Schedules

SCHEDULE - A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1. ***The Site***

(i) The Project road starts from intersection with NH- 8 (old no. NH-44) at Khayerpur and passes through old Agartala, East & North Champamura, Mekhlipara, Nagicherra, Malay Nagar, Ghoshpara, Dukli, Madhuban and ends at Amtali Junction (the starting point of Agartala-Udaipur Project).

The existing length of Project road is 12.900 km. 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 Annex-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 Project road starts from intersection with NH- 8 (old no. NH-44) at Khayerpur and passes through old Agartala, East & North Champamura, Mekhlipara, Nagicherra, Malay Nagar, Ghoshpara, Dukli, Madhuban and ends at Amtali Junction (the starting point of Agartala-Udaipur Project).

The existing length of project road is 12.900 km. Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

2. *Land*

The Site of the Project highway comprises the land as described below -

Sl. No.	Chainage (km)		Right of Way (m)	Remarks
	From	To		
1	0.000	12.900	45 m	

3. *Carriageway*

The present carriageway of the Project Highway is as described below –

Sl. No.	Chainage (km)		Carriage way width (m)	Remarks
	From	To		
1	0+000	0+040	32 (LHS) & 33 (RHS)-9.50	Width 65 m at CH 0.00 i.e. edge of the intersection
2	0+040	1+140	7.80-7.00	
2	1+140	1+750	3.90-8.00 (LHS)/ 7.50-10.00 (RHS)	Toll Plaza (Non-Operational) at Ch. 1+140 Km.
3	1+750	4+400	6.60-6.90	
4	4+400	4+440	8.00	RUB at Ch. 4+393

Sl. No.	Chainage (km)		Carriage way width (m)	Remarks
	From	To		
5	4+440	7+500	7.00-9.00	
5	7+500	7+700	7.50-8.00 (LHS)/ 7.50-9.00 (RHS)	Truck Lay bye
6	7+700	10+100	8.00-9.00	
7	10+100	10+525	8.00-9.00 (LHS)/ 7.00-8.00 (RHS)	Truck Lay bye
8	10+525	12+900	8.00-8.30	

The type of the existing pavement is Flexible.

4. ***Major Bridges***

The Site includes the following Major Bridges

Sl. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Super structure		
1.	0+075	Open	RCC	Steel Truss	2 x 36.0 = 72	13
2.	9+465	Open	RCC	RCC	2 x 30.0 = 60	12

5 Road over-bridges (ROB)/ Road under-bridges (RUB)

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

Sl. No.	Chainage (km)	Type of Structure		No. of Spans with Span length (m)	Width (m)	ROB/ RUB
		Foundation	Super Structure			
1.	4+500	Open	RCC	2x6 = 12	12	RUB
2.	10+975	Open	RCC	1x21.5= 21.5	12	ROB

6 Grade separators

The Site includes the following grade separators:

Sl. No.	Chainage (km)	Type of Structure		No. of Spans with Span length (m)	Width (m)
		Foundation	Super Structure		
Nil					

7 Minor bridges

The Site includes the following minor bridges:

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

8 Railway level crossings

The Site includes the following railway level crossings:

Sl. No.	Location (km)	Remarks
Nil		

9 Underpasses (vehicular, Non-vehicular)

The Site includes the following underpasses:

Sl. No.	Chainage (km)	Type of Structure	No. of Spans with Span length (m)	Width (m)
Nil				

10 Culverts:

The Site has the following culverts:

Sl.No	Chainage (Km)	Type of Culvert	Span / Opening with span length (m)	Width (m)
1	1+000	Box Culvert	1x2.3	12
2	1+115	Box Culvert	1x4.1	12
3	1+227	Box Culvert	1x6.7	12.1
4	1+578	Box Culvert	1x4.3	30.5
5	1+787	Box Culvert	1x3.3	12
6	2+119	Box Culvert	1x3	12.2
7	2+222	Box Culvert	1x4	11.7
8	2+403	Box Culvert	1x3.1	11.8
9	2+60	Box Culvert	1x3.1	11.6
10	2+756	Box Culvert	1x4.3	11.9
11	2+879	Box Culvert	1x3.1	12.2
12	3+158	Box Culvert	1x3.3	13
13	3+247	Box Culvert	1x4	12
14	3+460	Box Culvert	1x2.6	11.7
15	4+163	Box Culvert	1x2.9	11.8
16	4+284	Box Culvert	1x3.8	12.1
17	4+532	Box Culvert	1x3.2	11.8
18	4+725	Hume Pipe	1x1.2 (dia)	12

Sl.No	Chainage (Km)	Type of Culvert	Span / Opening with span length (m)	Width (m)
		Culvert		
19	5+357	Box Culvert	1x3.4	11.9
20	5+715	Box Culvert	1x3	11.6
21	6+042	Box Culvert	1x2.9	14
22	6+629	Box Culvert	1x4.4	12
23	6+734	Box Culvert	1x2.8	12
24	6+811	Box Culvert	1x3.6	12
25	6+984	Box Culvert	1x4.2	12
26	7+181	Box Culvert	1x4.2	12
27	7+282	Box Culvert	1x3.5	12
28	7+622	Box Culvert	1x4	12
29	7+950	Box Culvert	1x4.2	12
30	8+026	Box Culvert	1x4.4	12
31	8+495	Box Culvert	1x4.2	12
32	8+900	Box Culvert	1x3.4	12
33	9+602	Box Culvert	1x4.6	12
34	9+765	Box Culvert	1x4.4	13.2
35	9+970	Box Culvert	1x2	15
36	10+746	Box Culvert	1x4.4	12
37	11+548	Box Culvert	1x3.4	12
38	11+234	Box Culvert	1x2	12
39	11+687	Box Culvert	1x3	12
40	11+795	Box Culvert	1x5	12
41	12+104	Box Culvert	1x4	12
42	12+360	Box Culvert	1x5.2	12
43	12+630	Box Culvert	1x4	25

11 Bus Bays

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

Sl. No.	Chainage (Km)	Length (m)	Left Hand Side	Right Hand Side
Nil				

12 Truck Lay bays

The details of truck lay byes are as follows:

Sl. No.	Chainage (Km)	Length (m)	Left Hand Side	Right Hand Side
1.	7+500-7+700	**200**	**Left**	**-**
2.	10+100-10+525	**425**	**-**	**Right**

13 Road side drains

The details of the roadside drains are as follows:

Sl. No.	Location (km)		Type	
	From	To	RCC	Earthen (Kutcha)
1.	0+115	0+955	Drain (BHS) 1.50m X 1.50m	
2.	0+955	1+578	Drain (BHS) 1.200m X 1.00m	
3.	1+578	1+787	Drain (LHS) 1.200m X 1.00m	
4.	1+787	2+220	Drain (LHS) 1.200m X 1.00m	
5.	2+224	2+403	Drain (LHS) 1.200m X 1.00m	
6.	2+403	2+600	Drain (LHS) 1.200m X 1.00m	
7.	2+603	2+756	Drain (LHS) 1.200m X 1.00m	
8.	2+758	2+879	Drain (LHS) 1.200m X 1.00m	
9.	2+879	3+158	Drain (LHS) 1.00m X 1.00m	
10.	3+158	3+247	Drain (LHS) 1.00m X 1.00m	
11.	3+247	3+460	Drain (LHS) 1.00m X 1.00m	
12.	3+460	4+160	Drain (BHS) 1.00m X 1.00m	
13.	4+160	4+284	Drain (BHS) 1.00m X 1.00m	
14	4+284	4+390	Drain (LHS) 1.20m X 1.00m	
15	4+390	4+532	Drain (BHS) 1.00m X 1.00m	
16	4+535	4+600	Drain (BHS) 1.00m X 1.00m	
17	5+150	5+350	Drain (BHS) 1.00m X 1.00m	
18	5+650	6+035	Drain (BHS) 1.00m X 1.00m	
19	6+035	6+610	Drain (BHS) 1.00m X 1.00m	
20	6+625	6+730	Drain (BHS) 1.00m X 1.00m	
21	6+770	6+880	Drain (BHS) 1.00m X 1.00m	

Sl. No.	Location (km)		Type	
	From	To	RCC	Earthen
22	6+885	6+980	Drain (BHS) 1.00m X 1.00m	
23	6+985	7+181	Drain (BHS) 1.00m X 1.00m	
24	7+184	7+280	Drain (BHS) 1.00m X 1.00m	
25	7+285	7+620	Drain (BHS) 1.00m X 1.00m	
26	9+602	9+765	Drain (BHS) 1.00m X 1.00m	
27	9+770	9+970	Drain (BHS) 1.00m X 1.00m	
28	9+975	10+550	Drain (BHS) 1.00m X 1.00m	
29	10+550	11+200	Drain (BHS) 1.00m X 1.00m	
30	11+200	11+548	Drain (BHS) 1.00m X 1.00m	
31	11+687	11+795	Drain (BHS) 1.00m X 1.00m	
32	11+800	12+104	Drain (BHS) 1.00m X 1.00m	
33	12+105	12+360	Drain (BHS) 1.00m X 1.00m	
34	12+365	12+630	Drain (BHS) 1.00m X 1.00m	

14 Major junctions

The detail of major junction are as follows:

Sl. No.	Location (Km)		At grade	Separated	Category of Cross Road			
	From	To			NH	SH	MDR	Others
1.	0+000	0+000	3 Legged	3 Legged	NH			
2.	10+925	10+975	3 Legged	3 Legged			MDR	

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

15 Minor junctions

The details of the minor junctions are as follows:-

Sl.No.	Existing Chainage (Km)	Side	Type of Junction	LHS	RHS
1	0+200	Right	3-Legged		Das para Old Agartala
2	0+250	Left	3-Legged	Pal Para	
3	0+300	Both	4-Legged	Jora pukur, Paul para	Hari Lal Das Road
4	0+400	Right	3-Legged		Chandrapur
5	0+450	Left	3-Legged	Old Agartala, RD Block	

Sl.No.	Existing Chainage (Km)	Side	Type of Junction	LHS	RHS
6	0+500	Right	3-Legged		Chandrapur
7	0+505	Left	3-Legged	Matabari	
8	0+600	Left	3-Legged	Matabari	
9	1+103	Left	3-Legged	East Champamura	
10	1+140	Right	3-Legged		Baldakhal, Chandrapur
11	1+145	Both	4-Legged	Tulakuna High School	Baldakhal, Chandrapur
12	3+170	Left	3-Legged	Sevadham Ashram	
13	3+200	Left	3-Legged	Sevadham Ashram	
14	3+230	Right	3-Legged		Chandrapur, Baldakhal
15	3+235	Right	3-Legged		Chandrapur, Baldakhal
16	3+270	Left	3-Legged	Sevadham Ashram	
17	3+290	Left	3-Legged	Sevadham Ashram	
18	3+295	Right	3-Legged		Aralia
19	3+300	Left	3-Legged	Sevadham Ashram	
20	3+400	Left	3-Legged	Sevadham Ashram	
21	4+000	Skew	4-Legged	Tulakona Ranirbazar	
22	4+050	Right	3-Legged		Aralia
23	4+400	Right	3-Legged		Aralia
24	4+520	Left	3-Legged	Public School	
25	4+600	Left	3-Legged	Hotel Management College	
26	5+000	Left	3-Legged	Kathiababa Ashram	

Sl.No.	Existing Chainage (Km)	Side	Type of Junction	LHS	RHS
27	5+100	Left	3-Legged	Nagichara	
28	5+200	Left	3-Legged	Public School	
29	5+900	Left	3-Legged	Public School	
30	6+000	Right	3-Legged	Jogendranagar	
31	6+800	Left	3-Legged	Anandanagar	
32	6+850	Right	3-Legged		Jogendranagar Railway Station
33	6+890	Right	3-Legged	-	Jogendranagar Railway Station
34	7+040	Right	3-Legged		Malaynagar
35	7+700	Both	4-Legged	Ghosh para , Ananda nagar	Jogendranagar Railway Station
36	7+710	Left	3-Legged	Ghosh para	-
37	7+950	Right	3-Legged		Golbazar
38	8+100	Left	3-Legged	Shyama Prasad para	-
39	8+500	Right	3-Legged	-	Golbazar
40	9+200	Right	3-Legged	-	Golbazar
41	9+400	Left	4-Legged	Surjyamani nagar	
42	9+405	Right	3-Legged		Golbazar
43	10+000	Right	3-Legged		Golbazar
44	10+100	Left	3-Legged	Surjyamani nagar	
45	10+300	Left	3-Legged	Surjyamani nagar	-
46	10+310	Right	3-Legged		Echabazar
47	10+500	Both	4-Legged	Dukli	Echabazar

Sl.No.	Existing Chainage (Km)	Side	Type of Junction	LHS	RHS
48	10+600	Left	3-Legged	Cookoil	
49	11+000	Left	3-Legged	Kathaltali	
50	11+100	Both	4-Legged	Dukli Industrial Estate	Badharghat Rail Station
51	11+200	Both	4-Legged	Ramkrishna Mission	Badharghat Rail Station
52	11+250	Left	3-Legged	ONGC 3rd Gate	
53	11+700	Both	4-Legged	Rose valley	ONGC
54	11+900	Left	3-Legged	Dukli	
55	12+500	Left	3-Legged	Baisnab Tila	
56	12+550	Right	3-Legged		Hapania
57	12+600	Left	3-Legged	Baisnab Tila	
58	12+800	Left	3-Legged	Baisnab Tila	

16 Bypasses

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

Sl. No.	Name of Bypass (town)	Chainage (Km)		Length (Km)
		From	To	
Nil				

17 Other structures

Nil

Annex - II
(Schedule-A)

Dates for providing Right of Way of construction Zone

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)	Proposed Width (m)	Date of providing ROW*
1	**2**	**3**	**4**	**5**
(i) Full Right of Way (Full Width) Stretch	0+000 to 12+900	12.900	45 m	Date of Agreement

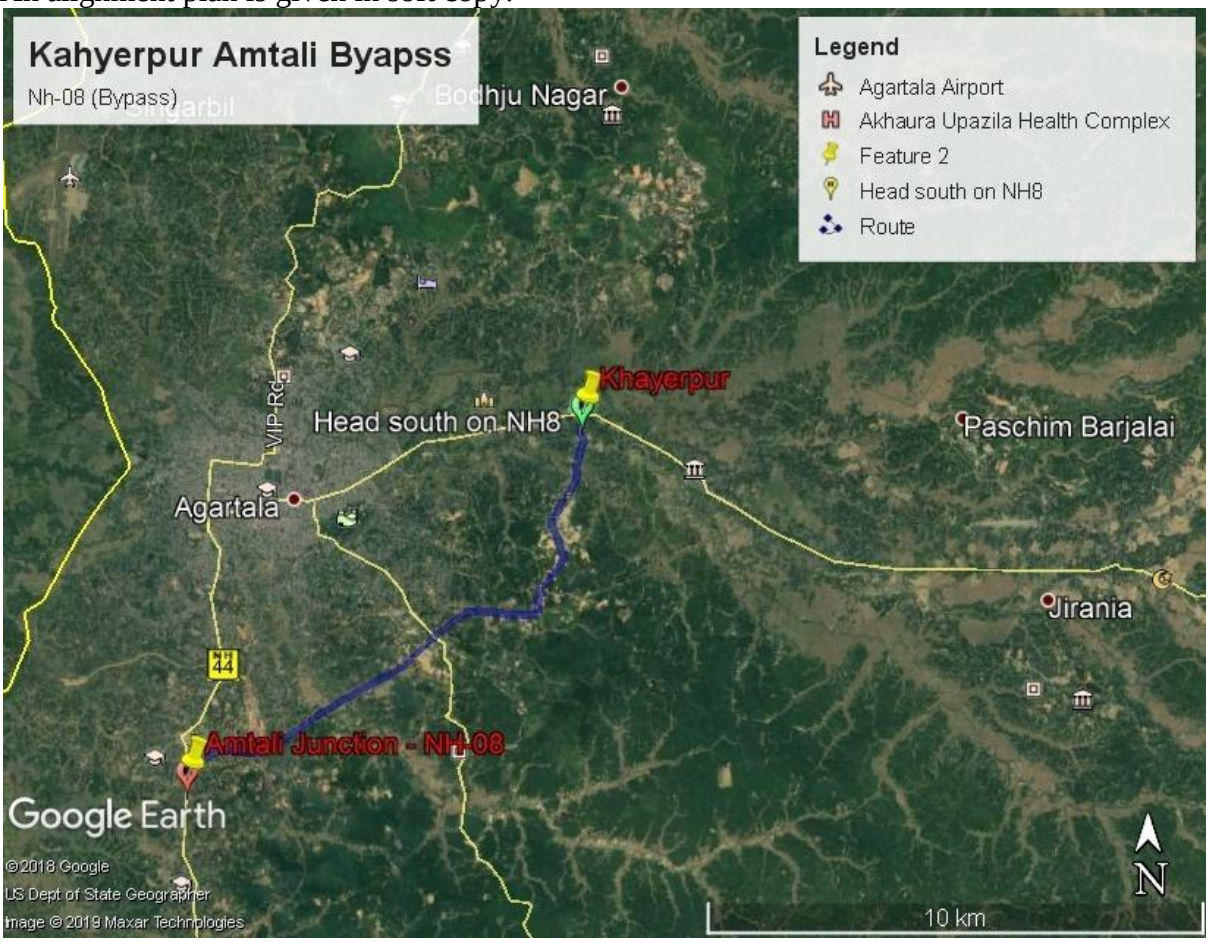
*The dates specified herein shall in no case be beyond 150 (one hundred and fifty) days after the Appointed Date.

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:

An alignment plan is given in soft copy.



(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 clearances have been obtained:

Sl. No.	**Clearances**	**Present Status**
1	Environment clearance	Environment Clearance is not required for two lanning of Project Highway as per MOEF Notification on 22nd Aug, 2013.
2	Forest Clearance	Not Applicable

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 Annexure I of this schedule B & 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 Lane with Paved Shoulder

The project road starts from NH- 8 (old no. NH-44) at Khayerpur and passes through old Agartala, East & North Champamura, Mekhlipara, Nagicherra, Malay Nagar, Ghoshpara, Dukli, Madhuban and ends at Amtali Junction (the starting point of Agartala-Udaipur Project).

The existing length of project road is 12.900 km.

