



# **National Highways and Infrastructure Development Corporation Ltd.**

## **Technical Schedules**

**FOR**

**Balance work of Widening to 2 (Two) lane with hard shoulder of  
Churachandpur to Tuivai section of NH-102B from km 130.000 to km  
141.029 (Package-4B) in the State of Manipur on EPC Mode**

**NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD  
(MINISTRY OF ROAD TRANSPORT & HIGHWAYS, GOVT. OF INDIA)**

**February, 2025**

## SCHEDULE - A

(See Clauses 2.1 and 8.1)

### SITE OF THE PROJECT

#### 1 The Site

- (i) Site of the 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 Highway shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The Contractor, however, improve/upgrade the road profile indicated in **Annex-III** based on site/design requirements.
- (v) The status of the environment clearances obtained or awaited is given in **Annex IV**.

## Annex-I

### (Schedule-A)

#### SITE

#### 1. Site

The Site of the Two-Lane Project Highway comprises the section of NH-102B commencing from km 130+000 to km 141+029 i.e. Sinzawl Village to Tuivai River (Mizoram Border) in the State of Manipur. The land, carriageway and stretches comprising the site are described below.

#### 2. Land

The Site of the Project Highway comprises the land as described below:

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Right of Way (m)
	From	To	From	To	
1	149+630	161+440	130+000	141+029	24

#### 3. Carriageway

The present carriageway of the Project Highway is single lane except in few sections where 2-laning with hard shoulder works have been carried out as summarized in following tables. Type of existing pavement is flexible.

(i) Already completed work for Earthwork upto Top of Sub-grade layer is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	130+000	140+800	10.800
		<b>Total</b>	<b>10.800</b>

(ii) Already completed work for GSB layer is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	130+000	139+816	9.816
2	140+000	140+800	0.800
		<b>Total</b>	<b>10.616</b>

(iii) Already completed work for WMM layer is as under:

Sl.No.	Chainage From	Chainage To	Length (km)
1	130+000	139+800	9.800
2	140+000	140+800	0.800
		<b>Total</b>	<b>10.600</b>

**(iv) Already completed work for DBM layer is as under:**

Sl. No.	Design Chainage		Length (km)
	From	To	
1	130+000	133+610	3.610
2	133+710	135+965	2.255
3	136+000	137+400	1.400
4	137+420	139+800	2.380
5	140+000	140+707	0.707
		<b>Total</b>	<b>10.352</b>

**(v) Already completed work for BC layer is as under:**

Sl. No.	Design Chainage		Length (km)
	From	To	
1	130+000	133+610	3.610
2	133+712	133+860	0.148
3	133+880	134+830	0.950
4	134+850	135+963	1.113
5	136+000	137+393	1.393
6	137+422	139+800	2.378
7	140+000	140+453	0.453
		<b>Total</b>	<b>10.045</b>

#### 4. Major Bridges

The Site includes the following Major Bridges:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure			Span Arrangement (m)	Width (m)
			Foundation	Sub-structure	Super-structure		
1	161+300	141+016	A1 Abutment wall & P1 Pier Completed	A1 Abutment wall shaft & P1 Pier completed	Balance	3 Nos Span (43+43+24)	16 m

#### 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.	Existing Chainage (km)	Type of Structure		Span Arrangement (m)	Width (m)
		Foundation	Superstructure		
Nil					

#### 6. Grade separators

The Site includes the following grade separators:

Sl.No.	Existing Chainage (km)	Type of Structure		Span Arrangement (m)	Width (m)
		Foundation	Superstructure		
Nil					

## 7. Minor bridges

The Site includes the following minor bridges:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure			No of spans with Span Length (m)	Width (m)	Remarks
			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.	Existing Chainage (km)	Type of structure	No. of span with Span Arrangement (m)	width (m)
Nil				

## 10. Culverts

The Site has the following Box Type culverts:

Sl.No.	Design Chainage (km)	Size
1	130+029	2 m x 2 m
2	130+180	2 m x 2 m
3	130+245	2 m x 2 m
4	130+372	2 m x 2 m
5	130+750	2 m x 2 m
6	130+865	2 m x 2 m
7	131+095	2 m x 3 m
8	131+193	2 m x 2 m
9	131+500	2 m x 2 m
10	131+575	2 m x 2 m
11	131+654	2 m x 2 m
12	131+783	2 m x 2 m
13	132+243	2 m x 2 m
14	132+433	2 m x 2 m
15	132+775	2 m x 2 m
16	132+843	2 m x 2 m
17	133+205	2 m x 2 m
18	133+372	2 m x 2 m
19	133+710	2 m x 2 m
20	134+480	2 m x 2 m
21	134+545	2 m x 2 m
22	134+690	2 m x 2 m
23	134+800	2 m x 2 m
24	134+896	2 m x 2 m

Sl.No.	Design Chainage (km)	Size
25	135+095	2 m x 2 m
26	135+193	2 m x 2 m
27	135+264	2 m x 2 m
28	135+367	2 m x 2 m
29	135+560	2 m x 3 m
30	135+642	2 m x 2 m
31	135+848	2 m x 2 m
32	135+955	2 m x 3 m
33	136+266	2 m x 2 m
34	136+462	2 m x 3 m
35	136+495	2 m x 2 m
36	136+550	2 m x 2 m
37	136+587	2 m x 2 m
38	136+628	2 m x 2 m
39	136+725	2 m x 2 m
40	137+300	2 m x 2 m
41	137+413	2 m x 2 m
42	137+488	2 m x 2 m
43	137+880	2 m x 2 m
44	138+115	2 m x 3 m
45	138+580	2 m x 2 m
46	138+768	2 m x 2 m
47	138+867	2 m x 2 m
48	138+995	2 m x 2 m
49	139+516	2 m x 2 m
50	139+562	2 m x 3 m
51	139+626	2 m x 3 m
52	140+101	2 m x 2 m
53	140+350	2 m x 2 m
	<b>Total</b>	<b>53 Nos.</b>

### 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 byes

The details of truck lay byes are as follows:

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

### 13. Road side drains

The details of the road side drains are as follows:

Sl. No.	Location		Length (km)	Type	
	From	To		Masonry/cc (Pucca)	Earthen (Kutchha)
1	131+870	131+960	0.090	Pucca lined drain	
2	132+240	132+420	0.180		

Sl. No.	Location		Length (km)	Type	
	From	To		Masonry/cc (Pucca)	Earthen (Kutcha)
3	132+440	132+530	0.090	(Single Side)	
4	133+620	133+690	0.070		
5	133+900	133+970	0.070		
6	134+920	135+150	0.230		
	<b>Total</b>		<b>0.730</b>		

#### 14. Major junctions

The details of major junctions are as follows:

Sl. No.	Existing Chainage	Lane Configuration	Type	Sides	Remarks
Nil					

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

#### 15. Minor junctions

The details of the minor junctions are as follows:

Sl. No.	Location (km)	Type of intersection	
		Type of Junction	Cross Road
Nil			

#### 16. Bypasses

The details of the bypasses are as follows:

Sl.No.	Name of bypass (town)	Chainage (km)	Length (in km)
Nil			

#### 17. Other structures

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

#### 18. Hazardous Locations

a) Already completed work of Retaining Wall is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	130+000	130+051	0.051
2	130+055	130+075	0.020
3	130+087	130+216	0.129
4	130+970	131+010	0.040
5	131+206	131+327	0.121
6	131+338	131+366	0.028
7	131+383	131+502	0.119

Sl. No.	Design Chainage		Length (km)
	From	To	
8	131+541	131+570	0.029
9	131+587	131+629	0.042
10	131+786	131+970	0.184
11	132+176	132+211	0.035
12	132+220	132+570	0.350
13	132+679	132+850	0.171
14	132+920	133+000	0.080
15	133+120	133+170	0.050
16	133+320	133+520	0.200
17	133+577	133+607	0.030
18	133+620	133+920	0.300
19	134+150	134+250	0.100
20	134+400	134+500	0.100
21	134+570	134+830	0.260
22	134+900	135+072	0.172
23	135+086	135+136	0.050
24	135+200	135+250	0.050
25	135+320	135+360	0.040
26	135+470	135+570	0.100
27	135+580	135+630	0.050
28	135+770	135+840	0.070
29	135+845	135+870	0.025
30	136+180	136+210	0.030
31	136+210	136+430	0.220
32	136+600	136+760	0.160
33	136+820	136+870	0.050
34	136+970	137+070	0.100
35	137+080	137+100	0.020
36	137+100	137+290	0.190
37	137+300	137+600	0.300
38	138+250	138+430	0.180
39	138+694	138+752	0.058
40	138+763	138+860	0.097
41	139+150	139+230	0.080
42	139+453	139+488	0.035
43	139+502	139+538	0.036
44	139+560	139+710	0.150
45	140+043	140+080	0.037
46	140+102	140+167	0.065
47	140+228	140+421	0.193
48	140+442	140+491	0.049
49	140+561	140+620	0.059
<b>Total</b>			<b>5.105</b>

b) Already completed work of Breast Wall is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	130+370	130+470	0.100
2	130+600	130+650	0.050



Sl. No.	Design Chainage		Length (km)
	From	To	
3	131+970	132+065	0.095
4	132+570	132+720	0.150
5	133+520	133+620	0.100
6	134+470	134+517	0.047
7	134+552	134+605	0.053
8	135+220	135+310	0.090
9	135+370	135+470	0.100
10	135+516	135+554	0.038
11	135+570	135+770	0.200
12	135+970	136+130	0.160
13	136+141	136+344	0.203
14	136+770	136+820	0.050
15	137+600	137+728	0.128
16	137+970	138+050	0.080
17	138+080	138+095	0.015
18	138+108	138+581	0.473
19	138+600	138+760	0.160
20	138+790	138+862	0.072
21	138+872	139+360	0.488
22	139+526	139+546	0.020
23	139+614	139+670	0.056
24	139+720	139+820	0.100
25	139+962	139+992	0.030
<b>Total</b>			<b>3.058</b>

c) Already completed work of Toe Wall is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	134+300	134+340	0.040
2	136+301	136+335	0.037
<b>Total</b>			<b>0.077</b>

## 19. Existing Utilities

(i) The site includes the following electrical utilities:

(a) Extra High-Tension Lines (EHT Lines) \*

Sl. No	Chainage		Length (in km)				Crossings			
	From	To	400KV	220KV	110KV	66KV	400KV	220KV	110KV	66KV
Nil										

(b) High Tension/Low Tension Lines (HT/LT Lines) \*

Sl. No.	Chainage		HT/LT Lines (Length/Nos+)			Distribution Station	
	From	To	33KV	11KV	LT	No	Capacity
Nil							

(ii) Public Health utilities (Water/Sewage Pipe Lines) \*

- The site includes the following Public Health utilities: -

Sl. No.	Chainage		Pipe line	Distribution Tank	Reservoir	Community Sanitary Complex	IHHL
	From	To	(in km)	Nos.	Nos.	Nos.	Nos.
Nil							

(\* This illustrative and may change as per features of existing utilities.)

Contractor shall inspect the project highway for existing utilities and undertake shifting in accordance with Annexure – I of Schedule – B and as per the Utility Relocation Plan approved by the concerned Utility Owning Dept.

## Annex – II

(See Clauses 8+3 (i))

(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.	Ch From	Ch To	Length (km)	Width (m)	Date of providing RoW
1	130+000	141+029	11+029	24	100% on Appointed date

The Construction of Project Highway will be implemented as per Manual, details of which are already given in Article-2 of Annexure – I of Schedule–A.

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### **Annex - III**

*(Schedule-A)*

#### **Alignment Plans**

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

- (i) The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL. In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.
- (ii) Traffic Signage plan of the Project Highway showing numbers & location of traffic signs is enclosed. The contractor shall, however, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per relevant specifications/IRC Codes/Manual.

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## **Annex - IV**

*(Schedule-A)*

### **Environment Clearances**

The project highway does not require environmental clearance as per MoEF circular F. No. 21-270/2008-1A.III (dated 22 August 2013).

## SCHEDULE - B

*(See Clause 2.1)*

### DEVELOPMENT OF THE PROJECT HIGHWAY

#### **1 Development of the Project Highway**

Development of the Project Highway shall include the design and construction of the Project Highway as described in this Schedule - B and Schedule – C.

#### **2. Rehabilitation and Augmentation**

Rehabilitation and augmentation shall include Two-Laning with hard shoulder of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

#### **3 Specifications and Standards**

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

## Annex - I

(Schedule-B)

### DESCRIPTION OF PROJECT

Site of the Two-lane with hard shoulder comprises between Churachandpur to Tuivai section from Sinzawl Village (Design Chainage km 130+000) to Tuivai River at Mizoram/Manipur Border (Design Chainage km 141+029) in the State of Manipur. The land, carriageway and stretches comprising the site are described below.

#### 1 Widening of existing Highway

- (i) The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in **Annex-III of Schedule-A**. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for hilly terrain to the extent land is available.
- (ii) Width of Carriageway
  - (a) Two-Lanning with hard shoulders shall be undertaken. The paved carriageway shall be 7 (Seven) m wide in accordance with the typical cross section drawings in the Manual.

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

Sl. No.	Built-up stretch (Township)	Location		Width (m)	Typical Cross Section (Refer to Manual)	Remarks
1	Sinzawl	130+000	141+029	7	As per attached TCS drawing	7 m Carriageway

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

#### 2 Geometric Design and General Features

##### (i) General

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

## (ii) Design speed

For Mountainous terrain design speed shall be the minimum design speed of 40-60 km/hr and for sharp curve and hair pin bend locations speed reduces up to 30 km/hr & 20 km/hr, respectively.

## (iii) Improvement of the existing road geometrics

In accordance with Paragraph 2.1(v) of Manual, as far as possible, uniformity of design standards shall be maintained throughout the length. In case of any change, it shall be effected in a gradual manner.

