

## **Schedules**

**Schedule-A**

*(See Clauses 2.1 and 8.1)*

**Site of the Project**

**1 The Site**

- (i) Site of the Proposed LHS 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 of LHS are specified in Annex-III. The proposed profile of the Project LHS shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The contractor may however, improve/upgrade the Road Profile as indicated in Annexure-III based on site/design requirement.
- (v) The status of the environment clearances obtained or awaited is given in Annex-IV.

**Annex – I**  
(Schedule-A)

**Site**

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

**1. Site**

The Site of the project Highway comprises Construction of LHS and its approaches in lieu of level Crossing No.C-23/T-2 at Km 221.050 on NH-65 (New NH-152) near siwani town in the State of Haryana on EPC mode under NH(O). The land, carriageway and structures comprising the site are described below.

**2. Land**

The land is available to construct proposed LHS.

**3. Carriageway**

The main carriageway shall be 5m in LHS box in railway portion and 6.50 m in Approaches portion and Approach road is 7.50 m..

**4. Major Bridges**

The Site includes the following Major Bridges:

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

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

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

S. No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Superstructure			
1.	221.050	RCC	RCC	4 Nos. Span (25m each) in State PWD boundary and 5 Nos. Span (37 m spam) in Railway Boundary.	12m	ROB

**6. Grade separators**

The site includes the following grade separators:

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

**7. Minor bridges**

The site includes the following minor bridges:

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

**8. Railway level crossings**

The site includes the following railway level crossings:

S. No.	Location (km)	Remarks
1	221.050	Hisar-Sadulpur Railway line

**9. Underpasses (vehicular, non-vehicular)**

The site includes the following underpasses:

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

**10. Culverts**

The site has the following culverts:

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
NIL				

**11. Bus bays**

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

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

**12. Truck Lay byes**

The details of truck lay byes are as follows:

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

**13. Road side drains**

The details of the road side drains are as follows:

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

**14. Major junctions**

The details of major junctions are as follows:

S. No.	Location		At grade	Separated	Category of Cross Road			
	From km	to km			NH	SH	MDR	Others
NIL								

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

**15. Minor junctions**

The details of the minor junctions are as follows:

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

**16. Bypasses**

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

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

**[17. Other structures**

[NIL]

*(As per Clause 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	From km to km	Length (km)	Width (m)	Date of providing Right of Way*
(1)	(2)	(3)	(4)	(5)
1	0.000 to 0.297	0.297	7.50	On appointed date

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

### ELECTRIC UTILITES

The site includes the following electrical Utilities :-

Extra High –Tension lines (EHT Lines )

Sr. No.	Chainage		Length in KM				Crossing			
	From	To	400 KV	220 KV	110 KV	66 KV	400 KV	220 KV	110 KV	66 KV
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B) HIGH Tension / low Tension lines (HT/LT LINES)

Sr. No.	Chainage		Length (in Km)			Crossing			Transformers	
	From	To	33 KV	11 KV	LT	33 KV	11 KV	LT	No	Capacity
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ii) Public Health utilities (water / sewage pipe lines)

The site includes the following Public Health Utilities

Sr. No.	Chainage		Length (in Km)				Crossing			
	From	To	Water supply line		Sewage line		Water supply line		Sewage line	
			With Pumping	With gravity flow	With Pumping	With gravity flow	With Pumping	With gravity flow	With Pumping	With gravity flow
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iii) Any other line

### **Annex - III**

*(Schedule-A)*

#### **Alignment Plans**

The existing alignment of the Project Highway shall be modified in the following section 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 with Drawing Volume. The contractor shall, however,
- (iii) Improve/upgrade upon the traffic signage plan as indicated in **Annex-III** based on site/design requirement as per the relevant Specification/IRC codes/manual.



**APPENDIX –I**

**Annex-III**

**(Schedule-A)**

**KEY MAP OF PROJECT LHS**

**APPENDIX –II  
Annex-III  
(Schedule-A)**

**ALIGNMENT PLAN OF THE PROJECT**

**Attached**

**APPENDIX –III  
Annex-III  
(Schedule-A)  
GAD**

**Attached**

**APPENDIX –IV**

**Annex-III**

**(Schedule-A)**

**Annex – IV**

*(Schedule-A)*

**Environment Clearances**

The environment clearances is not required.

**Schedule - B**

*(See Clause 2.1)*

**Development of the Project Highway**

**1. Development of the Proposed LHS**

Development of the Project LHS shall include design of Construction of LHS and its approaches in lieu of level Crossing No.C-23/T-2 at Km 221.050 on NH-65 (New NH-152) near siwani town in the State of Haryana on EPC mode under NH(O) as described in this Schedule-B and in Schedule-C.

**2. Rehabilitation and augmentation**

Rehabilitation and augmentation shall not be included

**3. Specifications and Standards**

The proposed 2-lane LHS shall be designed and constructed in conformity with the Specifications and Standards specified in Annex-I of Schedule-D and attached GAD.

## **Annex – I**

### *(Schedule-B)*

#### **Description of LHS**

[Note: Description of the Project Highway shall be given by the Authority in detail together with explanatory drawings (where necessary) to explain the Authority's requirements precisely in order to avoid subsequent changes in the Scope of the Project. The particulars that must be specified in this Schedule-B are listed below as per the requirements of the Manual of Specifications and Standards IRC: SP: 84-2019, referred to as the Manual. If any standards, specifications or details are not given in the Manual, the minimum design/construction requirements shall be specified in this Schedule. In addition to these particulars, all other essential project specific details, as required, should be provided in order to define the Scope of the Project clearly and precisely.]

#### **1. Widening of the Existing Highway**

- (i) The Proposed LHS shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex-III of Schedule-A. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for plain terrain to the extent land is available.
- (ii) Width of Carriageway
  - (a) Two-Lane LHS along with approaches shall be undertaken. The paved carriageway shall be in accordance with the Manual. The main carriageway shall be 5m in LHS box in railway portion and 6.50 m in Approaches portion and Approach road is 7.50 m. The typical cross sections are attached as Type-I in Appendix-I of Annex-I of Schedule-B.
  - (b) Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.1 above.

(c)

**Span arrangement**

follows (which have been ticked):-

**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 DATA :-

The design Traffic for Project LHS shall be designed with minimum 9650 PCU,

Design Life : 15 Years & CBR-8%.

(iii) Improvement of the existing road geometrics

In the sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved as per drawing provided in Appendix-I, II, III & IV of Annex-III in Schedule-A within given ROW and proper road signs and safety measures shall be provided.

Sl. No.	Stretch (from km to km)	Type of deficiency	Remarks
Refer to Annex-III of Schedule-A			

**Note:**

- Firstly, Contractor shall construct and maintain service road for smooth flow of traffic along with proposed Project LHS during construction period as per site requirement and satisfaction of Authority Engineer/PMC.
- No separate diversion route is required for through traffic. The current traffic will follow the service road crossing the crossing during the construction period.

(iv) Right of Way

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

(v) Type of shoulders

(a) In the Proposed LHS , shall be provide as follows:



Sl. No.	Stretch (from km to km)	Fully paved shoulders/ footpaths	Reference to cross section
1.	NIL		

(vi) Lateral and vertical clearances at underpasses

- (a) Lateral and vertical clearances at viaduct portion of approaches shall be as per manual clause.
- (b) Lateral clearance: The width of the opening at the underpasses shall be as follows:

Sl. No.	Location (Chainage) (from km to km)	Span/ opening (m)	Horizontal Clearance for Traffic	Length of Box	Remarks
1	Km.0.092 to 0.124	>= 6 M	Minimum 5m	32.330 m	21 nos of Segmental box having width 1.53 m each
1	Km.0.061 to 0.092 & km 0.124 to 0.166	>= 6 M	Minimum 5m	73.090 m	Cast in situ type

(c) Vertical clearance minimum 2.50m

(vii) Lateral and vertical clearances at overpasses

- (a) Lateral and vertical clearances at overpasses shall be as per paragraph 2.10 & 2.11 of the Manual.
- (b) Lateral clearance: The width of the opening at the overpasses shall be as follows:

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

(viii) Service roads

Service roads shall be constructed at the proposed LHS locations and for the lengths indicated below as per typical cross section type-II & III:-

S. 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	Remarks
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S. 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	Remarks
1	Approach road for connecting the service road of ROB On hisar side to LHS approaches	On hisar side	70 m	7.5m wide Approach Road = 70 m

Note:

- Merging of traffic from Service lanes to Main Carriageway shall be as per Cl. 2.12.2.4 of the Manual
- Total length of the service roads on hisar side along the Project LHS is 0.070 km.

**(ix) Grade separated structures**

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

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

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

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

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

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

Cattle and pedestrian underpass/ overpass shall be constructed as

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

Sl. No.	Location	Type of crossing
NIL		

**(xi) Typical cross-sections of the Proposed LHS**

The typical cross section has been developed and included in Appendix-I of this Schedule-B confirming to the Manual.

