Schedules

SCHEDULE - A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

(i) Site of the Two-Lane Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

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

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

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

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

Annex - I
(Schedule-A)

Site

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

1. Site

The Site of the [Two-Lane] Project Highway comprises the section of [National Highway 44A] commencing from km 0+000 to km 16.290 i.e. the Manu - Lalchera section in the State of Tripura. The land, carriageway and structures comprising the Site are described below.

2. 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:

S. No.	Chainage (km)		Right of Way (m)	Remarks
	From	To		
1.	0	100	48.4	
2.	100	200	38.3	Manu village
3.	200	300	46.6	
4.	300	400	45.1	
5.	400	500	46.1	
6.	500	600	36.6	
7.	600	700	46.5	
8.	700	800	46.9	
9.	800	900	45.8	
10.	900	1000	45.6	
11.	1000	1100	47.0	
12.	1100	1200	45.7	
13.	1200	1300	46.0	
14.	1300	1400	45.9	
15.	1400	1500	44.8	
16.	1500	1600	44.1	

17.	1600	1700	47.8	
18.	1700	1800	47.1	
19.	1800	1900	46.2	
20.	1900	2000	48.9	
21.	2000	2100	45.4	
22.	2100	2200	48.0	
23.	2200	2300	46.4	
24.	2300	2400	43.8	
25.	2400	2500	47.3	
26.	2500	2600	46.4	
27.	2600	2700	45.4	
28.	2700	2800	49.2	
29.	2800	2900	52.0	Mainama Village
30.	2900	3000	51.8	
31.	3000	3100	50.9	
32.	3100	3200	48.5	
33.	3200	3300	49.2	
34.	3300	3400	30.1	
35.	3400	3500	36.5	
36.	3500	3600	46.0	
37.	3600	3700	46.5	
38.	3700	3800	49.0	
39.	3800	3900	46.7	
40.	3900	4000	47.0	
41.	4000	4100	44.1	
42.	4100	4200	42.6	
43.	4200	4300	46.0	
44.	4300	4400	56.7	
45.	4400	4500	46.9	
46.	4500	4600	43.9	
47.	4600	4700	47.9	

48.	4700	4800	47.2	
49.	4800	4900	48.6	
50.	4900	5000	49.2	
51.	5000	5100	44.4	
52.	5100	5200	53.9	
53.	5200	5300	40.3	
54.	5300	5400	42.9	
55.	5400	5500	47.1	
56.	5500	5600	45.0	
57.	5600	5700	53.1	
58.	5700	5800	50.7	
59.	5800	5900	50.6	
60.	5900	6000	48.9	
61.	6000	6100	35.0	
62.	6100	6200	30.3	
63.	6200	6300	36.6	Chalengta Village
64.	6300	6400	30.0	
65.	6400	6500	30.5	
66.	6500	6600	30.0	
67.	6600	6700	30.0	
68.	6700	6800	30.0	
69.	6800	6900	32.3	
70.	6900	7000	30.6	
71.	7000	7100	35.8	
72.	7100	7200	39.8	
73.	7200	7300	39.9	
74.	7300	7400	39.6	
75.	7400	7500	33.7	
76.	7500	7600	37.6	
77.	7600	7700	40.1	
78.	7700	7800	53.0	

79.	7800	7900	71.3	
80.	7900	8000	53.4	
81.	8000	8100	34.9	
82.	8100	8200	30.3	
83.	8200	8300	36.6	
84.	8300	8400	30.0	
85.	8400	8500	30.5	
86.	8500	8600	30.0	
87.	8600	8700	30.0	
88.	8700	8800	30.0	
89.	8800	8900	37.6	
90.	8900	9000	42.6	
91.	9000	9100	46.9	Chalengta Village
92.	9100	9200	46.0	
93.	9200	9300	48.5	
94.	9300	9400	36.0	
95.	9400	9500	36.0	
96.	9500	9600	36.0	
97.	9600	9700	36.0	
98.	9700	9800	36.0	
99.	9800	9900	36.0	
100.	9900	10000	36.0	
101.	10000	10100	36.0	Lalchera Village
102.	10100	10200	36.0	
103.	10200	10300	45.8	
104.	10300	10400	47.3	
105.	10400	10500	45.7	
106.	10500	10600	48.9	
107.	10600	10700	50.3	
108.	10787	16290	24.0	

3. Carriageway

The present carriageway of the Project Highway is [Single Lane]. The type of the existing pavement is [flexible].

4. 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						

5 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**			
1.	2+150	Slab	4x8	4x8	8	RUB

6 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					

7 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	3+315	-	-	Bailey Bridge	1X40	3.40
2	7+105	-	-	Bailey Bridge	1X21.50	3.40
3	11+180	-	-	Bailey Bridge	1X18.50	3.40
4	11+750	-	-	Bailey Bridge	1X39.60	3.40
5	13+800	-	-	Bailey Bridge	1X26.00	3.45
6	14+725	-	-	Bailey Bridge	1X24.60	4.15
7	15+215	-	-	Bailey Bridge	1X30.70	5.60
8	15+690	-	-	Bailey Bridge	1X19.60	5.00

9	16+100	-	-	Bailey Bridge	1X19.80	5.00

8 Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location (km)	Remarks
NIL		

9 Underpasses (vehicular, non vehicular)

The Site includes the following underpasses:

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

10 Culverts

The Site has the following culverts:

S.No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
1.	0+210	HPC	1X0.900	12.50
2.	0+280	Burried	-	-
3.	0+300	RCC SLAB	1X0.75	11.70
4.	0+330	Burried	-	-
5.	0+720	RCC SLAB	1X2.90	11.60
6.	0+830	HPC	1X0.90	11.60
7.	1+100	HPC	1X0.90	11.65
8.	1+245	RCC SLAB	1X2.00	12.00
9.	1+560	RCC SLAB	1X3.00	12.50
10.	1+860	HPC	1X0.900	10.40
11.	2+540	HPC	1X0.900	12.50
12.	2+775	HPC	1X0.90	12.50
13.	4+450	HPC	1X0.90	15.10
14.	4+670	HPC	2X0.90	12.10

15.	7+480	Burried	-	-
16.	7+515	PIPE	1X0.60	7.50
17.	7+800	RCC SLAB	1X5.75	12.10
18.	8+060	HPC	2X0.90	12.40
19.	8+580	RCC SLAB	1X3.00	12.00
20.	8+660	RCC SLAB	1X2.00	12.00
21.	8+960	Burried	-	-
22.	11+405	RCC SLAB	1X1.10	8.50
23.	11+470	RCC SLAB	1X5.80	5.95
24.	11+620	RCC SLAB	1X0.90	5.90
25.	12+160	HPC	1X0.90	7.50
26.	13+495	HPC	1X0.90	7.50
27.	13+685	HPC	1X0.90	7.50
28.	14+165	HPC	1X0.90	7.50
29.	14+340	Burried	-	-
30.	14+535	HPC	1X0.90	7.50
31.	14+590	HPC	1X0.90	7.50
32.	14+695	HPC	1X0.90	7.50
33.	15+295	HPC	1X0.90	7.50
34.	15+630	HPC	1X0.90	7.50
35.	15+765	HPC	1X0.90	7.50
36.	15+840	HPC	1X0.90	7.50
37.	15+965	HPC	1X0.90	7.50
38.	16+040	HPC	1X0.90	7.50
39.	16+700	HPC	2X0.90	7.55

40.	16+870	HPC	1X0.90	7.55
41.	17+130	HPC	1X0.90	7.55

11 Bus bays

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

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

12 Truck Lay byes

The details of truck lay byes are as follows:

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

13 Road side drains

The details of the roadside drains are as follows:

S. No.	Location		Type	
	From km	to km	Masonry/cc (Pucca)	Earthen (Kutcha)
1	0+000	0+200	Stone Masonry	-

14 Major junctions

The details of major junctions are as follows:

S. No.	Location		At grade	Separated	Category of Cross Road			
	From km	To km			NH	SH	MDR	Others
1	0+000	0+000	Yes	-	NH – 44	-	-	-

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

15 Minor junctions

The details of the minor junctions are as follows:

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

1	0+000	0+100	T	Village Road
2	0+130	0+230	T	Village Road
3	0+265	0+365	T	Village Road
4	0+565	0+665	T	Village Road
5	0+900	1+000	T	Village Road
6	1+315	1+415	T	Village Road
7	2+570	2+670	T	Village Road
8	3+330	3+430	T	Village Road
9	3+810	3+910	T	Village Road
10	3+935	4+035	T	Village Road
11	4+160	4+260	T	Village Road
12	4+310	4+410	T	Village Road
13	4+790	4+890	T	Village Road
14	5+090	5+190	T	Village Road
15	5+640	5+740	T	Village Road
16	5+800	5+900	T	Village Road
17	5+950	6+050	T	Village Road
18	6+450	6+550	T	Village Road
19	6+630	6+730	T	Village Road
20	6+880	6+980	T	Village Road
21	6+900	7+000	T	Village Road
22	7+010	7+110	T	Village Road
23	7+190	7+290	T	Village Road
24	7+640	7+740	T	Village Road
25	8+440	8+540	T	Village Road
26	8+840	8+940	T	Village Road
27	9+880	9+980	T	Village Road
28	10+750	10+850	T	Village Road
29	11+700	11+800	T	Village Road
30	11+770	11+870	T	Village Road

16 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			

[17 Other structures] -NIL

[Provide details of other structures, if any.]

