Schedules

SCHEDULE - A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

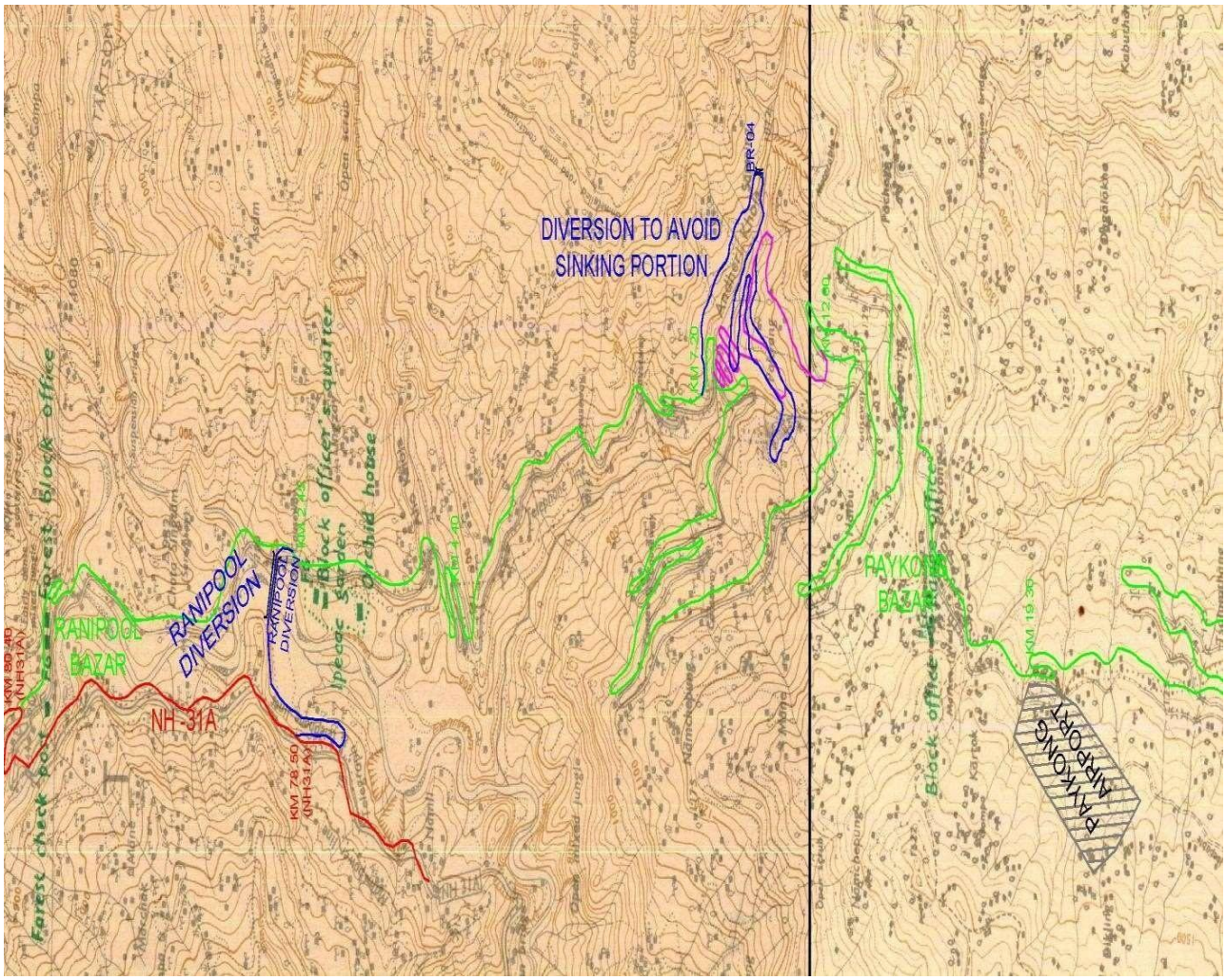
Site for the construction of highway from new take-off point at km 3+100 (i.e. located at out skirt of Ranipool town toward Singtam) on Sevok - Gangtok section of NH-717A, Km02+00 to Km 16.54 at Pakyong near Airport on EPC basis Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

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

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 8.2.1 of this Agreement.

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.

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



Project Location Map

(Schedule-A)

Annex – I: 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.]

1. Site

Pakyong, one of the Sub-Division Head Quarters of the East District has been gaining its importance due to upcoming 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.

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

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	16.50	Existing Road
3	7+250	12+520	5+800	8+950	3150	12.00	2nd Diversion from Andheri Khola (short cut to Pakyong)
4	12+520	19+100	8+950	15+500	6550	16.50	Existing Road
5			15+500	16+540	1040	6.50	Pakyong to Airport

4. Carriageway

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

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length in m (Design)	Lane Width (m)	Remarks
	From	To	From	To			
2	3+100	7+250	2+000	5+800	3800	3.5 to 4.5	Existing Road
3	7+250	12+520	5+800	8+950	3150	3.5 to 4.5	Partial Existing road
4	12+520	19+100	8+950	15+500	6550	3.5 to 4.5	Existing Road
5			15+500	16+540	1040	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.No.	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.No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Superstructure		
1	0+872	Open	Abutment	Steel truss	1x37	4.25
2	2+225	Open	Abutment	Steel truss	1x25	4.25
3	3+550	Open	Abutment	Steel truss	1x20	4.25
4	7+270	Open	Abutment	Steel truss	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	2035	Slab	1 X 1.2	7.30
2	2280	Slab	1 X 1.2	7.00
3	2500	Pipe	1 X 0.6	6.00
4	2530	Slab	1 X 1.3	9.50
5	2770	Slab	1 X 1.2	6.00
6	3090	Pipe	1 X 1	6.00
7	3648	Slab	1 X 1.2	7.00