**3. Intersections and Grade Separators**

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

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

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

**(i) At-grade intersections**

S. No	Location of Intersection	Type of Intersection	Other features
NIL			

**(ii) Grade separated intersection with/without ramps**

S. No.	Location	Salient features	Minimum length of viaduct to be provided(m)	Road to be carried over/under the 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 [Refer to the provision of relevant Manual and**

specify sections to be raised]

The existing road shall be raised in the following sections:

Sl. No.	Section (from km to km)	Length	Extent of raising [Top of finished road level]
As per Profile attached in Annexure –III of Schedule A			

## 5. Pavement Design

- (i) Pavement design shall be carried out in accordance with Section 5 of the Manual.
- (ii) Type of pavement: Rigid

### Approach Road

The minimum CBR to be taken as 8%. The approaches of LHS of total length 111.600 m is proposed to be provided with rigid pavement. The composition of proposed pavement and their corresponding minimum thickness to be provided is given in the table below:

S No	Crust composition	Min. Thickness (mm)
1	PCC M-15 (Foundation)	100
2	RCC M-35 (Retaining wall bottom/ Carriage way slab)	180+150
	<b>Total</b>	<b>430</b>

### Service Road & Slip Road & Under LHS Portion

The minimum CBR to be taken as 8%. The service road of total length 70 m is proposed to be provided with rigid pavement. The composition of proposed pavement and their corresponding minimum thickness to be provided is given in the table below:

Sr. No	Crust composition	Min. Thickness (mm)
1	PQC	300
2	DLC	150
3	GSB	150

Sr. No	Crust composition	Min. Thickness (mm)
	<b>Total</b>	<b>600</b>

(iii) Design requirements

(a) Design Period and strategy

Flexible pavement for new pavement shall be designed for a minimum design period of 20 years as per clause 4.3.1 of IRC: 37-2018. Stage construction shall not be permitted.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for a design traffic of 45 million standard axles.

(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
Under LHS Portion		

**6. Roadside Drainage**

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

S.No	Design Chainage (KM)		Length (m)	Lined/Unlined
	From	To		
NIL				

**The recharge well (Rain harvesting system) 2 nos. with one pumping setup for disposal of rain water shall be provided at site on proposed LHS.**

**7. Design of Structures**

(i) General

(a) All bridges, culverts and structures shall be designed and constructed in accordance with the provision of relevant Manual and shall conform to the cross-sectional features and other details specified therein. Width of the carriageway of new bridges, LHS and structures shall be as follows:

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

[Refer to the provision of relevant Manual and specify the width of carriageway of new bridges, LHS and structures of more than 60 (sixty) metres length, if the carriageway width is different from 7.5 (seven point five) metres in the table below.]

#### Box Type LHS Portion

Sl. No.	Cross section features	Width of carriageway and cross-sectional features *
1	Carriageway	1 x 5.00 M
2	RCC Wall	2 x 0.550 M
3	Top Slab	1 x 0.500 M

#### Approaches to LHS

Sl. No.	Cross section features	Width of carriageway and cross-sectional features *
1	Carriageway	1 x 6.50 M
2	RCC Wall	2 x 0.400 M
3	Fiber Sheet	1 x 8.300 M

#### Approach/ Service road of LHS

Sl. No.	Cross section features	Width of carriageway and cross-sectional features *
1	Carriageway	1 x 7.50 M

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

[Refer to the provision of relevant Manual and provide details of new structure with footpath]

Sl. No.	Location at km	Remarks
NIL		

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

[Refer to the provision of relevant Manual and state if there is any exception]

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

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

Sl. No.	Bridge at km	Utility service to be carried	Remarks
	As per list attached Clause 7 in iv a & b	Min. 2 no. of utility duct of 150mm dia. In each crash barrier, for Water pipeline, OFC Cable, Electric Cable, etc.	This may vary as per site condition and location identified with independent consultant during execution.

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

(ii) Culverts

- (a) Overall width of all culverts shall be equal to the roadway width of MDR (ROW)
- (b) Reconstruction of existing culverts:

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

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

Sl. No.	Culvert location	Span/Opening (m)	Remarks, if any*
NIL			

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

- (c) Widening of existing culverts:

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

S.No	Culvert location	Type, span, height and width of existing culvert (m)	Repairs to be carried out (Specify)
NIL			

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

S.No.	Design Chainage	Type	Span (m)	Width (m)	Remarks
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NIL

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

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

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

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

(iii) Bridges

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

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

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

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

\*Attach GAD

- (ii) The following narrow bridges shall be widened:

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

- (b) Additional new bridges

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

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

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

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



the following locations:

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

Sl. No.	Location at km	Remarks
NIL		

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

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

Sl. No.	Location at km	Remarks
NIL		

- (e) Drainage system for bridge decks

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

- (f) Structures in marine environment

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

**(iv) Rail-road bridges**

- (a) Design, construction and detailing of ROB/RUB/LHS shall be as specified in the provision of relevant Manual. [Refer to the provision of relevant Manual and specify modification, if any]

- (b) **LHS(Limited Height Subway)**

LHS shall be provided at the following level crossings, as per GAD drawings attached:

Sr. No.	Item	Description
<b>1</b>	<b>LHS Proper</b>	LHS RCC Box Type 1x5.00x2.65m (Pre-cast & cast in situ),  Length= 32.330 m (21 nos of segmental box of length 1.530 m  = 73.090 m ( cast in situ)  Total lenth = 105.420 m
1.1	Vertical Clearance	2.65 M
<b>2</b>	<b>Approach towards hisar side</b>	

<b>Sr. No.</b>	<b>Item</b>	<b>Description</b>
2.1	RCC wall	Length : 1x55.80 M PCC M-15 = 100mm RCC M-35 : Side/ Retaining walls = 400mm (minimum) Bottom/ Carriage way Slab = 180+150mm
2.2	Merging with Existing carriageway	7.5 M wide Approach Road = (1*70m)
<b>3</b>	<b>Approach towards siwani Side</b>	
3.1	RCC wall	Length : 1x55.80M PCC M-15 = 100mm RCC M-35 : Side/ Retaining walls = 400mm (minimum) Bottom/ Carriage way Slab = 180+150mm
3.2	Merging with Existing carriageway	5.5 M wide existing Approach Road of ROB
<b>4</b>	<b>Total Length of LHS including Approaches &amp; Approach road</b>	297 m
5	Carriageway Width	5.00 M in LHS portion and 6.50M in approaches and 7.50 M in approach road.
6	Fiber Sheet on top of approaches	8.300 M (2 x 61m)
7	Overall Width	1. LHS RCC Box Type 1x5.00x2.65m + 2x0.500m (RCC M-35) 2. Approaches of RCC M-35 to LHS (2x55.80m) 3. 7.5m approach road (1x70m)
8	Approach Road Gradient	1 in 15
9	Design Speed	30 Km/ Hour

\*Technical Specifications and Performance/ Guarantee Bond for Reinforced Soil Wall is given in Appendix-II of Annex-I in this Schedule-B.

● **Salient features of LHS Proper/Viaduct**

Foundation	250mm thick RCC M-25 thrust bed
Substructure	RCC M-35 in bottom slab 500 mm thick
Superstructure	Cast-in-situ & precast RCC slab in M-35 grade.
Wearing coat	150mm wearing course M-40 grade

**Miscellaneous Provision :** Diversion will be provided during execution of work.

(c) **Road under-bridges**

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

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

**(v) Grade separated structures**

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

**(vi) Repairs and strengthening of bridges and structures**

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

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

**(a) Bridges**

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

**(b) ROB / RUB**

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

**(c) Overpasses/Underpasses and other structures**

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

**(vii) List of Major Bridges and Structures**

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

Sl. No.	Location
NIL	

**8. Traffic Control Devices and Road Safety Works**

- (i) Traffic control devices and road safety works shall be provided in accordance with the provision of relevant Manual.
- (ii) **Specifications of the reflective sheeting.**  
Retro reflective sheeting should be of high intensity grade with encapsulated lens or with micro prismatic retro reflective element in accordance with Section 9.3 of the Manual and ASTM standard D 4956-04

**9. Roadside Furniture**

- (i) **Roadside furniture shall be provided in accordance with the provisions of Section-9 of the Manual & As per IRC 67-2012).**
- (ii) **Overhead traffic signs: location and size**  
Overhead traffic signs are provided as per requirement according to the Manual with details.

**10. Compulsory Afforestation**

The number of trees which are required to be planted by the contractor as compensatory afforestation should be twice the number of trees to be cut as per Forest Conservation Act. Total ..... numbers of trees are identified to be affected in the proposed ROW. As per guidelines, 1:2 numbers of new trees to be planted by the contractor.

