" means Secretary of SAROD as defined in Rules & Regulation of SAROD.

"TRIBUNAL" means either a Sole Arbitrator or all arbitrators when more than one is appointed.

PARTY" means a party to an arbitration agreement.

"E-Arbitration" means submission of pleadings, defence statement etc by E-mail and holding of proceedings via video conferencing.

Rule 3 - Notice, Calculation of periods of Time

3.1 For the purposes of these Rules, any notice, including a notification, communication or proposal, is deemed to have been received if it is physically delivered to the addressee or if it is delivered at his habitual residence, place of business or mailing address, or, if none of these can be found after making reasonable inquiry, then at the addressee's last-known residence or place of business. Notice shall be deemed to have been received on the day it is so delivered.

3.2 For the purposes of calculating a period of time under these Rules, such period shall begin to run on the day following the day when a notice, notification, communication or proposal is received. If the last day of such period is an official holiday or a non-business day at the residence or place of business of the addressee, the period is extended until the first business day which follows. Gazetted public holidays or non-business days occurring during the running of the period of time are included in calculating the period.

3.3 Without prejudice to the effectiveness of any other form of written communication, written communication may be made by fax, email or any other means of electronic transmission effected to a number, address or site of a party.

3.4 The transmission is deemed to have been received on the day of transmission.

Rule 4 - Commencement of Arbitration

4.1 Any party wishing to commence an arbitration under these Rules ("the Claimant") shall file with the Secretary and serve on the other party {"the Respondent"), a written Notice of Arbitration ("the Notice of Arbitration") which shall include the following:

a. a request that the dispute be referred to arbitration;

b. the names, addresses, telephone numbers, fax numbers and email addresses of the parties to the dispute;

c. a reference to the arbitration clause or any separate arbitration agreement that is invoked and provide a copy of the arbitration clause or arbitration agreement;

d. a reference to the contract out of which the dispute arises and provide a copy of the contract where possible;

e. a brief statement describing the nature and circumstances of the dispute;

f. the relief or remedy sought, including the amount of claim if quantifiable at the time the Notice or Arbitration is filed;

g. a proposal as to the number of arbitrators (i.e. one or three), if the parties have not previously agreed on the number; and

h. the name of the Claimant's nominated arbitrator.

4.2 A filing fee of Rs. 10,000/- (Ten thousand) or any amount decided by Governing Body from time to time is payable at the time of filing the Notice of arbitration.

4.3 The date of filing of the Notice of Arbitration with the Secretary is the date of commencement of the arbitration for the purpose of these Rules.

Rule 5 - Response by Respondent

5.1 Within 14 days of receipt of the Notice of Arbitration, the Respondent shall file with the Secretary and serve upon on the Claimant, a Response including

a. A confirmation or denial of all or part of the claims;

b. Brief statement of the nature and circumstances of any envisaged counterclaims;

c. A comment in response to any proposals contained in the Notice of Arbitration; and

d. The name of the respondent's nominated arbitrator.

5.2 A filing fee of Rs. 10,000/- or any amount decided by Governing Body from time to time is payable at the time of filing the Response.

5.3 In case parties have objection to the jurisdiction of Arbitral Tribunal, such objection shall be raised not later than 15 days of the commencement of Arbitration proceedings failing which it will be deemed that parties have waived their right to objection.

Rule 6 Filing of Case Statements

6.1 Within 30 days after the filing of the Notice of Arbitration, the claimant must file with the Secretary and serve on the Respondent, a Statement of Claimant's Case alongwith all documents to be relied upon by the Claimant.

6.2 Within 30 days after the service of the statement of Claimant's Case, the Respondent must file with the Secretary and serve on the Claimant, a statement of respondent's defence and counterclaim (if any) alongwith all documents to be relied upon by the Respondent.