Annex – II

(Schedule-A)

Dates for providing Right of Way

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

Sl. No	**From km to km**	**Length (km)**	**Width (m)**	**Date of providing ROW***
1	**2**	**3**	**4**	**5**
(i) Full Right of Way (full width) (a) Stretch (b) Stretch (c) Stretch				ROW will be provided before appointed date
(ii) Part Right of Way (part width) (a) Stretch (b) Stretch (c) Stretch				
(iii) Balance Right of Way (width) a) Stretch b) Stretch c) Stretch				

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

Annex - III

(Schedule-A)

Alignment Plans

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

(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, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per IRC: SP: 99 & IRC: 67.

Annex - IV

(Schedule-A)

Environment Clearances

The following environment clearances have been obtained:

- Environmental Clearance is not required as per new Notification of MoEF 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 and strengthening] of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3 Specifications and Standards

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

Annex - I
(Schedule-B)

Description of [Two-Laning]$

[Note: Description of the Project Highway shall be given by the Authority in detail together with explanatory drawings (where necessary) to explain the Authority's requirements precisely in order to avoid subsequent changes in the Scope of the Project. The particulars that must be specified in this Schedule-B are listed below as per the requirements of the Manual of Specifications and Standards for [Two Laning of Highways (IRC:SP:73)], referred to as the Manual. If any standards, specifications or details are not given in the Manual, the minimum design/construction requirements shall be specified in this Schedule. In addition to these particulars, all other essential project specific details, as required, should be provided in order to define the Scope of the Project clearly and precisely.]

1 WIDENING OF THE EXISTING HIGHWAY

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

(ii) Width of Carriageway

a) Two-Lane with paved shoulder in Plain/Rolling Terrain in open Country area: - The Carriageway shall be 7.0 m. wide with 2.50 m. paved shoulder both side and 1.5 m earthen shoulder both side shall be provided. The width of carriage way shall be specified in following table:

Sl. No.	Built-up stretch (Township)	Design Chainage	Width (m)	Length (km)	Typical cross section (Ref. to Manual)
1	Manu Village Builtup	0 - 2400	7+2.5x2+1.5x2=15m	2.400	Fig 2.1
2	Mainama Village Builtup	2650 - 4700	7+2.5x2+1.5x2=15m	2.050	Fig 2.1
3	Chalengta Village Builtup	5950 - 7650	7+2.5x2+1.5x2=15m	1.700	Fig 2.1
4	Lalchara Village Builtup	10400-11450	7+2.5x2+1.5x2=15m	1.050	Fig 2.1
5	-	12900 - 13400	7+2.5x2+1.5x2=15m	0.500	Fig 2.1
6	-	14600 - 15000	7+2.5x2+1.5x2=15m	0.400	Fig 2.1
	Total Length			8.100	

b) Two Lane Road with Paved shoulders in Hilly Terrain with Hill side drain :- The Carriageway shall be 7.0 m wide with 1.5 m paved shoulder both side and 1.0 m earthen shoulder Valley side shall be provided. The width of carriageway specified following table-

S.No.	Built-up stretch (Township)	Design Chainage	Width (m)	Length (km)	TCS as per IRC:SP: 73:2015
1	-	2400 - 2650	7+1.5x2+1x1=11 m	0.250	Fig. 2.9
2	-	4700 - 5950	7+1.5x2+1x1=11 m	1.250	Fig. 2.9
3	-	7650 - 10100	7+1.5x2+1x1=11 m	2.450	Fig. 2.9
4	-	11450 - 12900	7+1.5x2+1x1=11 m	1.450	Fig. 2.9
5	-	13400 - 14600	7+1.5x2+1x1=11 m	1.200	Fig. 2.9
6	-	15000 - 16290	7+1.5x2+1x1=11 m	1.290	Fig. 2.9
	Total Length			7.890	

$ The contents of this Annex-I may be modified in accordance with the structure of the Project.

c) Two Lane Road with Paved shoulders in Hilly Terrain with Hill side drain and breast wall:- The Carriageway shall be 7.0 m wide with 1.5 m paved shoulder both side and 1.0 m earthen shoulder Valley side shall be provided. The width of carriageway specified following table-

S.No.	Built-up stretch (Township)	Design Chainage	Width (m)	Length (km)	TCS as per IRC:SP: 73:2015
1	-	10100 - 10400	7+1.5x2+1x1=11 m	0.300	Fig. 2.9a (New)
	Total Length			0.300	

d) 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

(i) General

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

(ii) Design speed

The design speed shall be the minimum design speed of [80 km per hr for plain / rolling terrain].

(iii) Improvement of the existing road geometrics

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

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:

Sl. No.	Stretch		Type of deficiency	Remarks
	From	To		
1.	15	188	Radius-155	P/R (Built up)
2.	222	456	Radius-155	P/R (Built up)
3.	547	648	Radius-155	P/R (Built up)
4.	651	825	Radius-155	P/R (Built up)
5.	851	1005	Radius-155	P/R (Built up)
6.	6582	6808	Radius-155	P/R (Built up)
7.	6989	7164	Radius-155	P/R (Built up)
8.	7318	7496	Radius-155	P/R (Built up)
9.	10586	10949	Radius-155	P/R (Built up)

(iv) 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.

(v) Type of shoulders

[Refer to paragraph 2.5.2 of the Manual and specify]

(a) In open country paved shoulder of 2.5m & earthen shoulder of 1.5m width both sides shall be provided (plain/Rolling terrain).

S.No.	Design Chainage		Length km	Paved Shoulder	Earthen Shoulder	Reference to cross section
	From km	To km				
1	0	2400	2.400	2x2.5=5.0m	2x1.5=3.0m	Fig. 2.1
2	2650	4700	2.050	2x2.5=5.0m	2x1.5=3.0m	Fig. 2.1
3	5950	7650	1.700	2x2.5=5.0m	2x1.5=3.0m	Fig. 2.1
4	10400	11450	1.050	2x2.5=5.0m	2x1.5=3.0m	Fig. 2.1
5	12900	13400	0.500	2x2.5=5.0m	2x1.5=3.0m	Fig. 2.1
6	14600	15000	0.400	2x2.5=5.0m	2x1.5=3.0m	Fig. 2.1
	Total		=8.100			

(b) In open country paved shoulder of 1.5m both side & earthen shoulder of 1.0m width on Valley side shall be provided (Hilly terrain).

S.No.	Design Chainage		Length km	Paved Shoulder	Earthen Shoulder	Reference to cross section
	From km	To km				
1	2400	2650	0.250	2x1.5=3.0m	1x1=1.0m	Fig. 2.9
2	4700	5950	1.250	2x1.5=3.0m	1x1=1.0m	Fig. 2.9
3	7650	10100	2.450	2x1.5=3.0m	1x1=1.0m	Fig. 2.9
4	10100	10400	0.300	2x1.5=3.0m	1x1=1.0m	Fig. 2.9a (New)

5	11450	12900	1.450	2x1.5=3.0m	1x1=1.0m	Fig. 2.9
6	13400	14600	1.200	2x1.5=3.0m	1x1=1.0m	Fig. 2.9
7	15000	16290	1.290	2x1.5=3.0m	1x1=1.0m	Fig. 2.9
	Total		=8.190			

(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.