In the sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided:

Sl.No.	Stretch (from km to km)	Type of Deficiency	Remarks
1	130+099 to 130+112	Sharp Bend	Design Speed = 20 Kmph
2	130+179 to 130+200	Sharp Bend	Design Speed = 20 Kmph
3	130+246 to 130+248	Sharp Bend	Design Speed = 30 Kmph
4	130+294 to 130+317	Sharp Bend	Design Speed = 20 Kmph
5	130+356 to 130+365	Sharp Bend	Design Speed = 20 Kmph
6	130+593 to 130+616	Sharp Bend	Design Speed = 20 Kmph
7	131+086 to 131+131	Sharp Bend	Design Speed = 20 Kmph
8	131+200 to 131+208	Sharp Bend	Design Speed = 30 Kmph
9	131+278 to 131+324	Sharp Bend	Design Speed = 20 Kmph
10	131+394 to 131+403	Sharp Bend	Design Speed = 30 Kmph
11	131+467 to 131+472	Sharp Bend	Design Speed = 20 Kmph
12	131+567 to 131+591	Sharp Bend	Design Speed = 20 Kmph
13	131+701 to 131+741	Sharp Bend	Design Speed = 20 Kmph
14	131+893 to 131+935	Sharp Bend	Design Speed = 30 Kmph
15	132+121 to 132+146	Sharp Bend	Design Speed = 20 Kmph
16	132+210 to 132+222	Sharp Bend	Design Speed = 20 Kmph
17	132+304 to 132+320	Sharp Bend	Design Speed = 20 Kmph
18	132+550 to 132+560	Sharp Bend	Design Speed = 30 Kmph
19	132+624 to 132+660	Sharp Bend	Design Speed = 30 Kmph
20	132+711 to 132+724	Sharp Bend	Design Speed = 30 Kmph
21	132+862 to 132+872	Sharp Bend	Design Speed = 30 Kmph
22	133+419 to 133+478	Sharp Bend	Design Speed = 30 Kmph
23	133+699 to 133+776	Sharp Bend	Design Speed = 30 Kmph
24	133+878 to 133+893	Sharp Bend	Design Speed = 30 Kmph
25	133+984 to 134+016	Sharp Bend	Design Speed = 20 Kmph
26	134+274 to 134+285	Sharp Bend	Design Speed = 30 Kmph
27	134+368 to 134+380	Sharp Bend	Design Speed = 30 Kmph
28	134+564 to 134+596	Sharp Bend	Design Speed = 30 Kmph
29	134+637 to 134+653	Sharp Bend	Design Speed = 30 Kmph
30	134+699 to 134+757	Sharp Bend	Design Speed = 30 Kmph
31	134+959 to 134+981	Sharp Bend	Design Speed = 20 Kmph
32	135+089 to 135+117	Sharp Bend	Design Speed = 20 Kmph
33	135+564 to 135+607	Sharp Bend	Design Speed = 20 Kmph
34	135+662 to 135+740	Sharp Bend	Design Speed = 30 Kmph
35	135+870 to 135+879	Sharp Bend	Design Speed = 20 Kmph



Sl.No.	Stretch (from km to km)	Type of Deficiency	Remarks
36	135+911 to 135+926	Sharp Bend	Design Speed = 20 Kmph
37	135+998 to 136+025	Sharp Bend	Design Speed = 20 Kmph
38	136+071 to 136+114	Sharp Bend	Design Speed = 20 Kmph
39	136+306 to 136+370	Sharp Bend	Design Speed = 30 Kmph
40	136+482 to 136+500	Sharp Bend	Design Speed = 30 Kmph
41	136+570 to 136+578	Sharp Bend	Design Speed = 30 Kmph
42	136+692 to 136+719	Sharp Bend	Design Speed = 30 Kmph
43	137+267 to 137+309	Sharp Bend	Design Speed = 20 Kmph
44	137+453 to 137+476	Sharp Bend	Design Speed = 30 Kmph
45	137+644 to 137+672	Sharp Bend	Design Speed = 20 Kmph
46	137+715 to 137+750	Sharp Bend	Design Speed = 20 Kmph
47	137+824 to 137+862	Sharp Bend	Design Speed = 20 Kmph
48	137+947 to 138+000	Sharp Bend	Design Speed = 20 Kmph
49	138+137 to 138+183	Sharp Bend	Design Speed = 30 Kmph
50	138+385 to 138+433	Sharp Bend	Design Speed = 20 Kmph
51	138+484 to 138+499	Sharp Bend	Design Speed = 20 Kmph
52	138+555 to 138+569	Sharp Bend	Design Speed = 20 Kmph

#### (iv) Right of Way

The site of the project highway comprises the land as described in **Annex-II of Schedule-A.**

#### (v) Type of shoulders

(a) In built-up sections, footpaths/ covered drains shall be provided in the following stretches:

Sl. No.	Stretch (from km to km)	Fully Paved shoulders/footpaths	Reference to cross section
Nil			

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

(c) Design and specifications of hard 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 paragraph 2.10 of the Manual.

(b) Lateral & Vertical clearance: The width of the opening and vertical clearances at underpasses shall be as follows:

Sl. No.	Design Chainage	Clear span/ opening (m)	Vertical Clearance (m)	Remarks
Nil				

**(vii) Lateral and vertical clearances at overpasses**

(a) Lateral and vertical clearances at overpasses shall be as per paragraph 2.11 of the Manual.

(b) Lateral & Vertical clearances at overpasses shall be as follows:

Sl. No.	Design Chainage	Clear span/ opening (m)	Vertical Clearance (m)	Remarks
Nil				

**(viii) Service Roads**

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

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

**(ix) Grade-separated structures**

(a) Grade-separated structures shall be provided as per paragraph 2.13 of the Manual. The requisite particulars are given below:

**i) Overpass**

Sl. No.	Design Chainage	Span arrangement (m)	Road to be carried under the structure	Width of Structure (m)
Nil				

**ii) Vehicular Underpass (VUP)**

Sl. No.	Design Chainage	Span arrangement (m)	Road to be carried under the structure	Min. Vertical clearance (m)	Width of Structure (m)
Nil					

**iii) Light Vehicular Underpass**

Sl. No.	Design Chainage	Span arrangement(m)	Road to be carried under the structure	Min. Vertical clearance (m)	Width of Structure (m)
Nil					

**iv) Small Vehicular Underpass**

Sl. No.	Design Chainage	Span arrangement(m)	Road to be carried under the structure	Min. Vertical clearance (m)	Width of structure (m)
Nil					

(b) In the case of grade-separated structures, the type of structure and the level of the Project Highway and the crossroads shall be as follows:

Sl. No.	Location (Design Chainage)	Type of Structure	Cross road at		
			Existing level	Raised Level	Lowered Level

Sl. No.	Location (Design Chainage)	Type of Structure	Cross road at		
			Existing level	Raised Level	Lowered Level
Nil					

**(x) Cattle and pedestrian underpass/overpass**

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

Sl.No.	Location	Type of crossing
Nil		

**(xi) Typical cross-sections of the Project Highway**

The schedule of typical cross-sections is given in the table below. Drawings of typical cross-sections are attached. The indicative TCS for Project Highway are as follows-

TCS Type	Description	Length (m)
TCS-5	Two Lane carriageway with hard shoulder and one side toe wall & one side trapezoidal drain (existing pavement)	600
TCS-7	Two Lane carriageway with hard shoulder and one side trapezoidal drain (existing pavement)	2209
TCS-8	Two Lane carriageway with hard shoulder and one side breast wall (existing pavement)	2150
TCS-9	Two Lane carriageway with hard shoulder and one side breast wall & one side drain (existing pavement)	500
TCS-11	Two Lane carriageway with hard shoulder and one side retaining wall & one side drain (existing pavement)	5070
TCS-12	Two Lane carriageway with hard shoulder and one side retaining wall & one breast wall (existing pavement)	400
TCS-14	Two Lane carriageway with hard shoulder and one side toe wall & one side breast wall (existing pavement)	100
<b>Total</b>		<b>11029</b>

Sr. No.	Chainage		Length of CD (m)	Net Length (m)	TCS No.
	From	To			
1	130000	130220	2.6	217.4	TCS-11
2	130220	130270		50	TCS-8
3	130270	130370	7.8	92.2	TCS-11
4	130370	130470		100	TCS-14
5	130470	130870	2.6	397.4	TCS-8
6	130870	130920	2.6	47.4	TCS-11
7	130920	130970		50	TCS-9
8	130970	131620	7.9	642.1	TCS-11
9	131620	131770	2.6	147.4	TCS-7
10	131770	131970	2.6	197.4	TCS-11
11	131970	132220	2.6	247.4	TCS-8
12	132220	132570	8	342	TCS-11
13	132570	132720		150	TCS-9

Sr. No.	Chainage		Length of CD (m)	Net Length (m)	TCS No.
	From	To			
14	132720	133020	5.2	294.8	TCS-11
15	133020	133120		100	TCS-7
16	133120	133170	2.6	47.4	TCS-11
17	133170	133220		50	TCS-5
18	133220	133320		100	TCS-7
19	133320	133520	2.7	197.3	TCS-11
20	133520	133620		100	TCS-8
21	133620	133920	7.8	292.2	TCS-11
22	133920	134070		150	TCS-7
23	134070	134320	2.6	247.4	TCS-5
24	134320	134420	2.6	97.4	TCS-7
25	134420	134470	2.6	47.4	TCS-11
26	134470	134570		100	Tcs-8
27	134570	135220	15.6	634.4	TCS-11
28	135220	135320	2.6	97.4	TCS-8
29	135320	135370	2.6	47.4	TCS-11
30	135370	135470		100	TCS-9
31	135470	135570	2.7	97.3	TCS-11
32	135570	135770	2.6	197.4	TCS-8
33	135770	135870	2.6	97.4	TCS-11
34	135870	135970	2.7	97.3	TCS-5
35	135970	136020		50	TCS-8
36	136020	136320	7.9	292.1	Tcs-12
37	136320	136520	10.6	189.4	TCS-7
38	136520	136770	7.9	242.1	TCS-11
39	136770	136820		50	TCS-8
40	136820	136870		50	TCS-11
41	136870	136970	2.7	97.3	TCS-7
42	136970	137620	13.1	636.9	TCS-11
43	137620	137920	2.6	297.4	TCS-7
44	137920	137970		50	TCS-5
45	137970	138470	2.7	497.3	TCS-8
46	138470	138570	2.6	97.4	TCS-7
47	138570	138670	2.6	97.4	TCS-8
48	138670	138720	2.6	47.4	TCS-7
49	138720	138770		50	TCS-11
50	138770	138820		50	TCS-7
51	138820	138870	2.6	47.4	TCS-11
52	138870	138970		100	TCS-7
53	138970	139170		200	TCS-9
54	139170	139470	5.2	294.8	TCS-7
55	139470	139720	8	242	TCS-11
56	139720	139820	2.7	97.3	TCS-12
57	139820	140020	2.6	197.4	TCS-8
58	140020	140170	2.6	147.4	TCS-5
59	140170	140220		50	TCS-8
60	140220	140620	5.2	394.8	TCS-11
61	140620	141029	110	299	TCS-7
<b>Total</b>			<b>291</b>	<b>10738</b>	

### 3. Intersections and Grade Separators

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

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

#### (i) At grade Intersections

All intersections as per the site requirement shall be designed and constructed in accordance with the manual. A list of intersections is given in the below table. The draft layout of minor junctions is given in indicative Plan & Profile drawings for reference.

#### Major Intersections

Sl. No.	Location of intersection (km)	Type of intersection	Other features	Remarks
Nil				

#### Minor Intersections

Sl. No.	Location of intersection (km)	Type of intersection	Other features	Remarks
Nil				

#### (ii) Grade-separated intersection without ramps

Sl. No.	Design Chainage	Salient Feature (Formation width) (m)	Minimum Length of Viaduct (m)	Road to be carried Under the structure	Type of Structure
NIL					

### 4 Road Embankment and Cut Section

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

#### (ii) Raising of the existing road/New carriageway

The existing road shall be raised as per design requirements in accordance with the manual in conformity with the minimum FRL.

### 5 Pavement Design

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

(ii) Type of pavement

Flexible pavement shall be provided for the entire length of the project highway.

(iii) Design requirements - as per paragraphs 5.4, 5.9 and 5.10 of the manual and extant relevant IRC Guidelines.

(a) Design Period and strategy

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

(b) Design Traffic

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

(iv) Reconstruction of stretches:

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

Sl.No.	Stretch from km to km	Remarks	TCS Type
1	130+000 to 130+220	Reconstruction	TCS-11
2	130+220 to 130+270	Reconstruction	TCS-8
3	130+270 to 130+370	Reconstruction	TCS-11
4	130+370 to 130+470	Reconstruction	TCS-14
5	130+470 to 130+870	Reconstruction	TCS-8
6	130+870 to 130+920	Reconstruction	TCS-11
7	130+920 to 130+970	Reconstruction	TCS-9
8	130+970 to 131+620	Reconstruction	TCS-11
9	131+620 to 131+770	Reconstruction	TCS-7
10	131+770 to 131+970	Reconstruction	TCS-11
11	131+970 to 132+220	Reconstruction	TCS-8
12	132+220 to 132+570	Reconstruction	TCS-11
13	132+570 to 132+720	Reconstruction	TCS-9
14	132+720 to 133+020	Reconstruction	TCS-11
15	133+020 to 133+120	Reconstruction	TCS-7
16	133+120 to 133+170	Reconstruction	TCS-11
17	133+170 to 133+220	Reconstruction	TCS-5
18	133+220 to 133+320	Reconstruction	TCS-7
19	133+320 to 133+520	Reconstruction	TCS-11
20	133+520 to 133+620	Reconstruction	TCS-8
21	133+620 to 133+920	Reconstruction	TCS-11
22	133+920 to 134+070	Reconstruction	TCS-7
23	134+070 to 134+320	Reconstruction	TCS-5
24	134+320 to 134+420	Reconstruction	TCS-7
25	134+420 to 134+470	Reconstruction	TCS-11

Sl.No.	Stretch from km to km	Remarks	TCS Type
26	134+470 to 134+570	Reconstruction	TCS-8
27	134+570 to 135+220	Reconstruction	TCS-11
28	135+220 to 135+320	Reconstruction	TCS-8

## 6 Road Side Drainage

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

### RCC Covered Drain

Sl. No.	Chainage (m)		Length of CD	Net Length (m)	TCS No.	Side
	From	To				
Nil						

### RR Masonry Trapezoidal Drain

Sl. No.	Design Chainage (km)		Side	Length (m)
	From	To		
1	130+000	130+220	Single	220
2	130+270	130+370	Single	100
3	130+870	131+870	Single	1000
4	132+220	132+240	Single	20
5	132+420	132+440	Single	20
6	132+530	132+570	Single	40
7	132+720	133+520	Single	800
8	133+690	133+900	Single	210
9	133+970	134+470	Single	500
10	134+605	134+920	Single	315
11	134+605	135+220	Single	615
12	135+320	135+370	Single	50
13	135+470	135+516	Single	46
14	135+770	135+970	Single	200
15	136+344	136+770	Single	426
16	136+820	137+600	Single	780
17	137+728	137+970	Single	242
18	138+470	138+565	Single	95
19	138+970	139+720	Single	750
20	140+020	140+170	Single	150
21	140+220	141+029	Single	809
<b>Total</b>				<b>7388</b>

## 7 Designs of Structures

### (i) General

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

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



Sl. No.	Design Chainage	Width of structure and cross-sectional features	Remarks
1	141+016	Carriageway width= 11.0 m, Footpath width = 2 x 1.5 m, RCC Crash Barrier = 2 x 0.5 m, RCC Railing = 2 x 0.5m, Overall width= 16 m	Works already completed at site may be referred from Para 4 of Annx-I of Schedule-A.