6.3 Within 30 days after the service of the statement of Respondent's defence, if the Claimant intends to challenge anything in the statement of Respondent's defence and/or counterclaim, the Claimant must then file with the Secretary and serve on the Respondent, a statement of claimant's reply and if necessary, defence to counterclaim.

6.4 No further case statements may be filed without the leave of the Tribunal or if a Tribunal has not been appointed, the Secretary.

6.5 The Tribunal or if a Tribunal has not been appointed, the Secretary, may upon the written application of a party, extend the time limits provided under this Rule,

6.6 Thy party required to file a case statement must at the same time deposit with the Secretary for eventual transmission to the Tribunal an additional copy or additional copies of the case statement, according to the number of arbitrators constituting or who will constitute the Tribunal.

Role 7 - Contents of Case Statements

7.1 The case statements must contain the detailed particulars of the party's claim, defence or counterclaim and must thus contain a comprehensive statement of the facts and contentions of law supporting the party's position.

7.2 It must:

a. Set out all items of relief or other remedies sought together with the amount of all quantifiable claims and detailed calculations.

b. State fully its reasons for denying any allegation or statement of the other party.

c. State fully its own version of events if a party intends to put forward a version of events different from that given by the other party.

7.3 A case statement must be signed by or on behalf of the party making it.

Rule 8 - Default in Filing and Serving Case Statements

8.1 If the Claimant fails within the time specified under these Rules or as may be fixed by the Tribunal or by the Secretary, to submit its Statement of Case, the Tribunal or if a Tribunal has not been appointed, the Governing Body may issue an order for the termination of the arbitral proceedings or make such other directions as may be appropriate in the circumstances.

8.2 It the Respondent fails to submit a Statement of Respondent's Defence, the Tribunal may nevertheless proceed with the arbitration and make the award.

Rule 9 - Further Written Statements

9.1 The Tribunal will decide which further written statements, in addition to the case statement(s) already filed, are required from the parties and shall fix the periods of time for giving, filing and serving such statements.

9.2 All such further statements must be given to the Tribunal, filed with the Secretary and served on the Claimant or Respondent, whichever is applicable.

Rule 10 - SAROD to Provide Assistance

10.1 At the request of the Tribunal or either party, the Secretary will render such assistance as is required for the conduct of the arbitration, including arranging for facilities, suitable accommodation for sittings of the Tribunal, secretarial assistance or interpretation of these rules.

10.2 Any additional expenses incurred or to be incurred for any such arrangements shall be borne by the parties.

Rule 11 - Appointment of Tribunal

11.1 The disputes shall be decided by a Sole Arbitrator when the total claim of dispute is Rs. 3 Crores or less.

11.2 In all cases of disputes claimed for more than Rs. 3 Crores, the tribunal shall consist of odd number of Arbitrators to be nominated by the parties. The Presiding Arbitrator shall be appointed by the Arbitrators nominated by the parties from amongst the panel maintained by SAROD. For deciding the Presiding Arbitrator, a draw of lots can be carried out from amongst the names suggested by the Arbitrators nominated by the Parties. The eligibility criteria for empanelment of Arbitrators will be decided by the Governing Body.

11.3 If a Sole Arbitrator is to be appointed, the Governing Body will appoint the Arbitrator within 21 days from the date the Respondent's Statement of Defence and Counterclaim (if any) is filed or falls due, whichever is earlier. The Governing Body will appoint the Arbitrator from the panel of Arbitrators by draw of lots,

11.4 An Arbitrator/Presiding Arbitrator to be appointed under these Rules shall be a person on the SAROD Arbitration Panel as at the date of the appointment.

11.5 In the event of any party failing to appoint Arbitrator within 30 days of receipt of the notice of Arbitration, the Governing Body shall appoint the Arbitrator or Presiding Arbitrator as the case may be by a draw of lots.

Rule 12 - Multiparty appointment of the Tribunal

12.1 If there are more than 2 parties in the arbitration, the parties shall agree on the procedure for appointing the Tribunal within 21 days of the receipt of the Notice of Arbitration.