**11. Hazardous Locations**

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

Sl. No.	Location stretch from (km) to (km)	LHS/RHS
NIL		

**12. Special Requirement for Hill Roads**

Not Applicable; as the Proposed LHS falls under plain terrain.

**13. Change of Scope**

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

**14. PRECONSTRUCTION ACTIVITIES**

#### **14.1 Land Acquisition (LA)**

Nil

#### **14.2 Utility Shifting and Removal of Trees**

The project involves shifting of utilities of certain types. The Shifting of obstructing existing utilities indicated in schedule A to be an appropriate location in accordance with the standards and specifications 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 specifications of concerned Utility owning department shall be applicable and followed.

##### **Notes :-1**

- (a) The type/ spacing/ size /specification of poles/ towers/ lines cables to be used in shifting work shall be as per 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 works or for making any overhead crossings 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 binding 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 alongwith a copy of estimated cost given by the 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 the norm and practice and in that case the amount of credit for dismantled material may be availed by the contractor as per estimate agreed between them.
- (d) The utilities shall be handed over after shifting works 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 works are concerned.

**Note;- II** Copy of utility shifting plans enclosed as Annexure-II to schedule B1

**14.3 Clearance to be obtained**

The contractor shall obtain all necessary clearance from all the concerned authorities required for implementing the project. Authority shall provide support letters in this regard.

**14.4 Encroachment Removal**

Encroachment shall be removed by the Authority at their own cost.

**14.5 Compensatory Afforestation and Rehabilitation & Resettlement**

Authority shall bear cost in this regard. However, contractor shall proactively be involved for all related activities.

**Appendix-I**

**Annex-I**

*(Schedule B)*

**Summary of Typical Cross Sections**

<b>S.No</b>	<b>Section</b>	<b>Type</b>	<b>Description</b>	<b>Length (m)</b>
1	AA	I	LHS	105.40
2	BB	II	Approaches to LHS	121.60
3	CC	III	Approach Road	70
<b>Total length =</b>				<b>297.00</b>

**Typical Cross Section (Type-I)**

**Typical Cross Section (Type-II)**

**Typical Cross Section (Type-III)**



**Appendix-II**  
**Annex-I**  
*(Schedule-B)*

**TECHNICAL SPECIFICATIONS FOR REINFORCED SOIL WALLS**

**1. General**

The work of Reinforced Soil Walls shall consist of precast concrete facing, reinforcing element and backfill material in accordance with the following specifications by a specialized agency as appointed by the contractor with the approval of Authority Engineer/PMC. The specialized agency must be of reputed and must have been in the field for at least 10 years and shall have successfully executed at least three works. The contractor shall give a performance bond in the format specified in the tender document that they undertake to remove and rectify any defect whatsoever occurring in a period of 20 years from the actual date of completion of work in this item of work at their own cost. The specialized agency will get the design proof checked from a reputed agency. The employer will get this item of works supervised through a specialized agency at its own cost and contractor, his specialized agency will have to follow the instructions of supervising agency.

The work shall be executed in conformity with the lines, levels, grades, design and dimensions shown on the drawings submitted by that specialized agency with the prior approval of the Authority Engineer/PMC. The contractor, through the specialized agency, shall submit all the design calculations and drawings, duly proof checked at least two weeks in advance, to the Authority Engineer/PMC for approval.

**1.1 Codes and Standards**

The work shall generally be done in conformity to the MORTH Specifications for Road and Bridge Works: 5th Revision 2013, Section 3100 and Sub-sections thereto. The detailed design and drawings submitted by the contractor through the specialized agency engaged for the purpose shall be in accordance with (i) MORTH specifications (ii) IRC: SP 102 -2014, (iii) BS: 8006:2010 "Strengthened/ Reinforced Soils and other Fills" meeting the ultimate and serviceability limit state requirements and as per French Standard AFNOR NF-P 94-270 or (iv) AASHTO/US Federal Highway Administration (FHWA-NHI-I0-24 & 25) design guidelines. In case BS: 8006- I - 2010 is used for design, reference should be made to other codes of practices listed above for a seismic design. Specifications of specialized agency shall also be incorporated wherever relevant. The above reference to codes (ii) to (iv) is in order of priority for use where MORTH&H specification 5th Revision 2013 is silent.

## **1.2 Precast Concrete Facia Panels**

### **1.2.1 General**

Precast concrete facing elements shall conform to the details and dimensions shown on the drawings provided by the specialized agency and approved by the Authority Engineer/PMC. The area of single precast facia panel in elevation (after placing in position) shall not be less than 2.50 m<sup>2</sup> (height not less than 1580mm, except for top panels, which may vary in height depending upon slope/ gradient) with a minimum thickness of 180mm. Concrete shall conform to the requirements given in this tender document. Precast concrete facing panels in M-40 grade concrete shall be finished with form liner finish as approved by the Authority Engineer/PMC.

### **1.2.2 Casting**

The element shall be cast on a flat area. Tie- strips and lifting anchors shall be set in place to the dimensions and tolerances shown on the shop drawings provided by the specialized agency and tie- strips guides shall be set on the rear face, prior to casting. The concrete in each unit shall be placed without interruption and shall be consolidated by the use of a vibrator supplemented by hand-tamping as may be necessary to force the concrete into the corners of the forms and prevent formation of stone pockets or cleavage planes. Release agent of the approved manufacture shall be used throughout the casting operation. Air entraining, retarding or accelerating agents or other additives containing chloride shall not be used without approval of Authority Engineer/PMC. Coping beam shall be provided at the top. Thermocol (polystyrene foam) shall be provided in between the top panel of RS wall /Coping beam and nib of crash barrier.

### **1.2.3 Curing**

The precast elements shall be cured for a sufficient length of time (at least 14 days) so that the concrete develops required compressive strength.

### **1.2.4 Removal of Forms**

The forms shall remain in place until they can be removed without damaging the elements,

### **1.2.5 Scribing**

The date of manufacture shall be clearly scribed on the rear face of each unit.

### **1.2.6 Concrete Finish**

The front (exposed) face of the panels, shall have form liner finish as per drawing. The rear face shall have the finish of unformed surface.

### 1.2.7 Tolerances

All elements shall be cast within the following tolerances

- |      |                                      |                                |
|------|--------------------------------------|--------------------------------|
| i.   | All dimension                        | : $\pm 5\text{mm}$             |
| ii.  | Evenness of the front face           | : $\pm 5\text{mm}$ over 1500mm |
| iii. | Thickness                            | : $+ 5\text{mm}, -0\text{mm}$  |
| iv.  | Difference of two Diagonal dimension | : $\pm 5\text{mm}$             |

### Handling Storage and Transporting

All elements shall be handled, stored and transported in such manner as to eliminate the danger of chipping, cracks, fracture and excessive bending stress. Panels in storage shall be supported on firm blocking located adjacent to tie strips to avoid bending.

### 1.2.8 Acceptability And Placement

Acceptability of the precast elements shall be determined on the basis of compression tests, as specified and visual inspection. The age concrete of precast fascia elements shall not be less than 14 days at the time of placement in position and shall have achieved minimum 75% of 28 days strength.

### 1.2.9 Leveling Pad

Leveling pad/strip footing having min 350 mm width and 150 mm thickness made of M15 grade concrete shall be provided at the founding level under the walls. The depth of embedment below the finished ground level at the foot of the wall shall not be less than 1000 mm. The pad shall be cured for at least 24 hours prior to placing of panels. Regular check shall be conducted for verticality of wall after every layer of placement of panels by plumb.

### 1.2.10 Rejection

Elements shall be subjected to rejection in case of failure to meet any of the requirements specified above. In addition, defects that indicate imperfect moulding, or defects indicating honeycombed or open textured concrete, shall be sufficient cause for rejection.

**(On Rs. 100 stamp paper)**  
**Performance/ Guarantee Bond**  
**Reinforced Soil Walls**

Client : Haryana PWD (B&R)  
Contractor : .....  
RS Wall system Provider : .....  
Name of the Project : .....

Scope of Sub Contract Work : Construction of Reinforced soil walls including  
Designing, Supply of soil reinforcing system as  
per approved specification and drawings for  
approaches of the LHS

KNOW ALL MEN BY THESE PRESENTS, THAT WE ..... The Contractor for the  
above said work, having office at.....

As stated above bind ourselves, our executors, administrators & successors jointly and  
severally, firmly by these present subject to the provision of the aforesaid contract on  
demand and without demur on a claim made by Client.

We, the Contractor, shall ensure satisfactory compliance of design and construction of  
Reinforced Soil Wall Structure at above ROB constructed for the Client.

Now having executed the said Contract as per defined scope of work, terms, conditions and  
specifications, the Contractor namely ..... , have to give a Guarantee  
Bond for a period of 20 years from the date of completion of work which was awarded vide  
Work Order viz.