Existing road varies from two lanes to single lane of BT with fair to poor riding quality.

1 Widening of the Existing Highway

(i) The Project Highway shall follow the proposed alignment as 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) Construction of Two-Lane with paved shoulders shall be undertaken. The paved carriageway shall be 7.0 m wide with 1.5 m paved shoulders and 2.0 m Earthen & Hard shoulder combined (1.5m hard shoulder + 0.5m Earthen shoulder) on either side of the carriage way. (Refer Typical Cross section attached with this schedule).

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

Sl. No.	Built-up Stretch (Township)	Location/Design Chainage (Km)		Width (m)	Typical Cross Section
		From	To		
1	Kahayerpur	0+000	0+500	7	Refer TCS-1
2	Old Agartala	0+500	1+000	7	Refer TCS-1
3	East Champamura	1+350	1+725	7	Refer TCS-1
4	Uttar Champamura	1+725	2+500	7	Refer TCS-1
5	Mekhlipara	2+500	3+000	7	Refer TCS-1

Sl. No.	Built-up Stretch (Township)	Location/Design Chainage (Km)		Width (m)	Typical Cross Section
6	Malaynagar	6+500	7+250	7	Refer TCS-1
7	Goshpara	7+600	8+000	7	Refer TCS-1
8	Goshpara	8+000	8+300	7	Refer TCS-1
9	Madhuban	10+100	10+525	7	Refer TCS-1
10	Madhuban	10+525	11+000	7	Refer TCS-1
11	Amtali	11+000	12+900	7	Refer TCS-1

(b) Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall confirm 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 two lane manual.

(ii) Design speed

The design speed shall be the minimum design speed of 80 km per hr for Plain / Rolling terrain and 65 km per hr for hilly 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 standard is not possible, the existing road geometrics shall be improved to the extent possible within the given ROW and proper road signs and safety measures shall be provided:

Sl. No.	Stretch (from km to km)	Type of deficiency	Remarks
Nil			

(iv) Right of Way

Details of the Proposed Right of Way is as described below –

Sl. No.	Design Chainage (km)		Length(m)	PROW (m)		Total PROW (m)	Remarks
	From	To		LHS	RHS		
1	0+000	12+900	12900	22.50	22.50	45.00	

(v) Type of shoulders

Sl. No.	Design Chainage (Km)		TCS Type	Length (km)	Paved Shoulder	Earthen Shoulder	Remarks
	From	To					
1	0+000	1+800	TCS-1	1.800	BHS (1.5m)	BHS (2.0m)	
2	1+800	2+110	TCS-3	0.310	BHS (1.5m)	BHS (2.0m)	
3	2+110	2+125	TCS-1	0.015	BHS (1.5m)	BHS (2.0m)	
4	2+125	2+210	TCS-3	0.085	BHS (1.5m)	BHS (2.0m)	
5	2+210	2+410	TCS-1	0.200	BHS (1.5m)	BHS (2.0m)	
6	2+410	2+590	TCS-3	0.180	BHS (1.5m)	BHS (2.0m)	
7	2+590	2+605	TCS-1	0.015	BHS (1.5m)	BHS (2.0m)	
8	2+605	3+163	TCS-3	0.558	BHS (1.5m)	BHS (2.0m)	
9	3+163	3+460	TCS-1	0.297	BHS (1.5m)	BHS (2.0m)	
10	3+460	3+685	TCS-3	0.225	BHS (1.5m)	BHS (2.0m)	
11	3+685	3+900	TCS-1	0.215	BHS (1.5m)	BHS (2.0m)	
12	3+900	4+100	TCS-2	0.200	BHS (1.5m)	BHS (2.0m)	
13	4+100	4+765	TCS-1	0.665	BHS (1.5m)	BHS (2.0m)	
14	4+765	4+970	TCS-3	0.205	BHS (1.5m)	BHS (2.0m)	
15	4+970	5+025	TCS-1	0.055	BHS (1.5m)	BHS (2.0m)	
16	5+025	5+300	TCS-3	0.275	BHS (1.5m)	BHS (2.0m)	
17	5+300	5+500	TCS-1	0.200	BHS (1.5m)	BHS (2.0m)	
18	5+500	5+725	TCS-3	0.225	BHS (1.5m)	BHS (2.0m)	
19	5+725	5+850	TCS-1	0.125	BHS (1.5m)	BHS (2.0m)	
20	5+850	6+300	TCS-2	0.450	BHS (1.5m)	BHS (2.0m)	

Sl. No.	Design Chainage (Km)		TCS Type	Length (km)	Paved Shoulder	Earthen Shoulder	Remarks
	From	To					
21	6+300	6+990	TCS-1	0.690	BHS (1.5m)	BHS (2.0m)	
22	6+690	7+280	TCS-3	0.290	BHS (1.5m)	BHS (2.0m)	
23	7+280	9+650	TCS-1	2.370	BHS (1.5m)	BHS (2.0m)	
24	9+650	9+700	TCS-3	0.050	BHS (1.5m)	BHS (2.0m)	
25	9+700	10+100	TCS-1	0.400	BHS (1.5m)	BHS (2.0m)	
26	10+100	10+550	TCS-2	0.450	BHS (1.5m)	BHS (2.0m)	
27	10+550	12+900	TCS-1	2.400	BHS (1.5m)	BHS (2.0m)	

(a) In Built up sections, Pre-Polished Vibratory Interlocking Paver block shall be provided in the following stretches:

Sl. No.	Stretch (Km)		Details
	From	To	
1	0+000	0+050	Pre-Polished Vibratory Interlocking Paver block of thickness 150 mm
2	0+127	0+827	-Do-
3	4+393	4+493	-Do-

(b) In open country, [paved shoulders of 1.5 m width shall be provided and balance 2.0 m width shall be covered with 150 mm thick compacted layer of granular material].

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

(vi) Lateral and vertical clearances at underpasses

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

(b) Lateral and 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 the provision of relevant Manual.

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

Sl. No.	Location Chainage (From km to km)	Span / Opening (m)	Remarks
Nil			

(viii) Service roads

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

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

(ix) Grade separated structures

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

[Refer to the provision of relevant Manual and provide details]

Sl. No.	Location of structure (Km)	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 the provision of relevant 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 of structure (Km)	Type of Structure Length	Cross road at			Remarks, if any
			Existing level	Raised Level	Lowered Level	
Nil						

(x) Cattle and pedestrian underpass /overpass

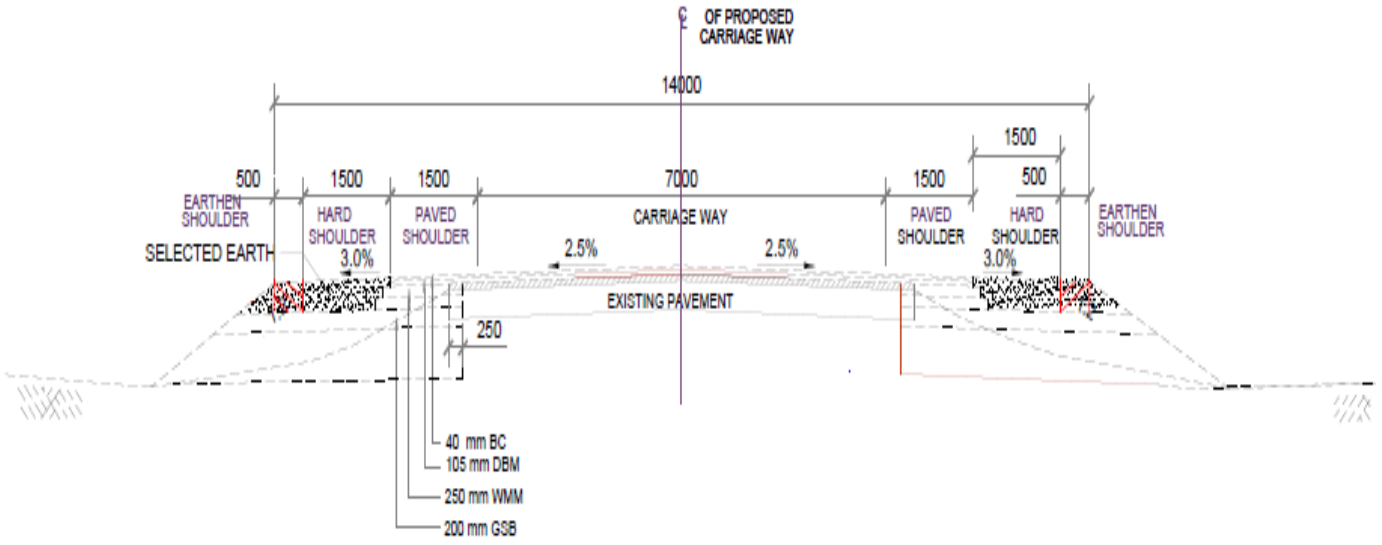
Cattle and pedestrian underpass/ overpass shall be constructed as follows:

[Refer to the provision of relevant Manual and specify the requirements of cattle and pedestrian underpass/ overpass]