12.2 If the parties are unable to do so, upon the lapse of the 21 day time period mentioned herein, the Tribunal shall be appointed by the Governing Body as soon as practicable.

Rule 13 - Appointment of Substitute Arbitrator

In the event of the death or resignation of any of the arbitrators, a substitute arbitrator must be appointed by the same procedure as in Rule 11 by which the arbitrator concerned was appointed, failing which, the Governing Body will make the appointment.

Rule 14 - Independence and Impartiality of the Tribunal

14.1 The Tribunal conducting arbitration under these Rules shall be and remain at all times independent and impartial, and shall not act as advocate for any party.

14.2 A prospective arbitrator shall disclose to those who approach him in connection with his possible appointment, any circumstances likely to give rise to justifiable doubts as to his impartiality or independence.

14.3 An arbitrator, once nominated or appointed, shall disclose any such circumstance referred to in Rule 14.2 to the Secretary and/ or to all parties.

Rule 15 - Code of Ethics for Arbitrators

An Arbitrator is a fountain of justice and emblem of equity, fairness and good conscience. Therefore he/she is expected to exhibit a noble conduct. The code of conduct prescribed by the Governing Body has to be adopted.

Appointment

15.1 A prospective arbitrator shall accept an appointment only if he is fully satisfied that he is able to discharge his duties without bias, he has an adequate knowledge of the language of the arbitration, and he is able to give to the arbitration the time and attention which the parties are reasonably entitled to expect.

15.2 In this code, the masculine includes the feminine.

Disclosure

15.3 A prospective arbitrator shall disclose all facts or circumstances that may give rise to justifiable doubts as to Ms impartiality or independence. such duty to continue thorough out the arbitral proceedings with regard to new facts and circumstances.

15.4 A prospective arbitrator shall disclose to the Secretary and any party who approaches him for a possible appointment:

(a) Any past or present close personal relationship or business relationship, whether direct or indirect, with any party to the dispute, or any representative of a party, or any person known to be a potentially important witness in the arbitration;

(b) The extent of any prior knowledge he may have of the dispute.

Bias

15.5 The criteria for assessing questions relating to bias are impartiality and independence. Partiality arises when an arbitrator favours one of the parties or where he is prejudiced in relation to the subject matter of the dispute. Dependence arises from relationships between an arbitrator and one of the parties, or with someone closely connected with one of the parties.

15.6 Any close personal relationship or current direct or indirect business relationship between an arbitrator and a party, or any representative of a party, or with a person who is known to be a potentially important witness, will normally give rise to justifiable doubts as to a prospective arbitrator's impartiality or independence. Past business relationships will only give rise to justifiable doubts if they are of such magnitude or nature as to be likely to affect a prospective arbitrator's judgment. He should decline to accept an appointment in such circumstances unless the parties agree in writing that he may proceed.

Communications

15.7 Before accepting an appointment, an arbitrator may only enquire as to the general nature of the dispute, the names of the parties and the expected time period required for the arbitration.

15.8 No arbitrator shall confer with any of the parties or their Counsel until after the Secretary gives notice of the formation of the Tribunal to the parties.

15.9 Throughout the arbitral proceedings, an arbitrator shall avoid any unilateral communications regarding the case with any party, or its representatives.

Fees

15.10 In accepting an appointment, an arbitrator agrees to the remuneration as prescribed in the rules of SAROD, and he shall make no unilateral arrangements with any of the parties or their Counsel for any additional fees or expenses without the agreement of all the parties and the consent of the Secretary of SAROD.

Conduct

15.11 Once the arbitration proceedings commence, the arbitrator shall acquaint himself with all the facts and arguments presented and all discussions relative to the proceedings so that he may properly understand the dispute.

Confidentiality

15.12 The arbitration proceedings shall remain confidential. An arbitrator is in a relationship of trust to the parties and should not, at any time, use confidential information acquired during the course of the proceedings to gain personal advantage or advantage for others, or to affect adversely the interest of another.