S.No.	Chainage (km)	Type of Culvert)	Span /Opening with span length (m)	Width (m)
8	4217	Slab	1 X 1.7	7.00
9	4238	Slab	1 X 1.5	6.60
10	4457	Slab	1 X 1.2	6.00
11	4570	Pipe	1 X 0.9	5.60
12	4657	Pipe	1 X 0.9	6.00
13	4840	Slab	1 X 1.2	7.10
14	5048	Slab	1 X 1.2	6.00
15	5418	Pipe	1 X 0.9	7.40
16	5787	Slab	1 X 1.2	7.00
17	7050	Box	1X3.0	9.60
18	9038	Slab	1 X 1.2	5.50
19	9235	Pipe	1 X 0.9	7.00
20	9512	Slab	1 X 1.2	6.00
21	10154	Slab	1 X 1.2	7.30
22	10226	Slab	1 X 2.8	7.50
23	10313	Pipe	1 X 0.9	6.00
24	10772	Pipe	1 X 0.9	6.00
25	12483	Slab	1 X 1.5	6.00
26	12537	Slab	1 X 1.2	6.00
27	13080	Pipe	1 X 0.6	6.00
28	13629	Slab	1 X 2.0	6.00
29	13928	Slab	1 X 1.2	6.00
30	14055	Pipe	1 X 0.9	11.00
31	14607	Slab	1 X 1.5	7.00
32	14920	Pipe	1 X 0.9	7.50
33	15298	Slab	1 X 2.0	6.00
34	15545	Box	1X3.3	7.00
35	15660	Pipe	1 X 0.6	6.00
36	15790	Box	1X3.3	7.00
37	16090	Slab	1 X 1.5	5.00
38	16516	Slab	1 X 0.7	6.00

12. Bus bays

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

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

13. 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				

14. Road side drains

The details of the roadside drains are as follows:

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

15. 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	16+560		At Grade				MDR	

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

16. Minor junctions

The details of the minor junctions are as follows:

S. No.	Location		Type	
	From km	To km	T -junction	Cross road
Nil				

17. Bypasses

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

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

18. Other structures : Nil

19. Built Up Locations

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

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 differentstretches of the Site are stated below:

Sl. No	Design Chainage		Length (km)	Proposed ROW Width(m)	Date of providing ROW*
	From	To			
(i) 90% of ROW (full width)	2+000	15+500	13.500	22m-24 m	At Appointed Date
(iii) Balance Right ofWay (width)	15+500	16+540	1.04	7 m – 10 m	Within 90 days after the appointed dateas per Clause 8.2 of DCA

* The dates specified herein shall in no case be beyond 150 (one hundred and fifty) days after the 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 is enclosed. The contractor shall, however, imp

(iii) rove/upgrade upon the traffic signage plan as indicated in Annex-III 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

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 and construction 2 Lane highways from Ranipool to Pakyong of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3 Specifications and Standards

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

Annex - I
(Schedule-B)

Project is construction/ improvement of 2 lane highway from Ranipool to Pakyong from new take- off point at km 78/100 (i.e. located at out skirt of Ranipool town toward Singtam) on Sevoke - Gangtoksection of NH-10 to Pakyong Airport in East Sikkim in accordance with IRC-SP: 73:2018, IRC-SP: 48:1998 and other relevant codes including standard good practice of the road construction

1. WIDENING OF THE EXISTING HIGHWAY

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

1.2 WIDTH OF CARRIAGEWAY

1.2.1 The proposed 2-Lane Carriageway starts from Km 78/100 of NH-10 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.

Provided that in the built-up areas [refer to paragraphs 2.1 (ii) (a) of the Manual and provide necessary details]: 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)
NIL				

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

2 GEOMETRIC DESIGN AND GENERAL FEATURES

2.1 General

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

2.2 Design speed

The design speed shall be the minimum design speed of 30 km per hr for Mountainous/ Steep terrain.

2.3 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 - 2015 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	Combine curve	Adopted Design Speed of 20 Kmph
2	2948.186	-20	Combine curve	Adopted Design Speed of 20 Kmph
3	3243.896	20	Combine curve	Adopted Design Speed of 20 Kmph
4	3272.257	20	Combine curve	Adopted Design Speed of 20 Kmph
5	9621.673	-20	Combine curve	Adopted Design Speed of 20 Kmph
6	9648.914	-20	Combine curve	Adopted Design Speed of 20 Kmph
7	10020.945	20	Combine curve	Adopted Design Speed of 20 Kmph
8	10050.519	20	Combine curve	Adopted Design Speed of 20 Kmph
9	11657.92	-20	Combine curve	Adopted Design Speed of 20 Kmph
10	11689.366	-20	Combine curve	Adopted Design Speed of 20 Kmph
11	13624.254	20	Combine curve	Adopted Design Speed of 20 Kmph
12	13660.972	20	Combine curve	Adopted Design Speed of 20 Kmph
13	14714.083	-20	Combine curve	Adopted Design Speed of 20 Kmph
14	15267.045	-25	Combine curve	Adopted Design Speed of 20 Kmph
15	15311.605	25	Combine curve	Adopted Design Speed of 20 Kmph
16	15576.585	-20	Combine curve	Adopted Design Speed of 20 Kmph
17	15963.844	-20	Combine curve	Adopted Design Speed of 20 Kmph

2.4 Right of Way

[Refer to paragraph 2.3 of the Manual]. Details of the Right of Way are given in Annex II of Schedule-A.