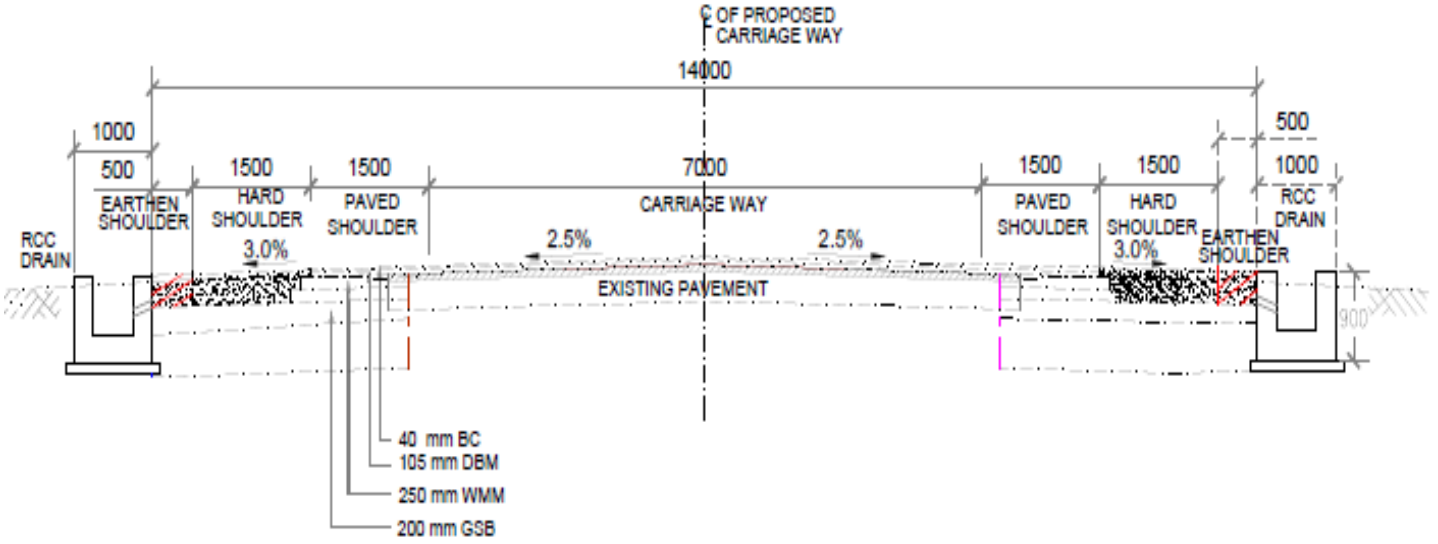
Sl. No.	Location (Km)	Type of Crossing
Nil		

(xi) Typical Cross section of the Project Highway

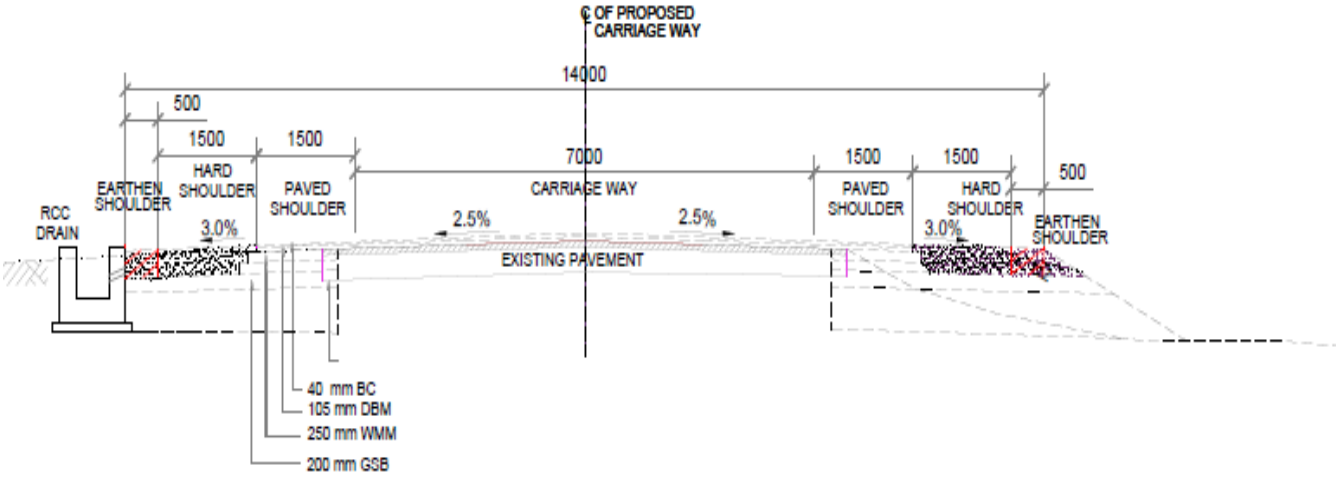
[Give typical cross-section of the Project Highway by reference to the Manual]



TCS-1: Typical Cross Section of Two Lane Carriageway in Flexible Pavement without Drain



TCS-2: Typical Cross Section of Two Lane Carriageway in Flexible Pavement with Both Side Drain



TCS-3: Typical Cross Section of Two Lane Carriageway in Flexible Pavement with Left Side Drain

Widening pattern of the Project Highway are tabulated below-

Sl. No.	Design Chainage (Km)		Bridge Length (km)	Length (Km)	TCS Type	Description
	From	To				
1	0+000	1+800	0.072	1.728	TCS-1	Two lane with Paved Shoulder
2	1+800	2+110	-	0.310	TCS-3	Two lane with Paved Shoulder
3	2+110	2+125	-	0.015	TCS-1	Two lane with Paved Shoulder
4	2+125	2+210	-	0.085	TCS-3	Two lane with Paved Shoulder
5	2+210	2+410	-	0.200	TCS-1	Two lane with Paved Shoulder
6	2+410	2+590	-	0.180	TCS-3	Two lane with Paved Shoulder
7	2+590	2+605	-	0.015	TCS-1	Two lane with Paved Shoulder
8	2+605	3+163	-	0.558	TCS-3	Two lane with Paved Shoulder
9	3+163	3+460	-	0.297	TCS-1	Two lane with Paved Shoulder
10	3+460	3+685	-	0.225	TCS-3	Two lane with Paved Shoulder
11	3+685	3+900	-	0.215	TCS-1	Two lane with Paved Shoulder
12	3+900	4+100	-	0.200	TCS-2	Two lane with Paved Shoulder
13	4+100	4+765	-	0.665	TCS-1	Two lane with Paved Shoulder

Sl. No.	Design Chainage (Km)		Bridge Length (km)	Length (Km)	TCS Type	Description
	From	To				
14	4+765	4+970	-	0.205	TCS-3	Two lane with Paved Shoulder
15	4+970	5+025	-	0.055	TCS-1	Two lane with Paved Shoulder
16	5+025	5+300	-	0.275	TCS-3	Two lane with Paved Shoulder
17	5+300	5+500	-	0.200	TCS-1	Two lane with Paved Shoulder
18	5+500	5+725	-	0.225	TCS-3	Two lane with Paved Shoulder
19	5+725	5+850	-	0.125	TCS-1	Two lane with Paved Shoulder
20	5+850	6+300	-	0.450	TCS-2	Two lane with Paved Shoulder
21	6+300	6+690	-	0.390	TCS-1	Two lane with Paved Shoulder
22	6+690	7+280	-	0.590	TCS-3	Two lane with Paved Shoulder
23	7+280	9+650	0.060	2.310	TCS-1	Two lane with Paved Shoulder
24	9+650	9+700	-	0.050	TCS-3	Two lane with Paved Shoulder
25	9+700	10+100	-	0.400	TCS-1	Two lane with Paved Shoulder
26	10+100	10+550	-	0.400	TCS-2	Two lane with Paved Shoulder
27	10+550	12+900	-	2.350	TCS-1	Two lane with Paved Shoulder

3. Intersections and Grade Separators

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

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.	Design Chainage (km)	Type of Junction	Side	To Village	Total Improved Area	Remarks
1	0+040	T	BHS	LHS - To Churaibari	1466.75	
				RHS - To Agartala		
2	0+250	4 Legged	BHS	LHS- To Dukli Industrial Estate	1090.00	

Sl. No.	Design Chainage (km)	Type of Junction	Side	To Village	Total Improved Area	Remarks
				RHS- Railway Station		

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

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

The existing road shall be raised in the following sections:

Sl. No.	Section (from km To km)	Length (Km)	Extent of raising [Top of finished road level]
Refer design plan & profile			

5. Pavement Design

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

(ii) **Type of pavement**

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

(iii) **Design requirements**

[Refer to the provision of relevant Manual and specify design requirements and strategy]

(a) Design Period and strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 15 years. 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 entire Project Highway for design traffic of not less than 20 million standards axles (MSA).