15.13 This Code is not intended to provide grounds for the setting aside of any award.

Rule 16 - Challenge of Arbitrators

16.1 An arbitrator may be challenged if there are circumstances that give rise to justifiable doubts as to his impartially or independence and also if he or she has committed any misconduct,

16.2 An arbitrator may also be challenged if he does not possess the qualifications required by the agreement of the parties,

16.3 A party may challenge an arbitrator appointed on its nomination or with its agreement only for reasons of which it becomes aware after the appointment has been made.

16.4 A party who intends to challenge an arbitrator shall file with the Secretary and serve on the other party or all other parties, whichever is applicable, a Notice of Challenge.

16.5 The Notice of challenge must be filed and served within 14 days from the appointment of the arbitrator or within 14 days after the circumstances mentioned in Rule 15.1 became known to that party.

16.6 The Notice of Challenge must state the reasons for the challenge.

16.7 The arbitration shall be suspended until the challenge is resolved or decided upon.

16.8 When an arbitrator has been challenged by one party, the other party may agree to the challenge. The arbitrator may also, after the challenge, withdraw from his office. However, it is not implied in either case that there has been an acceptance of the validity of the grounds for the challenge. In both cases, the procedure provided in Rule 11 read with Rule 13, shall be used for the appointment of a substitute arbitrator.

Rule 17 - Decision on Challenge

17.1 If the other party does not agree to the challenge and the arbitrator does not withdraw, the decision on the challenge will be made by the Governing Body.

17.2 If the Governing Body sustains the challenge, a substitute arbitrator shall be appointed or chosen pursuant to the procedure applicable to the appointment of an arbitrator as provided in Rule 11 read with Rule 13. If the Governing Body dismisses the challenge, the arbitrator shall continue with the arbitration.

Rule 18 - Removal of the Tribunal

18.1 The Governing Body may on the application of a party remove an arbitrator:

a. Who is physically or mentally incapable of conducting the proceedings or where there are justifiable doubts as to his ability to do so; or

b. Who has refused or failed to use all reasonable dispatch in conducting the arbitration or making an award.

c. Who has continuously absented from attending the proceedings for more than 3 sitting without prior permission of Presiding Arbitrator/Governing Body of SAROD.

18.2 The arbitrator(s) concerned is entitled to appear and be heard at the hearing of the application to remove him.

18.3 Upon the removal of the arbitrator, a substitute arbitrator shall be appointed in accordance with Rule 11 read with Rule 13.

18.4 The Governing Body's decision on the application is final and is not subject to appeal or review.

Rule 19 - Re-hearing in the Event of Replacement of the Tribunal

If the sole or presiding Arbitrator is replaced, there shall be a re-hearing. If any other arbitrator is replaced, such re-hearing may take place at the discretion of the Tribunal.

Rule 20 - Jurisdiction of the Tribunal

20.1 The Tribunal shall have the power to rule on its own jurisdiction, including any objection with respect to the existence, termination or validity of the arbitration agreement. For that purpose, an arbitration agreement which forms part of a contract shall be treated as an agreement independent of the other terms of the contract. A decision by the Tribunal that the contract is null and void shall not entail ipso jure the invalidity of the arbitration agreement.

20.2 The plea that the Tribunal does not have jurisdiction shall be raised not later than in the Statement of Defense. A plea that the Tribunal is exceeding the scope of its authority shall be raised promptly after the Tribunal has indicated its intention to decide on the matter alleged to be beyond the scope of its authority. In either case the Tribunal may nevertheless admit a late plea under this Rule if it considers the delay justified. A party is not precluded from raising such a plea by the fact that he has nominated, or participated in the appointment of an arbitrator.