(vi) Lateral and vertical clearances at underpasses

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

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

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

(vii) Lateral and vertical clearances at overpasses

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

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

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

(viii) Service roads

Service roads shall be constructed at the locations and for the lengths indicated below: [Refer to paragraph 2.13 of the Manual and provide details]

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

(ix) Grade separated structures

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

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

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

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

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

(x) Cattle and pedestrian underpass /overpass

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

Sl. No.	Location	Type of crossing
NIL		

(xi) Typical cross-sections of the Project Highway

Des Ch From (Km)	Des Ch To (Km)	Length (km)	TCS type	Remarks
0	2400	2.4	TCS 2.1	Manu Village
2400	2650	0.3	TCS 2.9	Open Country
2650	4700	2.1	TCS 2.1	Mainama Village
4700	5950	1.3	TCS 2.9	Open Country
5950	7650	1.7	TCS 2.1	Chalengta Village
7650	10100	2.5	TCS 2.9	Open Country
10100	10400	0.3	TCS 2.9a (New)	Open Country
10400	11450	1.1	TCS 2.1	Lalchara Village
11450	12900	1.5	TCS 2.9	Open Country
12900	13400	0.5	TCS 2.1	Open Country
13400	14600	1.2	TCS 2.9	Open Country
14600	15000	0.4	TCS 2.1	Open Country
15000	16290	1.3	TCS 2.9	Open Country

3 INTERSECTIONS AND GRADE SEPARATORS

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

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

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

(i) At-grade intersections

Sl. No.	Location of intersection	Type of intersection	Other features
1	0+000	T-Type	NH-44
2	0+060	Y-Type	Village Road
3	0+200	Y-Type	Village Road
4	0+340	T-Type	Village Road
5	0+650	Y-Type	Village Road
6	1+015	T-Type	Village Road
7	1+425	T-Type	Village Road
8	2+740	Y-Type	Village Road
9	3+520	T-Type	Village Road
10	4+000	T-Type	Village Road
11	4+130	T-Type	Village Road
12	4+360	Y-Type	Village Road
13	4+510	Y-Type	Village Road
14	5+000	T-Type	Village Road
15	5+315	T-Type	Village Road
16	5+960	T-Type	Village Road
17	6+140	T-Type	Village Road
18	6+300	T-Type	Village Road
19	6+805	T-Type	Village Road
20	7+000	Y-Type	Village Road
21	7+290	T-Type	Village Road
22	7+305	T-Type	Village Road
23	7+440	Y-Type	Village Road
24	7+620	Y-Type	Village Road
25	8+080	T-Type	Village Road
26	8+900	T-Type	Village Road
27	9+300	T-Type	Village Road
28	10+365	Y-Type	Village Road
29	11+400	T-Type	Village Road
30	12+410	T-Type	Village Road
31	12+475	Y-Type	Village Road

(ii) Grade separated intersection with/without ramps

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

4 ROAD EMBANKMENT AND CUT SECTION

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications

and Standards given in section 4 of the Manual and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

Note:-

1. Disposal of extra earth obtained by cutting is sole responsibility of contractor.

2. Indicative Muck disposal sites has been given in drawing volume but actual identification & finalization of disposal site is sole responsibility of contractor. The contractor has to acquire land if it is required.

(ii) Raising of the existing road [Refer to paragraph 4.2.2 of the Manual and specify sections to be raised]

The existing road shall be raised in the following sections:

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

5 PAVEMENT DESIGN

(i) Pavement design shall be carried out in accordance with Section 5 of the Manual.

(ii) Type of pavement

[Refer to paragraph 5.1 of the Manual and state specific requirement, if any, of providing cement concrete pavement.]

(iii) Design requirements

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

(a) *Design Period and strategy*

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

(b) *Design Traffic*

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for a design traffic of **30 million standard axles**.

(iv) Reconstruction of stretches

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

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

S.No.	**Stretch**		**Remark**
	From km	**To km**	

1.	0+000	16+290	-

6 ROADSIDE DRAINAGE

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

a) Catch water drain

Sr. No.	Type of TCS	Chainage		Length (m) for both side	Total Length (m)
		From km	To km		
1.	TCS 2.9	2400	2650	1x250	250
2.	TCS 2.9	4700	5950	1x1250	1250
3.	TCS 2.9	7650	10100	1x2450	2450
4.	TCS 2.9a (New)	10100	10400	1x300	300
5.	TCS 2.9	11450	12900	1x1450	1450
6.	TCS 2.9	13400	14600	1x1200	1200
7.	TCS 2.9	15000	16290	1x1290	1290
Total Length					**= 8190 m**

b) Hill side Drain

Sr. No.	Type of TCS	Chainage		Length (m)	Total Length(m)
		From km	To km		
1.	TCS 2.9	2400	2650	1x250	250
2.	TCS 2.9	4700	5950	1x1250	1250
3.	TCS 2.9	7650	10100	1x2450	2450
4.	TCS 2.9a (New)	10100	10400	1x0300	300
5.	TCS 2.9	11450	12900	1x1450	1450
6.	TCS 2.9	13400	14600	1x1200	1200
7.	TCS 2.9	15000	16290	1x1290	1290
Total Length					**= 8.190 km**

7 DESIGN OF STRUCTURES

(i) General

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

(b) 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 (sixty) meter length, if the carriageway width is different from 7.5 (seven point five) meters in the table below.]

Sl No.	Bridge at km	Width of carriageway and cross-sectional features@
1.	3+185	(0.5 x 2) + 11 = 12
2.	6+750	(0.5 x 2) + 11 = 12
3.	7+420	(0.5 x 2) + 11 = 12
4.	10+605	(0.5 x 2) + 11 = 12
5.	10+855	(0.5 x 2) + 11 = 12
6.	11+115	(0.5 x 2) + 11 = 12
7.	13+100	(0.5 x 2) + 11 = 12
8.	13+850	(0.5 x 2) + 11 = 12
9.	14+325	(0.5 x 2) + 11 = 12
10.	14+400	(0.5 x 2) + 11 = 12
11.	14+770	(0.5 x 2) + 11 = 12
12.	15+170	(0.5 x 2) + 11 = 12

(c) 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	Remark
NIL		

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

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

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

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

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

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

(ii) Culverts

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

(b) *Reconstruction of existing culverts:*

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

[Refer to paragraph 7.3 (i) of the Manual and provide details]

Hume Pipe Culvert – 17 Nos

Sl. No.	Culvert Location	Span/Opening (m)	Remarks, if any*
1	0+190	1x1.2	15.000 (Proposed width)
2	0+255	1x1.2	15.000 (Proposed width)
3	0+350	1x1.2	15.000 (Proposed width)
4	1+795	1x1.2	15.000 (Proposed width)
5	7+110	1x1.2	15.000 (Proposed width)
6	7+140	1x1.2	15.000 (Proposed width)
7	8+550	1x1.2	12.000 (Proposed width)
8	10+790	1X1.2	15.000 (Proposed width)
9	10+990	1X1.2	15.000 (Proposed width)
10	12+945	1X1.2	15.000 (Proposed width)
11	13+360	1x1.2	15.000 (Proposed width)
12	13+670	1x1.2	12.000 (Proposed width)
13	13+715	1x1.2	12.000 (Proposed width)
14	14+710	1x1.2	15.000 (Proposed width)
15	14+845	1x1.2	15.000 (Proposed width)
16	15+110	1x1.2	12.000 (Proposed width)

17	15+905	1x1.2	12.000 (Proposed width)

Slab Culvert – 07.

Sl. No.	Culvert Location	Span/Opening (m)	Remarks, if any*
1	11+510	1x2	12.000 (Proposed width)
2	12+760	1x2	15.000 (Proposed width)
3	13+820	1x2	12.000 (Proposed width)
4	14+920	1x2	15.000 (Proposed width)
5	15+040	1x2	15.000 (Proposed width)
6	15+745	1x2	12.000 (Proposed width)
7	16+140	1x2	12.000 (Proposed width)

Box Culvert - 13 Nos.

Sl. No.	Culvert Location	Span/Opening (m)	Remarks, if any*
1	0+275	1X2X2	15.000 (Proposed width)
2	0+680	1X4X3	15.000 (Proposed width)
3	0+770	1X2X2	15.000 (Proposed width)
4	1+040	1X2X2	15.000 (Proposed width)
5	1+185	1X3X3	15.000 (Proposed width)
6	1+500	1x4X4	15.000 (Proposed width)
7	2+450	1X2X2	15.000 (Proposed width)
8	2+665	1X2X3	12.000(Proposed width)
9	4+310	1X2X2	15.000 (Proposed width)
10	4+525	1X3X3	15.000 (Proposed width)
11	7+665	1X3X3	15.000 (Proposed width)
12	8+170	1X3X3	12.000(Proposed width)
13	8+250	1x4X4	12.000(Proposed width)

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

(c) *Widening of existing culverts*

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

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

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

Hume Pipe Culvert –10 Nos.