(iv) **Re-construction of stretches**

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

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

Sl. No.	Stretch (km)		Remarks
	From	To	
NIL			

6. Road Side Drainage

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

Sl. No.	Design Chainage (km)		Length (m)	Side	Remarks
	From	To			
RCC Drain					**Size**
1	0+115	0+955	840	BHS	1.50mX1.50m
2	0+955	1+578	623	BHS	1.20mX1.00m
3	1+578	1+787	209	LHS	1.20mX1.00m
4	1+787	2+220	433	LHS	1.20mX1.00m
5	2+224	2+403	179	LHS	1.20mX1.00m
6	2+403	2+600	197	LHS	1.20mX1.00m

Sl. No.	Design Chainage (km)		Length (m)	Side	Remarks
	From	To			
7	2+603	2+756	153	LHS	1.20mX1.00m
8	2+758	2+879	121	LHS	1.20mX1.00m
9	2+879	3+158	279	LHS	1.00mX1.00m
10	3+158	3+247	89	LHS	1.00mX1.00m
11	3+247	3+460	213	LHS	1.00mX1.00m
12	3+460	4+160	700	BHS	1.00mX1.00m
13	4+160	4+284	124	BHS	1.00mX1.00m
14	4+284	4+390	106	LHS	1.20mX1.00m
15	4+284	4+390	106	RHS	1.00m X1.00m
16	At RUB		100	BHS	1.00m X1.00m
17	4+390	4+532	142	BHS	1.00mX1.00m
18	4+535	4+600	65	BHS	1.00mX1.00m
19	5+150	5+350	200	BHS	1.00mX1.00m
20	5+650	6+035	385	BHS	1.00mX1.00m
21	6+035	6+610	575	BHS	1.00mX1.00m
22	6+625	6+730	105	BHS	1.00mX1.00m
23	6+770	6+880	110	BHS	1.00mX1.00m
24	6+885	6+980	95	BHS	1.00mX1.00m
25	6+985	7+181	196	BHS	1.00mX1.00m
26	7+184	7+280	96	BHS	1.00mX1.00m
27	7+285	7+620	335	BHS	1.00mX1.00m
28	9+602	9+765	163	BHS	1.00mX1.00m
29	9+770	9+970	200	BHS	1.00mX1.00m
30	9+975	10+550	575	BHS	1.00mX1.00m
31	10+550	11+200	650	BHS	1.00mX1.00m
32	11+200	11+548	348	BHS	1.00mX1.00m
33	11+687	11+795	108	BHS	1.00mX1.00m
34	11+800	12+104	304	BHS	1.00mX1.00m
35	12+105	12+360	255	BHS	1.00mX1.00m
36	12+365	12+630	265	BHS	1.00mX1.00m
	Total		**17203**		

7. Design of Structures

(i) General

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

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

[Refer to the provision of relevant 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) meter in the table below.]

Sl. No.	Bridge (km)	Width of carriageway and Cross Sectional feature
Nil		

(c) The following structures shall be provided with footpaths:
[Refer to provision of relevant Manual and provide details of new Structures with footpath.]

Sl. No.	Location (Km)	Remarks
Nil		

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

[Refer to the provision of relevant 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 the provision of relevant Manual and provide details]

Sl. No.	Location (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 the provision of 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 the provision of relevant Manual and provide details]

Sl. No.	Culvert location (km)	Span/Opening (m)	Remarks, if any*
1	4+725	1x12	HP of 1.20 m dia

(c) **Widening of existing culverts**

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

Sl. No.	Culvert Location (Km)	Type , Span, Height and width of existing culvert	Repair to be carried out [specify]
Nil			

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

Sl. No	Design Chainage (Km)	Size (m)	Proposal	Remarks
Nil				

(e) Repairs/ Replacements of Railing/Parapets, flooring and protection works of the existing culverts shall be undertaken as follows:

[Refer to the provision of relevant Manual and provide details]

Sl. No.	Location (km)	Type of repair required
1	1+000	Repair and Rehabilitation of Railing / Kerb / Parapet
2	1+115	Repair and Rehabilitation of Railing / Kerb / Parapet
3	1+227	Repair and Rehabilitation of Railing / Kerb / Parapet
4	1+578	Repair and Rehabilitation of Railing / Kerb / Parapet
5	1+787	Repair and Rehabilitation of Railing / Kerb / Parapet
6	2+119	Repair and Rehabilitation of Railing /

		Kerb / Parapet
7	2+222	Repair and Rehabilitation of Railing / Kerb / Parapet
8	2+403	Repair and Rehabilitation of Railing / Kerb / Parapet
9	2+60	Repair and Rehabilitation of Railing / Kerb / Parapet
10	2+756	Repair and Rehabilitation of Railing / Kerb / Parapet
11	2+879	Repair and Rehabilitation of Railing / Kerb / Parapet
12	3+158	Repair and Rehabilitation of Railing / Kerb / Parapet
13	3+247	Repair and Rehabilitation of Railing / Kerb / Parapet
14	3+460	Repair and Rehabilitation of Railing / Kerb / Parapet
15	4+163	Repair and Rehabilitation of Railing / Kerb / Parapet
16	4+284	Repair and Rehabilitation of Railing / Kerb / Parapet
17	4+532	Repair and Rehabilitation of Railing / Kerb / Parapet
18	4+725	Repair and Rehabilitation of Railing / Kerb / Parapet
19	5+357	Repair and Rehabilitation of Railing / Kerb / Parapet
20	5+715	Repair and Rehabilitation of Railing / Kerb / Parapet
21	6+042	Repair and Rehabilitation of Railing / Kerb / Parapet
22	6+629	Repair and Rehabilitation of Railing / Kerb / Parapet
23	6+734	Repair and Rehabilitation of Railing / Kerb / Parapet
24	6+811	Repair and Rehabilitation of Railing / Kerb / Parapet
25	6+984	Repair and Rehabilitation of Railing / Kerb / Parapet
26	7+181	Repair and Rehabilitation of Railing / Kerb / Parapet
27	7+282	Repair and Rehabilitation of Railing / Kerb / Parapet
28	7+622	Repair and Rehabilitation of Railing / Kerb / Parapet
29	7+950	Repair and Rehabilitation of Railing / Kerb / Parapet
30	8+026	Repair and Rehabilitation of Railing /

		Kerb / Parapet
31	8+495	Repair and Rehabilitation of Railing / Kerb / Parapet
32	8+900	Repair and Rehabilitation of Railing / Kerb / Parapet
33	9+602	Repair and Rehabilitation of Railing / Kerb / Parapet
34	9+765	Repair and Rehabilitation of Railing / Kerb / Parapet
35	9+970	Repair and Rehabilitation of Railing / Kerb / Parapet
36	10+746	Repair and Rehabilitation of Railing / Kerb / Parapet
37	11+548	Repair and Rehabilitation of Railing / Kerb / Parapet
38	11+234	Repair and Rehabilitation of Railing / Kerb / Parapet
39	11+687	Repair and Rehabilitation of Railing / Kerb / Parapet
40	11+795	Repair and Rehabilitation of Railing / Kerb / Parapet
41	12+104	Repair and Rehabilitation of Railing / Kerb / Parapet
42	12+360	Repair and Rehabilitation of Railing / Kerb / Parapet
43	12+630	Repair and Rehabilitation of Railing / Kerb / Parapet

(f) Floor Protection works shall be as specified in the relevant IRC codes and specifications.

(iii) Bridges

(b) Existing Bridges to be reconstructed/Widened

[(i) The existing bridges at the following locations shall Reconstructed as new structures]

[Refer to the provision of relevant Manual and provide details]

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

(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				

(b) **Additional New Bridges**

(i) Major Bridges: - New major bridge 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)	Span Arrangement (m)	Total length(m)	Remarks
Nil				

(ii) Minor Bridges: - New minor bridge 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)	Span Arrangement (m)	Total Length (m)	Remarks
Nil				

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

[Refer to the provision of relevant Manual and provide details:]

Sl. No.	Location (km)	Remarks
Nil		

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

[Refer to the provision of relevant Manual and provide details]

Sl. No.	Location (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 the provision of relevant 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 7of the Manual. (Refer to the provision of relevant Manual and specify modification, if any)

(b) **Road Over-Bridges and**

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

Sl. No.	Location of Level crossing (Km)	Length of bridge (m)	Type of structure	Remarks
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 crossings (km)	Length of Span (m)
Nil		

(v) Grade separated structures

(Refer to the provision of relevant Manual)

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2(ix) and 3 of this Annex-I.

(vi) Repairs and strengthening of bridges and structures

(Refer to the provision of relevant 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. Overpass / Underpass 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 (Design Chainage Km)
1	0+075
2	9+465

8. Traffic Control Devices and Road Safety works

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

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

9. Road Side Furniture

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

(ii) Overhead traffic signs: Location and Size

[Refer to the provision of relevant Manual and provide details]

10. Compulsory afforestation

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

11. Hazardous Locations

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

Sl. No.	**Location stretch from (km) to (km)**	**LHS/RHS**
This shall be Provided at High Embankment (more than 3.0m) and at Sharp curve locations.		

(a) **W-Beam Crash barriers:-** The location of W Beam Crash barriers shall be as follows :-

Sl. No.	Design Chainage (km)		Length (m)	Total Length (m)	Side	Remarks
	From	To				
1	1787	2100	313	313	RHS	
2	2222	2403	181	181	RHS	
3	2415	2490	75	75	RHS	
4	2800	2890	90	90	RHS	
5	2890	3158	268	268	RHS	
6	3232	3267	35	70	BHS	
7	4590	5150	560	1120	BHS	
8	5250	5390	140	280	BHS	
9	6080	6380	300	300	LHS	
	Total Length (m)			**2697**		

Note: The above Crash barrier length is minimum & indicative and shall be estimated by EPC contractor. Any increase in the length of Crash barrier beam as per site requirements may not be considered as positive change of scope.