20.3 The Tribunal must rule on an objection that it lacks jurisdiction as a preliminary question upon the objection being raised. It may rule on an objection that it exceeds the scope of its authority either as a preliminary question or in an award on the merits, as it deems just and convenient.

20.4 In addition to the jurisdiction to exercise the powers defined elsewhere in these Rules, the Tribunal shall have jurisdiction to determine any question of law arising in the arbitration; proceed with the arbitration not with sanding the failure or refusal of any party to comply with these Rules or with the Tribunal's orders or directions, or to attend any meeting or hearing, but only after giving that party written notice that it intends to do so; and to receive and take into account such written or oral evidence as it shall determine to be relevant, whether or not strictly admissible in law.

Rule 21 - Fees of SAROD and Arbitral Tribunal
Fee Schedule

Registration Fee (Non - Refundable): Rs. 10,000/- or any amount fixed by Governing Body from time to time. The Schedule of Fees and allied expenditure shall be decided by Governing Body.

Rule 22- Transmission of File to the Tribunal

22.1 The Secretary shall, as soon as practicable transmit to the Tribunal, a file containing the Notice of Arbitration, the Response and all case statements.

22.2 The Tribunal shall as soon as practicable, after consultation with the parties, issue such orders and/or directions as are necessary for the conduct of the arbitration to conclusion, including a timetable for steps to be taken in the arbitration and for the hearing of the arbitration.

Rule 23 - Judicial Seat of Arbitration

23.1 Unless otherwise agreed by the parties, the judicial seat of arbitration shall be New Delhi.

23.2 Notwithstanding Rule 22.1 and 22.2, the Tribunal may, unless otherwise agreed by the parties, hold hearings and meetings anywhere convenient, subject to the provisions of Rule 28.2.

Rule 24 - Language of Arbitration

The language of arbitrators shall be English. In case of material existing are in any other language, other than English the same has to be translated to English language.

Rule 25 - Conduct of the Proceedings

The Tribunal shall have the widest discretion allowed by the Act to ensure the just, expeditious, economical and final determination of the dispute. The proceedings shall be conducted from 10.AM to 5PM with a recess of one hour.

Rule 26 - Communication between Parties and the Tribunal

26.1 Where the Tribunal sends any written communication to one party, it shall send a copy to the other party or parties as the case may be.

26.2 Where a party sends any written communication (including Statements, expert reports or evidentiary documents) to the Tribunal, the same shall be copied to the other party or all other parties, whichever is applicable, and show to the Tribunal that the same has been so copied.

26.3 The address of the parties for the purpose of all communications during the proceedings shall be those set out in the Notice of Arbitration, or as either party may at any time notify the Tribunal and the other party or parties, whichever is applicable.

26.4 A copy of correspondence between the parties and the Tribunal shall be sent to the Secretary.

Rule 27 - Party Representatives

Any party may be represented by legal practitioners or any other representatives, subject to such proof of authority as the Tribunal may require. The names and addresses of such representatives must be notified to the other party or parties. In case one party is represented by non-legal person, another party will also be represented by non-legal person so as to maintain natural justice.

Rule 28 - Hearings

28.1 Unless the parties have agreed on documents-only arbitration, the tribunal shall hold a hearing for the presentation of evidence by witnesses, including expert witnesses, or for oral submissions.

28.2 The Tribunal shall fix the date, time and place of any meetings and hearings in the arbitrations on the first hearing, and complete time table pertaining to all the activities of the Arbitration e. g. submission of statement of claim, reply, counter claim, reply therein, admission and denial of documents, visit/inspection of site if any. The tribunal shall stick to the time table with without any deviations unless there are unavoidable circumstances warranting such deviation which will be with the prior permission of the tribunal.

28.3 Prior to the hearing, the Tribunal may provide the Parties with matters or questions to which it wishes them to give special consideration.

28.4 In the event that a party to the proceedings without sufficient cause, fails to appear at a hearing of which the notice has been given, the Tribunal may proceed with the arbitration and may make the Award after the party present has submitted evidence to prove its case.