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

Sl. No.	Design Chainage	Width of structure and cross-sectional features	Remarks
1	141+016	Carriageway width= 11.0 m, Footpath width = 2 x 1.5 m, RCC Crash Barrier = 2 x 0.5 m, RCC Railing = 2 x 0.5m, Overall width= 16 m	Works already completed at site may be referred from Para 4 of Annx-I of Schedule-A.

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

(e) The structures shall be designed to carry utility services like electric cable, water pipeline, OFC etc. as per the requirement of the site.

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

(ii) Culverts

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

(b) Reconstruction of New additional culverts / existing culverts:

Reconstruction of new culverts / existing culverts shall be provided at the following locations:

Sl.No.	Culvert Location	Span /Opening (m)
1	132+562	2.0 X 3.0
2	133+625	2.0 X 2.0
3	134+081	2.0 X 2.0
4	136+084	2.0 X 2.0
5	136+140	2.0 X 2.0
6	136+420	2.0 X 3.0
7	136+924	2.0 X 3.0
8	137+250	2.0 X 3.0
9	139+392	2.0 X 2.0
10	139+421	2.0 X 2.0
11	139+977	2.0 X 2.0
12	140+502	2.0 X 2.0



(c) Widening of existing culverts

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

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

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

Sl.No.	Culvert Location	Span /Opening (m)
1	133+788	2.0 X 2.0
2	134+932	2.0 X 2.0
3	137+158	2.0 X 2.0
4	139+747	2.0 X 3.0

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

Sl.No.	Location	Type of repair required
Nil		

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

(iii) Bridges

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

(i) The existing bridges at the following locations shall be re-constructed:

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

(ii) The following narrow bridges shall be widened:

Sl. No.	Design Chainage	Existing Chainage	Span Arrangement	Existing width (m)	Proposed Total Width (m)	Cross-section at deck level for widening
Nil						

(b) **Additional new bridges:** New bridges at the following locations on the Project Highway shall be constructed. GADs for the new bridges are attached in the drawings folder.

Sl. No.	Design Chainage	Name of Nallah	Span arrangement (m)	Width of structure and cross-sectional features	Remarks
1	141+016	Tuivai River	3 Nos. Span (43m+43m+24m)	Carriageway width= 11.0 m, Footpath width = 2 x 1.5 m, RCC Crash Barrier = 2 x 0.5 m, RCC Railing = 2 x 0.5m, Overall width= 16 m	Works already completed at site may be referred from Para 4 of Annx-I of Schedule-A.

Note: Proposed span arrangement is indicative and any increase in length/span/height shall not be treated as a change in the scope of work.

IRC Class Special Vehicle loading shall be taken into account in the structural design of bridges/Flyover/VUP/ Viaduct.

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

Sl.No.	Location at Chainage	Remarks
NIL		

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

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

The following bridges shall be retained with repairs:

Sl.No.	Design Chainage	Existing Chainage	Remarks
NIL			

- (e) Drainage system for bridge decks

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

- (iv) Rail-road bridges

- (a) Design, construction and detailing of ROB shall be as specified in section 7 of the Manual.

- (b) Road over-bridges

Road over-bridges (road over rail) shall be provided at the following locations:

Sl. No.	Design Chainage	Route	Span arrangement (m)	Total Length (m)	Width (m)
NIL					

(c) Road under-bridges

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

Sl.No.	Location of Level crossing (Ch)	Number and length of span(m)
NIL		

(v) Grade-separated structures

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

(vi) Repairs and strengthening of bridges and structures

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	Nature and extent of repairs to be carried out
As per table on para 7 (iii) d		

(b) ROB / RUB

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

(c) Overpasses/Underpasses and other structures

Sl. No.	Location of Structure (Ch)	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	Type
1	141+016 (Tuivai River)	RCC Steel Girder

## 8. Traffic Control Devices and Road Safety Works

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

Sl.No.	Traffic Signages, Road Marking and other appurtenances	Unit	Quantity
1	Total No of Street Light=	Nos	10
2	Kilometer stones=	Nos	9
3	5th Kilometer stones=	Nos	2
4	Boundary Stones=	Nos	113
5	Delineators (100 cm long and circular shaped) +Hazard marker =	Nos	950
6	Road Stud=	Nos	4758
7	900 mm Octagonal	Nos	3

Sl.No.	Traffic Signages, Road Marking and other appurtenances	Unit	Quantity
8	600 mm circular	Nos	44
9	900 mm Triangular	Nos	69
10	800 mm x 600 mm rectangular	Nos	6
11	Direction Sign < 0.9 sqm	sqm	257
12	Direction Sign > 0.9 sqm	sqm	4
13	Convex Mirror for Blind Curve	sqm	5
14	Rumble Strip	sqm	21

(ii) Specifications of the reflective sheeting.

## 9. Roadside Furniture

(i) Road side furniture shall be provided in accordance with article 8(i) of this schedule.

(ii) Overhead traffic signs: location and size

Sl.No.	Location (km)	Size
Nil		

## 10. COMPULSORY AFFORESTATION

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

## 11. HAZARDOUS LOCATIONS

The safety measures shall be provided at all hazardous/sinking/landslide locations as per the manual in consultation with the Authority's Engineer The safety barriers shall also be provided at the following hazardous structure (Bridges, culverts) locations:

a) Retaining Wall -

Sl. No.	Chainage		Side	Net Length (m)
	From	To		
1	130+370	130+470	Single	100
2	130+470	130+612	Single	142
<b>Total</b>				<b>242</b>

Note: Repairs/replacements of Retaining wall on site shall be assessed as per its site condition as per directions of Authority/ Authority's Engineer.

b) Breast Wall –

Sl. No.	Chainage		Side	Net Length (m)
	From	To		
1	130+370	130+430	Single	60
<b>Total</b>				<b>60</b>

Note: Repairs/replacements of breast wall on site shall be assessed as per its site condition as per directions of Authority/ Authority's Engineer.

c) Toe Wall

Sl. No.	Chainage		Side	Net Length (m)
	From	To		
1	130+370	130+470	Single	100
2	133+170	133+220	Single	50
3	134+070	134+235	Single	165
4	134+870	135+970	Single	100
5	137+920	137+970	Single	50
6	140+020	140+170	Single	150
<b>Total</b>				<b>615</b>

d) Metal Beam Crash Barrier

Chainage		Side	Net Length (m)
From (m)	To (m)		
130000	130220	Single	217
130270	130370	Single	92
130370	130470	Single	100
130870	130920	Single	47
130970	131620	Single	642
131770	131970	Single	197
132220	132570	Single	342
132720	133020	Single	295
133120	133170	Single	47
133170	133220	Single	50
133320	133520	Single	197
133620	133920	Single	292
134070	134320	single	247
134420	134470	single	47
134570	135220	single	64
135320	135370	single	47
135470	135570	single	97
135770	135870	single	97
135870	135970	single	97
136020	136320	single	292
136520	136770	single	242
136820	136870	single	50
136970	137620	single	637
137920	137970	single	50
138720	138770	single	50
138820	138870	single	47
139470	139720	single	242
139720	139820	single	97
140020	140170	single	147
140220	140620	single	395
<b>Total Length</b>			<b>6039</b>

For Bridge Approaches = 100 m

(Taking 50 m each approach)

**Total length of crash barrier = 6139 m**

d) Hydroseeding

Sl. No.	Chainage		Length (m)	Average Width (m)	Area (Sqm)
	From	To			
1	130+000	141+029	3121.1	8	24969

Note: Location of Hydroseeding is to be finalized in consultation of Authority and Authority's Engineer.

e) Turfing with Sods

Sl. No.	Chainage		Length (m)	Average Width (m)	Area (Sqm)
	From	To			
1	130+000	141+029	6038.8	4.47	27006

Note: Location of Turfing with sods is to be finalized in consultation of Authority and Authority's Engineer.

## 12. SPECIAL REQUIREMENTS FOR HILL ROADS

In accordance with Section 13 of the Manual (from IRC:SP:73-2018), IRC: SP:48-1998 & recommended practice for the treatment of embankment and roadside slopes for erosion control (first revision) IRC: 56-2011 and relevant IRC codes & The cutting slope surface except on Hard Rock classified as per Clause 301.2 of MORTH Specifications for Road and Bridge Works shall be protected by the Seeding and Mulching as per Clause 301.8 of MORTH Specification, and the embankment slope shall be protected by Turfing as per Clause 301.7 of MORTH Specification.

Sl.No.	Design Ch (From)	Design Ch (To)	LHS/RHS
Whenever necessary to be notified by Authority's Engineer.			

## 13. CHANGE OF SCOPE

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

## **Annexure-I to Schedule-B1**

### **Utility Shifting**

Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and specification of concerned Utility Owning Department is part of the scope of work of the Contractor. The bidders may visit the site and assess the quantum of shifting of utilities for the projects before submission of their bid. Copy of utility relocation plan is enclosed. The specification of concerned Utility Owning Department shall be applicable and followed.

#### **Notes:**

- a) The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work shall be as per the guidelines of utility owning department and it is to be agreed solely between the contractor and the utility owning department. No change of scope shall be admissible and no cost shall be paid for using different type/spacing/size/specifications in shifted work in comparison to those in the existing work or for making any overhead crossing to underground as per requirement of utility owning department and/or construction of project highway. The contractor shall carry out joint inspection with utility owning department and get the estimates from the utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of contractor to utility owning department whenever asked by the contractor. The decision/approval of utility owning department shall be on the contractor.
- b) The supervision charges at the rates/charges applicable of the utility owning department shall be paid directly by the Authority to the utility Owning department as and when contractor furnishes demand of utility Owning Department along with a copy of estimated cost given by later.
- c) The dismantled material/scrap of existing Utility to be shifted/Dismantled shall belong to the contractor who would be free to dispose-off the dismantled material as deemed fit by them unless the contractor is required to deposit the dismantled material to utility owning department as per the norm and practice and in that case the amount for dismantled material may be available by the contractor as per estimate agreed between them.
- d) The utilities shall be handed over after shifting work is completed to utility Owning Department to their entire satisfaction. The maintenance liability shall rest with the Utility Owning Department after Handing over Process is complete as far as utility shifting works are concerned.

**Note-II: Copy of utility shifting plans enclosed as Annexure – II to Schedule B1**

## Schedule - C

(See Clause 2.1)

### Project Facilities

#### 1. Project Facilities

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

- (a) Toll plaza[s]
- (b) Roadside furniture;
- (c) Pedestrian facilities;
- (d) Truck Lay byes;
- (e) Bus-bays and passenger shelters;
- (f) Rest areas; and
- (g) Others to be specified

#### 2. Description of Project Facilities

Each of the Project Facilities is described below:

##### a) Toll Plaza: -

Sl. No.	Design Chainage (km)	Name of the Place
	Nil	

##### b) Roadside furniture: -

Sl. No.	Description	Location	Design Standard
1	Traffic sign & pavement marking	Entire Length (As per Schedule B)	As per Manual
2	Km Stone, 5th kilometre stone	Entire Length	As per Manual
3	Boundary Stone	Entire Length	As per Manual
4	Roadside Delineator, marker & Road Stud	As per Schedule B	As per Manual
5	Metal beam crash barrier	As per Schedule B	As per Manual

##### c) Pedestrian Facility: -

Pedestrian facilities in the form of foot path shall be provided in the built-up area (refer typical cross – section drawing). Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with NHIDCL.



**d) Truck Lay bye: -**

Sl. No.	Truck lay bye Chainage (Both Side)	Name of the Place
Nil		

**e) Bus Bay & Passenger shelter: -**

Sl. No.	Project Facility	Location (km)	Design Requirements	Other Essential Details
Nil				

**f) Rest Areas**

Sl. No.	Rest Area Chainage	Name of the Place
Nil		

**g) Others to be specified**

**Street Lighting:**

Total 10 Nos. Street lighting shall be provided in junction, passenger shelters & bridge locations.

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

## SCHEDULE - D

*(See Clause 2.1)*

### **SPECIFICATIONS AND STANDARDS**

#### **1 Construction**

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

#### **2 Design Standards**

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

- a) Manual of Specifications and Standards for Two Laning of Highways with paved shoulder (IRC: SP: 73-2018), referred to herein as the Manual.

## Annex - I

### (Schedule-D)

### Specifications and Standards for Construction

#### 1 Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Two-Laning of Highways with paved shoulder (IRC: SP:73-2018), referred to as the Manual and Indian Road Congress (IRC) Codes and Standards and MORTH Specifications for Road and Bridge Works.