2.5 Type of shoulders

[Refer to paragraph 2.5.2 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
Nil			

(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 paragraphs 5.9.9 and 5.9.10 of the Manual.

2.6 Lateral and vertical clearances at underpasses

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

2.6.2 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			

2.1 Lateral and vertical clearances at overpasses

2.1.1 Lateral and vertical clearances at overpasses shall be as per provision of relevant Manual.

2.1.2 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			

2.2 Service roads

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

2.3 Grade separated structures

2.3.1 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					

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

Sl. No.	Location	Type of structure Length (m)	Cross road at			Remarks, if any
			Existing Level	Raised Level	Lowered Level	
Nil						

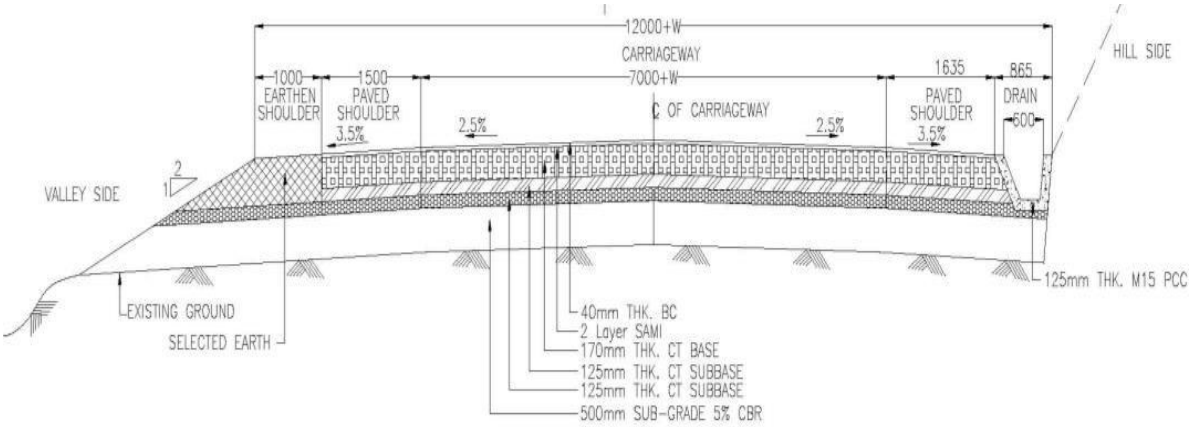
2.4 Cattle and pedestrian underpass /overpass

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		

2.5 Typical cross-sections of the Project Highway

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



TYPICAL PAVEMENT DETAILS FOR MAIN ROAD

Typical Pavement Cross Section

2.6 Longitudinal Section

As a minimum, the Construction Contractor shall achieve the proposed finished road levelas 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.

2.7 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 andfeatures 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	5+800	T- Intersection				Other
2	9+000	T- Intersection				Other
3	13+000	Y- Intersection				Other

(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

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

4.2 Raising of the existing road [Refer to 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			

5 PAVEMENT DESIGN

5.1 Pavement design shall be carried out in accordance with Section 5 of the Manual.

5.2 Type of pavement

Flexible Pavement with CT Sub-base and Base course shall be designed as per IRC-37.

5.3 Design requirements

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

5.3.1 Design Period and strategy

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

5.3.2 Design Traffic

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

5.4 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 followingnorms:

6.1 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 locationof lined drains.

Sr. No.	Chainage in m		Length	Type	Remarks
	From	To			
4	2000.00	2350.00	350.0	Type-1	Trapezoidal open drain
5	2350.00	3350.00	1000.0	Type-2	Trapezoidal Cover drain
6	3350.00	3850.00	500.0	Type-1	Trapezoidal open drain
7	3850.00	5000.00	1150.0	Type-2	Trapezoidal Cover drain
8	5000.00	5800.00	800.0	Type-1	Trapezoidal open drain
9	5800.00	7950.00	2150.0	Type-1	Trapezoidal open drain
10	7950.00	9650.00	1700.0	Type-1	Trapezoidal open drain
11	9650.00	10300.00	650.0	Type-2	Trapezoidal Cover drain
12	10300.00	11550.00	1250.0	Type-1	Trapezoidal open drain
13	11550.00	16167.00	4617.0	Type-2	Trapezoidal Cover drain
14	Box cutting portion		2440	Type-1	Trapezoidal open drain
15	Catch water drain		1200	Type-1	Trapezoidal open drain

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

6.2 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	Type-2
2	3410.00	1.85	20	Type-1
3	4570.00	1.85	20	Type-1
4	5130.00	2.70	20	Type-2
5	5990.00	2.70	20	Type-2
6	6557.00	3.2	20	Type-3
7	6842.00	3.2	20	Type-3
8	7700.00	1.85	20	Type-1
9	7880.00	1.85	20	Type-1
10	9573.00	1.85	20	Type-1
11	9701.00	2.70	20	Type-2
12	9898.00	1.85	20	Type-1
13	12410.00	1.85	20	Type-1