28.5 All meetings and hearing shall be in private unless the parties agree otherwise.

Rule 29 - Documents Only Arbitration

29.1 The Disputes may be decided without an oral hearing if it is so agreed by the parties.

29.2.1 Where the parties agree to dispense with oral hearing, the Tribunal must be promptly informed by either of the parties, as soon as is practicable. The Tribunal must also be promptly informed if, at a later stage, the parties or either of them intends to apply for an oral hearing.

29.2.2 Parties may seek discovery of documents if they are not satisfied with existence of documents annexed with statement of claim, reply and counter claim by giving self contained request to the Tribunal justifying the necessity for such documents. Decision of tribunal shall be final and binding upon the parties.

Rule 30 - Witnesses

30.1 The Tribunal may require each party to give notice of the names and designations of the witnesses it intends to call and reasons for legal necessity of such witness.

30.2 No party shall call any expert witness without the leave of the Tribunal.

30.3 Any witness who gives evidence may be questioned by each party or its representative subject to any rulings made by the Tribunal.

30.4 A Witness may be required by the Tribunal to testify under oath or affirmation.

30.5 Subject to such order or direction which the Tribunal may make, the testimony of witness may be presented in written form, either as signed statements or by duly sworn or affirmed affidavits,

30.6 Any party may require a witness to attend an oral examination at a hearing. If the witness fails to attend, the Tribunal may place such weight on the written testimony as it thinks fit, or may exclude it altogether,

30.7 The Tribunal shall determine the admissibility, relevance, materiality and weight of the evidence given by any witness.

Rule 31 - Experts Appointed by the Tribunal

31.1 Unless otherwise agreed by the parties, the Tribunal may:

a. appoint one or more experts to report the Tribunal on specific issues;

b. require a party to give any such expert any relevant information or to produce, or to provide access to, any relevant documents, goods or property for inspection by the expert.

31.2 Unless otherwise agreed by the parties, if a party so requests or if the Tribunal deem it fit, the expert shall, after delivery of his written or oral report, participate in an oral hearing, at which the parties may question him and present expert witnesses in order to testify on the points at issue.

31.3 Rule 30.2 shall not apply to an assessor appointed by agreement of the parties, or to an expert appointed by the Tribunal to advise solely in relation to procedural matters.

Rule 32 - Rules applicable to substance of dispute- (1) Where the place of arbitration is situated in India,

32.1 In an arbitration, the arbitral tribunal shall decide the dispute submitted to arbitration in accordance with the substantive law for the time being in force in India;

Rule 33- Closure of Hearing

33.1 The Tribunal may inquire of the parties if they have any further proof to offer or witnesses to be heard or submission to make and, if there are none, declare the hearing closed.

33.2 The Tribunal may also, in view of exceptional circumstance, reopen the hearings at any time before the award is made.

Rule 34 - Additional Powers of the Tribunal

34.1 In addition to the powers conferred by the Act, the Tribunal shall also have the power to:-

a. Allow any party, upon such termsfas to costs and otherwise) as it shall determine, to amend claims or counterclaims;

b. Extend or abbreviate any time limits provided by these Rules;

c. Conduct such enquires as may appear to the Tribunal to be necessary or expedient;

d. Order the parties to make any property or thing available for inspection

e. Order any parties to produce to the Tribunal. and to the other parties for inspection, and to supply copies of any documents or classes of documents in their possession, custody or power which the Tribunal determines to be relevant;

f. Make orders or give directions to any party for interrogatories;

g. Make orders or give directions to any party for an interim injunction or any other interimmeasure;

h. Makesuch orders or give such directions as it deems fit in so far as they are not inconsistent with the Act or any statutory re-enactment thereof or such law which is applicable or these Rules.

34.2 If the parties so agree, the Tribunal shall also have the power to add other parties (with their consent) to be joined in the arbitration and make a single Final Award determining all disputes between them.