The Contractor, through their Managing Director, do hereby agree and undertake to  
guarantee the satisfactory design and execution for the work as stipulated under the  
contract/ work order during the entire period of twenty (20) years from the date of  
completion of work which was awarded vide Work Order viz ..... and undertake to make  
good any defects or any failure of the system which may occur by reason of failure or default  
on the part of the Contractor upon receipt of written notice from the Client within a  
reasonable period of time.

The Guarantee Bond will be in full force and effect for a period of 20 years from the date of  
Completion. We understand that in case of default on our part the client can black list us for  
participating in future works.

In witness where of the above bound part has executed this instrument under their seal of  
the date indicated below and name and seal of the said bound party being hereto fixed and  
these presents duly signed by their undersigned representative pursuant to authority.

Signed at ..... on this date.....

For.....  
Managing Director

**(Schedule B-1)**

1. The shifting of utilities shall be carried out by the Contractor. The details of utilities are as follows:

S.No	Types of utility	Unit	Quantity	Location/Stretch (LHS/RHS)
A	Electrical utilities	-	-	-
A1	Electrical poles	-	-	-
A2	Electrical Cables	-	-	-
A3	Transformer	-	-	-

**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.

**2. Description of Project Facilities**

Each of the Project Facilities is described below:

**(a) Toll Plaza**

NIL

**(b) Road side Furniture**

Adequate road signs, markings and other road side furniture have been proposed for the proposed project road in order to provide advance information to regulate/control traffic flow and ensure safety of operations as per Manual.

**(c) Pedestrian Facilities**

Footpaths will be provided as per typical cross section Type-I attached in Appendix-I of Annex-I in this schedule.

**(d) Tree Plantation**

NIL.

**(e) Truck Laybys**

S. No	Design Chainage	Location	Side
NIL			

**(f) Bus-Bays and Bus Shelters**

S. No	Design Chainage	Location	Side
NIL			

**(h) Rest Areas**

Rest areas are proposed to be provided at locations of truck laybys as tabulated (h) Rest Areas

S. No	Existing Chainage	Design Chainage	Location
NIL			

(i) Others to be specified

S. No.	Project Facility	Location	Design Requirements	Other Essential details
1	Roadside Furniture	LHS	As per MoRTH	
2	Project Display Boards	LHS	As per MoRTH	
3	Highway Lighting	LHS	As per MoRTH	

**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 Schedule-B and Manual of Standards and Specifications for Four Laning of Highways published by the Indian Roads Congress – IRC:SP-84-2019 for construction of the Project Highway.

#### **2. Design Standards**

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

Manual of Standards and Specifications for Four Laning of Highways published by the Indian Roads Congress – IRC:SP-84-2019.

“As regard the work of utility shifting , the relevant specification, relevant rules, regulations and acts of Utility owning department / Agencies shall be applicable. “



**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 Four-Laning of Highways (IRC: SP: 84-2019), referred to as the Manual, and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer/PMC.

**2 Deviations from the Specifications and Standards**

- (i) The terms "Concessionaire", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer/PMC" and "Agreement" respectively.
- (ii) Notwithstanding anything to the contrary contained in Paragraph 1 above, the following Specifications and Standards shall apply to the Proposed LHS, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below:

S. No.	Item	Description of Deviation	Clause reference to the Manual
1.	Right of Way	Proposed Right of Way shall be as per Schedule-B	IRC
2.	Cross Section Type	Shall be shown as per Drawings attached and Schedule-B	IRC

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

## **Schedule - E**

*(See Clauses 2.1 and 14.2)*

### **Maintenance Requirements**

#### **1 Maintenance Requirements**

- (i) The Contractor shall, at all times maintain the Proposed LHS in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.
- (ii) The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfilment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.
- (iii) All Materials, works and construction operations shall conform to the MORTH Specifications for Road and Bridge Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted.

#### **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 Proposed LHS 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 Proposed ROB and maintain a record thereof in a register to be kept in such form and manner as the Authority's Engineer/PMC may specify. Such record shall be kept in safe custody of the Contractor and shall be open to inspection by the Authority and the Authority's Engineer at any time during office hours.

**7. Pre-monsoon Inspection / Post-monsoon Inspection**

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

**8. Repairs on Account of Natural Calamities**

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

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

**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 of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)</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.tfhr.com/pavement/ltp/reports/03031/">http://www.tfhr.com/pavement/ltp/reports/03031/</a> )	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5mm	Daily	Straight Edge		15-30 days	MORT&H Specification 3004.2

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

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					
	Corrugation and Shoving	Nil	< 1 % of area	Daily	Length Measurement Unit like Scale, Tape, odometer etc.		2-7 days	IRC:82 2015
	Bleeding	Nil	< 1 % of area	Daily			3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily			7- 15 days	IRC:82-2015
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sidewayforce Coefficient Routine Investigation	Class I Profilometer : ASTM E950 (98) :2004 – Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

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					
	Pavement Condition Index	3	2.1	Bi-Annually	Machine or equivalent)	Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	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, approaches of connecting roads, slip roads, lay byes etc. as applicable)</b>	Roughness BI	2200m m/km	2400mm /km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656-94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sidewayforce Coefficient Routine			
		Minimu m SN	Traffic Speed					

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment  Investigation Machine or equivalent)	Standards and References for Inspection and Data Analysis	Time limit for Rectification / Repair	Maintenance Specifications
		Desirable	Acceptable					
			(Km/h)					
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					
Embankment/ Slope	Edge drop at shoulders	Nil	40 mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe side slope	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

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					
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
CRACKING						
1	Single Discrete Cracks Not intersecting with any Joint	w = width of crack L = length of crack d = depth of crack D = depth of Slab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if L > 1m.
			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	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.	Within 7days	
2	Single Transverse (or	w = width of crack	0	Nil, not discernible	No Action	



**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

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>Diagonal) Crack intersecting with one or more joints</b>	L = length of crack d = depth of crack D = depth of Slab				
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit.  Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m.  Within 7 days	Full Depth Repair Dismantle and reconstruct affected.  Portion with norms and specifications See Para 5.5 & 9.2 Within 15days
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit.  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	<b>Single Longitudinal Crack intersecting with one or more joints</b>		0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernible from slow moving vehicle	Seal with epoxy, if L > 1 m Within 7 days	Staple or dowel bar retrofit. Within 15day
			2	w = 0.5 – 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > 1m  Within 15 days	-
			3	w = 3.0 – 6.0 mm	Staple, if L > 1m	Partial Depth Repair

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

S.No.	Type of Distress	Measured Parameter w = width of crack L = length of crack d = depth of crack D = depth of Slab	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
					Within 15 days	with stapling
			4	w = 6.0 – 12.0 mm, usually associated with spalling	Not Applicable, as it may be full	Within 15 days
			5	w > 12 mm, usually associated with spalling, and/or Slab rocking under traffic	Depth	Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications – See Para 5.6.4  Within 15 days
4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m.	-
					Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinststate subbase, Reconstruct whole Slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces.		

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

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

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

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	$w > 3 \text{ mm}$ , $L > 3 \text{ m/ m}^2$ and deformation		damaged area taking care not to damage reinforcement.  Within 30days
<b>Surface Defects</b>						
					Short Term	Long Term
7	Ravelling or Honeycomb type surface	$r = \text{area damaged surface/total surface of Slab (\%)}$ $h = \text{maximum depth of damage}$	0	Nil, not discernible	No action.	Not Applicable
			1	$r < 2 \%$	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	$r = 2 - 10 \%$	Bonded Inlay, 2 or 3 Slabs if affecting. Within 30 days	
			3	$r = 10-25\%$	Reconstruct Slabs, 4 or more Slabs if affecting. Within 30 days	
			4	$r = 25 - 50 \%$		
			5	$r > 50\%$ and $h > 25 \text{ mm}$		
8	Scaling	$r = \text{damaged surface/total}$	0	Nil, not discernible	Short Term	Long Term
			1	$r < 2 \%$	No action.	Not Applicable
			2	$r = 2 - 10 \%$	Local repair of areas damaged and liable to be	

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

S.No.	Type of Distress	Measured Parameter surface of Slab (%) h = maximum depth of damage	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
					damaged. Within 7days	
			3	r = 10 - 20%	Bonded Inlay within 15 days	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 mm	Reconstruct Slab within 30 days	
9	Polished Surface/Glazing	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm		
			2 '	t = 1 - 0.6 mm	Monitor rate of Deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more Slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m <sub>2</sub> d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1per 5 m <sup>2</sup>	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m <sub>2</sub>	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m <sub>2</sub>		