Sl No.	**Culvert Location**	**Span/Opening** (m)
1	1+560	1x1.2
2	4+250	1x1.2
3	6+040	1x1.2
4	9+080	1x1.2
5	9+165	1x1.2
6	10+060	1x1.2
7	11+550	1X1.2
8	11+735	1x1.2
9	11+945	1x1.2
10	15+460	1x1.2

Slab Culvert –03

Sl No.	**Culvert Location**	**Span/Opening** (m)
1	12+090	1x2
2	12+290	1x2
3	13+540	1x2

Box Culvert – 04 Nos.

Sl No.	**Culvert Location**	**Span/Opening** (m)
1	2+740	1 no. 2x2
2	4+950	1no. 3X3
3	5+445	1 no. 2x2
4	10+555	1 no. 2x2

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

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

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

(iii) Bridges

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

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

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

(a) Major Bridge – NIL

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

(b) Minor Bridge – 12 Nos.

Sl. No.	Bridge location (km)	Salient details of existing bridge	Span Arrangement	Remarks
1	3+185	Steel Bailey Bridge	1X40	12.000(Proposed width)
2	6+750	Steel Bailey Bridge	1X10	12.000(Proposed width)
3	7+420	RCC SLAB	1x8	12.000(Proposed width)
4	10+605	Steel Bailey Bridge	1x21	12.000(Proposed width)
5	10+855	RCC SLAB	1x6	12.000(Proposed width)
6	11+115	Steel Bailey Bridge	1x16	12.000(Proposed width)
7	13+100	Steel Bailey Bridge	1x10	12.000(Proposed width)
8	13+850	Steel Bailey Bridge	1x16	12.000(Proposed width)
9	14+325	Steel Bailey Bridge	1x10	12.000(Proposed width)
10	14+400	HPC	1x6	12.000(Proposed width)
11	14+770	Steel Bailey Bridge	1x8	12.000(Proposed width)
12	15+170	Steel Bailey Bridge	1x10	12.000(Proposed width)

*Attach GAD

(ii) The following narrow bridges shall be widened:

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

@ Attach cross-section

(b) *Additional new bridges*

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

Sl. No.	Location (km)	Total length (m)	Remarks, if any
NIL			

(c) The railings of existing bridges shall be replaced by crash barriers at the following locations:

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

Sl. No.	Location at km	Remarks
NIL		

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

Sl. No.	Location at km	Remarks
NIL		

(e) *Drainage system for bridge decks*

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

(f) *Structures in marine environment*

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

(iv) Rail-road bridges

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

(b) *Road over-bridges*

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

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

(c) *Road under-bridges*

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

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

(v) Grade separated structures

[Refer to paragraph 7.20 of the Manual]

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

(vi) Repairs and strengthening of bridges and structures

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

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

A. Bridges

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

B. ROB / RUB

Sl. No.	Location of ROB/RUB (km)	Nature and extent of repairs /strengthening to be carried out
NIL		

C. Overpasses/Underpasses and other structures

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

(vii) List of Major Bridges and Structures

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

Sl. No.	Location
NIL	

8 TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

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

(ii) Specifications of the reflective sheeting. [Refer to paragraph 9.3 of the Manual and specify]

9. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provisions of Section 11 of the Manual.

(ii) Overhead traffic signs: location and size
As per paragraph 11.5 of the Manual

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 a forestation.]

11 HAZARDOUS LOCATIONS

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

Sl. No.	Location stretch		LHS/RHS
	From (km)	To (km)	
1	2400	2650	On Valley Side as per TCS
2	4700	5950	On Valley Side as per TCS
3	7650	10100	On Valley Side as per TCS
4	10100	10400	On Valley Side as per TCS

5	11450	12900	On Valley Side as per TCS
6	13400	14600	On Valley Side as per TCS
7	15000	16290	On Valley Side as per TCS

12 SPECIAL REQUIREMENT FOR HILL ROADS

[Refer to paragraphs 14.5 and 14.8 of the Manual and provide details where relevant and required.]

Special requirement for hill roads in accordance with the provisions of section 14 of the manual shall be provided in the following locations:-

a) Retaining Wall

S.No.	Existing Chainage (In km.)		Design Chainage (In km.)		Length (km)	Remarks
	From	To	From	To		
1	2.810	3.015	2.700	2.900	0.200	Hilly portion. Retaining wall shall be designed and provided as per the technical requirement in consultation with the Authority Engineer subject to minimum length of 2730 metre.
2	4.270	4.300	4.120	4.150	0.030	
3	4.340	4.370	4.190	4.220	0.030	
4	4.475	4.470	4.275	4.320	0.045	
5	4.440	4.500	4.290	4.350	0.060	
6	4.540	4.575	4.390	4.425	0.035	
7	4.620	4.700	4.470	4.550	0.080	
8	4.790	4.840	4.640	4.690	0.100	
9	5.660	5.875	5.480	5.600	0.240	
10	5.875	5.970	5.600	5.700	0.100	
11	7.405	7.680	7.050	7.300	0.250	
12	8.405	8.480	8.000	8.070	0.070	
13	8.590	8.680	8.180	8.280	0.100	
14	9.250	9.275	8.840	8.870	0.030	
15	9.545	9.660	9.120	9.230	0.110	
16	10.265	10.330	9.830	9.890	0.060	
17	10.385	10.470	9.950	10.030	0.080	
18	10.470	10.640	10.030	10.100	0.140	
19	10.700	11.000	10.100	10.400	0.300	
20	12.225	12.355	11.575	11.700	0.125	
21	12.860	13.025	12.175	12.300	0.125	
22	13.000	13.065	12.280	12.350	0.070	
23	13.100	13.180	12.380	12.450	0.070	
24	13.180	13.280	12.450	12.550	0.100	
25	13.410	13.440	12.680	12.710	0.030	
26	16.335	16.445	15.400	15.550	0.150	
		Total			=2.730	

b) Breast wall

Sl. No.	Type of TCS	Location stretch		Length (m) for both side	Total Length (m)
		From (km)	To (km)		
1	TCS 2.9a (New)	10.100	10.400	1 x 300	300
Total Length					= 0.300 (km)

13 CHANGE OF SCOPE

The length of Structures and bridges specified hereinabove shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule-B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

(Schedule-B-1)

1. The shifting of utilities and felling of trees shall be carried out by the Contractor. The cost of the same shall be borne by the Authority. The details of utilities are as follows:

Sr. No	Type of Utility	Unit	Quantity	Location/stretch (LHS/RHS)
A	Electrical Utilities		As Per TSECL & DWS Estimates	
A1	Electrical Poles	Nos.		
A2	Electrical cables	meters		
A3	Transformers	Nos.		
-	-----	-		
-	------	-		
B	Water/Sewage pipeline			
B1	Sewage	meters		
B2	Water supply	meters		
-	------	-		
-	------	-		
C	Felling of Tress	Nos.		

SCHEDULE - C
(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

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

(a) toll plaza[s];

(b) roadside furniture;

(c) pedestrian facilities;

(c) tree plantation;

(e) truck lay-byes;

(d) bus-bays and bus shelters;

(h) rest areas; and

(i) others to be specified

2 Description of Project Facilities

Each of the Project Facilities is described below:

S. No.	Project Facility	Location	Design Requirement	Other essential details
1	Bus bay & Bus Shelter	Manu	1+050	-
2	Bus bay & Bus Shelter	Mainama	2+550	-
3	Bus bay & Bus Shelter	Mainama	3+550	-
4	Bus bay & Bus Shelter	Chalengeta	5+700	-
5	Bus bay & Bus Shelter	Chalengeta	7+250	-
6	Bus bay & Bus Shelter	Lalcherra	10+300	-
7	Bus bay & Bus Shelter	Lalcherra	11+850	-

Note: Provide adequate details of each Project Facility to ensure their design and completion in accordance with the project-specific requirements and the provisions of the Manual.

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), referred to herein as the Manual]

[Note: Specify the relevant Manual, Specifications and Standards]

Annex - I
(Schedule-D)

Specifications and Standards for Construction

1 Specifications and Standards

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

2 Deviations from the Specifications and Standards

(i) The terms "Concessionaire", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer" and "Agreement" respectively.

(ii) [Notwithstanding anything to the contrary contained in Paragraph 1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below:]

(iii) [Note 1: Deviations from the aforesaid Specifications and Standards shall be listed out here. Such deviations shall be specified only if they are considered essential in view of project-specific requirements.]