(b) **Breast wall** – Breast wall shall be used at following locations:-

Sl.No.	Design Chainage (Km)	Side	Length in (m)	Remarks
1	4+393 to 4+493 (At RUB)	BHS	100	Height 4 m
2	6+000 to 6+030	LHS	30	Height 4 m
3	10+700	RHS	300	Height 4 m
4	10+700	LHS	100	Height 4 m

The above length & height of breast wall is minimum & any increase in the length/Qty of Breast wall as per site requirements may not be considered as positive change of scope.

(c) **Retaining wall** – Retaining wall shall be used at following locations:-

Sl. No.	Design Chainage (km)	Side	Length (m)	Remarks
1	3+158 to 3+188	LHS	30	3 m height
2	3+247 to 3+540	LHS	293	3 m height
3	4+284 to 4+390	LHS	106	3 m height
4	4+600 to 4+.950	BHS	350	4 m height
5	5+300 to 5+390	BHS	90	4 m height
6	6+080 to 6+380	LHS	300	4 m height
7	6+395 to 6+620	BHS	225	4 m height
Total			**2059**	

The above length & height of retaining wall is minimum & any increase in the length/Qty of retaining wall as per site requirements may not be considered as positive change of scope.

(d) Providing and laying pitching on slope laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and technical specification (Stone / Boulder) – As per site condition.

(e) Providing and laying Filter material underneath pitching in slopes complete as per drawing and Technical specification – As per site condition.

(f) The traffic signs installed will be minimum but not limited to as specified in under table:-

Item	Description	Unit	Quantity
1	**Retro- Reflectorised Traffic Signs**- Providing and fixing of retro- reflectorised cautionary, mandatory and informatory sign as per IRC:67 mad eof High itensity grade sheeting vide MoRT&H techniacl Specification Clause 801.3 fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75mmx75mmx6mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450mm x 450mmx600mm, 600 mm below ground level as per drawings and MoRT&H Technical Specifications Clause 801.	Nos	-
(i)	90 cm equilateral Triangle	Nos.	230.00
(ii)	60 cm equilateral Triangle	Nos.	75.00
(iii)	90 cm Octagon	Nos.	80.00
(iv)	60 cm circular	Nos.	50.00
(v)	60 cm x 60 cm square & chevron panel	Nos.	204.00
(vi)	60 cm x 45 cm rectangular	Nos.	75.00
2	**Direction and Place Identification Signs upto 0.9 sqm Size Board:-** Providing and erecting direction and place identification retro- reflectorised sign as per IRC:67 made of high intensity grade sheeting vide cluse 801.3, fixed over aluminium sheeting, 2mm thick area not exeeding 0.9 sqm supported on a mild steel single angle iron past 75 x 75 x 6 mm firmly fixed to the ground by means of property designed foundation with m 15 grade cement concrete 450 x 450 x 600 mm, 600 mm below ground level as per approved drawing and MoRT&H TECHNICAL specifcation	Nos.	134
3	**Road Delineators:-** Supplying and installation of delineators (road way indicators, hazard markers, object markers), 80-100 cm high above ground level, painted black and white in 15 cm wide strips, fitted with 80 x 100 mm rectangular or 75 mm dia circular reflectorised panels at the top, buried or pressed into the ground and conforming toIRC-79 and the drawings.	Nos.	596

4	**Road Markers/Road Stud with Lense Reflector:-** Providing and fixing of road stud 100x 100 mm, die-cast in aluminium, resistant to corrosive effect of salt and grit, fitted with lense reflectors, installed in concrete or asphaltic surface by drilling hole 30 mm upto a depth of 60 mm and bedded in a suitable bituminous grout or epoxy mortar, all as per BS 873 part 4:1973	Nos.	5000
5	**Painting Two Coats on New Concrete Surfaces:-** Painting two coats after filling the surface with synthetic enamel paint in all shades on new plastered concrete surfaces		
(i)	Steel bridge	Sqm	5000
(ii)	Steel bridge	Sqm	1960
(iii)	Gurad Post	Sqm	26.68
(iv)	At RUB	Sqm	67.20
(v)	At RUB	Sqm	10.80
(vi)	At RUB	Sqm	192.00
(vii)	RCC Major Bridge	Sqm	
(viii)	Crash Barrier	Sqm	200.64
(ix)	Railing	Sqm	231.04
(x)	Approch	Sqm	54.95
(xi)	Parapet new (for 43 Nos culvert)	Sqm	856.28
6	**Road Marking with Hot Applied Thermoplastic Compound with Reflectorising Glass Beads on Bituminous Surface:-** Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250 gms per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 .The finished surface to be level, uniform and free from streaks and holes.		
(i)	Road eadge side	Sqm	2580
(ii)	Middle	Sqm	426
7	**Kilometre Stone:-** Reinforced cement concrete M15grade kilometre stone of standard design as per IRC:8-1980, fixing in position including painting and printing etc		
(i)	5th kilometre stone (precast)	Nos	3

(ii)	Ordinary kilometer stone (precast)	Nos	14
(iii)	Hectometer stone (precast)	Nos	52
8	**Boundary pillar:-** Reinforced cement concrete M15 grade boundary pillars of standard design as per IRC:25-1967, fixed in position including finishing and lettering but excluding painting	Nos	867
9	**Tubular Steel Railing on Medium Weight Steel Channel (ISMC series) 100 mm x 50 mm:-** Providing, fixing and erecting 50 mm dia steel pipe railing in 3 rows duly painted on medium weight steel channels (ISMC series) 100 mm x 50 mm, 1.2 metres high above ground, 2 m centre to centre, complete as per approved drawings		
(i)	On 0+050 to 0+127 for Footh path side	Rm	462
10	**Gantry Mounted Variable Message Sign Board:-** Providing and erecting gantry mounted variable message sign board electronically operated capable of flashing the desired message over a designed support system of aluminium alloy or galvanised steel, erected as per approved design and drawings and with lateral clearance as per clause 802.3		
(i)	Gantry Support System at 2 location (one from 0+00 and 2 Ch.12+900)	Tone	5.08

12. Special Requirement for Hill Roads

[Refer to the provision of relevant e Manual and provide details where relevant and required.]

13. Change of Scope

The length of Structures and bridges specified here in above shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the 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 Article13.

14. Chainage References

Design Chainage (m)	Easting (m)	Northing (m)	Remarks
Not available			

(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:

Sl. No	**Type of Utility**	**Unit**	**Quantity**	**Location/stretch (LHS/RHS)**
A	Electrical Utilities		Not assessed	
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;

(b) Roadside furniture;

(c) Pedestrian facilities;

(d) Tree plantation;

(e) Truck lay-byes;

(f) Bus stop 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 showing:

(a) Toll Plaza

Toll plaza shall be designed as per the guidelines of manual and it is provided at following locations:

S. No.	Toll Plaza Location (Design Chainage in Km)
Non-operational	

(b) Landscaping and Tree Plantation

The landscaping and tree plantation shall be provided. The locations for these provisions shall be finalized in consultation with Authority Engineer.

(c) Truck Lay-byes

Truck lay byes shall be retained at the following locations.

Sl. No.	Proposed Chainage (Km)
1	7+500 to7+700
2	10+100 to 10+525

(d) Bus Bays

The Contractor shall provide Bus Bays along the project highway and the locations are given below. The design of Bus Bays should be aesthetically pleased with surrounding.

The locations of these bus bays shall be finalized by the Contractor in consultation with the Authority's Engineer.

Sl. No.	Design Chainage (Km)		Remarks
	LHS	RHS	
Nil			

(e) Rest Areas,

Nil.

(f) Others

1. Highway Lighting

Lighting shall be provided at the following locations (Minimum 40 Lux to be maintained):

(i) Lighting shall be provided at approach to bridges, Built up areas, Bus stops and as per manual recommended in Schedule D.

2. Highway Patrol

Not applicable

3. Ambulances

Not applicable

4. Cranes

Not applicable

5. Traffic Aid Post

Traffic aid post shall be provided in consultation with Authority Engineer

6. Advance Traffic Management System (ATMS)

Typical Drawing of Advance Traffic Management System (ATMS) is given and location of the same shall be as per IRC: 67: 2001 and IRC: SP: 73-2015. Provisions of other facilities, if required may be made in similar manner.

7. Rainwater Harvesting

As per Ministry of Environment and Forests Notification, New Delhi dated 14/01/1997 (as amended on 13/01/1998, 05/01/1999 & 6/11/2000), the construction of Rain water, harvesting structure is mandatory in and around Water Crisis area, notified by the Central Ground Water Board.

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 Lanning 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-Lanning 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 as 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.]

Clause Referred in Manual	**Item**	**Provision as per Manual**	**Modified Provision**	**Remarks**
2.2.1	Minimum design speed in Mountainous & Rolling Terrain	100/80 kmph (Plain or Rolling) and 65/40 kmph (Hilly) terrain	At one locations listed below, where the horizontal curve radius is not meeting the criteria as per clause 2.9.4 and table 2.5 of IRC:SP:73-2018.	Speed is restricted for Curve having radius 50m.