Where the aforesaid Manuals, guidelines, codes, standards and specifications are silent on any aspect, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

#### 2 Deviations from the Specifications and Standards

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

2.2 Notwithstanding anything to the contrary contained in the aforesaid Manual, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Manual shall be deemed to be amended to the extent set forth below;

Item	Manual Clause Reference	Provision as per Manual					Modified Provision				
Shoulder	2.6	<b>Mountainous Terrain</b>					<b>Mountainous Terrain</b>				
		Type of Section		Width of Shoulder (m)			Type of Section		Width of Shoulder (m)		
				Paved	Earthen	Total			Paved	Earthen	Total
		Open Country with Isolated Built-up Area	Hill Side	1.5	-	1.5	Open Country with Isolated Built-up Area	Hill Side	-	-	-
			Valley Side	1.5	1	2.5		Valley Side	-	Up to 1.0 m	1
		Built-up Area and Approaches to grade separated structures/ bridges	Hill Side	0.25 m + 1.5 m (Raised)	-	1.75	Built-up Area and Approaches to grade separated structures/ bridges	Hill Side	-	-	-
			Valley Side	0.25 m + 1.5 m (Raised)	-	1.75		Valley Side	-	-	-
Design Speed	2.2	<b>Mountainous Terrain:</b>  Ruling: 60 Kmph Minimum: 40 Kmph					<b>Mountainous Terrain:</b> Design Speed followed 40-60 kmph in general. However, design speed has been reduced to 20 kmph due to site constraints and to accommodate the proposal within EROW. (Refer Horizontal Alignment Drawing and Table 1.1 below)				
Extra Widening	2.7	Extra Widening has been proposed as per IRC: SP: 73-2015					Extra Widening has been proposed as per IRC: SP: 48-1998 (Table 6.9) of Hill Road Manual.				
		Radius	Extra Widening				Radius	Extra Widening			
		75-100 m	0.9 m				21-40 m	1.5 m			
		101-300 m	0.6 m				41-60 m	1.2 m			
							61-100 m	0.9 m			
							75-100 m	0.9 m			
							101-300 m	0.6 m			
Radii Of Horizontal Curve	2.9.4	<b>Mountainous Terrain:</b> Desirable Minimum Radius: 150 m Absolute Minimum Radius: 75 m					Above 300 m		NIL		
					Radius below 75 m has been provided in the location listed in table 1.2						

**Table 1.1: Locations where Design Speed is less than 40 kmph**

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
1	130+099 to 130+112	Sharp Bend	Design Speed = 20 Kmph
2	130+179 to 130+200	Sharp Bend	Design Speed = 20 Kmph
3	130+246 to 130+248	Sharp Bend	Design Speed = 30 Kmph
4	130+294 to 130+317	Sharp Bend	Design Speed = 20 Kmph
5	130+356 to 130+365	Sharp Bend	Design Speed = 20 Kmph
6	130+593 to 130+616	Sharp Bend	Design Speed = 20 Kmph
7	131+086 to 131+131	Sharp Bend	Design Speed = 20 Kmph
8	131+200 to 131+208	Sharp Bend	Design Speed = 30 Kmph
9	131+278 to 131+324	Sharp Bend	Design Speed = 20 Kmph
10	131+394 to 131+403	Sharp Bend	Design Speed = 30 Kmph
11	131+467 to 131+472	Sharp Bend	Design Speed = 20 Kmph
12	131+567 to 131+591	Sharp Bend	Design Speed = 20 Kmph
13	131+701 to 131+741	Sharp Bend	Design Speed = 20 Kmph
14	131+893 to 131+935	Sharp Bend	Design Speed = 30 Kmph
15	132+121 to 132+146	Sharp Bend	Design Speed = 20 Kmph
16	132+210 to 132+222	Sharp Bend	Design Speed = 20 Kmph
17	132+304 to 132+320	Sharp Bend	Design Speed = 20 Kmph
18	132+550 to 132+560	Sharp Bend	Design Speed = 30 Kmph
19	132+624 to 132+660	Sharp Bend	Design Speed = 30 Kmph
20	132+711 to 132+724	Sharp Bend	Design Speed = 30 Kmph
21	132+862 to 132+872	Sharp Bend	Design Speed = 30 Kmph
22	133+419 to 133+478	Sharp Bend	Design Speed = 30 Kmph
23	133+699 to 133+776	Sharp Bend	Design Speed = 30 Kmph
24	133+878 to 133+893	Sharp Bend	Design Speed = 30 Kmph
25	133+984 to 134+016	Sharp Bend	Design Speed = 20 Kmph
26	134+274 to 134+285	Sharp Bend	Design Speed = 30 Kmph
27	134+368 to 134+380	Sharp Bend	Design Speed = 30 Kmph
28	134+564 to 134+596	Sharp Bend	Design Speed = 30 Kmph
29	134+637 to 134+653	Sharp Bend	Design Speed = 30 Kmph
30	134+699 to 134+757	Sharp Bend	Design Speed = 30 Kmph
31	134+959 to 134+981	Sharp Bend	Design Speed = 20 Kmph
32	135+089 to 135+117	Sharp Bend	Design Speed = 20 Kmph
33	135+564 to 135+607	Sharp Bend	Design Speed = 20 Kmph
34	135+662 to 135+740	Sharp Bend	Design Speed = 30 Kmph
35	135+870 to 135+879	Sharp Bend	Design Speed = 20 Kmph
36	135+911 to 135+926	Sharp Bend	Design Speed = 20 Kmph
37	135+998 to 136+025	Sharp Bend	Design Speed = 20 Kmph
38	136+071 to 136+114	Sharp Bend	Design Speed = 20 Kmph
39	136+306 to 136+370	Sharp Bend	Design Speed = 30 Kmph
40	136+482 to 136+500	Sharp Bend	Design Speed = 30 Kmph
41	136+570 to 136+578	Sharp Bend	Design Speed = 30 Kmph
42	136+692 to 136+719	Sharp Bend	Design Speed = 30 Kmph
43	137+267 to 137+309	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
44	137+453 to 137+476	Sharp Bend	Design Speed = 30 Kmph
45	137+644 to 137+672	Sharp Bend	Design Speed = 20 Kmph
46	137+715 to 137+750	Sharp Bend	Design Speed = 20 Kmph
47	137+824 to 137+862	Sharp Bend	Design Speed = 20 Kmph
48	137+947 to 138+000	Sharp Bend	Design Speed = 20 Kmph
49	138+137 to 138+183	Sharp Bend	Design Speed = 30 Kmph
50	138+385 to 138+433	Sharp Bend	Design Speed = 20 Kmph
51	138+484 to 138+499	Sharp Bend	Design Speed = 20 Kmph
52	138+555 to 138+569	Sharp Bend	Design Speed = 20 Kmph
53	138+617 to 138+647	Sharp Bend	Design Speed = 20 Kmph
54	138+736 to 138+741	Sharp Bend	Design Speed = 30 Kmph
55	138+811 to 138+820	Sharp Bend	Design Speed = 30 Kmph
56	138+883 to 138+907	Sharp Bend	Design Speed = 20 Kmph
57	139+018 to 139+025	Sharp Bend	Design Speed = 30 Kmph
58	139+157 to 139+178	Sharp Bend	Design Speed = 30 Kmph
59	139+390 to 139+404	Sharp Bend	Design Speed = 20 Kmph
60	139+445 to 139+449	Sharp Bend	Design Speed = 30 Kmph
61	139+809 to 139+822	Sharp Bend	Design Speed = 20 Kmph
62	139+900 to 139+902	Sharp Bend	Design Speed = 30 Kmph
63	139+972 to 139+987	Sharp Bend	Design Speed = 30 Kmph
64	140+140 to 140+147	Sharp Bend	Design Speed = 20 Kmph
65	140+195 to 140+204	Sharp Bend	Design Speed = 20 Kmph
66	140+264 to 140+269	Sharp Bend	Design Speed = 30 Kmph
67	140+563 to 140+597	Sharp Bend	Design Speed = 30 Kmph
68	140+616 to 140+637	Sharp Bend	Design Speed = 30 Kmph

**Table 1.2: Locations where Radii of Horizontal Curve is less than 75 m**

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS (m)
		From	To	
1	1136	130.099	130.112	50
2	1137	130.179	130.200	20
3	1138	130.246	130.248	60
4	1139	130.294	130.317	20
5	1140	130.356	130.365	40
6	1142	130.593	130.616	30
7	1145	131.086	131.131	30
8	1146	131.200	131.208	60
9	1147	131.278	131.324	40
10	1148	131.394	131.403	60
11	1149	131.467	131.472	50
12	1150	131.567	131.591	20
13	1151	131.701	131.741	30
14	1152	131.893	131.935	50
15	1153	132.121	132.146	20
16	1154	132.210	132.222	40
17	1155	132.304	132.320	40
18	1157	132.550	132.560	60
19	1158	132.624	132.660	40
20	1159	132.711	132.724	60
21	1163	133.419	133.478	50
22	1164	133.699	133.776	60
23	1165	133.878	133.893	60
24	1166	133.984	134.016	20

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS (m)
		From	To	
25	1168	134.274	134.285	50
26	1169	134.368	134.380	50
27	1171	134.564	134.596	60
28	1172	134.637	134.653	60
29	1173	134.699	134.757	60
30	1174	134.959	134.981	20
31	1175	135.089	135.117	40
32	1176	135.564	135.607	50
33	1177	135.662	135.740	60
34	1178	135.870	135.879	30
35	1179	135.911	135.926	30
36	1180	135.998	136.025	30
37	1181	136.071	136.114	30
38	1182	136.306	136.370	40
39	1183	136.482	136.500	40
40	1184	136.570	136.578	60
41	1185	136.692	136.719	50
42	1186	136.836	136.898	60
43	1189	137.267	137.309	25
44	1190	137.453	137.476	50
45	1191	137.644	137.672	20
46	1192	137.715	137.750	30
47	1193	137.824	137.862	30
48	1194	137.947	138.000	30
49	1195	138.137	138.183	50
50	1197	138.385	138.433	30
51	1198	138.484	138.499	20
52	1199	138.555	138.569	20
53	1200	138.617	138.647	20
54	1201	138.736	138.741	50
55	1202	138.811	138.820	50
56	1203	138.883	138.907	20
57	1204	139.018	139.025	50
58	1205	139.157	139.178	50
59	1207	139.390	139.404	30
60	1209	139.550	139.586	50
61	1210	139.809	139.822	50
62	1211	139.900	139.902	40
63	1212	139.972	139.987	30
64	1213	140.140	140.147	30
65	1214	140.195	140.204	30
66	1215	140.264	140.269	50
67	1219	140.771	140.809	30
68	1220	140.944	140.999	50

(i) [Note1: 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.]

## **Schedule - E** *(See Clause 2.1 and 14.2)* **MAINTENANCE REQUIREMENTS**

### **1. Maintenance Requirements**

- 1.1. The Contractor shall, at all-time maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.
- 1.2 The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfillment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.
- 1.3. All Materials, works and construction operations shall conform to the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (FIFTH REVISION, April 2013)", including latest corrections slips, issued by the Ministry of Surface Transport & Highways, Government of India and published by the Indian Roads Congress.

Where the specifications for a work are not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

### **2. Repair/rectification of Defects and deficiencies**

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

### **3. Other Defects and deficiencies**

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

### **4. Extension of time limit**

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

## **5. Emergency repairs/restoration**

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

## **6. Daily inspection by the Contractor**

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

## **7. Pre-monsoon inspection / post-monsoon inspection**

The Contractor shall carry out a detailed pre-monsoon inspection of all bridges, culverts and drainage system before [1st June] every year in accordance with the guidelines contained in IRC: SP:35. Report of this inspection together with details of proposed maintenance works as required on the basis of this inspection shall be sent to the Authority's Engineer before the [10th June] every year. The Contractor shall complete the required repairs before the onset of the monsoon and send to the Authority's Engineer a compliance report. Post monsoon inspection shall be done by the [30th September] and the inspection report together with details of any damages observed and proposed action to remedy the same shall be sent to the Authority's Engineer.

## **8. Repairs on account of natural calamities**

All damages occurring to the Project Highway on account of torrential rains, floods, earthquake or other natural disasters shall be undertaken by the Contractor at its own cost and/or out of the proceeds of insurance.



## 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					
<b>Flexible Pavement (Pavement of MCW, Service Road, approaches</b>	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 ( <a href="http://www.tfhrcc.com/pavement/ltp/reports/03031/">http://www.tfhrcc.com/pavement/ltp/reports/03031/</a> )	24-48 hours	MORT&H Specification 3004.2
<b>S of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)</b>	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50m 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

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)	Bleeding	Nil	< 1 % area	Daily	Scale, Tape odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation / Breaking	Nil	< 1 m for any 100m section and width < 0.1m at any location, restricted to 30cm from the edge	Daily			7-15 days	IRC:82-2015

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					
	Roughness	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway force Coefficient Routine Investigation Machine or equipment)	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
	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
<b>Rigid Pavement (Pavement of MCW, Service Road, Grade structure,</b>	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTME950(98) :2004 and ASTM E1656-94:2000	180 days	IRC:SP:83-2008

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)	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN	Traffic Speed (Km/h)		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					
Embankment / Slopes	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	<20% variation in prescribed slope 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

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

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< 0.2mm.hair cracks		
			2	w= 0.2 -0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if L >1m. Within 7 days
			3	w= 0.5 -1.5 mm, discernible from fast-moving car		
			4	w= 1.5-3.0 mm	Seal, and stitch if L > 1m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15 days
			5	w > 3 mm		

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	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< 0.2mm.hair cracks	Route and seal with epoxy Within 7 days	Staple or Dowel Bar Retrofit. Within 15 days
			2	w= 0.2 -0.5 mm, discernible from slow-moving car		
			3	w= 0.5 - 3.0 mm, discernible from fast-moving car	Route and seal and stitch, if L >1m. Within 7 days	
			4	w= 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected.  Portion with norms and specifications - See Para 5.5 &9.2 Within 15 days
			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, discernible from slow-moving vehicle	Seal with epoxy, if L > 1m. Within 7 days	Staple or Dowel Bar Retrofit. Within 15 days
			2	w= 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > 1m. Within 15 days	-

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	w= 3.0 - 6.0 mm	Staple, if L> 1m. Within 15 days	Partial Depth Repair with stapling. Within15 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		
4	Multiple Crack 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 > 1m. Within 15 days	
			2	w= 0.2 - 0.5 mm, discernible from slow vehicle	Full depth repair within 15 days	Dismantle, Reinstall subbase, Reconstruct whole slab as per specifications within 30 days
			3	w= 0.5 - 3.0 mm, discernible from fast vehicle		
			4	w= 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and /or panel broken into more than 4 pieces		



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	Corner Break	w= width of crack L= length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5mm, only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7 days
			2	w < 1.5mm, L < 0.6m, only one corner broken		
			3	w < 1.5mm, L < 0.6m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:83-2008) Within 15 days	Full depth repair
			4	w > 1.5mm, L > 0.6m or three corners broken		
			5	Three or four corners broken		Reinstate sub-base and reconstruct the slab as per norms and specifications  Within 30 days
6	Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)	w= width of crack L= length (m/m <sup>2</sup> )	0	Nil, Not discernible		No, Action
			1	w < 0.5 mm, L < 3m / m <sup>2</sup>	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts.
			2	either w > 0.5 mm or L < 3m / m <sup>2</sup>		
			3	w > 1.5mm and L < 3m / m <sup>2</sup>		Full depth repair Cutout and replace damaged area taking care not to damage reinforcement. Within 30 days
			4	w > 3mm, L < 3m / m <sup>2</sup> and deformation		
			5	w > 3mm, L < 3m / m <sup>2</sup> and deformation		