Sr. No.	Cl. No.	Provisions in Clause	Deviation from Manual
1	TCS-2.9a(New)	New Typical Cross Section	Reconstruction in Two Lane Road with Paved shoulders in Hilly Terrain with Hill side drain and breast wall

With Reference to clause no. 2.9.4 of IRC Sp 73-2015, Radius of horizontal curve is restricted at locations listed below:-

Sl. No.	Stretch		Radius of Curve(m)	Reason
	From	To		
1.	15	188	155	P/R Terrain (Built up)
2.	222	456	155	P/R Terrain (Built up)
3.	547	648	155	P/R Terrain (Built up)
4.	651	825	155	P/R Terrain (Built up)
5.	851	1005	155	P/R Terrain (Built up)
6.	6582	6808	155	P/R Terrain (Built

				up)
7.	6989	7164	155	P/R Terrain (Built up)
8.	7318	7496	155	P/R Terrain (Built up)
9.	10586	10949	155	P/R Terrain (Built up)

Appendix D-I

Typical Cross Sections

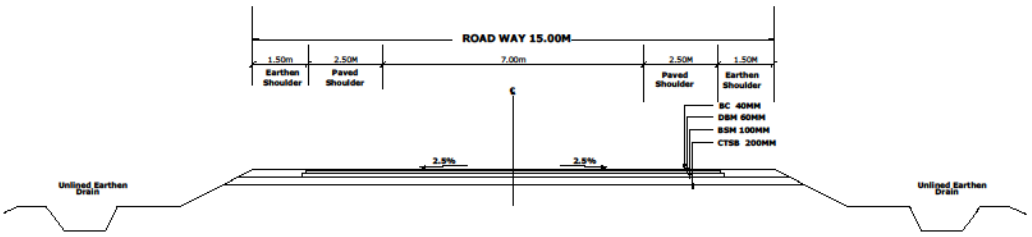

Fig - 2.1
Typical Cross Section
(Open Country - Plain/Rolling Terrain)
2- lane Carriageway (With Paved Shoulders) Without service road

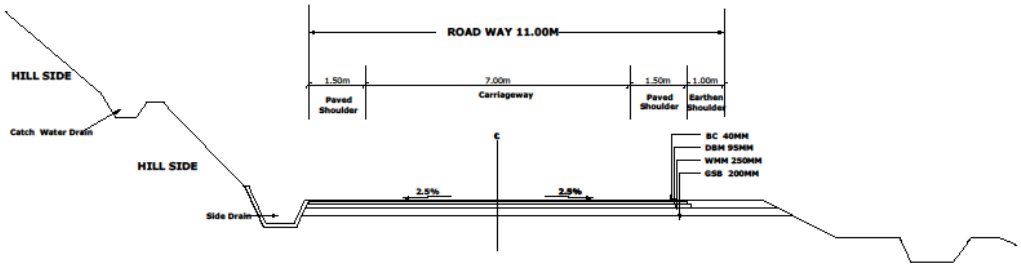

Fig - 2.9
Typical Cross Section (Hilly Terrain)
(With Hill Side Drain One Side)
2- lane Carriageway (With Paved Shoulders)

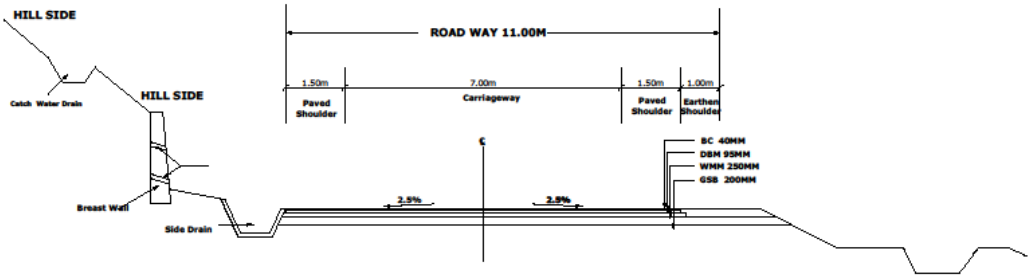

Fig - 2.9A (NEW)
Typical Cross Section (Hilly Terrain)
(With Hill Side Drain One Side)
2- lane Carriageway (With Paved Shoulders)

SCHEDULE - E
(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

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

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

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

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex - I
(Schedule-E)

Repair/rectification of Defects and deficiencies

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

Table – 1 Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm indepth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82- 2015
	Bleeding	Nil	< 0.1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Raveling / Stripping	Nil	< 0.1 % of area	Daily			7-15 days	IRC:82- 2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily	Scale, Tape, odometer etc.			IRC:82- 2015
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-			180 days	BS: 7941-1: 2006

				Annually	(Sideway-force Coefficient Routine Investigation Machine or equivalent)	Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment		
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82- 2015
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82- 2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflect meter	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade Structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Roughness BI	2200m m/km	2400mm /km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	RC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN	**Traffic Speed (Km/h)**					
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

Embankment/ Slope	Edge drop at shoulders	Nil	40 mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe side slope	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

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

Table -2: Maintenance Criteria for Rigid Pavements:

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
CRACKING						
1.	Single Discrete Cracks Not intersecting with any joint	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car		Seal, and stitch if L > lm.
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car	Seal without delay	Within 7days
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m.	Staple or Dowel Bar Retrofit, FDR for affected portion.
			5	w > 3 mm.	Within 7 days	Within 15days
2.	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy.	Staple or Dowel Bar Retrofit.
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle	Within 7 days	Within 15 days
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit.	Full Depth Repair

			5	w > 6 mm, usually associated with spelling, and/or slab rocking under traffic	Within 15 days Not Applicable, as it may be full depth	Dismantle and reconstruct affected. Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
3	Single Longitudinal Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > l m. Within 15 days	
			3	w = 3.0 – 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15days
			4	w = 6.0 - 12.0 mm, usually associated with spalling		
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4

						Within 15days
4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m.	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle	Within 15 days	
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate Sub-base, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to	Seal with epoxy seal with epoxy
			2	w < 1.5 mm; L < 0.6 m, only one corner broken	secure broken parts Within 7 days	Within 7 days
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken	IRC:SP: 83-2008) Within 15 days	Reinstate sub-base,

			5	three or four corners broken		and reconstruct the slab as per norms and specifications within 30days
6	Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)	w = width of crack L = length (m/m2)	0	Nil, not discernible	**Not Applicable, as it may be full depth**	No Action
			1	w < 0.5 mm; L < 3 m/m2		Seal with low viscosity epoxy to secure broken parts. Within 15 days
			2	either w > 0.5 mm or L < 3 m/m2		
			3	w > 1.5 mm and L < 3 m/m2		
			4	w > 3 mm, L < 3 m/m2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage Reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m2 and deformation		
7	Raveling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	No Action	
			1	r < 2 %	Local repair of areas Damaged	
			2	r = 2 - 10 %	and liable to be damaged. Within 15 days	
			3	r = 10-25%	Bonded Inlay, 2 or 3	

					slabs if	
			4	r = 25 - 50 %	Affecting Within 30 days	
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	Scaling	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	Short Term No Action	Long Term
			1	r < 2 %	Local repair of areas Damaged and liable to be damaged. Within 7days Bonded Inlay within 15 Days	
			2	r = 2 - 10 %		
			3	r = 10 - 20%		
			4	r = 10 - 30%	Reconstruct slab within 30 days	
			5	r>30 % and h> 25mm		
9	Polished Surface/Glazing	t = texture depth, sand patch test	0		No action	

			1	t > 1 mm		Not Applicable
			2	t = 1 – 0.6 mm		
			3	t = 0.6 – 0.3 mm	Monitor rate of deterioration	
			4	t = 0.3 – 0.1 mm	Diamond Grinding if Affecting 50% or more slabs in a	
			5	t < 0.1 mm	Continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m^2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m^2	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m^2	Partial depth repair 110mm	
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m^2	i.e.10 mm more than	

			4 5	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m^2 d > 300 mm; h > 100 mm: n > 1 per 5 m^2	the depth of the hole. Within 30 days Full depth repair. Within 30 days	
11	Joint Seal Defects	loss or damage L = Length as % total joint length	0	Difficult to discern.	No action.	Not Applicable
			1 2	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material. Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean joint, inspect later. Clean and reapply sealant in Selected locations. Within 7 days	
			4	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	Spalling of Joints	w = width on either side of the joint L = length of spalled	0	Nil, not discernible	No action. Apply low viscosity	

		portion (as % joint length)	1 2 3 4 5	w < 10 mm w = 10 - 20 mm, L < 25% w = 20 - 40 mm, L > 25% w = 40 - 80 mm, L > 25% w > 80 mm, and L > 25%	epoxy resin/ mortar in cracked portion. Within 7 days Partial Depth Repair. Within 15 days 30 - 50 mm deep, h = w + 20% of w, within 30 days 50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	Not Applicable
13	Faulting (or Stepping) in Cracks or Joints	f = difference of level	0 1	not discernible, < 1 mm f < 3 mm	No action.	No action.
			2 3	f = 3 - 6 mm f = 6 - 12 mm	Determine cause and observe, take action for diamond grinding Diamond Grinding	Replace the slab as appropriate. Within 30days