*3. **Horizontal Deficient Curve Details:***

Curve No.	**HORIZONTAL CURVE**				**Terrain**	**Transition Length (m)**	**Speed**	**Reason for Deviation**
	Start Chainage (Km)	**End Chainage (Km)**	**Radius**	**Direction**			**(Kmph)**	

1	0+500	0+600	60	Left	Plain	52.311	40	Development of junction
2	1+500	1+580	60	Right	Plain	10.490	40	Development of junction
3	4+420	4+500	45	Left	Plain	73.452	35	Development of junction

4. ***Vertical Deficient Curve Details:***

There is no vertical curve comes under the deviation.

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-fulfilment 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 wilful 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,	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pave	24-48 hours	MORT&H Specification 3004.2

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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					
s of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	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

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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					
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width< 0.1 m at any location,	Daily			7- 15 days	IRC:82-2015

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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**					
			d to 30 cm from the edge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82 - 2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82 - 2015

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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					
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection / Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure,	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83- 2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83- 2008

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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					
approaches of connecting roads, slip roads, lay byes etc. as applicable)		**Minimum SN**	**Traffic Speed (Km/h)**		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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					
Embankment/ Slope	Edge drop at shoulders	Nil	40mm	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	Daily			7-15 days	MORT&H Specification 408.4

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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**					
			side slope					
	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

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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	**For the case d > D/2**
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 without delay	Seal, and stitch if L > lm.
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		Within 7days

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or 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. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected. Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	
3	**Single Longitudinal Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth 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

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			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 15 days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
						See Para 5.6.4 Within 15 days
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. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken		

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
				into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	ree or four corners broken		Reinstate sub-base, and reconstruct the

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
						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		No Action
			1	w < 0.5 mm; L < 3 m/m^2	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3 m/m^2		
			3	w > 1.5 mm and L < 3 m/m^2		
			4	w > 3 mm, L < 3 m/m^2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m^2 and deformation		

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
Surface Defects						
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			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.	

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
					Within 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**	**Long Term**
					No action.	Not Applicable
			1	r < **2 %**	Local repair of areas damaged and liable to be damaged. Within 7days	
			2	r = 2 - 10 %		

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	r = 10 - 20%	Bonded Inlay within 15 days	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 mm	Reconstruct slab within 30 days	
9	**Polished Surface/Glazing**	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm		
			2 '	t = 1 - 0.6 mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a 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		

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m^2	Partial depth repair 110mm	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m^2	i.e.10 mm more than the depth of the hole. Within 30 days	
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	

Joint Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total joint length	0	Difficult to discern.	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress of water	Clean, widen and reseal the joint. Within 7 days	

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.				and trapping incompressible material.		
12	**Spalling of Joints**	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion.	
			2	w = 10 - 20 mm, L < 25%	Within 7 days	
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	

13	**Faulting (or Stepping)**	f = difference of level	0	not discernible, < 1 mm	No action.	No action.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

	in Cracks or Joints		1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	
14	**Blowup or Buckling**	h = vertical displacement from normal profile	0	Nil, not discernible	**Short Term**	**Long Term**
			1	h < 6 mm	No Action	
			2	h = 6 - 12 mm	Install Signs to Warn Traffic	

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

			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.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstate pavement at normal level	

					if L < 20 m.	
			5	h > 100 mm	Within 30 days	

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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

			3	f = 25 - 50 mm	Fill up shoulder	

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

			0-2	No discernible problem	No action.	
20	**Ponding**	Ponding on slabs due to 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-	

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="3">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="5">Highway</td><td rowspan="5">Availability of Safe Sight Distance</td><td colspan="3">As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.</td><td rowspan="5">Monthly</td><td rowspan="5">Manual Measurements with Odometer along with video/ image backup</td><td colspan="2" rowspan="5">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.</td><td rowspan="5">IRC:SP 84-2014</td></tr>
<tr><td>Design Speed, kmph</td><td>Desirable Minimum Sight Distance (m)</td><td>Safe Stopping Sight Distance (m)</td></tr>
<tr><td>100</td><td>360</td><td>180</td></tr>
<tr><td>80</td><td>260</td><td>130</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td colspan="3"><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
</table>

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m^2/lux Bituminous Road - 100mcd/m^2/lux	Monthly	As per Annexure-D of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35 - 2015
	Night Time Visibility	Initial and Minimum Performance for Dry Retro reflectivity during night time:	Bi-Annually	As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015
		Design Speed	(RL) Retro Reflectivity (mcd/m^2/lux)				
			Initial (7 days)	Minimum Threshold level (TL) & warranty period required up to 2 years			
		Up to 65	200	80			
		65 - 100	250	120			
		Above 100	350	150			
		Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):					

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification and Standards
		Initial 7 days Retro reflectivity: 100 mcd/m^2/lux Minimum Threshold Level: 50 mcd/m^2/lux					
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of	IRC:67-2012

						Gantry/Cantilever Sign boards	
	Retro reflectivity	As per specifications in IRC:67-2012	Bi Annually	Testing of each	hange of ignboard	48 hours in case of Mandatory	RC:67-2012

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.		Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilever Sign boards	
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furnitu	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

r e	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84- 2014, IRC:119-2015
	End Treatment of	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84- 2014,

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification and Standards
	Traffic Safety Barriers			backup			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	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

System	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

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
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
	Cleaning of toilets	-	Daily	-	-	Every 4 hours	

Rest Areas	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus-shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

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
	Structurally sound	Spalling of concrete not more than 0.25 sqm	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause
		Delamination of concrete not more than 0.25 sq.m.					

		Cracks wider than 0.3 mm not more than 1m aggregate length		recording the defects			2800

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

	Protection works in good condition	Damaged of roughstone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons 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 ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
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	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

		Rusted reinforcement	No more than 0.25 sq.m	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 the repairs to affected concrete portion with epoxy mortar / concrete.	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					
		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 Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.
		Deflection due to permanent loads and	Within design limits.	Once in every 10 years for spans more	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.

	live loads		than 40 m				
Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.							
	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 through expansion joint in case of buried and asphalt plug and copper strip joint.	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.

	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint	Monthly	Detailed condition survey as per IRC SP:35-1990 using	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

	expansion Joint	gap.		Mobile Bridge Inspection Unit			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.	Monthly	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. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
Bridge-substructure	Cracks/spalling of concrete/ rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge 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.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

	Bearings	Delamination 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	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH 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 doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2	IRC: SP 40-1993 and IRC:SP:13-2004.

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

		sq.m. damage to solid apron (concrete apron) not more than 1 sq.m				weeks before onset of rainy season whichever is earlier.	
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on EPC basis.

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
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road lighting**	
(i)	Any major failure of the system	24 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e)	**Trees and plantation**	

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f) Rest area		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g) [Toll Plaza]		
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a) Superstructure		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b) Foundations		

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours

Nature of Defect or deficiency		**Time limit for repair/ rectification**
(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 4.1 (vii)(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) Licence for use of explosives;

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

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

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

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

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

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

(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)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

Managing Director,
NHIDCL

WHEREAS:

_____[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 Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(A) 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**").

(B) 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 & Infrastructure Development Corporation Ltd.], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

7. Notwithstanding anything contained hereinbefore, the liability of the Bank

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

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

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

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

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

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

13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of [Ministry/NHAI/NHIDCL/State PWD/BRO], details of which is as under:

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

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

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 Advance Payment

Managing Director,
NHIDCL

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the construction of the Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing *@Bank Rate + 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 r eference 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 & Infrastructure Development Corporation Ltd.], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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 Advance Payment.

_____

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. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of [Ministry/NHAI/NHIDCL/State PWD/BRO], details of which is as under:

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.

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

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

_____

Schedule-H

(See Clauses 10.1.4 and 19.3)

Contract Price Weightages

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

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	**2**	**3**	
Road works including culverts, widening and repair of culverts	60.925%	**B.1- Reconstruction of 2- Lane/ realignment/bypass (Flexible pavement)**	
		(1) Clearing and Grubbing(114.505 Ha)	0.36%
		(2) Dismantling of Structures (597.165 cum)& Flexible Pavement(8659.46 cum)	
		A) Dismantling of Structures	0.04%
		B) Dismantling of Flexible Pavement	0.31%
		(3) Sub-base & Non-Bituminous Base Course	
		(A) GSB	
		(i)GSB for road	18.84%
		(ii) GSB for shoulder	5.60%
		(iii) GSB for truck lay-bye & toll plaza	1.18%
		(B) WMM	
		(i) WMM for road	23.63%
		(ii) WMM for shoulder	7.02%
		(iii) WMM for truck lay-bye & toll plaza	1.49%
		(4) **Embankment/ earth filling for Shoulders and widening of Formation Width**	4.39%
		(5) **Bituminous Work**	
		(a) DBM	
		(i) DBM for road	
		1. Prime Coat	0.53%
		2. DBM	22.88%
		(ii) DBM for truck lay-bye & toll plaza	
		1. Prime Coat	0.03%
		2. DBM	1.45%
		(b) **BC**	