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	$r = \frac{\text{area damaged surface}}{\text{total surface of slab}} (\%)$ $h = \text{maximum depth of damage}$	0	Nil, not discernible	Short Term	Long Term
					No action.	Not Applicable
			1	$r < 2 \%$	Local repair of area damaged and liable to be damaged.	
			2	$r = 2 - 10 \%$	Within 15 days	
			3	$r = 10 - 25 \%$	Bonded Inlay, 2 or 3 slabs if affecting. Within 30 days	
			4	$r = 25 - 50 \%$		
			5	$r > 50\%$ and $h > 25\text{mm}$	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	

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						
8	Scalling	$r = \frac{\text{damaged surface}}{\text{total surface of slab}} (\%)$ $h = \text{maximum depth of damage}$	0	Nil, not discernible	Short Term	Long Term
					No action.	
			1	$r < 2 \%$	Local repair of area damaged and liable to be damaged.	
					2	
			3	$r = 10 - 20 \%$	Bonded Inlay Within 15 days	
			5	$r > 30\%$ and $h > 25\text{mm}$	Reconstruct slabs Within 30 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
9	Polished Surface /Glazing	t = texture depth, sand patch test	0		No action. Monitor rate of deterioration Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	Not Applicable
			1	$t > 1$ mm		
			2	$t = 1 - 0.6$ mm		
			3	$t = 0.6 - 0.3$ mm		
			4	$t = 0.3 - 0.1$ mm		
			5	$t < 0.1$ mm		
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m <sup>2</sup> d = diameter h = maximum depth	0	$d < 50$ mm; $h < 25$ mm ; n < 1 per 5 m <sup>2</sup>	No action	
			1	$d = 50 - 100$ mm; $h < 50$ mm; n < 1 per 5 m <sup>2</sup>	Partial depth repair 65 mm deep.	Not Applicable
			2	$d = 50 - 100$ mm; $h > 50$ mm; n < 1 per 5 m <sup>2</sup>	Within 15 days	
			3	$d = 100 - 300$ mm; $h < 100$ mm; n < 1 per 5 m <sup>2</sup>	Partial depth repair 110 mm	
			4	$d = 10 - 300$ mm; $h > 100$ mm; n < 1 per 5 m <sup>2</sup>	i.e. 10mm more than the depth of the hole. Within 30 days	
			5	$d > 300$ mm; $h > 100$ mm ; n > 1 per 5 m <sup>2</sup>	Full depth repair. Within 30 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
Joints Defects						
11	Joint Seal Defects	loss or damage L = Length as % total joint length			Short Term	Long Term
			0	Difficult to discern	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; $w > 3\text{ mm}$ negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	Spalling of Joints	$w$ = width on either side of the joint L = length of spalled portion ( as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	$w < 10\text{ mm}$	Apply low viscosity epoxy resin / mortar in cracked portion.	
			2	$w = 10 - 20\text{ mm}$ , $L < 25\%$	Within 7 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
Joints Defects						
			3	$w = 20 - 40 \text{ mm}$ , $L > 25\%$	Partial Depth Repair. Within 15 days	Not Applicable
			4	$w = 40 - 80 \text{ mm}$ , $L > 25\%$	30 – 50 mm deep, $h = w + 20\%$ of $w$ , within 30 days	
			5	$w > 80 \text{ mm}$ , and $L > 25\%$	50 – 100 mm deep repair. $H = w + 20\%$ of $w$ . Within 30 days	
13	Faulting (or Stepping) in Cracks or Joints	$f = \text{difference of level}$	0	not discernible, $< 1 \text{ mm}$	No action.	No action
			1	$f < 3 \text{ mm}$		
			2	$f = 3 - 6 \text{ mm}$	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate.
			3	$f = 6 - 12 \text{ mm}$	Diamond Grinding	Within 30 days
			4	$f = 12 - 18 \text{ mm}$	Raise sunken slab	Replace the slab as appropriate.
			5	$f > 18 \text{ mm}$	Strengthen subgrade and sub – base by grouting and raising sunken slab	Within 30 days

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
Joints Defects						
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		
			3	$h = 12 - 25$ mm	Install Signs to Warn Traffic Within 7 days	
			4	$h > 25$ mm	Full Depth Repair. Within 30 days	
			5	shattered slab, 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	Strengthen subgrade. Reinstate pavement at normal level if $L < 20$ m. Within 30 days	
			4	$h > 50$ mm or $> 20\%$ joints		
			5	$h > 100$ mm		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
<b>Joints Defects</b>						
					<b>Short Term</b>	<b>Long Term</b>
16	Heave	h = positive vertical displacement from normal profile. L = length	0	Not discernible, $h < 5$ mm	No action	scrabble
			1	$h = 5 - 15$ mm	Follow up	
			2	$h = 15 - 30$ mm, Nos $< 20\%$ joints	Install Signs to Warn Traffic	
			3	$h = 30 - 50$ mm	Within 7 days	
			4	$h > 50$ mm or $> 20\%$ joints	Stabilise subgrade.	
			5	$h > 100$ mm	Reinstate pavement at normal level if length $< 20$ m. Within 30 days	
			5	$f > 18$ mm	Strengthen subgrade and sub - base by grouting and raising sunken slab	
17	Bump	h = vertical displacement from normal profile.	0	$h < 4$ mm	No action	Construction Limit for new Construction
			1	$h = 4 - 7$ mm	Grind, in case of new construction Within 7 days	
			3	$h = 7 - 15$ mm	Grind, in case of on going maintenance Within 15 days	
			5	$h > 15$ mm	Full Depth Repair. Within 30 days	



S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
Joints Defects						
					Short Term	Long Term
18	Lane to Shoulder Dropoff	f = difference of level	0	Nil, Not discernible, < 3 mm	No action	
			1	f = 3 – 10 mm	Spot repair of shoulder Within 7 days	
			2	f = 10 – 25 mm		
			3	f = 25 – 50 mm	Fill up shoulder Within 7 days	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30 days
			4	f = 50 – 75 mm		
			5	f > 75 mm		
Drainage						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	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/100m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
20	Ponding	Ponding on slabs due to blockage of drains	0-2	not discernible problem	No Action	
			3 to 4	Blockage observed in drains, but water flowing	Clean drains etc within 7days follow up	Action required to stop water damaging foundation within 30 days
			5	Ponding, accumulation of water observed	-do-	

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

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

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 <sup>2</sup> /lux Bituminous Road - 100mcd/m <sup>2</sup> /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	<u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>		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 <sup>2</sup> /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
		<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u>						

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Initial 7 days Retro reflectivity: 100 mcd/m <sup>2</sup> /lux Minimum Threshold Level: 50 mcd/m <sup>2</sup> /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 Gantry/Cantilever Sign boards	IRC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Retro reflectivity	As per specification in IRC:67-2012	Bi-Annually	Testing of each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs)  1 Month in case of Gantry/Cantilever Sign boards	IRC:67-2012
<b>Kerb</b>	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	<u>Functionality</u> : Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
<b>Other Road Furniture</b>	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	<u>Functionality</u> : Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	<u>Functionality</u> : Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	End Treatment of	<u>Functionality:</u> Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014,
	Traffic Safety Barriers			backup			IRC:119-2015
	Attenuators	<u>Functionality:</u> 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	<u>Functionality:</u> 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	<u>Functionality:</u> Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
<b>Highway Lighting System</b>	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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	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 failure	8 hours	IRC:SP:84-2014
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014



Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay- bys, bus-bays, bus-shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15days	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 be 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	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	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 recording the defects	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 2800
		Delamination of concrete not more than 0.25 sq.m.					
		Cracks wider than 0.3 mm not more than 1m aggregate					

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Protection work in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons 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.
<b>Bridges including ROBS Flyover etc. as applicable</b>	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspections per IRCSP:35-1990	Repairs to BC or wearing coat	15 days	MORTH Specification 2811
<b>Bridge - Super Structure</b>	Bumps	No bump at expansion joint	Daily	Visual inspections per IRCSP:35-1990	Repairs to BC or either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORTH 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 inspections and detailed condition survey as per IRC SP:35-1990	Repairs and replacement of safety barriers as the case may be	3 days	IRC: 5-1998 IRC:SP: 84-2004. And IRC SP: 40-1993

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Rusted reinforcement	Not 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 repair 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, investigation causes for cracks development and carry out necessary rehabilitation.	48 hours	IRC:SP: 40-1993. And MORTH Specification 2800.
	Rain seepage through deck slab	Leakage- nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Grouting with slab at leakage areas, waterproofing, repairs to drainage spouts.	1months	MORTH Specification 2600 & 2700.
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity.	6months	IRC:SP: 51-1999.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	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 30m.	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD Specification
	Leakage in Expansion Joints	No damage to elastomeric sealant compound in strip 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 Specification 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH Specification 2600 and IRC SP: 40-1993.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	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 sub structure	Cracks/spalling of concrete / rusted steel	No cracks spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed.	30 days	IRC:SP: 40-1993. And MORTH Specification 2800.
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more	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.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		than 2 locations per side, no rupture of reinforcement or rubber.					
<b>Bridge Foundations</b>	Scouring around foundations	Scouring shall not be lower than maximum scour level from the bridge	Bi-Annually	Condition survey 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 months	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 sq.m. damage to apron (concrete apron) not more than 1 sq.m.	2 times in a year (before and after rainy season)	Condition survey as per IRC SP: 35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier	MORTH Specification 2810 and IRC SP: 40-199.

Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.

**Table 4: Maintenance Criteria for Structures and Culverts:**



**Table 5: Maintenance Criteria for Hill Roads**

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

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

**Note:** For all tables 1 to 5 above, latest BIS & IRC standard (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>(b) Granular earth shoulders, sides lopes, drains and culvert</b>		
(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) days
(vii)	Railing, parapets, crash barriers	7(seven) days (Restore immediately if causing safety hazard)
<b>(c) Road side furniture including road sign and pavement marking</b>		
(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)	Damaged to road mark ups	7 (Seven) days
<b>(d) Road lighting</b>		
(i)	Any major failure of the system	24 (Twenty Four) days
(ii)	Faults and minor failures	8 (eight) hours
<b>(e) Trees and plantation</b>		

	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) days
(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
<b>(f) Rest area</b>		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (Twenty Four) days
<b>(g) [Toll Plaza]</b>		
(h)	<b>Other Project Facilities and Approach roads</b>	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossing,[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
<b>Bridges</b>		
<b>(a) Superstructure</b>		
(i)	Any damage, cracks, spalling/ scaling Temporary measures	Within 48 (forty eight) hours Within 15 (fifteen) days or as

	Permanent measures	specified by the Authority's Engineer
<b>(b) Foundations</b>		

	Nature of Defect or deficiency	Time limit for repair/rectification
(i)	Scouring and / or cavitation	15 (fifteen) days
<b>(c) Pipers, abutment, return walls and wing walls</b>		
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
<b>(d) Bearings (metallic) of bridges</b>		
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
<b>(e) Joints</b>		
(i)	Malfunctioning of joints	15 (fifteen) days
<b>(f) Other items</b>		
(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)	Damaged to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs,	30 (thirty) days

	pitching apron, toes, floor or guide bunds	
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
<b>(g) Hill Roads</b>		
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours

	<b>Nature of Defect or deficiency</b>	<b>Time limit for repair/rectification</b>
(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**

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 Panchayat and Pollution Control Board for installation of crushers;
- (c) License for use of explosives;
- (d) Permission of the State Government for drawing water from river/reservoir;
- (e) License from inspector of factories or other competent Authority for setting up batching plant;
- (f) Clearance of Pollution Control Board for setting up batching plant;
- (g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;
- (h) Permission of Village Panchayats and State Government for borrow earth; and
- (i) Any other permits, clearances or approvals required under Applicable Laws.
- (j) Royalty permits as applicable under the state govt. rules.

1.2 Applicable permits, as required, relating to environmental protection and conservation shall have been produced by the Authority in accordance with the provisions of this Agreement

**Schedule-G**  
(See Clause 7.1.1, 7.5.3 and 19.2)  
**FORM OF BANK GUARANTEE**  
Annex-I  
(See Clause 7.1.1)  
**PERFORMANCE SECURITY**

The Managing Director,  
NHIDCL,  
1<sup>st</sup> & 2<sup>nd</sup> Floor, Tower A,  
World Trade Center, Nauroji Nagar  
New Delhi-110029

WHEREAS:

(A) \_\_\_\_\_ [name and address of contractor] (hereinafter called "the Contractor") and [NHIDCL], ("the Authority") have entered into an agreement (the "Agreement") for "Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode", subject to and in accordance with the provisions of the Agreement.

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

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during Construction Period and Defects Liability 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 NHIDCL 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 difference 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 \*\*\*\*\$<sup>1</sup>. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.
9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was 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 Para 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
12. This guarantee shall also be operable at our..... Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension/ renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
13. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, New Delhi 110001

14. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication no. 758, except that the supporting statement under Article 15 (a) is hereby excluded.

<sup>5</sup> Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement).

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

- (i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.
- (ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

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

**Form for Guarantee for Withdrawal of Retention Money**

**The Managing Director,  
NHIDCL,  
1st & 2nd Floor, Tower A,  
World Trade Center, Nauroji Nagar  
New Delhi-110029**

WHEREAS:

[Name and address of contractor] (hereinafter called "**the Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [NHIDCL], (hereinafter called "**the Authority**") for the "**Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode.**" subject to and in accordance with the provisions of the Agreement.

- (A) In accordance with the Clause 7.5.3 of the Agreement, the Contractor may withdraw the retention money (hereinafter called "**Retention Money**") after furnishing to the Authority a bank guarantee for an amount equal to the proposed withdrawal.
- (B) We, ..... through our branch at ..... (the "**Bank**") have agreed to furnish this bank guarantee (hereinafter called the "**Guarantee**") for the amount of Rs. ....Cr. (Rs..... in words) (the "**Guarantee Amount**").