			4 5	f= 12 - 18 mm f> 18 mm	Raise sunken slab. Strengthen sub-grade and sub-base by grouting and raising sunken slab	Replace the slab as appropriate. Within 30days
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	No Action	
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic	
			3	h = 12 - 25 mm	within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	Depression	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	

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

			5	h > 100 mm	length < 20 m. Within 30 days	
17	Bump	h = vertical displacement from normal profile	0	h < 4 mm	No action	
			1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			4	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level			**Short Term**	**Long Term**
			0	Nil, not discernible < 3mm	No Action	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		

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

		blockage of drains				
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do	

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

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.			Monthly	Manual Measurements with O dometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments. In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP 84-2014
		Design Speed, kmph	**Desirable Minimum Sight Distance (m)**	**Safe Stopping Sight Distance (m)**					
		100	360	180					
		80	260	130					
Pavement Marking	Wear	<70% of marking remaining			Bi-Annually	**Visual Assessment as per Annexure-F**	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect -	IRC:35-2015

<table>
<tr><td></td><td></td><td></td><td></td><td>of IRC:35-2015</td><td></td><td>within 2 months</td><td></td></tr>
<tr><td></td><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m2/lux
Bituminous Road - 100mcd/m2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td rowspan="6">Night Time Visibility</td><td colspan="3"><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u></td><td rowspan="6">Bi-Annually</td><td rowspan="6">As per Annexure-E of IRC:35-2015</td><td rowspan="6">Re - painting</td><td rowspan="6">Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months</td><td rowspan="6">IRC:35-2015</td></tr>
<tr><td></td><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m2/lux)</td></tr>
<tr><td></td><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td></td><td>65-100</td><td>250</td><td>120</td></tr>
<tr><td></td><td>Above 100</td><td>350</td><td>150</td></tr>
<tr><td></td><td colspan="3">Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</td></tr>
<tr><td>Road Signs</td><td>Shape and Position</td><td>Shape and Position as per IRC:67-2012.
Signboard should be clearly visible for
the design speed of the section.</td><td>Daily</td><td>Visual with video/image backup</td><td>Improvement of shape, in case if shape is damaged.

Relocation as Per requirement</td><td>48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of</td><td>IRC:67-2012</td></tr>
</table>

						Gantry/Cantilever Sign boards	
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of Each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/ Cantilever Sign boards	IRC:67-2012
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	IRC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	IRC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84-2014,

				backup			IRC:119- 2015
	End Treatment of Traffic Safety Barriers	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119- 2015
	Attenuators	Functionality: Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119- 2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014

Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, busshelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pipe/box/ slab culverts	Free waterway / unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurall	Spalling of	Bi-	Detailed	Repairs to	15 days	IRC SP 40-

	y sound	concrete not more than 0.25 sqm Delamination of concrete not more than 0.25 sq.m. Cracks wider than 0.3 mm not more than 1m aggregatelength	Annually	inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993.		1993 and MORTH Specifications clause 2800
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concreteapron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridges including	Riding quality or	No pothole in	Daily	Visual inspectio	Repairs to BC or wearing	15 days	MORT&H Specificati

ROBs Flyover etc. as applicable	user comfort	wearing coat on bridge deck		n as per IRC SP:35-1990	coat		on 2811
Bridge - Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	**3** days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.
	Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990	All the corroded reinforcement shall need to be thoroughly	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m					

	Delamination	Not more than 0.50 sq.m		using Mobile Bridge Inspection Unit	cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.		
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700

				Bridge Inspection Unit			
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993.

		through expansion joint in case of buried and asphalt plug and copper strip joint					
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specification s 2600 and IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab.	3 days	MORTH specification 2700.

					Providing sealant around the drainage spout if any leakages observed		
Bridge-substructure	Cracks/ spalling of concrete/ Rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
	Bearings	Delaminatin	Bi-	Detailed	In case of	3 months	MORTH

		g of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Annually	condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	failure of even one bearing on any pier/abutment, all the bearings on that pier/ abutment shall be replaced, in order to get uniform load transfer on to bearings.		specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual Inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of oubt, use	suitable protection works around pier/abutment	1 months	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500

				Underwater camera for inspection of deep wells in major Rivers.			
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days After defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

(vi)	Damage to road mark ups	7 (seven) days
(d) Road lighting		
(i)	Any major failure of the system	24 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e) Trees and plantation		
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(vi)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f) Rest area		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g) [Toll Plaza]		
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a) Superstructure		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b) Foundations		
(i)	Scouring and/or cavitation	15 (fifteen) days
(c) Piers, abutments, return walls and wing walls		
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d) Bearings (metallic) of bridges		

(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e) Joints		
(i)	Malfunctioning of joints	15 (fifteen) days
(f) Other items		
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(vi)	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

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

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

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

(c) License for use of explosives;

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

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

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

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

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

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

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

SCHEDULE – G

(See Clauses 7.1 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

(See Clause 7.1)

[Performance Security/Additional Performance Security]

[DG(RD)&SS,

Ministry of Road Transport & Highways Transport Bhawan, New Delhi]

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 the construction of the **"Rehabilitation and up-gradation of road from km 0.000 to km 16.290 (Total length: 16.29 km) of Manu-Lalchara section on NH-44A to two lane with paved shoulder in the state of Tripura on EPC basis-(Package-I)"**, subject to and in accordance with the provisions of the Agreement

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

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision

that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

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

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

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

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized 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 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 opera table at our …….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension/ renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation

13. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

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

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:
(Signature)
(Name)
(Designation)
(Code Number)
(Address)

NOTES:

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

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

Annex – II
(Schedule - G)
(See Clause 19.2)

Form for Guarantee for Withdrawal of Retention Money

[DG(RD)&SS,

Ministry of Road Transport & Highways Transport Bhawan, New Delhi]

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "Agreement") with the NHIDCL, (hereinafter called the "**Authority**") for the construction of the **"Rehabilitation and up-gradation of road from km 0.000 to km 16.290 (Total length: 16.29 km) of Manu- Lalchara section on NH-44A to two lane with paved shoulder in the state of Tripura on EPC basis- (Package-I)"**, subject to and in accordance with the provisions of the Agreement.

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

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid 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.

   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.

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

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

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

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

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

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

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

9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at

the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

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

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

12. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

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

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Schedule - H
(See Clauses10.1 (iv) and
19.3)
Contract Price Weightages

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

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road works including culverts, widening and repair of culverts.	[58.56%]	**A- Widening and strengthening of existing road**	
		(1)Earthwork up to top of the sub-grade	[4.03%]
		(2) sub-base Course	[16.89%]
		(3) Non Bituminous base Course	[0%]
		(4) Bituminous Base Course	[43.93%]
		(5) Wearing coat	[13.25%]
		(6) Widening and repair of culvert	[0%]
		B.1- Reconstruction New 2-lane realignment/bypass (Flexible pavement)	
		(1) Earthwork up to top of the sub-grade	[0%]
		(2) sub-base Course	[0%]
		(3) Non Bituminous base Course	[0%]
		(4) Bituminous Base Course	[0%]
		(5) Wearing coat	[0%]
		B.2- Reconstruction/ New 2-lane realignment/bypass (Rigid pavement)	
		(1)Earthwork up to top of the sub-grade	[0%]
		(2) sub-base Course	[0%]
		(3)Dry lean concrete (DLC) Course	[0%]
		(4) Pavement quality control (PQC) course	[0%]
		C.1- Reconstruction/ New Service Road (Flexible pavement)	
		(1) Earthwork up to top of the sub-grade	[0%]
		(2) sub-base Course	[0%]
		(3) Non Bituminous base Course	[0%]
		(4) Bituminous Base Course	[0%]
		(5) Wearing coat	[0%]
		C.2-Reconstruction/ New Service Road (Rigid pavement)	
		(1) Earthwork up to top of the sub-grade	[0%]
		(2) sub-base Course	[0%]
		(3)Dry lean concrete (DLC) Course	[0%]
		(4) Pavement quality control (PQC) course	[0%]
		D-Re-construction/ New culverts on	

		existing road, realignments, bypasses: Culvert (Length<6m)	[21.97%]
Minor Bridge/ Underpasses/Overpasses	24.95%	**A.1- Widening and repairs of Minor Bridges (length>6m and <60m)** Minor bridges **A.2 New Minor Bridges (length>6m and <60m)** (1) **Foundation +Sub-Structure**: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap. (2)**Super Structure:** On completion of the super-structure in all respects including Girder, Deck slab, bearings (3)**Approaches:** On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect, tests on completion in all respect and fit for use (4)**Guide Bunds and River Training Works:** On completion of Guide Bunds and River Training Works complete in all respect. **B-1 Widening and repair of underpasses/ overpasses** Underpasses/ Overpasses **B-2 New underpasses/ overpasses** **(1) Foundation +Substructure:** On completion of the foundation work including foundation for wing and return wall, abutments, piers upto the abutment/pier cap. **(2)Super Structure:** On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Over pass wearing coat 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. (3) **Approaches:** On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[0%] [75.53%] [20.64%] [2.05%] [1.78%] [0%] [0%] [0%] [0%] [0%]