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			3	$d = 100 - 300 \text{ mm}; h < 100 \text{ mm}$ $n < 1 \text{ per } 5 \text{ m}^2$	Partial depth repair 110mm	
			4	$d = 100 - 300 \text{ mm}; h > 100 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	i.e.10 mm more than the depth of the hole. Within 30 day.	
			5	$d > 300 \text{ mm}; h > 100 \text{ mm}; n > 1 \text{ per } 5 \text{ m}^2$	Full depth repair. Within 30 days	
11	Joint Seal Defects	loss or damage $L = \text{Length as \% total joint length}$	0	Difficult to discern.	<b>Short Term</b>	<b>Long Term</b>
					No action.	
			1	Discernible, $L < 25\%$ but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. $L > 25\%$ insufficient protection against ingress of water 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	$w = \text{width on either}$	0	Nil, not discernible	No action.	Not Applicable

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
		side of the joint $L =$ length of spalled portion (as % joint length)	1	$w < 10$ mm	Apply low viscosity epoxy resin/ mortar in cracked portion. Within 7 days  Partial Depth Repair. within 15 days  30 - 50 mm deep, $h = w$ + 20% of $w$ , within 30 days  50 - 100 mm deep repair. $H = w + 20\%$ of $w$ . Within 30 days	
			2	$w = 10 - 20$ mm, $L < 25\%$		
			3	$w = 20 - 40$ mm, $L > 25\%$		
			4	$w = 40 - 80$ mm, $L > 25\%$		
			5	$w > 80$ mm, and $L > 25\%$		
13	<b>Faulting (or Stepping) in Cracks &amp; joints</b>	$f =$ difference of level	0	not discernible, $< 1$ mm	No action.	No action.
			1	$f < 3$ mm		
			2	$f = 3 - 6$ mm	Determine cause and observe, take action for diamond grinding	Replace the Slab as appropriate. Within 30days
			3	$f = 6 - 12$ mm	Diamond Grinding	
			4	$f = 12 - 18$ mm	Raise sunken Slab.	Replace the Slab as appropriate. Within 30days
			5	$f > 18$ mm	Strengthen subgrade and sub-base by grouting and raising sunken Slab	
14	<b>Blowup or Buckling</b>	$h =$ vertical displacement from normal profile	0	Nil, not discernible	<b>Short Term</b>	<b>Long Term</b>
					No Action	

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			1	$h < 6$ mm		
			2	$h = 6 - 12$ mm	Install Signs to Warn Traffic	
			3	$h = 12 - 25$ mm	Within 7 days	
			4	$h > 25$ mm	Full Depth Repair. Within 30 days	
			5	Shattered Slabs, i.e 4 or more pieces	Replace broken Slabs. Within 30 days	
15	Depression	h=negative displacement from normal profile L= Length	0	Not discernible, $h < 5$ mm	No Action	Not Applicable
			1	$h = 5 - 15$ mm		
			2	$h = 15 - 30$ mm, Nos $< 20\%$ joints	Install Signs to warn Traffic within 7 days	
			3	$h = 30 - 50$ mm		
			4	$h > 50$ mm or $> 20\%$ joints	Strengthen subgrade. Reinststate pavement at normal level  If $L < 20$ m. Within 30 days	
			5	$h > 100$ mm		
16	Heave	h=positive vertical displacement from normal profile L = Length			Short Term	Long Term
			0	Not Discernible, $h < 5$ mm	No Action	scrabble
			1	$h = 5 - 15$ mm	Follow up	



**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

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	$h = 15 - 30 \text{ mm}$ , Nos < 20% joints	Install Signs to warn Traffic	
			3	$h = 30 - 50 \text{ mm}$	Within 7 days	
			4	$h > 50 \text{ mm}$ or $> 20\%$	Stabilize subgrade. Reinstate pavement at normal level if length < 20m.	
			5	$h > 100 \text{ mm}$	Within 30 days	
17	Bump	h = vertical displacement from normal profile	0	$h < 4 \text{ mm}$	No Action	Construction Limit for New Construction
			1	$h = 4 - 7 \text{ mm}$	Grind, in case of new construction Within 7 days	

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

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	$h = 7 - 15 \text{ mm}$	Grind, in case of ongoing Maintenance Within 15 days	Replace in case of new construction. Within 30 days
			5	$h > 15 \text{ mm}$	Full depth repair. Within 30 days	Full depth repair. Within 30 days
18	Lane to shoulder Dropoff	f = difference of level			<b>Short Term</b>	<b>Long Term</b>
			0	Nil, not discernible < 3 mm	No action	
			1	$f = 3 - 10 \text{ mm}$	Spot repair of shoulder Within 7 days	
			2	$f = 10 - 25 \text{ mm}$		
			3	$f = 25 - 50 \text{ mm}$	Fill up shoulder	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch Within 30 days

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			4	$f = 50 - 75 \text{ mm}$	Within 7 days	
5	$f > 75 \text{ mm}$					
Drainage						
19	Pumping	Quatity of fines and water expelled through open joints and cracks nos	0 1 to 2 3 to 4	Not Discernible  Slight / occasional Nos < 10%  Appreciable / Frequent 10 – 25%	No Action  Repair cracks and joints without delays  Lift or jack Slab within 30 days	Inspect and repair sub-drainage at distressed sections and upstream
		Nos / 100m stretch	5	Abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and sub-base. Replace Slab  Within 30 days	

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

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	No discernible problem	No action	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days
			5	Ponding, accumulation of water observed	-do-	

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

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP: 84-2019, 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		IRC:SP:84-2019
		Design Speed, kmph	Desirable Minimum Sight Distance (m)	Safe Stopping Sight Distance (m)					
		100	360	180					

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		80	260	130			calming measures such as transverse bar marking, blinker s, etc. shall be applied during the period of rectification.		
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
	Day time Visibility	During expected life Service Time Cement Road - 130 mcd/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>			Bi-Annually	As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours  Cat-2 Defect – Within 2 months	IRC:35-2015
		Design Speed	(RL) Retro Reflectivity (mcd/m <sup>2</sup> /lux)						
			Initial (7 days)	Minimum Threshold level (TL)& warranty period required 2 years					
		Up to 65	200	80					
		65 -100	250	120					

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Above 100	350	150					
		<u>Initial and Minimum performance for Night Visibility under wet condition. (Retro Reflectivity):</u>							
		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	IRC:67-2012

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
						Gantry/Cantilever Sign boards	
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	Change of signboard	48 hours in case of Mandatory	IRC:67-2012
				signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.		Signs, Cautionary and Informatory Signs(Single and Dual post signs)  1 Month in case of Gantry/Cantilever Sign boards	
<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	IRC 86:1983
	Kerb Painting	<u>Functionality:</u> Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	IRC 35:2015
<b>Other Road Furniture</b>	Reflective Pavement Markers(Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2019 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2019 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:84-2019

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Traffic Safety Barriers	<u>Functionality</u> : Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2019, IRC:119-2015
	End Treatment of Traffic Safety Barriers	<u>Functionality</u> : Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2019, 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:84-2019
<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:84-2019
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2019



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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2019
<b>Trees and Plantation including median plantation</b>	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:84-2019
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2019
	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:84-2019
	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:84-2019
	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:84-2019

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

<b>Asset Type</b>	<b>Performance Parameter</b>	<b>Level of Service (LOS)</b>	<b>Frequency of Measurement</b>	<b>Testing Method</b>	<b>Recommended Remedial measures</b>	<b>Time limit for Rectification</b>	<b>Specifications and Standards</b>
<b>Rest Areas</b>	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
<b>Other Project Facilities and Approach roads</b>	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works	Daily	-	Rectification	15 days	IRC:SP:84-2019	

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
<b>Pipe/box/ slab culverts</b>	Free waterway/ unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15days 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: 351990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC : SP:40-1993 and IRC : SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and 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
		Cracks wider than 0.3 mm not more than 1m aggregate length					

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3sqm, 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 inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
<b>Bridge Super Structure</b>	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2019 and IRC SP: 40-1993.
	Rusted reinforcement	Not more than 0.25sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out	15 days	IRC:SP:40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50sq.m					

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Delamination	Not more than 0.50sq.m		Unit	the repairs to affected concrete portion with epoxy mortar / concrete.		
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999

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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 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint 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 specifications 2600 and IRC SP: 40-1993.

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

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 Specifications 2700.
<b>Bridge substructure</b>	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	30 days	IRC SP: 40-1993 and MORTH Specifications 2800.



**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
					substructure by grouting/guniting and micro concreting depending on type of defect noticed		
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH Specifications 2810 and IRC SP: 40199.

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana.**

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
<b>Bridge Foundations</b>	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and, visual inspection as per IRC:SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC:SP:40-1993, IRC:83-2014, MORTH specifications 2500
	Protection Works in good condition	Damaged of rough stone apron or bank, revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 401993 and IRC:SP:132004.