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

7 DESIGN OF STRUCTURES

7.1 General

7.1.1 All bridges and structures shall be designed and constructed in accordance with section 7 of the Manual and shall conform to the cross sectional features and other details specified in MoRTH circular No: RW/NH/33044/2/88-S&R dated 24.03.2009 (for 2 lane structures as 12.9m without & 14.9 m with footpath) and shall conform to the cross sectional features and other details specified in IRC: SP: 84-2014. 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 away so that the outer most face of railing/parapet shall be in line with the out most edge of shoulder.

ii. The existing culverts shall be extended to match the new road cross sections.

iii. The adequacy of the vent size for all culverts/bridges shall be ascertained through detailed hydrological surveys and finalized in consultation with the IC/Project Company. The highest flood level/maximum supply level shall be properly assessedafter 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 2.0m 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 withAuthority's Engineer and if required additional culverts shall be provided.

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

7.1.2 Width of the carriageway of new bridges and structures shall be as follows:

[Refer to paragraph 7.1 (ii) 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		

7.1.3 The following structures shall be provided with footpaths:

[Refer to paragraph 7.1 (iii) of the Manual and provide details of new Structures with footpath.]

Sl. No.	Location at km	Remarks
Nil		

7.1.4 All bridges shall be high-level bridges.

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

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

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

Sl. No.	Bridge at km	Utility service to be carried	Remarks
NIL			

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

7.2 Culverts

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

7.2.2 Reconstruction of existing culverts:

@ Attach typical cross-section, if necessary.

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

[Refer to provsions of the Manual and provide details]

Sr. No.	Culvert locationin 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	BOX-TYPE-1
5	4210	1 X 2	BOX-TYPE-1
6	4303	1 X 2	BOX-TYPE-1
7	4459	1 X 2	BOX-TYPE-1
8	4660	1 X 2	HPC-TYPE-1
9	4842	1 X NP4	HPC-TYPE-1
10	5050	1 X 2	BOX-TYPE-1
11	5420	1 X 2	BOX-TYPE-1
12	5787	1 X 2	BOX-TYPE-1
13	9700	1 X 2	BOX-TYPE-1
14	9900	1 X NP4	HPC-TYPE-2
15	11854	1 X 2	BOX-TYPE-1
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 and location is indicative and shall be estimated by the EPC contractor.			

7.2.3 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			

7.2.4 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	6430	1 X 2	BOX-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.

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

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

Sl. No.	**Location at km**	**Type of repair required**
Nil		

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

7.3 Bridges

7.3.1 Existing bridges to be re- constructed/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

7.3.2 Additional new bridges

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

New bridges at the following locations on the Project Highway shall be constructed. GADsfor 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

7.3.3 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		

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

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

Sl. No.	Location at km	Remarks
Nil		

7.3.5 Drainage system for bridge decks

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

7.3.6 Structures in marine environment

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

7.4. Rail-road bridges

7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual. [Refer to paragraph 7.19 of the Manual and specify modification, if any]

7.4.2 Road over-bridges

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

Sl. No.	Location of Level crossing (chainage km)	Length of bridge (m)
Nil		

7.4.3 Road under-bridges

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

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

7.5 Grade separated structures

[Refer to paragraph 7.20 of the Manual]

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

7.6 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 extentof repairs /strengthening required are given below:

A. Bridges

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

B. ROB / RUB

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

7.7 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

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

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

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

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

8.3 Traffic Signs

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

(ii) Temporary traffic and construction signs are to be provided during construction and maintenance operations for traffic diversion and pedestrian safety.

8.4 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 NHIDCL.

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 size board.	Sqm	8.0
8	Road Marking with Hot Applied Thermoplastic Compound with Reflectorising Glass	Sqm	4961.7
9	5th kilometre 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

9 ROADSIDE FURNITURE

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

9.2 Overhead traffic signs: location and size - Nil

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

10 COMPULSORY AFFORESTATION

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

11 HAZARDOUS LOCATIONS

Metal Beam crash barrier length of minimum 1500 m (single runner, heavy duty and W- 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: 2015), 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

12.1 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.

12.2 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.

12.3 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

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.

12.4 (a) Slope Protection

In accordance with IRC-SP: 48:1998 – Hill Road Manual

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) 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

(c) 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 changeof 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 sameto 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.

12.5 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, disposalof unserviceable material and stacking the serviceable material with all lifts and lead of 1000 metres

Nos of culvert & other cross drainage structure	-	38 No.
Nos of retaining wall, breast wall & other protection structure	-	204 Nos

12.6 Dismantling of Flexible Pavements

Dismantling of flexible pavements and disposal of dismantled materials up to a lead of 1000 metres, stacking serviceable and unserviceable materials separately

Length of existing pavement - 7.84 Km

12.7 Removal of landslide

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

12.8 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 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[51]	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	1185	10	3	LHS

		5			
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	12225	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

SR.NO.	CHAINAGE		LENGTH in m	HEIGHT in m	REMARKS
	FROM	TO			
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
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	15265	15275	10	3	LHS
124	15285	1529	10	3	LHS

		5			
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

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[158]	5175	5185	10	2	RHS

Sr.No.	Chainage		Length in 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
95[159]	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.