Major Bridges (length>60m) work and ROB/RUB/elevated section/ flyover including viaducts, if any	0%	**A-1 Widening and repair of Major Bridges** (1) Foundation (2) Sub-structure (3) Super-structure including bearings. (4) wearing coat including expansion joints (5) Miscellaneous Items like hand rails, crash barriers, road markings etc.) (6)Wing walls/return walls up to top (7) Guide bunds, river Training works etc. (8)Approaches (including Retaining walls, stone pitching and protection works) **A.2New Major Bridges** (1) Foundation (2) Sub-structure (3) Super-structure including bearings. (4) wearing coat including expansion joints (5) Miscellaneous Items like hand rails, crash barriers, road markings etc.) (6)Wing walls/return walls (7) Guide bunds, river Training works etc. (8)Approaches (including Retaining walls, stone pitching and protection works) **B.1- Widening and repair of** **(a) ROB** **(b) RUB** (1) Foundation (2) Sub-structure (3) Super-structure (including bearings) **(4) wearing coat: (a)** in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified and specified. (5) Miscellaneous Items like hand rails, crash barriers, road markings etc.) (6)Wing walls/return walls (7)Approaches (including Retaining walls stone pitching and protection works) **B.2- New ROB/ RUB** **(a) ROB** **(b) RUB** (1) Foundation (2) Sub-structure (3) Super-structure (including bearings) **(4) wearing coat: (a)** in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified and specified.	[0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%]

		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.) (6)Wing walls/return walls (7)Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works) **C.1- Widening and repair of Elevated Section/Flyovers/Grade separators** 1) Foundation (2) Sub-structure (3) Super-structure (including bearings) (4) wearing coat including expansion joints (5) Miscellaneous Items like hand rails, crash barriers, road markings etc.) (6)Wing walls/return walls (7)Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works) **C.2- New Elevated Section/Flyovers/Grade separators** (1) Foundation (2) Sub-structure (3) Super-structure (including bearings) (4) wearing coat including expansion joints (5) Miscellaneous Items like hand rails, crash barriers, road markings etc.) (6)Wing walls/return walls (7)Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%] [0%]
Other works	16.48% (a) Bus Ba-=ys (b) Truck lay byes (c) Rest Areas (d) Others	(i) Toll Plaza (ii) Road side drains (iii) Road signs, marking, km stones, safety devices,… (iv) Project facilities (a) Bus bays (b) Truck lay-byes (c) Rest areas (d) Others (v) Road side plantation (vi) Repair of protection works other than approaches to the bridges, elevated sections/ flyovers/grade separators and ROBs/RUBs. (vii) Safety and traffic management during construction (viii) Site Clearance (ix) Retaining Wall	[0%] [12.90%] [15.82%] [13.29%] [0%] [0%] [0%] [0%] [0%] [0.05%] [1.40%] [56.55%]

Procedure of estimating the value of work done

(i) Road works

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

Table 1.3.1

Stage of Payment	**Percentage -weightage**	**Payment Procedure**
A-Widening and strengthening of road (1) Earthwork up to top of the sub-grade	4.03 %	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(2) sub-base Course	16.83 %	
(3) Non Bituminous Base course	0 %	
(4) Bituminous Base course	43.93 %	
(5) Wearing Coat	13.25 %	
(6) Widening and repair of culverts	0%	Cost of completed culverts shall be determined on pro rata with respect to the total number of culverts. The Payment shall be made on the completion of at least five culverts.
B.1Reconstruction/ New 2-lane realignment, bypass (flexible pavement) (1) Earthwork up to top of the sub-grade	0%	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.
(2) sub-base Course	0%	
(3) Non Bituminous Base course	0%	
(4) Bituminous Base course	0%	
(5) Wearing Coat	0%	
B.2Reconstruction/ New 2-lane realignment, bypass **(Rigid pavement)** (1)Earthwork up to top of the sub-grade	0 %	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.
(2) sub-base Course	0 %	
(3)Dry lean concrete (DLC) Course	0 %	
(4) Pavement quality control (PQC) course	0 %	
C.1-Reconstruction/ New Service Road (flexible pavement) (1) Earthwork up to top of the sub-grade	0 %	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.
(2) sub-base Course	0%	
(3) Non Bituminous Base course	0 %	
(4) Bituminous Base course	0%	
(5) Wearing Coat	0 %	

C.2Reconstruction/ New Service Road **(Rigid pavement)** (1)Earthwork up to top of the sub-grade	0 %	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.
(2) sub-base Course	0 %	
(3)Dry lean concrete (DLC) Course	0 %	
(4) Pavement quality control (PQC) course	0 %	
D. Re-construction and new culverts on existing road, realignments, bypasses: (1)Culvert (length<6m)	21.97 %	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 one culverts.

@. 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 shall be worked out accordingly.

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 affected and referred in other clauses of the contract Agreement.

(ii) Minor Bridge and underpasses/Overpasses.

Procedure for estimating the value of minor Bridge and underpasses/Overpasses shall be as stated in table 1.3.2:

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
A- Widening and repairs of minor bridges (length>6m and < 60m)	0%	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 completion of widening & repair works of a minor Bridge.

A.2-New Minor bridges (length>6m and < 60m) (1) **Foundation +Sub-Structure**: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	75.53%	(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 + substructure of each bridge subject to completion of at least two foundations along with sub-structure up to 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.
(2) Super-structure: On completion of the superstructure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	20.64%	**Super-structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super-structure of at least one span in all respects as specified in the column of "Stage of payment" in this sub clause.
(3) Approaches: On completion of approaches including retaining wall, stone pitching, protection work complete in all respects & fit for use.	2.05%	**Approaches:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of approaches in all respects as specified in the column of "Stage of payment" in this sub clause.
(4) Guide Bunds and River Training works: On completion Guide Bunds and River Training works complete in all respects	1.78%	**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 complete in all respects as specification.
B.1 Widening and repairs of underpasses/overpasses	0%	Cost of each underpasses/overpasses shall be determined on pro rata basis with respect to the total linear length of the underpasses/overpasses. Payment shall be made on completion of widening & repair works of a underpasses/overpass.
B.2-New underpasses/overpasses: **(i) Foundation +Sub-**		**Foundation:** Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total

Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	0%	linear length (m) of the underpass/overpass. 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 of each underpass/overpass subject to completion of at least two foundations along with sub-structure up to 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 superstructure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs &markings, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass- wearing coat 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.	0%	**Super-structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super-structure of at least 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 for use.	0%	Approaches: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified.

(iii) 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	Weightage	Payment Procedure

A.1- Widening and repairs of Major bridges **(i)Foundation:**	0%	**Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridges. 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 at least Two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2)Substructure:	0%	**Substructure:** Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of substructure of the major bridge subject to completion of atleast two sub-structures of abutments /piers upto abutment/pier cap level of the major bridge.
(3) Super-structure: including bearings.	0%	**Super-structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super-structure including bearing of at least one span in all respects as specified.
(4) Wearing Coat including expansion Joints	0%	**Wearing Coat:-** Payment shall be made on completion of wearing coat including expansion joint complete in all respects as specified.
(5) Miscellaneous Items like Hand Rails, Crash Barriers, Road Markings etc.	0%	**Miscellaneous:** Payment shall be made on Completion of all Misc Works like Hand Rails, Crash Barriers, Road Markings etc. complete in all respects as specified.
(6) Wing Walls/Return Walls	0%	**Wing Walls/Return Walls:** Payment shall be made on Completion of all wing walls/Return walls complete in all respects as specified.