**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 5: Maintenance Criteria for Hill Roads**

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

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

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

**A. Flexible Pavement**

<b>Nature of Defect or deficiency</b>		<b>Time limit for repair/ rectification</b>
<b>(b) Granular earth shoulders, side slopes, drains and culverts</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) hours
(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)	Damage to road mark ups	7 (seven) days
<b>(d) Road lighting</b>		
(i)	Any major failure of the system	24 (twenty four) hours

(ii)	Faults and minor failures	8 (eight) hours
<b>(e) Trees and plantation</b>		
	<b>Nature of Defect or deficiency</b>	<b>Time limit for repair/ rectification</b>
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
<b>(f) Rest area</b>		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
<b>(g) [Toll Plaza]</b>		
<b>(h)</b>	<b>Other Project Facilities and Approach roads</b>	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours

(iii)	Malfunctioning of the mobile crane	4 (four) hours
<b>Bridges</b>		
<b>(a) Superstructure</b>		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
<b>(b) Foundations</b>		
	Nature of Defect or deficiency	Time limit for repair/ rectification
(i)	Scouring and/or cavitation	15 (fifteen) days
<b>(c) Piers, abutments, 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

**Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at km 221.050 on  
NH-65 (New NH-152) near Siwani town in the State of Haryana.**

(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
<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**

- (i) The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:
  - (a) Permission of the State Government for extraction of boulders from quarry;
  - (b) Permission of Village Panchayat and Pollution Control Board for installation of crushers;
  - (c) Licences for use of explosives;
  - (d) Permission of the State Government for drawing water from river/reservoir;
  - (e) Licences 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 Panchayat and Pollution Control Board for setting up asphalt plant;
  - (h) Permission of Village Panchayat and State Government for borrow earth; and
  - (i) Any other permits or clearances required under Applicable Laws.
- (ii) Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.



**Schedule – G**

*(See Clauses 7.1 and 19.2)*

**Annex-I**

*(See Clause  
7.1)*

**Form of Bank Guarantee**

**[Performance Security/Additional Performance Security]**

[DG (RD)&SS,

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

- (A) \_\_\_\_\_[name and address of contractor]  
(Hereinafter called the “**Contractor**”) and [name and address of the  
authority], (hereinafter called the “**Authority**”) have entered into an  
agreement (hereinafter called the “**Agreement**”) for the **Construction of  
LHS and its approaches in lieu of level crossing No. C-23/T-2 at km 221.050  
on NH-65 (New NH-152) in Siwani town in the State of Haryana**] on  
Engineering, Procurement and Construction (the “**EPC**”) basis, subject to  
and in accordance with the provisions of the Agreement
- (B) The Agreement requires the Contractor to furnish a Performance Security for  
due and faithful performance of its obligations, under and in accordance  
with the Agreement, during the {Construction Period/ Defects Liability  
Period and Maintenance Period} (as defined in the Agreement) in a sum of  
Rs..... cr. (Rupees  
..... crore) (the “**Guarantee Amount**”).
- (C) We, ..... through our branch at ..... (the “**Bank**”) have  
agreed to furnish this bank guarantee (*hereinafter called the “**Guarantee**”*)  
by way of Performance Security.

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and  
faithful performance of the Contractor’s obligations during the  
{Construction Period/ Defects Liability Period and Maintenance Period}  
under and in accordance with the Agreement, and agrees and undertakes to  
pay to the Authority, upon its mere first written demand, and without any

demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.
3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank

from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and  
The Bank shall be relieved from its liabilities hereunder.
8. The Guarantee shall cease to be in force and effect on \*\*\*\*\$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.
9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

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

\_\_\_\_\_

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

well as of issuing branch should be mentioned on the covering letter of issuing branch.

Annex – II

(Schedule - G)

(See Clause 19.2)

**Form for Guarantee for Advance Payment**

[DG(RD)&SS,

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

- (A) [name and address of contractor] (Hereinafter called the “**Contractor**”) has executed an agreement (hereinafter called the “**Agreement**”) with the [name and address of the authority], (hereinafter called the “**Authority**”) for the **Construction of LHS and its approaches in lieu of level crossing No. C-23/T-2 at km 221.050 on NH-65 (New NH-152) in Siwani town in the State of Haryana**] on Engineering, Procurement and Construction (the “**EPC**”) basis, subject to and in accordance with the provisions of the Agreement
- (B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing @*Bank Rate + 3%* advance payment (herein after called “**Advance Payment**”) equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs. ----- cr. (Rupees ----- crore) and the amount of this Guarantee is Rs. ----- cr. (Rupees ----- crore) (the “**Guarantee Amount**”)\$.
- (C) We, ..... through our branch at ..... (the “**Bank**”) have agreed to furnish this bank guarantee (*hereinafter called the “Guarantee*”) for the Guarantee Amount.

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid installment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the

§ The Guarantee Amount should be equivalent to 110% of the value of the applicable installment.

Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for 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 differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

- 2 In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
- 3 It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
- 4 The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to

the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

5. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.
6. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
7. The Guarantee shall cease to be in force and effect on \*\*\*\*. \$ Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.
8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
10. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

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 signing the guarantee.

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

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

\_\_\_\_\_



**Schedule - H**

(See Clauses 10.1 (iv) and 19.3)

**Contract Price Weightages**

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

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road works including culvert, widening and repair of culverts.	3.70%	<b>A- Widening and Strengthening of Existing Road</b>	
		(1) Earthwork up to top of the sub-grade	-
		(2) Sub-base Course	-
		(3) Non Bituminous Base Course	-
		(4) Bituminous base course	-
		(5) Wearing Coat	-
		(6) Culvert, Widening and repair of culverts	-
		<b>B-1 Reconstruction/ New 4-lane realignment/bypass (Flexible Pavement)</b>	
		(1) Earthwork up to top of the sub-grade	-
		(2) Sub-base Course	-
		(3) Non Bituminous Base Course	-
		(4) Bituminous base course	-
		(5) Wearing Coat	-
		<b>B-2 Reconstruction/ New 4-lane realignment/bypass (Rigid Pavement)</b>	
		(1) Earthwork up to top of the sub-grade	-
		(2) Sub-base Course	-
		(3) Dry Lean Concrete (DLC) Course	-
		(4) Pavement Quality Concrete(PQC) Course	-
		<b>C-1 Reconstruction/ New Service road (Flexible pavement)</b>	
		(1) Earthwork up to top of the sub-grade	-
		(2) Sub-base Course	-
		(3) Non Bituminous Base Course	-
		(4) Bituminous base course	-
		(5) Wearing Coat	-

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 sub-grade	5.48%
		(2) Sub-base Course	14.93%
		(3) Dry Lean Concrete (DLC) Course	16.62%
		(4) Pavement Quality Concrete (PQC) Course	62.97%
		(5) RCC Crash Barrier	-
		<b>D- Re-Construction and New culverts on existing road, realignments, bypasses</b>	
		Culvert (length< 6m)	-
Minor Bridges / Over passes/ Underpasses	0.00%	<b>A.1- Widening and Repair of Minor bridges (length &gt;6 m and &lt; 60 m)</b>	
		Minor bridges	-
		<b>A.2- New Minor bridges (length &gt;6 m and &lt; 60 m)</b>	
		<b>(1) Foundation + Substructure:</b> On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment /pier cap.	-
		<b>(2) Super-structure:</b> On completion of the super-structure in all respects including wearing coat, bearing, expansion joints, hand rails, crash barrier, road sign & marking, tests on completion etc. complete in all respect.	-
		<b>(3) Approaches:</b> On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect, tests on completion in all respect and fit for use	-
		<b>(4) Guide Bunds and River Training Works:</b> On completion of Guide Bunds and river training works complete in all respects	-
		<b>B.1- Widening and repairs of Underpasses /overpasses</b>	
		Underpasses/ Overpasses	-
		<b>B2-New Underpasses/Overpasses</b>	
		<b>(1) Foundation + Substructure:</b> On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment /pier cap.	-

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		<b>(2) Super-structure:</b> On completion of the super-structure in all respects including wearing coat, bearing, expansion joints, hand rails, crash barrier, road sign & marking, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass-rigid pavement including drainage facility complete in all respects as specified	-
		<b>(3) Approaches:</b> On completion of Retaining /Reinforced earth walls, Stone pitching, protection work in all respect and fit to use complete in All respect and fit for use	-
Major Bridges works/ Elevated sections / flyovers including viaducts, if any	89.04%	<b>A.1- Widening and Repair of Major bridges</b>	
		(1) Foundation	-
		(2) Sub-structure	-
		(3) Super-structure(including bearing)	-
		(4) Wearing Coat including expansion joints	-
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	-
		(6) Wing walls/ return walls upto top	-
		(7) Guide Bunds, River Training works etc.	-
		(8) Approaches (including Retaining walls, stone pitching and protection works)	-
		<b>A.2 -New Major bridges</b>	
		(1) Foundation	-
		(2) Sub-structure	-
		(3) Super-structure (including bearings)	-
		(4) Wearing Coat including expansion joints	-
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	-
		(6) Wing walls/ return walls	-
		(7) Guide Bunds, River Training works etc.	-
		(8) Approaches (including Retaining walls, stone pitching and protection works)	-