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 Section 9.0 of the Manual of Standards and Specifications.

(c) Pedestrian Facilities

Pedestrian crossing Facilities shall be provided in accordance with Clause 9.8 / 12.2 of the 2 Lane / 4 Lane Manual of Standards and Specifications and Typical Cross Section Details provided in Appendix BI.

(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 Clause 12.6 of the 2 Lane 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-73:2015

(g) Rest areas - Nil

(h) Street lighting

Lighting shall be provided at the following locations:

(i) Solar Lighting shall be provided on bridge as per Schedule D

(ii) High Mast Lighting shall be provided at all Major Junctions

(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) Others

SCHEDULE - D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1 Construction

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

2 Design Standards

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

Manual of Specifications and Standards for Two Laning of Highways (IRC: SP: 73-2015)

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:73-2015) of Specifications and Standards for Two-Laning (IRC:SP:73-2015) 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:73-2015) 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 be limited to 7 Percent	Super-elevation shall be limited to 10**% (five 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.**

Sl. No.	Clause No.	Description	Deviation
4	Clause 2.3	Sight Distance: On two-lane roads, normally intermediate sight distance 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.

SCHEDULE - E

(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

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

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.

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

[Specify all the relevant documents]

2 Repair/rectification of Defects and deficiencies

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

3 Other Defects and deficiencies

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

4 Extension of time limit

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

5 Emergency repairs/restoration

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

6 Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

All damages occurring to the Project Highway on account of a Force Majeure Event or 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.

Nature of Defect or deficiency		Time limit for repair/rectification
ROADS		
(a)	**Carriageway and paved shoulders**	
(i)	Breach or blockade	Temporary restoration of traffic within 24 hours; permanent restoration within 15 (fifteen) days
(ii)	Roughness value exceeding 2,200 mm in a stretch of 1 km (as measured by a calibrated bump integrator)	120 (one hundred and twenty) days
(iii)	Pot holes	24 hours
(iv)	Any cracks in road surface	15 (fifteen) days
(v)	Any depressions, rutting exceeding 10 mm in road surface	30 (thirty) days
(vi)	Bleeding/skidding	7 (seven) days
(vii)	Any other defect/distress on the road	15 (fifteen) days
(viii)	Damage to pavement edges	15 (fifteen) days
(ix)	Removal of debris, dead animals	6 hours
(b)	**Granular earth shoulders, side slopes, drains and culverts**	
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
Nature of Defect or deficiency		**Time limit for repair/rectification**
(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 hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Road side furniture including road sign and pavement marking**	
(i)	Damage to shape or position, poor visibility or	48 hours

	loss of retro-reflectivity	
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/Once every year
(iii)	Damaged/missing road signs requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road lighting**	
(i)	Any major failure of the system	24 hours
(ii)	Faults and minor failures	8 hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum head-room of 5 m above carriageway or obstruction in visibility of road signs	24 hours
(ii)	Removal of fallen trees from carriageway	4 hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
Nature of Defect or deficiency		**Time limit for repair/rectification**
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f)	**Rest area**	
(i)	Cleaning of toilets	Every 4 hours
(ii)	Defects in electrical, water and sanitary installations	24 hours
(g)	**[Toll 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 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
Nature of Defect or deficiency		**Time limit for**

		repair/rectification
(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 of crushers;

(c) Licence for use of explosives;

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

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

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

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

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

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

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

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 16.539 of Ranipool - Pakyong of NH-717-A 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.

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

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

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

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

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

Sl. No	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	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 – 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 16.539 of Ranipool - Pakyong of NH-717-A 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:-

Sl. No	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	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 16.539 of Ranipool - Pakyong of NH-717-A 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 as follows:

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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sl. No	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	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 Clauses 10.1.4 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
Road works including culverts, widening and repair of culverts.	**61.157%**	**A**	**Widening and strengthening of existing road**	**65.782%**	
		1	Earthwork up to top of the sub-grade	29.98%	18.335%
		2	Sub-Base course	13.180%	8.060%
		3	Non Bituminous Base Course	8.498%	5.197%
		4	Bituminous Base Course	4.982%	3.047%
		5	Wearing Coat	9.142%	5.591%
		6	Widening and repair of culverts	0.000%	0.000%
		B.1	**Reconstruction/ New 2-Lane realignment/ bypass (Flexible pavement)**	**25.955%**	
		1	Earthwork up to top of the sub- grade	9.746%	5.961%
		2	Sub Base Course	6.248%	3.821%
		3	Non-Bituminous Base Course	3.787%	2.316%
		4	Bituminous Base Course	2.191%	1.340%
		5	WearingCoat	3.982%	2.435%
		B.2	**Reconstruction/ New 2 lane realignment/bypass (Rigid Pavement)**	**0.000%**	
		1	Earthwork up to top of the sub-grade	0.000	0.000%
		2	Sub Base Course	0.000	0.000%
		3	Dry Lean Concrete (DLC) Course	0.000	0.000%
		4	pavement QualityContral (PQC) Course	0.000	0.000%
		C.1	**Reconstruction/ New service road (Flexible pavement)**	**0.00%**	
		1	Earthwork up to top of the sub-grade	0.000	0.000%
		2	Sub Base Course	0.000	0.000%
		3	Non- Bituminous Base Course	0.000	0.000%
		4	Bituminous Base Course	0.000	0.000%
		5	Wearing Coat	0.000	0.000%
		C.2	**Reconstrution/ new Services road (Rigid Pavement)**	**0.000%**	