Rule 35 - Deposits to Costs and Expenses

35.1 The Tribunal's fees and SAROD administration fees shall be ascertained in accordance with the Schedule of Fees in Force at the time of commencement of the arbitration.

35.2 The Claimant shall deposit with the SAROD half of the fees payable at the time of filing of the Statement of Case. The Respondent shall deposit with the SAROD one-half of the fees payable at the time of filing the Statement of Respondent's Defence and Counterclaim (if any). The balance of fees payable shall be paid 60 days before the date of the final hearing or on such other date that the Secretary may direct.

35.3 Where the amount of the claim or the counterclaim is not quantifiable at the time payment is due, the Secretary will make a provisional estimate. The fees will be adjusted in the light of such information as may subsequently become available. If the arbitration is settled or disposed of without a hearing, the amount of the Tribunal's fees and SAROD administration fees shall be finally determined by the Secretary who will have regard to all the circumstances of the case, including the stage of proceedings at which the arbitration is settled or otherwise disposed of.

35.4 The Secretary may from time to time direct parties to make one or more deposit(s) towards any further expenses incurred or to be incurred on behalf of or for the benefit of the parties.

35.5 All deposit(s) shall be made to and held by the SAROD. Any interest which may accrue on such deposit(s) shall be retained by the SAROD.

35.6 If a party fails to make the payments or deposits required or directed, the Tribunal may refuse to hear the claims or counterclaims, whichever is applicable, by the non-complying party, although it may proceed to determine claims or counterclaims by any party who has complied with orders.

35.7 The parties shall remain jointly and severally liable to the SAROD for payment of all such fees and expenses until they have been paid in full even if the arbitration is abandoned, suspended or concluded, by agreement or otherwise, before the final Award is made.

Rule 36 - Decision Making by the Tribunal

36.1 Where a Tribunal has been appointed, any direction, order, decision or award of the Tribunal must be made by the whole Tribunal or a majority. If an arbitrator refuses or fails to sign the Award, the signatures of the majority shall be sufficient, provided that the reason for the omitted signature is stated.

36.2 If there is no unanimity, the same shall be made by the majority arbitrators as well as by the dissenting Arbitrator alone as if acting as a sole arbitrator.

36.3 However, in the case of a three-member Tribunal the presiding arbitrator may, after consulting the other arbitrators, make procedural rulings alone.

Rule 37 - The Award

37.1 It will be mandatory for the parties to submit written synopsis of their arguments respectively which will form part of the arbitral proceedings.

37.2 The Tribunal shall assemble at the assigned place in SAROD and shall exercise utmost secrecy and confidentiality in writing the award.

37.3 Unless the Secretary extends the time or the parties agree otherwise, the Tribunal shall make its Award in writing within 30 days from the date on which the hearings are closed and shall state the reasons upon which its award is based. The award shall contain the date and shall be signed by the arbitrator or arbitrators.

37.4 The Tribunal may make interim awards or separate awards on different issues at different times.

37.5 All Awards must be submitted by the Tribunal to the Secretary and they shall be issued through the Secretary.

37.6 The Tribunal must deliver to the Secretary number of originals of the award sufficient for the parties and for filing with the Secretary.

37.7 The Secretary shall release the award to the parties only upon receipt of sufficient deposits to cover the fees and expenses due to the Tribunal and to the SAROD.

37.8 By agreeing to have arbitration under these Rules, the parties undertake to carry out the award without delay.

37.9 Stamp duty on award shall be payable by the party in whose favor the award has been pronounced.

Rule 38 - Additional Award

38.1 Within 30 days after the receipt of the award, either party, with notice to the Secretary and the other party may request the Tribunal to make an additional award as to claims presented in the arbitral proceedings but omitted from the award.

38.2 If the Tribunal considers the request for an additional award to be justified and considers that the omission can be rectified without any further hearings or evidence, it shall notify all the parties within 7 days of the receipt of the request, that it will make and additional award, and complete the additional award within 30 days after the receipt of the request.