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		<b>B.1-Widening and repair of ROB/RUB</b>	
		(a) ROB	
		(b) RUB	
		(1) Foundation	
		(2) Sub-structure	
		(3) Super-structure (including bearings)	
		(4) Wearing Coat	
		(a) in case of ROB wearing coat including expansion joints complete in all respects as specified and	
		(b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	
		(6) Wing walls/return walls	
		(7) Approaches (including Retaining / Reinforced earth walls, stone pitching, protection works)	
		<b>B.2-New ROB/RUB/LHS</b>	
		(a) ROB	
		(b) RUB	
		(c) LHS	
		(1) Foundation/Dismantling	16.09%
		(2) Sub-structure	30.00%
		(3) Super-structure (including bearings)	12.31%
		4(a) in case of ROB wearing coat including expansion joints complete in all respects as specified and	-
		4(b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	-
		(5) Miscellaneous Items like imported Galvolume sheet & steel structure frame	14.30%
		(6) Wing walls/return walls	-
		(7) Approaches (including Retaining / Reinforced earth walls, stone pitching, protection works)	27.30%
		<b>C.1- Widening and repair of Elevated section/flyovers/Grade Separators</b>	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(1) Foundation	
		(2) Sub-structure	
		(3) Super-structure (including bearings)	
		(4) Wearing Coat including expansion Joints	
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	
		(6) Wing walls/ return walls	
		(7) (7) Approaches (including Retaining / Reinforced earth walls, stone pitching, protection works)	
		<b>C.2- New Elevated Section/Flyovers/Grade Separators</b>	
		(1) Foundation	
		(2) Sub-structure	
		(3) Super-structure (including bearings)	
		(4) Wearing Coat including expansion Joints	
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	
		(6) Wing walls/ return walls	
		(7) Approaches (including Retaining/ Reinforced earth walls, stone pitching, protection works)	
Electrical utilities and Public Health Utilities (water pipe lines and sewage lines)	0.00%	i) EHT Lines	
		ii) EHT Crossing	
		iii) HT/LT Line	
		iv)) HT/LT Crossing	
		iv) Water pipe line	
		v) Water pipeline crossings	
		vi) Sewage line	
		vii) Sewage line crossing	
Other works, Bus bays, Truck lay byes, Rest area, Protection works and other	7.26%	(i) Toll plaza	0
		(ii) Road side drains	0
		a. lined	0
		b. unlined	0
		(iii) Road signs, markings, km stones, safety devices,	3.14%
		(iv) Project Facilities	0

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(a) Diversion	0
		(b) Kerb	0
		(c) Earthen Shoulder	0
		(d) others such as Height gauge	30.11%
		(e) Rain water harvesting system	66.75%
		(f) Boundary wall	0
		(v) Road side Plantation	0
		(vi) Repair protection works other than approaches to the bridges, elevated sections/flyovers/grade separators and ROBs/RUBs.	0
		(vii) Safety and traffic management during construction	0

### 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 Road</b>		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on complete of a stage in a length of not less than 10 (ten) percent of the total length.
(1) Earthwork up to top of the sub-grade		
(2) Sub-base Course		
(3) Non Bituminous Base Course		
(4) Bituminous base course		
(5) Wearing Coat		Cost of ten completed culverts shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least five culverts.
(6) Culvert, Widening and repair of culverts		
<b>B-1 Reconstruction/New 4-lane realignment/bypass (Flexible Pavement)</b>		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 5(five) km length, whichever is less.
(1) Earthwork up to top of the sub-grade		

Stage of payment	Percentage - weightage	Payment Procedure
(2) Sub-base Course		
(3) Non Bituminous Base Course		
(4) Bituminous base course		
(5) Wearing Coat		
<b>B-2 Reconstruction/New 4-lane realignment/bypass (Rigid Pavement)</b>		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 5(five) km length, whichever is less.
(1) Earthwork up to top of the sub-grade		
(2) Sub-base Course		
(3) Dry Lean Concrete (DLC) Course		
(4) Pavement Quality Concrete(PQC) Course		
<b>C-1 Reconstruction/New Service road (Flexible pavement)</b>		
(1) Earthwork up to top of the sub-grade		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 5(five) km length, whichever is less.
(2) Sub-base Course		
(3) Non Bituminous Base Course		
(4) Bituminous Base Course		
(5) Wearing Coat		
<b>C-2 Reconstruction/New Service road (Rigid pavement)</b>		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 5(five) km length, whichever is less.
(1) Earthwork up to top of the sub-grade	5.48%	
(2) Sub-base Course	14.93%	
(3) Dry Lean Concrete (DLC) Course	16.62%	
(4) Pavement Quality Concrete (PQC) Course	62.97%	
(5) RCC Crash Barrier	-	
<b>D- Re-Construction and New culverts on existing road, realignments, bypasses</b>		Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts.
Culvert (length< 6m)		Payment shall be made on the completion of at least five culverts.

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

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

Where P= Contract Price

L = Total length in km

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

**Note:** The length affected due to law and order problems or litigation during execution including the length not handed over to the Contractor under clause 8.3 of this Contract Agreement 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.

(i) 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**

<b>Stage of Payment</b>	<b>Weightage</b>	<b>Payment Procedure</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
<b>A.1- Widening and repairs of Minor Bridges (length&gt;6m &amp;&lt;60)</b>		Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of widening & repair works of a minor bridge
<b>A.2- New Minor Bridges (length&gt;6m &amp; &lt;60m)</b>  <b>(1) Foundation + Substructure:</b> On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment / pier cap.		<b>Foundation + Sub Structure:</b> Cost of each minor bridge shall be determined on pro- rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation+ Substructure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation + Sub structure of each bridge subject to completion of atleast two foundation along with substructure upto abutment / pier cap level of each bridge . In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
<b>(2) Super-structure:</b> On completion of the super-structure in all respects including wearing coat, bearing, expansion joints, hand rails, crash barrier, road sign & marking, tests on completion etc. complete in all respect.		<b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub- clause.
<b>(3) Approaches:</b> On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use		<b>Approaches:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause.



<b>Stage of Payment</b>	<b>Weightage</b>	<b>Payment Procedure</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
<b>(4) Guide Bunds and River Training Works:</b> On completion of Guide Bunds and river training works complete in all respects		<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
<b>B.1- Widening and repairs of underpasses/overpasses</b>		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>  <b>(1) Foundation + Substructure:</b> On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment /pier cap.		<b>Foundation:</b> Cost of each Underpass/ Overpass shall be determined on pro- rata basis with respect to the total linear length (m) of the Underpasses/Overpasses. Payment against foundation + sub structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation + sub structure of each Underpasses/ Overpasses subject to completion of atleast two foundation along with substructure upto abutment / pier cap level of each underpass/overpass . In case where load testing is required for foundation, the trigger of first payment shall include load testing
<b>(2) Super-structure:</b> On completion of the super-structure in all respects including wearing coat, bearing, expansion joints, hand rails, crash barrier, road sign & marking, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass-rigid pavement including drainage facility complete in all respects as specified		<b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
<b>(3) Approaches:</b> On completion of Retaining /Reinforced earth walls, Stone pitching, protection work in all respect and fit to use complete in All respect and fit for use		Payment shall be made on pro-rata basis on completion of a stage i.e. completion in all respects as specified

### **1.3.3 Major Bridges works, ROB/RUB and Structures**

Procedure for estimating the value of Major Bridge work, ROB/RUB and Structures shall be as stated in table 1.3.3:

Table 1.3.3

Stage of Payment	Weightage	Payment Procedure
(1)	(2)	(3)
<b>A.1- Widening and repairs of Major Bridges</b> (1) Foundation:		<b>Foundation:</b> Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of the major Bridge subject to atleast two foundation of the major bridge.  In case where load testing is required for foundation, the trigger of first payment shall
(2) Sub-structure		<b>Sub-structure:</b> Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of sub-structure of major bridge subject to atleast two substructure of abutment /pier upto abutment / pier cap level of the major bridge.
(3) Super-structure (including Bearing)		<b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.
(4) Wearing Coat including expansion joints		<b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.		<b>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.
(6) Wing walls/return walls		<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.