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

1. The Bank hereby unconditionally and irrevocably undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the NHIDCL 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 difference between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other Authority or body, or by the discharge of the Contractor for any reason whatsoever.
3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the

Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Retention Money and any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Retention Money.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
8. The Guarantee shall cease to be in force and effect 90 (ninety) days after the date of the Completion Certificate specified in Clause 12.4 of the Agreement.
9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was 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 para 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
12. This guarantee shall also be operable 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. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, New Delhi 110001

14. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication no. 758, except that the supporting statement under Article 15 (a) is hereby excluded

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Annex-III  
(Schedule-G)  
(See Clause 19.2)

## Form for Guarantee for Advance Payment

The Managing Director,  
NHIDCL,  
1st & 2nd Floor, Tower A,  
World Trade Center, Nauroji Nagar  
New Delhi-110029

WHEREAS:

[name and address of contractor] (hereinafter called "**the Contractor**") has executed an agreement (hereinafter called the "Agreement") with the [NHIDCL], (hereinafter called "**the Authority**") for the "**Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode**" subject to and in accordance with the provisions of the Agreement.

- (A) In accordance with the Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing (@ Bank Rate) advance payment (hereinafter 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**")<sup>\$2</sup>.
- (B) We, .....through our branch at ..... (the "**Bank**") have agreed to furnish this bank guarantee (hereinafter called the "**Guarantee**") for the Guarantee Amount.

---

<sup>\$2</sup>The Guarantee Amount should be equivalent to 110% of the value of the applicable installment.

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid installment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the guarantee amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the NHIDCL, that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the installment 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 difference between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other Authority or body, or by the discharge of the Contractor for any reason whatsoever
3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.



6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
8. The guarantee shall cease to be in force and effect on \*\*\*,<sup>5</sup> Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.
9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was 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 Para 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
12. This guarantee shall also be operable at our..... Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension/ renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
13. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062

<sup>5</sup>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).



4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, New Delhi 110001

14. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication no. 758, except that the supporting statement under Article 15 (a) is hereby excluded.

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)

## Annex-IV

### (Schedule - G)

(See Clause 7.1)

### Form of Insurance Surety Bond

#### [Performance Security/Additional Performance Security]

National Highways & Infrastructural Development Corporation Ltd.

1st & 2nd Floor, Tower A,  
World Trade Center, Nauroji Nagar  
New Delhi-110029

WHEREAS:

- (A) [name and address of contractor] (hereinafter called the “**Contractor**”) and [name and address of the authority], (hereinafter called the “**Authority**”) have entered into an agreement (hereinafter called the “**Agreement**”) for the “\*\*\*\*\* EPC Mode” subject to and in accordance with the provisions of the Agreement
- (B) The Agreement requires the Contractor to furnish a Performance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the {Construction Period/ Defects Liability Period and Maintenance Period} (as defined in the Agreement) in a sum of Rs.....cr.(Rupees ..... crore) (the “**Surety Bond Amount**”).
- (C) We, ..... through our branch at (the “**Surety Insurer**”) have agreed to furnish this bank guarantee (*hereinafter called the “**Surety Bond**”*) by way of Performance Security.

NOW, THEREFORE, the **Surety Insurer** hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The **Surety Insurer** 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 **Surety Bond** 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 Limited], 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 **Surety Insurer**. The **Surety Insurer** 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 **Surety Insurer**, 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 **Surety Bond**, the Authority shall be entitled to act as if the **Surety Insurer** were the principal debtor and any change in the constitution of the Contractor and/or the **Surety Insurer**, 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 **Surety Insurer** under this **Surety Bond**.
  4. It shall not be necessary, and the **Surety Insurer** hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this **Surety Bond**.
  5. The Authority shall have the liberty, without affecting in any manner the liability of the **Surety Insurer** under this **Surety Bond**, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfilment 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 **Surety Insurer** 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 **Surety Insurer** from its liability and obligation under this **Surety Bond** and the **Surety Insurer** hereby waives all of its rights under any such law.

6. This **Surety Bond** is in addition to and not in substitution of any other **Surety Bond** or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfilment, 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 **Surety Insurer** under this **Surety Bond** is restricted to the **Surety Bond** Amount and this **Surety Bond** 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 **Surety Insurer** under this **Surety Bond** all rights of the Authority under this **Surety Bond** shall be forfeited and the Surety Insurer shall be relieved from its liabilities hereunder.
8. The **Surety Bond** shall cease to be in force and effect on \*\*\*\*\$. Unless a demand or claim under this **Surety Bond** is made in writing before expiry of the **Surety Bond**, the **Surety Insurer** shall be discharged from its liabilities hereunder.
9. The **Surety Insurer** undertakes not to revoke this **Surety Bond** 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 **Surety Bond** and the undersigned has full powers to do so on behalf of the **Surety Insurer**.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the **Surety Insurer** at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
11. This **Surety Bond** 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 **Surety Bond** is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.
13. This **Surety Bond** shall also be operatable at our .... Branch at New Delhi, from whom confirmation regarding the issue of this **Surety Bond** or extension / renewal thereof shall be made available on demand. In the contingency of this Surety Bond 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.
14. The Insurance Surety Bond shall be verified from the branch concerned/ specific

portal created for this purpose.

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 Surety Bond should contain the name, designation and code number of the officer(s) signing the Surety Bond.
- (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 (iv) and 19.3)

### 1 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	4
<b>I. Road works including culverts, widening and repair of culverts</b>	14.86%	<b>A-Widening and strengthening of existing road</b>	
		(1) Earthwork up to top of the embankment	[Nil]
		(2) Sub-Grade	[Nil]
		(3) Sub-Base Course	[Nil]
		(4) Non bituminous Base Course	[Nil]
		(5) Bituminous Base Course	[Nil]
		(6) Wearing Coat	[Nil]
		(7) Widening and repair of culverts	[Nil]
		<b>B.1-Reconstruction/ New realignment/ bypass (Flexible pavement)</b>	
		(1) Earthwork up to top of the embankment	0.24%
		(2) Sub-Grade	
		(3) Sub-Base Course	2.90%
		(4) Non bituminous Base Course	9.77%
		(5) Bituminous Base Course	10.14%
		(6) Wearing Coat	8.83%
		<b>B.2-Reconstruction/ realignment/ bypass/Geometric Improvement (Rigid Pavement)</b>	
		(1) Earthwork up to top of the embankment	[Nil]
		(2) Sub-Grade	[Nil]
		(3) Sub-Base Course	[Nil]
		(4) Dry Lean Concrete (DLC) Course	[Nil]
		(5) Pavement Quality Concrete (PQC) Course	[Nil]
		<b>C.1-Reconstruction/ New Service Road (Flexible Pavement)</b>	
		(1) Earthwork up to top of the embankment	[Nil]
		(2) Sub-Grade	[Nil]
		(3) Sub-Base Course	[Nil]
		(4) Non bituminous Base Course	[Nil]
		(5) Bituminous Base Course	[Nil]
		(6) Wearing Coat	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		<b>C.2-Reconstruction/ New Service Road (Rigid Pavement)</b>	
		(1) Earthwork up to top of the embankment	[Nil]
		(2) Sub-Grade	[Nil]
		(3) Sub-Base Course	[Nil]
		(4) Dry Lean Concrete (DLC) Course	[Nil]
		(5) Pavement Quality Concrete (PQC) Course	[Nil]
		<b>D-Reconstruction and New culverts on existing road, realignment, bypasses:</b>	
		Culverts (length < 6m)	68.12%
<b>II. Minor Bridges/ Underpasses/ Overpasses</b>	0.00%	<b>A.1-Widening and repairs of Minor Bridges (length &gt; 6m and &lt; 60m)</b>	
		Minor Bridges	
		(1) <b>Foundation:</b> On completion of the foundation work of abutments and piers	[Nil]
		(2) <b>Sub-structure:</b> On completion of abutments and piers with abutment/ pier cap.	[Nil]
		(3) <b>Super-structure:</b> On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, handrails, crash barriers, road signs and markings, tests on completion etc. complete in all respect.	[Nil]
		(4) <b>Approaches:</b> On completion of approaches including wing walls/ return walls, Retaining walls, stone pitching, protection works for floor, embankment slope, etc. complete in all respect and fit for use.	[Nil]
		<b>A.2-New of Minor Bridges (length &gt; 6m and &lt; 60m)</b>	
		(1) <b>Foundation:</b> On completion of the foundation work of abutments and piers	[Nil]
		(2) <b>Sub-structure:</b> On completion of abutments and piers with abutment/ pier cap.	[Nil]
		(3) <b>Super-structure:</b> On completion of the super-structure upto deck slab including bearings.	[Nil]
		(4) <b>Miscellaneous Works:</b> On completion of wearing coat, expansion joint, crash barrier, railings, protection works and any remaining work associated to bridge including tests on	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		bridge.	
		(5) <b>Approaches:</b> On completion of approaches including wing walls/ return walls, Retaining walls, stone pitching, protection works for floor, embankment slope etc. complete in all respect and fit for use.	[Nil]
		(6) <b>Guide Bunds and River Training Works:</b> On completion of Guide Bunds and river Training Works complete in all respect.	[Nil]
		<b>B.1-Widening and repairs of Underpasses/Overpasses</b>	
		Underpasses/ Overpasses	[Nil]
		<b>B.2 - New Underpasses/Overpasses</b>	
		(1) <b>Foundation:</b> On completion of the foundation work of abutments and piers	[Nil]
		(2) <b>Sub-structure:</b> On completion of abutments and piers with abutment/ pier cap	[Nil]
		(3) <b>Super-structure:</b> On completion of the super-structure upto deck slab including bearing	[Nil]
		(4) <b>Miscellaneous Works:</b> On completion of wearing coat, expansion joint, crash barrier, railings and any remaining work associated to bridge including tests on bridge	[Nil]
		(5) <b>Approaches:</b> On completion of approaches including Wing walls/ Return walls, Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]
III. Major Bridge (length > 60 m) works and ROB/RUB/elevated sections/flyovers including viaducts, if any	50.56%	<b>A.1-Widening and repairs of existing major bridges</b>	
		(1) Foundation:	[Nil]
		i) Pile Foundation	
		ii) Open Foundation	
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings.)	[Nil]
		(4) Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Guide bunds, river training works etc.	[Nil]
		(8) Approaches (including Retaining walls, stone pitching and protection works for floor, embankment slope etc.)	[Nil]
		<b>A.2-New major bridges</b>	



Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(1) Foundation	14.37%
		(i) Well Foundation	
		(ii) Pile Foundation	
		(iii) Open Foundation	
		(2) Sub-Structure	13.43%
		(3) Super-structure (including bearings)	68.15%
		(4) Wearing Coat including expansion joints	2.29%
		(5) Miscellaneous Items (like hand rails, crash barriers, road markings etc.)	0.00%
		(6) Wing walls/return walls	1.19%
		(7) Guide Bunds, River Training works etc.	0.57%
		(8) Approaches (including Retaining walls, stone pitching and protection works for floor, embankment slope, etc.)	0.00%
		<b>B.1-Widening and repairs of</b>	
		<b>(a) ROB</b>	
		<b>(b) RUB</b>	
		(1) Foundation:	[Nil]
		(i) Pile Foundation	
		(ii) Open Foundation	
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings.)	[Nil]
		(4) Wearing Coat: (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.	[Nil]
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]
		<b>B.2-New ROB / RUB</b>	
		<b>(a) ROB</b>	
		<b>(b) RUB</b>	
		(1) Foundation	[Nil]
		(i) Well Foundation	
		(ii) Pile Foundation	
		(iii) Open Foundation	
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4) Wearing Coat: (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b)	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.	
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		<b>C.1-Widening and repairs of Elevated section / Flyover / Grade Separators</b>	
		(1) Foundation	[Nil]
		(i) Pile Foundation	
		(ii) Open Foundation	
		(2) Sub-structure	[Nil]
		(3) Superstructure (including bearing)	[Nil]
		(4) wearing coat including expansion joint	[Nil]
		(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	[Nil]
		(6) wing walls/return walls	[Nil]
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		<b>C.2-New Elevated section/Flyover/Grade Separators</b>	
		(1) Foundation	[Nil]
		(i) Well Foundation	
		(ii) Pile Foundation	
		(iii) Open Foundation	
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearing)	[Nil]
		(4) Wearing coat including expansion joint	[Nil]
		(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	[Nil]
		(6) wing walls/return walls	[Nil]
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
<b>IV. Other works</b>	34.58%	(i) Toll plaza	[Nil]
		(ii) Road side drains	17.79%
		(a) Drain	
		(b) Cover Slab	
		(iii) Road signs, markings, km stones safety Devices etc.	41.42%
		(iv) Overhead gantry mounted signs	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(v) Project facilities (a) Bus Bays/Junctions (b) Truck lay-byes (c) Passenger Shelter/Rest areas (d) Others	[Nil]
		(vi) Road side plantation	[Nil]
		(vii) Protection works # other than approaches to the bridges, elevated sections, flyovers/grade separators and ROB/RUBs.	
		(a) Crash Barrier	[Nil]
		(b) Retaining Wall	20.24%
		(c) Breast Wall	2.91%
		(d) Toe Wall	8.05%
		(e) Hydroseeding and Turfing	9.59%
		(viii) Safety and traffic management during construction	[Nil]

### 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 of Payment	Percentage -weightage	Payment Procedure
<b>A-Widening and strengthening of existing road</b>		
(1) Earthwork up to top of the embankment	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of total length or 500m, whichever is less.
(2) Sub-Grade	[Nil]	
(3) Sub-Base Course	[Nil]	
(4) Non bituminous Base Course	[Nil]	
(5) Bituminous Base Course	[Nil]	
(6) Wearing Coat	[Nil]	
(7) Widening and repair of culverts	[Nil]	Cost of completed culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least one culverts.