		1	Earthwork up to top of the sub-grade	0.000	0.000%
		2	Sub Base Course	0.000	0.000%
		3	Dry Lean Concrete (DLC) Course	0.000	0.000%
		4	Pavement Quality Control (PQC) Course	0.000	0.000%
		D	**Re- Construction and New culverts on existing road, realignments, bypassed:**	**8.263%**	
			Culverts (length<6m)		
		a	Pipe culvert	1.952%	1.194%
		b	RCC Box Culvert	6.311%	3.860%
Minor Bridges/ underpasses/ Overpasses	6.240%	**A1**	**Widening and Repair of Minor bridges (length<6m and <60 m)**		
			Minor bridges	0.000%	
		A2	**New Minor bridges (length<6 and >60 m.)**		
		1	**Foundation +Sub- Structure:** On completion of the foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	66.320%	4.138%
		2	**Super-Structure:** On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, had rails, crash, barriers, road signs & markings, tests on completion etc. complete in all respect.	33.680%	2.102%
		3	**Approaches:** On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit all respect and fit for use.	0.000%	
		4	**Guide Bands and River Training Works:** **O**n completion of Guide Bunds and river Training Works complete in all respects	0.000%	
		B1	**Widening and Repair of underpasses/ overpasses**		
			Underpasses/ Overpasses	0.000%	
		B2	**New underpasses / overpasses**		
		1	**Foundation +sub- Structure**: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	0.000%	

		2	**Super-structure**: On completion of the super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs& marking, tests on completion etc. complete in all respect. Wearing Cost (a) in case of Overpass- wearing coat including expansion joints complete in all respect as specified in all respect as specified and (b) in case of underpass- rigid pavement including drainage facility complete in all respects as specified as specified.	0.000%	
		3	**Approaches:** On completion of approaches including walls/Reinforced Earth walls/ stone pitching, protection works complete in all respect and fit for use.	0.000%	
Minor Bridge (length< 60 m.) works and ROB/RUB. Elevated sections/ flyover including viaducts, if any		A1	**Widening and repairs of Major Bridges**		
		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	Wing walls/ return walls	0.000%	0.000%
		7	Guide Bunds, River Training work etc.	0.000%	0.000%
		8	Approaches (including Retaining walls, stone pitching and protection works)	0.000%	0.000%
		A2	**New Major Bridges**		
		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	Wing walls/ return walls	0.000%	0.000%
		7	Guide Bunds, River Training work etc.	0.000%	0.000%
		8	Approaches (including Retaining walls, stone pitching and protection works)	0.000%	0.000%
		B1	**Widening and repair of**		
			(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 Cost:	0.000%	0.000%
			(a) In case of ROB- wearing cost 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 as specified.	0.000%	0.000%
		5	Miscellaneous items like hand rails, crash barriers, road markings etc)	0.000%	0.000%
		6	Wing walls/return walls	0.000%	0.000%
		7	Approaches (including Retaining walls, stone pitching and protection works)	0.000%	0.000%
		B2	**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 Cost:	0.000%	0.000%
			(a) In case of ROB- wearing cost 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 as specified.	0.000%	0.000%
		5	Miscellaneous items like hand rails, crash barriers, road markings etc)	0.000%	0.000%
		6	Wing walls/return walls	0.000%	0.000%
		7	Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.000%	0.000%
		C1	**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	Wing walls/return walls	0.000%	0.000%
		7	Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.000%	0.000%

		C2	**New Elevated Section / Flyovers / Grade Separators**		
		1	Foundation	0.0%	
		2	Sub- structure	0.0%	
		3	Super-Structure (including bearings)	0.0%	
		4	Wearing Coat including expansion joints	0.0%	
		5	Miscellaneous items like hand rails, crash barriers, road markings etc.)	0.0%	
		6	Wing walls/return walls	0.0%	
		7	Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.0%	
Other works	32.603 %	(i)	Toll plaza	0.00%	0.00%
		(ii)	Road side drains	8.917%	2.907%
		(iii)	Road signs markings, km stones, safety devices,…		
		a	Traffic Sign	0.282%	0.092%
		b	Pavement marking	1.640%	0.535%
		c	Crash barrier/"W" Metal Beam Crash Barrier	1.744%	0.569%
		d	Boundary stone, km stone,5th km stone, & hectometre stones	0.049%	0.016%
		e	Traffic blinker LED Delineator, stud, reflective payment marker, tree reflector	0.049%	0.016%
		f	Direction and Place Identification signs upto 0.9 sqm size board	0.049%	0.016%
		g	Minor junction	5.911%	1.927%
		h	Major Junction	6.756%	2.203%
		i	Traffic diversion, Safety and traffic management during construction		
		j	Road furniture	0.284%	0.092%
		k	Dismantling of Structures	0.203%	0.066%
		l	Dismantling of Flexible Pavements	0.690%	0.225%
		m	Site Clearance	0.116%	0.38%
		n	Chute drain	0.706%	0.230%
		o	Land Slide Clearance	1.745%	0.569%
		(iv)	Project Facilities		
		(a)	Bus bays	0.493%	0.161%
		(b)	Truck lay-byes	0.00%	0.00%
		(c)	Rest areas	0.38%	0.124%
		(d)	other	0.225%	0.0798%
		(v)	Roadside plantation		
		a	Road side plantation & medium Plantation.	0.00%	0.00%