Rule 39 - Correction of Awards

39.1 Within 30 days of receiving an Award, unless another period of time has been agreed upon by the parties, a party may by notice to the Secretary and the other party request the Tribunal to correct in the Award, any errors in computation, any clerical or typographical errors or any errors of similar nature.

39.2 If the Tribunal considers the request to be justified, it shall make the corrections) within 30 days of receiving the request. Any correction shall be notified in writing to the parties and shall become part of the Award.

39.3 The Tribunal may correct any error of the type referred to in Rule 37.1 on its own initative within 30 days of the date of the Award.

Rule 40 - Settlement

40.1 If, the parties arrived at amicable settlement of the dispute during the currency proceedings, the parties shall file memo of settlement before the tribunal who shall either issue an order for the termination of the arbitral proceedings or, if requested by both parties and accepted by the Tribunal, record the settlement in the form of an arbitral award on agreed terms. The Tribunal is not obliged to give reasons for such an award.

40.2 The Parties shall:

a. Notify the Tribunal and the Secretary immediately if the arbitration is settled or otherwise terminated:

b. Make provision in any settlement for payment of all the costs of the arbitration and fees and expenses due to the SAROD and the Tribunal.

40.3 If the continuation of the arbitral proceedings becomes unnecessary or impossible for any reason not mentioned in Rule 38.1, before the award is made, the Tribunal shall inform the parties of its intention to issue an order for the termination of the proceedings. The Tribunal shall have the power to issue such an order unless party raises justifiable grounds for objection.

40.4 Copies of the order for termination of the arbitral proceedings or of the arbitral award on agreed terms, signed by the Tribunal, shall be communicated by the Tribunal to the parties through the Secretary.

Rule 41 - Interest

The Tribunal may award interest on any sum awarded at such rate as applicable in fixed deposits of Sate Bank of India in respect of such periods ending not later than the date of the award as the Tribunal considers just.

Rule 42 - Costs

42.1 The Tribunal shall specify in the final award, the costs of the arbitrations and decide which party shall bear them and in what proportion they shall be borne.

42.2 In this Rule, "costs of the arbitration" shall include:

a. The fees and expenses of the Tribunal and the administration fees of the SAROD as determined by the Secretary in accordance with the Schedule of Fees;

b. The costs of tribunal appointed experts or of other assistance rendered: and

c. All expenses which are reasonably incurred by the SAROD in connection with the arbitration.

42.3 The Tribunal has power to order in its Award, that all or part of the legal or other costs (such as legal fees and expenses, costs incurred in respect of party appointed experts etc) of one party shall be paid by the other party.

Rule 43 - Waiver

A party which is aware of non-compliance with these Rules and yet proceeds with the arbitration without promptly stating its objection in writing to such non-compliance shall be

Deemed to have waived its right to object.

Rule 44 - Exclusion of Liability

44.1 The Tribunal, the President, the SAROD and any of its officers, employees or agents shall not be liable to any party for any act or omission in connection with any arbitration conducted under these Rules.

44.2 After the Award as been made and the possibilities of corrections and additional Awards have lapsed or been exhausted, neither the Tribunal nor the President shall be under any obligation to make any statement to any person about any matter concerning the arbitration, and no party shall seek to make any arbitrator or the President or the SAROD and any of its officers a witness in any legal proceedings arising out of the arbitration.

Rule 45 - General Provisions

45.1 In all matters not expressly provided for in these Rules, the President, the Secretary and the Tribunal shall act in the spirit of these Rules and shall make every reasonable effort to ensure the just, expeditious and economical conclusion of the arbitration.

45.2 The Secretary may from time to time issue Practice Notes on the implementation of these Rules.

Rule 46 - Amendment to Rules

These Rules may from time to time be amended by the Governing Body of SAROD.

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