(7) Guide Bunds and River Training works, etc.	0%	**Guide Bunds and River Training works:** Payment shall be made on completion of all Guide Bunds/River Training works etc. complete in all respects as specified.
(8) Approaches: (including retaining walls, stone pitching, protection works)	0%	**Approaches:** Payment shall be made on pro rata basis on completion of 10% of the scope of each stage.
A.2- New Major bridges **(i)Foundation:**	0%	**Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridges. 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 at least Two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2)Substructure:	0%	**Substructure:** payment against substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of substructure of major bridge subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(3) Super-structure: including bearings.	0%	**Super-structure:** Payment shall be made on pro rata basis on completion of a stage i.e. completion of super-structure including bearing of at least one span in all respects as specified.
(4) Wearing Coat including expansion Joints	0%	**Wearing Coat:-** Payment shall be made on completion of wearing coat including expansion joint complete in all respects as specified.

(5) Miscellaneous Items like Hand Rails, Crash Barriers, Road Markings etc.	0%	**Miscellaneous:** Payment shall be made on Completion of all Misc Works like Hand Rails, Crash Barriers, Road Markings etc. complete in all respects as specified.
(6) Wing Walls/Return Walls	0%	**Wing Walls/Return Walls :** Payment shall be made on Completion of all wing walls/Return walls complete in all respects as specified.
(7) Guide Bunds and River Training works, etc.	0%	**Guide Bunds and River Training works:** Payment shall be made on completion of all Guide Bunds/River Training works etc. complete in all respects as specified.
(8) Approaches: (including retaining walls, stone pitching, protection works)	0%	**Approaches:** Payment shall be made on pro rata basis on completion of 10% of the scope of each stage.
B.1- Widening and repairs of **(a) ROB** **(b) RUB** (1)Foundation	0%	(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 prorate 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 at least two foundations 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.
(2) Sub-structure:	0%	(ii) Sub-Structure:. Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of substructure of the ROB/RUB subject to completion of at least two sub-structures of abutments /piers upto abutment/pier cap level of the ROB/RUB.
(3) Super-structure (including bearings)	0%	**(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.

(4) Wearing coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as Specified.	0%	**(iv) Wearing coat:** Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.
(5) Miscellaneous Items like hand rail, crash barriers, road markings etc.	0%	**(v) Miscellaneous:** Payment shall be made on completion of miscellaneous work like hand rail, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0%	**(vi) Wing walls/return walls:** Payment shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches: (including Retaining walls, stone pitching and protection works)	0%	**Approaches:** Payment shall be made on pro rata basis on completion of a stage in all respect as specified.
B.2- New ROB/RUB (1)Foundation	0%	(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 prorate 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 at least two foundations 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.
(2) Sub-structure:	0%	(ii) Sub-Structure:. Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of substructure of the ROB/RUB subject to completion of at least two sub-structures of abutments /piers upto abutment/pier cap level of the ROB/RUB.
(3) Super-structure (including bearings)	0%	**(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.
(4) Wearing coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as Specified.	0%	**(iv) Wearing coat:** Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.
(5) Miscellaneous Items like hand rail, crash barriers, road markings etc.	0%	**(v) Miscellaneous:** Payment shall be made on completion of miscellaneous work like hand rail, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0%	**(vi) Wing walls/return walls:** Payment shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches: (including Retaining walls, stone pitching and protection works)	0%	**Approaches:** Payment shall be made on pro rata basis on completion of a stage in all respect as specified.
C.1- Widening & Repairs of Elevated Section/Flyovers/Grade Seperators. (1)Foundation	0%	(i) Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on prorate basis on completion of a stage i.e. not less than 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 include load testing also where specified.
(2) Sub-structure:	0%	**(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 Structure subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the structure..

(3) Super-structure: including Bearings.	0%	**(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.
(4) Wearing coat including expansion joints.	0%	**(iv) Wearing coat:** Payment shall be made on completion of wearing coat including expansion Joints Complete in all respect as specified.
(5) Miscellaneous Items like hand rail, crash barriers, road markings etc.	0%	**(v) Miscellaneous:** Payment shall be made on completion of miscellaneous work like hand rail, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0%	**(vi) Wing walls/return walls:** Payment shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches: (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0%	Payment shall be made on pro rata basis on completion of a stage in all respect as specified.
C.2- New Elevated Section/Flyovers/Grade Seperators. (1)Foundation	0%	(i) Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on prorate basis on completion of a stage i.e. not less than 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 include load testing also where specified.
(2) Sub-structure:	0%	**(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 Structure subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the structure..

(3) Super-structure : including Bearings.	0%	**(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.
(4) Wearing coat including expansion joints.	0%	**(iv) Wearing coat:** Payment shall be made on completion of wearing coat including expansion Joints Complete in all respect as specified.
(5) Miscellaneous Items like hand rail, crash barriers, road markings etc.	0%	**(v) Miscellaneous:** Payment shall be made on completion of miscellaneous work like hand rail, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0%	**(vi) Wing walls/return walls:** Payment shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches: (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0%	Payment shall be made on pro rata basis on completion of a stage in all respect as specified.

Note: (1) In case of innovate Major Bridge projects like cable suspension/cable stayed/ Extra Dozed and exceptionally long span bridges, the schedule may be modified as per site requirements before bidding with due approval of DG(RD)&SS, MoRT&H.

(2) The Schedule for exclusive tunnel projects may be prepared as per site requirements before bidding with due approval of DG(RD)&SS, MoRT&H.

(iv) Other works.

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Toll plaza	0%	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	12.90%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 % (ten per cent) of the total length.
(iii) Road signs, markings, km stones, safety devices,…	15.82	

(iv) Project Facilities a) Bus bays b) Truck lay-byes c) Rest areas d) others	 13.29% 0% 0%	Payment shall be made on pro rata basis for completed facilities.
(v)Road side plantation	0%	
(vi) Repair of protection works other than approaches to the bridges, elevated sections/ flyovers/grade separators and ROBs/RUBs.	0.05%	
(vii) Safety and traffic management during construction (viii) Site Clearance (ix)) Retaining Wall	0% 1.40% 56.55%	Payment shall be made on pro rata basis every six months.

2. Procedure for payment for Maintenance

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

b) Payment for Maintenance shall be made in quarterly instalments in accordance with the provisions of Clause 19.7

SCHEDULE - I
(See Clause 10.2 (iv))

DRAWINGS

1 Drawings

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

2 Additional Drawings

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

Annex – I

(Schedule - I)

List of Drawings

1. A minimum list of the drawings of the various components/elements of the project highway and project facility required to be submitted by the Contractor is given below:

(a) Drawing of horizontal alignment, vertical profile and detailed cross sections

(b) Drawings of cross drainage works i.e. Bridges/Culverts/Flyovers and Other Structures.

(c) Drawings for River Training works

(d) Drawings of interchanges, major intersections and underpasses

(e) Drawing of control centre

(f) Drawings of road furniture items including traffic signage, marking, safety barriers, etc.

(g) Drawings of traffic diversions plans and traffic control measures

(h) Drawings of road drainage measures

(i) Drawings of typical details slope protection measures

(j) Drawings of landscaping and horticulture

(k) Drawings of pedestrian crossing

(k) Drawings of street lighting

(l) Any other drawings as per instruction of Authority Engineer

(m) General Arrangement showing Base Camp and Administrative Block

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the 55th day from then Appointed Date (the "Project Milestone- I").

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

3. Project Milestone-II

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

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

4. Project Milestone-III

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

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

5. Scheduled Completion Date

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

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

6. Extension of time

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

SCHEDULE - K
(See Clause 12.1 (ii))

Tests on Completion

1 Schedule for Tests

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

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

2 Tests

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

(ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a Network Survey Vehicle (NSV) fitted with latest equipments and

the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each 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.

3.1 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 **"Rehabilitation and up-gradation of road from km 0.000 to km 16.290 (Total length: 16.29 km) of Manu- Lalchara section on NH-44A to two lane with paved shoulder in the state of Tripura on EPC basis- (Package-I)"** (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	20%

	foundations	
(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")# **"Rehabilitation and up-gradation of road from km 0.000 to km 16.290 (Total length: 16.29 km) of Manu- Lalchara section on NH-44A to two lane with paved shoulder in the state of Tripura on EPC basis- (Package-I)"** 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 **"Rehabilitation and up-gradation of road from km 0.000 to km 16.290 (Total length: 16.29 km) of Manu-Lalchara section on NH-44A to two lane with paved shoulder in the state of Tripura on EPC basis-(Package-I)"** (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 *****