Stage of Payment	Percentage-weightage	Payment Procedure
		75% of the cost will be payable on completion of box/abutments and slab/pipe and head wall. Remaining 25% will become payable on completion of protection works including return/wing wall and any other work associated with culverts.
<b>B.1-Reconstruction/ New realignment/ bypass (Flexible pavement)</b>		
(1) Earthwork up to top of the embankment	0.24%	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 500 m length, whichever is less.
(2) Sub-Grade		
(3) Sub-Base Course	2.90%	
(4) Non bituminous Base Course	9.77%	
(5) Bituminous Base Course	10.14%	
(6) Wearing Coat	8.83%	
<b>B.3-Reconstruction/ realignment/ bypass/Geometric Improvement (Rigid Pavement)</b>		
(1) Earthwork up to top of the embankment	[Nil]	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 500 m length, whichever is less.
(2) Sub-Grade	[Nil]	
(3) Sub-Base Course	[Nil]	
(4) Dry Lean Concrete (DLC) Course	[Nil]	
(5) Pavement Quality Concrete (PQC) Course	[Nil]	
<b>C.1-Reconstruction/ New Service Road (Flexible Pavement)</b>		
(1) Earthwork up to top of the embankment	[Nil]	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 500 m length, whichever is less.
(2) Sub-Grade	[Nil]	
(3) Sub-Base Course	[Nil]	
(4) Non bituminous Base Course	[Nil]	
(5) Bituminous Base Course	[Nil]	
(6) Wearing Coat	[Nil]	
<b>C.2-Reconstruction/ New Service Road (Rigid Pavement)</b>		
(1) Earthwork up to top of the embankment	[Nil]	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 500 m length, whichever is less.
(2) Sub-Grade	[Nil]	
(3) Sub-Base Course	[Nil]	
(4) Dry Lean Concrete (DLC) Course	[Nil]	
(5) Pavement Quality Concrete (PQC) Course	[Nil]	
<b>D-Reconstruction and New culverts on existing road, realignment, bypasses:</b>		
Culverts (length < 6m)	68.12%	Cost of completed culverts shall be

Stage of Payment	Percentage -weightage	Payment Procedure
		determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least one culverts. 75% of the cost will be payable on completion of box/abutments and slab/pipe and head wall. Remaining 25% will become payable on completion of protection works including return/wing wall and any other work associated with culverts.

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

$$\text{Cost per km} = P \times \text{weightage for road work} \times \text{weightage for bituminous work} \times (1/L)$$

Where P= Contract Price

L = Total length in km

Similarly, the rates per km for other stages shall be worked out accordingly.

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

**1.3.2 Minor Bridges and Underpasses/Overpasses** - Procedure for estimating the value of Minor bridge and Underpasses/Overpasses shall be as stated in table 1.3.2:

**Table 1.3.2**

Stage of Payment	Percentage -weightage	Payment Procedure
<b>A.1-Widening and repairs of Minor Bridges (length &gt; 6m and &lt; 60m)</b>  (i) <b>Foundation:</b> On completion of the foundation work of abutments and piers	[Nil]	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges.  (i) <b>Foundation:</b> Payment against foundation shall be made on pro-rata basis on completion of a stage i.e completion of atleast two foundations of each bridge.  In case where load testing is

Stage of Payment	Percentage-weightage	Payment Procedure
		specified for foundation, the trigger of first payment shall include load testing also.
(ii) <b>Sub-structure:</b> On completion of abutments and piers with abutment/ pier cap.	[Nil]	(ii) <b>Sub-structure:</b> Payment shall be made on pro-rata basis on completion of stage i.e. completion of atleast one sub-structure upto abutment/ pier cap level of each bridge.
(iii) <b>Super-structure:</b> On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, handrails, crash barriers, road signs and markings, tests on completion etc. complete in all respect.	[Nil]	(iii) <b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(iv) <b>Approaches:</b> On completion of approaches including wing walls/ return walls, Retaining walls, stone pitching, protection works for floor, embankment slope, etc. complete in all respect and fit for use.	[Nil]	(iv) <b>Approaches:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches including wing walls/ return walls, retaining walls, stone pitching in all respect as specified in the column of "Stage of Payment" in this sub-clause for each bridge.
<b>A.2-New of Minor Bridges (length &gt; 6m and &lt; 60m)</b>  (i) <b>Foundation:</b> On completion of the foundation work of abutments and piers	[Nil]	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges.  (i) <b>Foundation:</b> Payment against foundation shall be made on pro-rata basis on completion of a stage i.e completion of atleast two foundations of each bridge.  In case where load testing is specified for foundation, the trigger of first payment shall include load testing also.
(ii) <b>Sub-structure:</b> On completion of abutments and piers with abutment/ pier cap.	[Nil]	(ii) <b>Sub – structure:</b> Payment shall be made on pro-rata basis on completion of stage i.e. completion of atleast one sub-structure upto abutment/ pier cap level of each bridge.
(iii) <b>Super-structure:</b> On completion of the super-structure upto deck slab including bearings.	[Nil]	(iii) <b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of at least one



Stage of Payment	Percentage -weightage	Payment Procedure
		span in all respects as specified in the column of "Stage of Payment" in this sub-clause.  If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(iv) <b>Miscellaneous Works:</b> On completion of wearing coat, expansion joint, crash barrier, railings, protection works and any remaining work associated to bridge including tests on bridge.	[Nil]	(iv) <b>Miscellaneous Works:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of wearing coat, expansion joint, crash barrier, railing, protection works, drainage and any other remaining work associated to bridge including tests on bridge for each bridge.
(v) <b>Approaches:</b> On completion of approaches including wing walls/ return walls, Retaining walls, stone pitching, protection works for floor, embankment slope etc. complete in all respect and fit for use.	[Nil]	(v) <b>Approaches:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches including wing walls/ return walls, retaining walls, stone pitching in all respect as specified in the column of "Stage of Payment" in this sub-clause for each bridge.
(vi) <b>Guide Bunds and River Training Works:</b> On completion of Guide Bunds and river Training Works complete in all respect.	[Nil]	(vi) <b>Guide Bunds and River Training Works:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training Works in all respects as specified for each bridge.
<b>B.1-Widening and repairs of Underpasses/Overpasses</b>	[Nil]	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/overpasses. Payment shall be made on the completion of widening & repair works of a underpass/overpass.
<b>B.2-New Underpasses/Overpasses</b> (i) <b>Foundation:</b> On completion of the foundation work of abutments and piers	[Nil]	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/overpasses.  (i) <b>Foundation:</b> Payment against foundation shall be made on pro-rata basis on completion of a stage i.e.

Stage of Payment	Percentage-weightage	Payment Procedure
		completion of foundation(s) of each underpass/overpass.  In case where load testing is specified for foundation, the trigger of first payment shall include load testing also.
(ii) <b>Sub-structure:</b> On completion of abutments and piers with abutment/ pier cap	[Nil]	(ii) <b>Sub-structure:</b> Payment shall be made on pro-rata basis on completion of stage i.e. completion of atleast one sub-structure upto abutment/ pier cap level of each bridge.
(iii) <b>Super-structure:</b> On completion of the super-structure upto deck slab including bearing	[Nil]	(iii) <b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of at least one span upto deck slab including bearing as specified in the column of "Stage of Payment" in this sub-clause:  If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(iv) <b>Miscellaneous Works:</b> On completion of wearing coat, expansion joint, crash barrier, railings and any remaining work associated to bridge including tests on bridge	[Nil]	(iv) <b>Miscellaneous Works:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of wearing coat, expansion joint, crash barrier, railing, protection works and any other remaining work associated to bridge including tests on bridge for each bridge.
(v) <b>Approaches:</b> On completion of approaches including Wing walls/ Return walls, Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]	(v) <b>Approaches:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches including wing wall/ return wall, retaining walls, Reinforced Earth walls, stone pitching, protection works complete in all respect for each bridge.



**1.3. Major Bridge works, ROB/RUB and Structures** - Procedure for estimating the value of Major Bridge works, ROB/RUB and Structures shall be as stated in table 1.3.3:

**Table 1.3.3**

Stage of Payment	Percentage -weightage	Payment Procedure
<b>A.1-Widening and repairs of existing major bridges</b>  <b>(1) Foundation:</b>	[Nil]	<p>Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridges.</p> <p><b>(1) Foundation:</b> Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one foundation of each of the major Bridge as specified hereinunder.</p>
(i) Pile Foundation  (a) Piling - On completion of pile upto bottom of pile cap.  (b) Pile Cap – On completion of pile cap.		<p>(i) Pile Foundation</p> <p>(a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorata basis.</p> <p>(b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap.</p> <p>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.</p>
(ii) Open Foundation		<p>(ii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.</p>
<b>(2) Sub-structure</b>	[Nil]	<p><b>(2) Sub-Structure:</b> Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments /piers upto abutment/pier cap level of each of the major bridge.</p>
<b>(3) Super-structure</b> (including bearings.)	[Nil]	<p><b>(3) Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified here</p>

Stage of Payment	Percentage -weightage	Payment Procedure
		in under:  If pre-cast RCC/PSC/Steel girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
<b>(4) Wearing Coat</b> including expansion joints	[Nil]	<b>(4) Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each major bridge.
<b>(5) Miscellaneous Items</b> like hand rails, crash barrier, road markings etc.	[Nil]	<b>(5) Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each major bridge.
<b>(6) Wing walls/return walls</b>	[Nil]	<b>(6) Wing walls/return walls:</b> Payments shall be made on completion of all Wing walls/return walls complete in all respects as specified for each major bridge.
<b>(7) Guide bunds, river training works</b> etc.	[Nil]	<b>(7) Guide bunds, river training works:</b> Payments shall be made on completion of all Guide bunds, river training works etc complete in all respects as specified for each major bridge.
<b>(8) Approaches</b> (including Retaining walls, stone pitching and protection works for floor, embankment slope etc.)	[Nil]	<b>(8) Approaches:</b> Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each major bridge.
<b>A.2-New major bridges</b> <b>(1) Foundation</b>	14.37%	Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge.  <b>(1) Foundation:</b> Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one foundation of each of the major

Stage of Payment	Percentage -weightage	Payment Procedure
		Bridge as specified here in under:
<p>(i) Well Foundation</p> <p>(a) On completion of Cutting Edge + Well Curb</p> <p>(b) Wellsteining: On completion of well steining upto bottom of well cap.</p> <p>(c) On completion of bottom plug + top plug (if provisioned as per design) + well cap</p>		<p>(i) Well Foundation</p> <p>(a) Cutting Edge + Well Curb: Payment of 10% shall be made on completion of a stage i.e. completion of cutting edge + well curb.</p> <p>(b) Wellsteining: Payment of 65% shall be made on completion of well steining upto bottom of well cap. The payment stage shall be further sub-divided on pro-rata basis i.e. (i) on completion upto 10 m and (ii) on completion of each subsequent 5 m or part thereof.</p> <p>(c) Bottom plug + top plug (if provisioned as per design) + well cap: Payment of 25% shall be made on completion of a stage i.e. completion of bottom plug, back fill, top plug and well cap.</p>
<p>(ii) Pile Foundation</p> <p>(a) Piling - On completion of pile upto bottom of pile cap.</p> <p>(b) Pile Cap – On completion of pile cap.</p>		<p>(ii) Pile Foundation</p> <p>(a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorata basis.</p> <p>(b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap.</p> <p>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.</p>
<p>(iii) Open Foundation</p>		<p>(iii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.</p>
<p><b>(2) Sub-Structure</b></p>	13.43%	<p><b>(2) Sub-Structure:</b> Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the major bridge.</p>

Stage of Payment	Percentage -weightage	Payment Procedure
<b>(3) Super-structure</b> (including bearings)	68.15%	<p><b>(3) Super-structure:</b></p> <p>Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified here in under:</p> <p>If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon. (For cable stayed bridge and suspension cable bridge, detailed payment stage may be included on case-to-case basis)</p>
<b>(4) Wearing Coat</b> including expansion joints	2.29%	<p><b>(4) Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each major bridge.</p>
<b>(5) Miscellaneous Items</b> (like hand rails, crash barriers, road markings etc.)	0.00%	<p><b>(5) Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each major bridge.</p>
<b>(6) Wing walls/return walls</b>	1.19%	<p><b>(6) Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each major bridge.</p>
<b>(7) Guide Bunds, River Training works</b> etc.	0.57%	<p><b>(7) Guide Bunds, River Training works:</b> Payments shall be made on completion of all guide bunds, river training works etc. complete in all respects as specified for each major bridge.</p>
<b>(8) Approaches</b> (including Retaining walls, stone pitching and protection works for floor, embankment slope, etc.)	0.00%	<p><b>(8) Approaches:</b> Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each major bridge.</p>

Stage of Payment	Percentage -weightage	Payment Procedure
<b>B.1-Widening and repairs of</b> <b>(a) ROB</b> <b>(b) RUB</b>  (1) Foundation:	[Nil]	Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUBs.  (1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one foundation of each of the ROB/RUB as specified here in under.
(i) Pile Foundation  (a) Piling - On completion of pile upto bottom of pile cap.  (b) Pile Cap – On completion of pile cap.		(i) Pile Foundation  (a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorata basis.  (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap.  In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Open Foundation		(ii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
<b>(2) Sub-structure</b>	[Nil]	<b>(2) Sub-Structure:</b> Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the ROB/RUB.
<b>(3) Super-structure</b> (including bearings.)	[Nil]	<b>(3) Super-structure:</b>  Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified here in under:  If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from

Stage of Payment	Percentage -weightage	Payment Procedure
		MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
<b>(4) Wearing Coat:</b> (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.	[Nil]	<b>(4) Wearing Coat:</b> Payment shall be made on completion of (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified for each of the ROB and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified for each of the RUB.
<b>(5) Miscellaneous Items</b> like hand rails, crash barrier, road markings etc.	[Nil]	<b>(5) Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the ROB/RUB.
<b>(6) Wing walls/return walls</b>	[Nil]	<b>(6) Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the ROB/RUB.
<b>(7) Approaches</b> (including Retaining walls, stone pitching and protection works)	[Nil]	<b>(7) Approaches:</b> Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each of the ROB/RUB.
<b>B.2-New</b> <b>(a) ROB</b> <b>(b) RUB</b>  (1) Foundation	[Nil]	Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUBs.  <b>(1) Foundation:</b> Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one foundation of each of the ROB/RUB as specified here in under:
(i) Well Foundation  (a) On completion of Cutting Edge + Well Curb.  (b) Well steining: On completion of well steining upto bottom of well cap.		(i) Well Foundation  (a) Cutting Edge + Well Curb: Payment of 10% shall be made on completion of a stage i.e. completion of cutting edge + well curb.  (b) Wellsteining: Payment of 65%



Stage of Payment	Percentage -weightage	Payment Procedure
(c) On completion of bottom plug + top plug (if provisioned as per design) + well cap.		shall be made on completion of well steining upto bottom of well cap. The payment stage shall be further sub-divided on pro-rata basis i.e. (i) on completion upto 10 m and (ii) on completion of each subsequent 5 m or part thereof.  (c) Bottom plug + top plug (if provisioned as per design) + well cap: Payment of 25% shall be made on completion of a stage i.e. completion of bottom plug, back fill, top plug and well cap.
(ii) Pile Foundation  (a) Piling - On completion of pile upto bottom of pile cap.  (b) Pile Cap – On completion of pile cap.		(ii) Pile Foundation  (a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorata basis.  (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap.  In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(iii) Open Foundation		(iii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-Structure	[Nil]	<b>(2) Sub-Structure:</b> Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the ROB/RUB.
(3) Super-structure (including bearings)	[Nil]	<b>(3) Super-structure:</b>  Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified herein under:

Stage of Payment	Percentage -weightage	Payment Procedure
		If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
<b>(4) Wearing Coat</b> including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility complete in all respects as specified.	[Nil]	<b>(4) Wearing Coat:</b> Payment shall be made on completion of (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified for each of the ROB and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified for each of the RUB.
<b>(5) Miscellaneous</b> Items like hand rails, crash barriers, road markings etc.	[Nil]	<b>(5) Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the ROB/RUB.
<b>(6) Wing walls/return walls</b>	[Nil]	<b>(6) Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the ROB/RUB.
<b>(7) Approaches</b> (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	<b>(7) Approaches:</b> Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each of the ROB/RUB.  If reinforced soil wall is used with facia panel/blocks, interim payment shall be made @75% of the Cost of that element as derived from MoRTH data Book. Applicable SOR of State PWD on Base Date with tender discount/premium applied thereon. Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures.
<b>C.1-Widening and repairs of Elevated section / Flyover / Grade Separators</b>	[Nil]	<b>(1) Foundation:</b> Payment against foundation shall be made on pro-rata basis on completion of a stage i.e.