		(i) BC for road	
		1. Tack Coat	0.35%
		2. BC	9.89%
		(ii) BC for truck lay-bye & toll plaza	
		1. Tack Coat	0.01%
		2. BC	0.63%
		(6) **Construction of Concrete Kerbs in Divider at starting point, for Non-operational Toll Plaza (1 no) and Truck Lay byes (2 nos) (2477.20 mtr.)**	0.16%
		(7) **Pre-Polished Vibratory Interlocking Paver Block at different locations (5820 sqm.)**	1.20%
		Culverts (lengths < 6m)	-
Minor Bridges/ Major Bridges / Underpasses/ Overpasses	0.357%	**Providing and fixing 50 mm. dia Steel Pipe Railing (462 mtr.)**	16.52%
		Painting 2 coats after filling the surface with synthetic enameled paint of Bridges (Steel and RCC) and Culverts (8599.59 sqm.)	13.47%
		Providing Wearing Coat by Mastic Asphalt (1516.27 sqm.)	38.78%
		Tack Coat (1516.27 sqm)	0.35%
		RCC Crash Barrier for Parapet	30.87%
Other Engineering Works	38.718%	**(i) Retro-reflectorised Traffic Signs (714 nos. in 7 sizes), Place Identification Sign (134 nos.), Road Delineators (596 nos.), Road Studs (5000 nos.) and Gantry Sign Board (5.08 ton)**	
		a) Retro reflectorised Traffic Signs	0.37%
		b) Direction & Place Identification Sign	0.09%
		c) Road Delineators	0.09%
		d) Road studs	0.32%
		e) Gantry Sign board	0.10%
		(ii) Crash Barriers	1.82%

		(iii) Project facilities (a) Bus Shelters (b) Passing Places (c) Parking space (d) Rest areas (e) others	0.00%
		(iv**) Construction of RCC Drain (1 m x 1 m – 12879 m, 1.2 m x 1 m – 2644 m and 1.5 m x 1.5 m – 1680 m)**	`
		a) Earthwork	0.46%
		b) PCC	4.41%
		c) RCC	15.27%
		d) Sand filling	0.33%
		e) Steel	7.66%
		(v) **Construction of Retaining Wall (3 m height – 429 m and 4 m height – 1630 m)**	
		(a) Earthwork	1.58%
		(b) PCC	1.53%
		(c) Steel	15.72%
		(d) RCC	25.67%
		(vi) Construction of Breast Wall (4 m height – 630 m)	
		(a) Earthwork	0.52%
		(b) PCC	0.49%
		(c) Steel	5.33%
		(d) RCC	8.71%
		(vii) **Kilometre Stone and Boundary Pillar**	
		Kilometre Stone (69 nos)	0.02%
		Boundary Pillar (867 Nos)	0.21%
		(viii) **Road Marking with Hot Applied Thermoplastic Compound**	0.41%
		(ix) **Junctions** (a) Major Junctions (2 nos.) (b) Minor Junctions (58 nos.)	
		(i) GSB	2.20%
		(ii) WMM	2.21%
		(iii) <u>DBM</u> Prime Coat	0.10%

		DBM	0.2.47%
		(iv) <u>BC</u> Tack Coat	0.03%
		BC	1.87%
		TOTAL	

- The above list is illustrative and may require modification as per the scope of the work.

1.3 Procedure of estimating the value of work done

1.3.1 Road works.

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

Table 1.3.1

Stage for Payment	**Percentage weightage**	**Payment Procedure**
3		
B.1- Reconstruction of 2- Lane/ realignment/bypass (Flexible pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 1 (one) km length, whichever is less.
(1) Clearing and Grubbing(114.505 Ha)	0.36%	
(2) Dismantling of Structures (597.165 cum)& Flexible Pavement(8659.46 cum)		
A) Dismantling of Structures	0.04%	
B) Dismantling of Flexible Pavement	0.31%	
(3) Sub-base & Non-Bituminous Base Course		
(B) GSB		
(i)GSB for road	18.84%	
(ii) GSB for shoulder	5.60%	
(iii) GSB for truck lay-bye & toll plaza	1.18%	
(B) WMM		
(i) WMM for road	23.63%	
(ii) WMM for shoulder	7.02%	
(iii) WMM for truck lay-bye & toll plaza	1.49%	
(4) **Embankment/ earth filling for Shoulders and widening of Formation Width**	4.39%	
(5) **Bituminous Work**		
(a) DBM		
(i) DBM for road		
1. Prime Coat	0.53%	

2. DBM	22.88%	
(ii) DBM for truck lay-bye & toll plaza		
1. Prime Coat	0.03%	
2. DBM	1.45%	
(b) **BC**		
(i) BC for road		
1. Tack Coat	0.35%	
2. BC	9.89%	
(ii) BC for truck lay-bye & toll plaza		
1. Tack Coat	0.01%	
2. BC	0.63%	
(6) **Construction of Concrete Kerbs in Divider at starting point, for Non-operational Toll Plaza (1 no) and Truck Lay byes (2 nos) (2477.20 mtr.)**	0.16%	
(7) **Pre-Polished Vibratory Interlocking Paver Block at different locations (5820 sqm.)**	1.20%	
Culverts (lengths < 6m)	-	Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least 1 (One) culvert.
Providing and fixing 50 mm. dia Steel Pipe Railing (462 mtr.)	16.52%	
Painting 2 coats after filling the surface with synthetic enameled paint of Bridges (Steel and RCC) and Culverts (8599.59 sqm.)	13.47%	
Providing Wearing Coat by Mastic Asphalt (1516.27 sqm.)	38.78%	
Tack Coat (1516.27 sqm)	0.35%	
RCC Crash Barrier for Parapet	30.87%	
(i) Retro-reflectorised Traffic Signs (714 nos. in 7 sizes), Place Identification Sign (134 nos.), Road Delineators (596 nos.), Road Studs (5000 nos.) and Gantry Sign Board (5.08 ton)		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.
a) Retro reflectorised Traffic Signs	0.37%	
b) Direction & Place Identification Sign	0.09%	

c) Road Delineators	0.09%	
d) Road studs	0.32%	
e) Gantry Sign board	0.10%	
(ii) Crash Barriers	1.82%	
(iii) Project facilities (f) Bus Shelters (g) Passing Places (h) Parking space (i) Rest areas (j) others	0.00%	
(iv**) Construction of RCC Drain (1 m x 1 m – 12879 m, 1.2 m x 1 m – 2644 m and 1.5 m x 1.5 m – 1680 m)**	`	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
f) Earthwork	0.46%	
g) PCC	4.41%	
h) RCC	15.27%	
i) Sand filling	0.33%	
j) Steel	7.66%	
(v) **Construction of Retaining Wall (3 m height – 429 m and 4 m height – 1630 m)**		
(e) Earthwork	1.58%	
(f) PCC	1.53%	
(g) Steel	15.72%	
(h) RCC	25.67%	
(vi) Construction of Breast Wall (4 m height – 630 m)		
(e) Earthwork	0.52%	
(f) PCC	0.49%	
(g) Steel	5.33%	
(h) RCC	8.71%	
(vii) **Kilometre Stone and Boundary Pillar**		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.
Kilometre Stone (69 nos)	0.02%	
Boundary Pillar (867 Nos)	0.21%	
(viii) **Road Marking with Hot Applied Thermoplastic Compound**	0.41%	
(ix) **Junctions** (c) Major Junctions (2 nos.) (d) Minor Junctions (58 nos.)		Payments shall be made on completion of 2 junctions
(v) GSB	2.20%	
(vi) WMM	2.21%	

(vii) <u>DBM</u> Prime Coat	0.10%	
DBM	0.2.47%	
(viii) <u>BC</u> Tack Coat	0.03%	
BC	1.87%	
TOTAL		

2. Procedure for payment for Maintenance

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

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

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

[**Note**: The Authority shall describe in this Annex-I, all the Drawings that the Contractor is required to furnish under Clause 10.2.]

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

During Construction period, the Contractor shall comply with the requirements set forth in this Schedule-J for each of the Project Milestones and the **Scheduled Completion Date**. Within 15 (fifteen) days of the date 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 **255th** day from the Appointed Date (the "**Project Milestone- I**").

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

3. Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the **438th** 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 **620th** 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 730th 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 kilometre.

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

(iv) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards, except tests as specified in clause 5,but shall include measuring the

reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.

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

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

Sr. 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 Weigh t Deflectometer (FWD)	At least once a year
4	Bridges	Mobile Bridg e 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 Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura (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… , Scheduled Completed
Date for which was 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 on monthly basis

(i) 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 cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%

S. No.	Item/Defect/Deficiency	Percentage
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

$$R = {}^{P}/_{100} \times (M1 \text{ or } M2) \times {}^{L1}/_{L}$$

Where,

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

M1= Monthly lump-sum payment in accordance para 1.2 above of this Schedule M2= Monthly lump-sum payment in accordance para 1.2 above of this Schedule 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 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

Terms of Reference for Authority's Engineer

1. Scope

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the [name and address of the Authority] (the "**Authority**") and

..... (the "**Contractor**")# for Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura on Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

- 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) issuance of Completion Certificate or

(e) any other matter which is not specified in (a), (b), (c) or (d) above and which creates a financial liability on either Party.

(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 and approve 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 and approve 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 (ix), 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 50 (fifty) 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 (ix), 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's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.

(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, as the case may be. For

carrying out its functions under this Paragraph 4 (xviii) 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 (iv) (d).

(ii) Authority's Engineer shall -

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

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

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

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

8. Other duties and functions

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

9. Miscellaneous

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

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

(iii) Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro

film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as- built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

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

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

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with 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 Improvement and Widening to two laning with paved shoulder of Khayerpur –Amtali (Agartala) Section from km 0.00 to km 12.900 of NH-8 in the State of Tripura (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)