		b	Plantation (Vetiver, Hydro seeding& Turbine etc.) for slope protection on exposed hill slopes as slide mitigation measure.	0.398%	0.130%
		(vi)	Repair of protection works other than approaches to the bridges, elevated section/ flyovers/grade separators and ROBs.	0.00%	0.00%
		(vii)	Safety and traffic management during construction	0.00%	0.00%
		(viii)	**Protection works**		
		a	Breast wall	32.732%	10.672%
		b	Retaining wall	5.397%	1.759%
		c	Cut Slope Wall	8.694%	2.835%
		d	Gabion wall	5.419%	1.767%
		e	Toe wall	5.819%	1.897%
		f	Seeding and Mulching (Soil Cut Slope)	1.689%	0.551%
		g	Vegetation Mat (Steep Slope)	0.380%	0.124%
		h	Crib Work (F300)	0.380%	0.124%
		i	Crib Work (F500)	0.873%	0.285%
		j	Groundwater Drainage Work	6.503%	2.120%
		k	Anchor Work	1.422%	0.463%
		l	Rock-bolt Work	0.056%	0.018%

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).

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

Table 1.3.1

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 up top of the sub-grade	29.980%	
2	Sub-Base Course	13.180%	
3	Non Bituminous Base Course	8.498%	
4	Bituminous Base Course	4.982%	
5	Wearing Coat	9.142%	
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 atleast one culverts.
B.1	**Reconstruction /New 2- lane realignment/bypass (Flexible pavement**	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (Five) percent of the total length.
1	Earthwork up to top of the sub-grade	9.746%	
2	Sub Base Course	6.248%	
3	Non-Bituminous Course	3.787%	
4	Bituminous Base Course	2.191%	
5	Wearing Coat	3.982%	
B.2	**Reconstruction/New 2- lane realignment/bypass(Rigid pavement)**		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 0.5(Zero Point five) km. length, whichever isless..
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 pro rata basis on completion of a stage in full length or 0.5(Zero Point five) km. length, whichever is less..
1	Earthworkup to of the sub-grade	0.00%	
2	Sub Base Course	0.00%	
3	Non- Bituminous Course	0.00%	
4	Bituminos Base Course	0.00%	
5	Wearing Coat	0.00%	
C.2	**Reconstruction/New serviceRoad (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 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 atleast one culverts.
	(a) Pipe Culvert	1.952%	
	(b) RCC Box culvert	6.311%	

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

Cost per km = P x weightage for 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:

Table 1.3.2

	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.	66.320%	**(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 along with sub-structure upto abutment/pier cap level of each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii)	**Super-structure:** On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, had rails, crash barriers, road signs & marking, tests on completion etc. complete in all respect.	33.680	(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:** On completion of Guide Bunds and river Training Works complete in all respects	**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 underpasses/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	**New Underpasses / 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/Overpass shall be determined on pro rata basis with respect to the total linear length (m) of the Underpasses/Overpasses. Payment against foundation+Sub structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of each underpasses/Overpasses subject to completion of atleast two foundations along with sub- structure upto abutment/pier cap level each underpass/overpass. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii)	**Super-structure:** On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & marking, tests on completion etc. complete in all respect. Wearing Cost (a) in case of Overpass-wearing cost including expansion joints complete in all respects as specified and (b) in case of underpass- rigid pavement including drainage facility complete in all respects as specified as specified as specified.	**0.00%**	**(ii) Super-structure:** Payment shall be made on pro- rata basis on completion of a stage i.e. completion of a stage i.e. completion of super-structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.

(iii)	**Approaches:** On Completion of approaches including Retaining Walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit use.	**0.00%**	(iii) **Approaches:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches inn 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 table 1.3.3:

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

A.2	**New major Bridges**		
(i)	Foundation	[**]	**(i) Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of atleast two foundations of the major Bridges. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii)	Sub-structure	[**]	**(ii) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the major bridge subject to completion of atleast two sub-structures of abutment/pier cap level of the major bridge.
(iii)	Super-structure (including bearings)	[**]	**(iii) Super-structure:** Payment shall be made on pro-rata basis on completion of a stage I.e. completion of super- structure including bearings of atleast one span in ll respects as specified.
(iv)	Wearing Cost including expansion joints	[**]	**(iv) Wearing Coat:** Payment shall be made on completion of wearing coat including Expansion joints complete in all respects as specified.
(v)	Miscellaneous item like hand rails, crash barriers, road markings etc.	[**]	**(v)Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road marking etc. complete in all respects as specified.
(vi)	Wing walls/return wells	[**]	**(vi) wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii)	Guide Bunds, River, Training works etc.	[**]	**(vii) Guide Bunds, River Training works:** Payment shall be made on completion of all guide bunds/ river training works etc. complete in all respects as specified.
(viii)	Approaches (including Retaining walls, stone pitching and protection works)		**(viii) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. Complete in all respects as specified.
B.1	**Widening and repairs of** **(a) ROB** **(b) RUB**		