Stage of Payment	Percentage -weightage	Payment Procedure
(1) Foundation		completion of atleast one foundation of each of the structure as specified here in under:
(i) Pile Foundation  (a) Piling - On completion of pile upto bottom of pile cap.  (b) Pile Cap – On completion of pile cap.		(i) Pile Foundation  (a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorata basis.  (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap.  In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Open Foundation		(ii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-structure	[Nil]	(2) <b>Sub-Structure:</b> Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the structure.
(3) Superstructure (including bearing)	[Nil]	(3) <b>Super-structure:</b>  Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified herein under:  If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing coat including expansion joint	[Nil]	(4) <b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified

Stage of Payment	Percentage -weightage	Payment Procedure
		for each of the structure.
<b>(5) Miscellaneous items</b> (like hand rails, crash barriers, road markings etc.)	[Nil]	<b>(5) Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the structure.
<b>(6) Wing walls/return walls</b>	[Nil]	<b>(6) Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the structure.
<b>(7) Approaches</b> (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	<b>(7) Approaches:</b> Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each of the structure.
<b>C.2-New Elevated section/Flyover/Grade Separators</b> (1) Foundation	[Nil]	Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures.  (1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one foundation of each of the structure as specified here in under:
(i) Well Foundation  (a) On completion of Cutting Edge + Well Curb.  (b) Wellsteining: On completion of well steining upto bottom of well cap.  (c) On completion of bottom plug + top plug (if provisioned as per design) + well cap.		(i) Well Foundation  (a) Cutting Edge + Well Curb: Payment of 10% shall be made on completion of a stage i.e. completion of cutting edge + well curb.  (b) Wellsteining: Payment of 65% shall be made on completion of well steining upto bottom of well cap. The payment stage shall be further sub-divided on pro-rata basis i.e. (i) on completion upto 10 m and (ii) on completion of each subsequent 5 m or part thereof.  (c) Bottom plug + top plug (if provisioned as per design) + well cap: Payment of 25% shall be made on completion of a stage i.e. completion of bottom plug, back fill,

Stage of Payment	Percentage -weightage	Payment Procedure
		top plug and well cap.
(ii) Pile Foundation  (a) Piling - On completion of pile upto bottom of pile cap.  (b) Pile Cap – On completion of pile cap.		(ii) Pile Foundation  (a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorata basis.  (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap.  In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(iii) Open Foundation		(iii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-structure	[Nil]	(2) <b>Sub-Structure:</b> Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the structure.
(3) Super-structure (including bearing)	[Nil]	(3) <b>Super-structure:</b>  Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified herein under:  If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing coat including expansion joint	[Nil]	(4) <b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each of the structure.

Stage of Payment	Percentage -weightage	Payment Procedure
<b>(5) Miscellaneous items</b> (like hand rails, crash barriers, road markings etc.)	[Nil]	<b>(5) Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the structure.
<b>(6) Wing walls/return walls</b>	[Nil]	<b>(6) Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the structure.
<b>(7) Approaches</b> (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	<b>(7) Approaches:</b> Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified here in under:  If reinforced soil wall is used with facia panel/blocks, interim payment shall be made @75% of the Cost of that element as derived from MoRTH data Book. Applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.

### 1.3.4 Other works.

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

**Table 1.3.4**

Stage of Payment	Percentage -weightage	Payment Procedure
(i) Toll plaza	[Nil]	Unit of measurement is each completed toll plaza. Payment for each toll plaza shall be made on pro-rata basis with respect to the total of all toll plazas as specified here in under:
(a) DLC (LHS)		(a) DLC (LHS): Payment of 12.5% on pro-rata basis shall be made on completion of a stage i.e., completion of DLC on LHS.
(b) DLC (RHS)		(b) DLC (RHS): Payment of 12.5% on pro-rata basis shall be made on completion of a stage i.e., completion of DLC on LHS.
(c) PQC (LHS)		(a) PQC (LHS): Payment of 25% on pro-rata basis shall be made on

Stage of Payment	Percentage-weightage	Payment Procedure
		completion of a stage i.e., completion of DLC on LHS.
(d) PQC (RHS)		(b) PQC (RHS): Payment of 25% on pro-rata basis shall be made on completion of a stage i.e., completion of DLC on LHS.
(e) Admin Building		(e) Admin Building: Payment of 10% on pro-rata basis shall be made on completion of a stage i.e. completion of Admin Building and miscellaneous works.
(f) Toll Booth, canopy, safety items and all other associated works		(f) Toll Booth, canopy, safety items and all other associated works:  Payment of 15% on pro-rata basis shall be made on completion of a stage i.e. completion of Toll Booth, canopy, safety items and all other associated works.
(ii) Road side drains	17.79%	
(a) Drains		(a) Drains: Unit of measurement is linear length in metre. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
(b) Cover Slabs		(b) Cover slabs: Unit of measurement is linear length in metre. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
(iii) Road signs, markings, km stones, safety devices, ...	41.42%	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 one km on both sides.
(iv) Overhead gantry mounted signs	[Nil]	Unit of measurement is each number. Payment shall be made on pro-rata basis on completion of each overhead gantry mounted sign.
(v) Project facilities (a) Bus Bays (b) Truck lay-byes (c) Rest areas (d) Others	[Nil]	Unit of measurement is each number. Payment shall be made on pro-rata basis for completed facilities.
(vi) Road side plantation	[Nil]	Unit of measurement is linear length in km. Payment shall be made on pro-rata basis on completion of one km.
(vii) Protection works # other than approaches to the bridges, elevated		

Stage of Payment	Percentage -weightage	Payment Procedure
sections, flyovers/grade separators and ROB/RUBs.		
(a) Crash Barrier	[Nil]	Unit of measurement is linear length. Payment against items (a), (b) & (c) 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 and 100 m whichever is less.
(b) Retaining Wall	20.24%	
(c) Breast Wall	2.91%	
(d) Toe Wall	8.05%	
(e) Hydroseeding and Turfing	9.59%	
(viii) Safety and traffic management during construction	[Nil]	Payment shall be made on pro-rata basis every six months.

**Note:**

- (1) (a) In order to maintain cash flow in the project, the Authority shall also make interim monthly payments to the Contractor for the work done during the month for which the corresponding stage, as mentioned in Schedule-H, has not been achieved. Such work shall be measured, in a length, number or area as specified in corresponding stage of Schedule-H and valued in accordance with the proportion of the weightage of Contract Price assigned to that stage in Schedule-H. '90% of value of such work shall be paid as an 'Interim Monthly Payment' under clause 19.3 (i) of Contract Agreement.
- (b) For Pre cast/ pre-fabricated elements to be used in permanent works, interim payments to be made @ 75% of cost of that element (to be derived from MoRT&H data book) as per schedule H.
- (c) Upon completion of the defined 'stage', a reconciliation of the interim payments shall be carried out, and any balance amount shall be paid. For the avoidance of doubt, it is clarified that the interim monthly payments are made solely to maintain cash flow in the project. In the event of termination of the project, under Clause 23.1, 23.2 or 23.3, as the case may be, such interim payments shall be dealt with as per Clause 23.5 (i) (b) of the Contract Agreement.

## **Schedule - I**

(See Clause 10.2 (iv))

### **1. Drawings**

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

### **2. Additional Drawings: -**

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



## **Annex – I**

### **(Schedule - I)**

#### **List of Drawings**

[Note: The Contractor is required to furnish drawings as per standard Manual & specifications under Clause 10.2.]

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

- (a) Drawing of horizontal alignment, vertical profile and detailed cross sections;
- (b) Drawings of cross drainage works, i.e. Bridges/Culverts/Flyovers and Other Structures;
- (c) Drawings for River Training works;
- (d) Drawings of interchanges, major intersections and underpasses;
- (e) Drawing of control centre;
- (f) Drawings of road furniture items including traffic signage, marking, safety barriers, etc;
- (g) Drawings of traffic diversions plans and traffic control measures;
- (h) Drawings of road drainage measures;
- (i) Drawings of typical details slope protection measures;
- (j) Drawings of landscaping and horticulture;
- (k) Drawings of pedestrian crossing;
- (l) Drawings of street lighting;
- (m) General Arrangement showing Base Camp and Administrative Block;
- (n) Any other drawings as per instruction of Authority's Engineer.



## 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 **[35% of the Scheduled Construction Period]** 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 **[60% of the Scheduled Construction Period]** 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 **[85% of the Scheduled Construction Period]** 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 [Scheduled Construction Period] 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 12.1.2)  
**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 all the tests specified in IRC code, manual and MORTH specifications for the road and Bridge works, 5th revision, 2013.

(ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometer.

(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) meters 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.

(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 Vehicle (NSV) Survey	At least twice a year (As per survey months defined for the state basis rainy season)
2	Roughness of pavement	Network Vehicle (NSV) Survey	At least twice a year (As per survey months defined for the state basis rainy season)
3	Strength of pavement	Falling Weight Deflectometer (FWD)	At least once a year
4	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey months defined for the state basis rainy season)
5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basis rainy season)

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

**Schedule-L**  
(See Clause 12.2)

**COMPLETION CERTIFICATE**

1. I, .....(Name of the Authority's Engineer), acting as Authority's Engineer, under and in accordance with the Agreement dated .....(the "**Agreement**"), for construction of the "**Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode**", through ..... (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.
2. It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the.....day of..... 20.....

SIGNED, SEALED AND DELIVERED

For and on behalf of  
The Authority's Engineer by:

(Signature)  
(Name)  
(Designation)  
(Address)

## Schedule-M

(See Clauses 14.6., 15.2 and 19.7)

### PAYMENT REDUCTION FOR NON-COMPLIANCE

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

- 1.1 Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule-E.
- 1.2 Any deduction made on account of non-compliance with the maintenance Requirements shall not be paid even after compliance subsequently. The deduction shall continue to be made every month until compliance is done.
- 1.3 The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph 2.

#### 2. Percentage reductions in lump sum payments

- 2.1 The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
<b>(a)</b>	<b>Carriageway/Pavement</b>	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
<b>(b)</b>	<b>Road, Embankment, Cuttings, Shoulders</b>	
(i)	Edge drop, inadequate crossfall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
<b>(c)</b>	<b>Bridges and Culverts</b>	
(i)	Desilting, cleaning, vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
<b>(d)</b>	<b>Roadside Drains</b>	
(i)	Cleaning and repair of drains	5%

<b>(e)</b>	<b>Road Furniture</b>	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
<b>(f)</b>	<b>Miscellaneous Items</b>	
(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%
<b>(g)</b>	<b>Defects in Other Project Facilities</b>	5%

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

$$R = P/100 \times M \times L1/L$$

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

M = Monthly lump-sum payment in accordance with the para 1.2 of this Schedule

L1 = Non-complying length

L = Total length of the road,

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

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

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

**Schedule-N**  
(See Clause 18.1.1)

**SELECTION OF AUTHORITY'S ENGINEER**

**1 Selection of Authority's Engineer**

- (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 Ministry of Road Transport and Highways (the “**Authority**”) and ..... (the “**Contractor**”) for “**Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode**”, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.
- (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 Clauses 1.2, 1.3 and 1.4 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 10.2.4 (d).
- (ii) Authority's Engineer shall -
  - (a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and
  - (b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause 19.10.
- (iii) The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.
- (iv) The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

## **8. Other duties and functions**

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

## **9. Miscellaneous**

- (i) A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.
- (ii) The Authority's Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.
- (iii) Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.
- (iv) The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.
- (v) The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

## **SCHEDULE - O**

*(See Clauses 19.4.1, 19.6.1, and 19.8.1)*

### **Forms of Payment Statements**

#### **1. Stage Payment Statement for Works**

The Stage Payment Statement for Works shall state:

- (a) The estimated amount for the Works executed in accordance with Clause 19.3.1 subsequent to the last claim;
- (b) Amounts reflecting adjustments in price for the aforesaid claim;
- (c) The estimated amount of each Change of Scope Order executed subsequent to the last claim;
- (d) Amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2.3 (a);
- (e) Total of (a), (b), (c) and (d) above;
- (f) Deductions:
  - (i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
  - (ii) Any amount towards deduction of taxes; and
  - (iii) Total of (i) and (ii) above.
- (g) Net claim: (e) – (f) (iii);
- (h) The amounts received by the Contractor 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 last 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 paragraph 1.1 (a) and (b) above shall cover the authority and the Contractor against all loss or damage from whatsoever cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

**2. Insurance for Contractor's Defects Liability**

The Contractor shall effect and maintain insurance cover for the works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and arises from a cause occurring prior to the issue of 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 each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Paragraph 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit on the number of occurrences. The insurance cover shall be not less than: Rs. 2.0 Crore.
- (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 and 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 2,500 (two thousand five hundred) mm for each kilometer.

2. Visual and physical test:

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



**SCHEDULE-R**  
**(See Clause 14.10)**

**Taking Over Certificate**

I, ..... (Name and designation of the Authority's representative) under and in accordance with the Agreement dated ..... (the "Agreement"), for "***Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode***", ..... (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 of Authority's Engineer)

(Address)