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

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

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

(ii)	Sub-Structure	[**]	**(ii) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of abutments/piers up to abutment/pier cap level cap level of the structure.
(iii)	Super-Structure (including bearings)	[**]	**(iii) Super-Structure:** Payment shall be made on pro-rata basis on completion of a stage completion of super-structure including bearings of at least one span in all respects asspecified.
(iv)	Wearing Coat including expansion joints	[**]	**(vi) Wearing Coat:** payment shall be made be on completion of wearing coat including expansion joints complete.
(v)	Miscellaneous item like hand rails, crash barriers, road markings etc.	[**]	**(v) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified,
(vi)	Wing walls/return walls	[**]	**(vi) Wing walls/return walls:** Payment shall be made on completion of all wing walls/return walls complete in all respects as Specified.
(vii)	Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works	[**]	**(vii) Approaches:** payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.

1.3.4 Other works.

1.3 Procedure of estimating the value of work done shall be as stated in table 1.3.4

	Table 1.3.4		
	Stage of Payment	**weightage**	**Payment Procedure**
(i)	Toll plaza	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(ii)	Road side drains	8.917%	Unit of measurement is linear in Km Payment shall be made on pro rata 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	0.282%	Unit of measurement is linear in km Payment shall be made on pro rata basis on completion of a stage in a length on not less than 5% (five percent) of the total length.
b	Pavement marking	1.64%	
c	Crash barrier/"W" Metal Beam Crash Barrier	1.744%	
d	Boundary stone, km stone,5th km stone, & hectometer stones	0.049%	
e	Traffic blinker LED Delineator, stud, reflective payment marker, tree reflector	0.049%	
f	Direction and Place Identification signs upto 0.9 sqm size board	0.049%	
g	Minor junction	5.911%	
h	Major Junction	6.756%	
i	Traffic diversion, Safety and traffic management during construction	0.000%	
j	Road furniture	0.000%	
k	Dismantling of Structures	0.203%	
l	Dismantling of Flexible Pavements	0.690%	
m	Site Clearance	0.116%	
n	Chute drain	0.706%	
o	Land Slide Clearance	1.745%	
(iv)	Project Facilities		
(a)	Bus bays	0.493%	Payment shall be made on pro rata basis for completed facilities.
(b)	Truck lay-byes	0.00%	
(c)	Rest areas	0.380%	
(d)	other	0.225%	
(v)	Roadside plantation		
a	Road side plantation & medium Plantation.	0.00%	Unit of measurement is linear length payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five per cent) of the total length.
b	Plantation (Vetiver, Hydro seeding& Turbine etc.) for slope protection on exposed hill slopes as slide mitigation measure.	0.398%	

(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 length payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five per cent) of the total length.
(vii)	Safety and traffic management during construction	0.00%	Payment shall be made on pro rata basis every six months.
(viii)	**Protection works**		
a	Breast wall	32.732%	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	5.397%	
c	Cut Slope Wall	8.694%	
d	Gabion wall	5.419%	
e	Toe wall	5.819%	
f	Seeding and Mulching (Soil Cut Slope)	1.689%	
g	Vegetation Mat (Steep Slope)	0.380%	
h	Crib Work (F300)	0.380%	
i	Crib Work (F500)	0.873%	
j	Groundwater Drainage Work	6.503%	
k	Anchor Work	1.422%	
l	Rock-bolt Work	0.056%	

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 55th 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.

1 Schedule for Tests

SCHEDULE - K
(See Clause 12.1 (ii))

Tests on Completion

1 Schedule for Tests

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

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

2 Tests

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

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

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

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

Schedule – L

(See Clause 12.2)

Completion Certificate

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated …… (the "**Agreement**"), for **Construction/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'mode-(Package-IV)"** (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, bearings and sub-structures	10%
S. No.	**Item/Defect/Deficiency**	**Percentage**
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%

(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

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

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

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

L1 = Non-complying length

L = Total length of the road,

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

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

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

SCHEDULE - N
(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

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

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

2 Terms of Reference

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

3 Appointment of Government entity as Authority's Engineer

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

Annex – I
(Schedule - N)

TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

1 Scope

(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 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'mode-(Package-IV)"** and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

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

2 Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time Extension;
(b) any additional cost to be paid by the Authority to the Contractor;
(c) the Termination Payment; or
(d) 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, that are required to be determined by it under the Agreement.

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

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

7. Payments

(i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2.4 (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 19.4.1, 19.6.1, and 19.8.1)

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with Clause 19.3(i) subsequent to the last claim;
(b) amounts reflecting adjustments in price for the aforesaid claim;
(c) the estimated amount of each Change of Scope Order executed subsequent to the last claim;
(d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2(iii) (a);
(e) total of (a), (b), (c) and (d) above;
(f) Deductions:
  (i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
  (ii) Any amount towards deduction of taxes; and
  (iii) Total of (i) and (ii) above.
(g) Net claim: (e) – (f) (iii);
(h) The amounts received by the Contractor upto the last claim:
(i) For the Works executed (excluding Change of Scope orders);

(ii) For Change of Scope Orders, and

(iii) Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes.

3. Contractor's claim for Damages

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

SCHEDULE - P
(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

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

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

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

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, …….. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …… (the "Agreement"), for **Construction/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'mode-(Package-IV)"** (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 AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

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