Stage of Payment	Weightage	Payment Procedure
(7) Guide bunds, River Training works etc.		<b>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.
(8) Approaches (including Retaining walls, stone pitching and protection works)		<b>Approaches:</b> Payments shall be made on pro rata basis on completion of 10% of the scope of each stage.
<b>A.2- New Major Bridges</b> (1) Foundation.		<b>Foundation:</b> Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of the major Bridge subject to atleast two foundation of the major bridge. In case where load testing is required for foundation, the trigger of first payment shall
(2) Sub-structure: On completion of abutments, piers upto the abutment/ pier cap		<b>Sub-structure:</b> Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of major bridge subject to atleast two substructure of abutment /pier upto abutment / pier cap level of the major bridge
(3) Super-structure:		<b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of atleast one span in all respects as specified.
(4) Wearing Coat including expansion joints		<b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.		<b>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.
(6) Wing walls/return walls upto top		<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as

Stage of Payment	Weightage	Payment Procedure
(7) Guide bunds, River Training works etc.		<b>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.
(8) Approaches (including Retaining walls, stone pitching and protection works)		<b>Approaches:</b> Payments shall be made on pro rata basis on completion of both approaches including stone pitching, protection works etc. complete in all respects as specified.
<b>B.1- Widening and repairs of (a) ROB (b)RUB</b>		<b>Foundation:</b> Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB subject to atleast two foundation of the ROB/RUB.  In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(1) Foundation		
(2) Sub-structure		<b>Sub-structure:</b> Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of ROB/RUB subject to atleast two substructure of abutment /pier upto abutment / pier cap level of the ROB/RUB.
(3) Super-structure (including bearing)		<b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of atleast one span in all respects as specified.
(4)Wearing Coat including expansion joints in case of ROB. In case of RUB-rigid pavement under RUB including drainage facility as specified		<b>Wearing Coat:</b> Payment shall be made on completion (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.

Stage of Payment	Weightage	Payment Procedure
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.		<b>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.
(6) Wing walls/return walls		<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as
(7) Approaches (including Retaining / Reinforced earth walls, stone pitching, protection works)		Payment shall be made on pro-rata basis on completion of both approaches including stone pitching, protection work, etc. complete in all respect as specified.
<b>B.2- New ROB/ RUB/ LHS</b> (1) Foundation	16.09%	<b>Foundation:</b> Cost of each ROB/RUB/LHS shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB/LHS. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB/LHS subject to atleast two foundation of the ROB/RUB/LHS. In case where load testing is required for foundation, the trigger of first payment shall
(2) Sub-structure	30.00%	<b>Sub-structure:</b> Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of sub- structure of ROB/RUB/LHS subject to atleast two substructure of abutment /pier upto abutment / pier cap level of the ROB/RUB/LHS.
(3) Super-structure	12.31%	<b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of atleast one span in all respects as specified.
(4) Miscellaneous Items like imported Galvalume sheet & Steel Structure Frame	14.30%	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like imported Galvalume sheet & Steel Structure Frame Hand rail, Crash barrier,
(5) Wing walls/return walls	-	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as

Stage of Payment	Weightage	Payment Procedure
(6) Approaches (including Retaining / Reinforced earth walls, stone pitching, protection works)	27.30%	Payment shall be made on pro-rata basis on completion of both approaches including stone pitching, protection work, etc. complete in all respect as specified.
<b>C.1- Widening and repairs of Elevated Section/ Flyovers/ Grade Separators</b>  (1) Foundation		<b>Foundation:</b> Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the structure subject to atleast two foundation of the structure.  In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure		<b>Sub-structure:</b> Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of sub- structure of structure subject to completion of atleast two sub-structure of abutment /pier upto abutment / pier cap level of the structure.
(3) Super-structure (including bearing)		<b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of atleast one span in all respects as specified.
(4) Wearing Coat including expansion joints		<b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.		<b>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.

Stage of Payment	Weightage	Payment Procedure
(6) Wing walls/return walls		<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining / Reinforced earth walls, stone pitching, protection works)		Payment shall be made on pro-rata basis on completion of both approaches including stone pitching, protection work, etc. complete in all respect as specified.
<b>C.2- New Elevated Section/ Flyovers/ Grade Separators</b>		
(1) Foundation		<p><b>Foundation:</b> Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the structure subject to atleast two foundation of the structure.</p> <p>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.</p>
(2) Sub-structure		<b>Sub-structure:</b> Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure subject to completion of atleast two sub-structure of abutment /pier upto abutment / pier cap level of the structure.
(3) Super-structure (including bearing)		<b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of atleast one span in all respects as specified.
(4) Wearing Coat including expansion joints		<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	Weightage	Payment Procedure
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.		<b>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.
(6) Wing walls/return walls		<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining / Reinforced earth walls, stone pitching, protection works)		Payment shall be made on pro-rata basis on completion of both approaches including stone pitching, protection work, etc. complete in all respect as specified.

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

(2) The Schedule for exclusive tunnel projects may be prepared as per site requirements before bidding with due approval of Competent Authority.

#### 1.3.4 Other Works &

##### Utility shifting

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

1.3.4:

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(1)	(2)	(3)
<b>Utility Shifting</b>		
<b>i) EHT Line</b>		Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rate basis as per its weightage with reference to total cost of EHT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of poles-20% (ii) Conductor stringing including laying of cable 30% (iii) DTR erection (if involved)-15% and (iv) charging of line including dismantling and site clearance -40% (with DTR and 50% without DTR)
<b>ii) EHT Crossing</b>		Cost of each crossing shall be determined on pro-rate basis with reference to total No. of crossing. Payment shall be made for not less than 25% of the crossing subject to a minimum of 4 crossings.
<b>iii) HT/LT Line (including transformers if any)</b>		Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rate basis as per its weightage with reference to total cost of LT/HT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of poles-20% (ii) Conductor stringing including laying of cable 30% (iii) DTR erection (if involved)-10% and (iv) charging of line including dismantling and site clearance -40% (with DTR and 50% without DTR)
<b>iv) HT/LT crossing</b>		Cost of each crossing shall be determined on pro-rate basis with reference to total No. of crossing. Payment shall be made for not less than 25% of the crossing subject to a minimum of 10 crossings

<b>v) Water pipeline</b>		Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rate basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (the average weightage of major activities (only for payment) purpose) in shifting work is laying of pipe-50% , charging of line including all miscellaneous works and dismantling and site clearance-50%
<b>vi) water pipeline crossing</b>		Cost of each crossing shall be determined on pro-rate basis with reference to total No. of crossing. Payment shall be made for not less than 25% of the crossing subject to a minimum of 8 crossings
<b>vii)Sewage line</b>		Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rate basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (the average weightage of major in shifting work is laying of pipe-50% , charging of line including all miscellaneous works and dismantling and site clearance-50%
<b>viii) Sewage line crossing</b>		Cost of each crossing shall be determined on pro-rate basis with reference to total No. of crossing. Payment shall be made for completed activity. (The average weightage of major activities in shifting work is laying pipe -50% Charging of line including all miscellaneous works and dismantling and site clearance-50%
<b>Other works, Bus bays, Truck lay byes, Rest area, Protection works and other</b>		
<b>(1) Toll Plaza</b>		Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plaza.
<b>(2) Road side drains</b>		Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a
<b>Lined Drain</b>		

Unlined Drain		length of not less than 10% (ten per cent) of the total length.
(3) Road signs, marking, safety Devices, Road Furnitures etc.	3.14%	
(4) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Diversion		
b) Kerb		
c) Earthen Shoulder		
c) Other (height gauge)	30.11%	
E) Rain water Harvesting System	66.75%	
f) Boundary Wall		
(5) Road side Plantation		Unit of measurement is linear Length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(6) Repair of Protection Works other than approaches to the bridges, elevated sections/ flyover/ grade separators and ROBs/ RUBs		
(7) Safety and traffic management during construction		Payment shall be made on prorated basis every six months.

## **2. Procedure for payment for Maintenance**

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

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

**Schedule - I**

*(See Clause 10.2 (iv))*

**Drawings**

**1. Drawings**

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

**2. Additional Drawings**

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

**Annex – I**

*(Schedule - I)*

**List of Drawings**

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

## Schedule - J

(See Clause 10.3  
(ii))

### Project Completion Schedule

#### 1. Project Completion Schedule

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

#### 2. Project Milestone-I

- (i) Project Milestone-I shall occur on the date falling on the 90<sup>th</sup> day **[25% 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 25% (twenty five per cent) of the Contract Price.

#### 3. Project Milestone-II

- (i) Project Milestone-II shall occur on the date falling on the 180<sup>th</sup> day **[50% 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 50% (Fifty 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 270<sup>th</sup> day **[75% 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 75% (seventy five 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] 365<sup>th</sup> day from the Appointed Date.
- (ii) On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

**6. Extension of time**

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



## **Schedule - K**

*(See Clause 12.1  
(ii))*

### **Tests on Completion**

#### **1. Schedule for Tests**

- (i) The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority's Engineer and the Authority of its intent to subject the Project Highway to Tests, and no later than 10 (ten) days prior to the actual date of Tests, furnish to the Authority's Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Works.
- (ii) The Contractor shall notify the Authority's Engineer of its readiness to subject the Project Highway to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Authority's Engineer shall, in consultation with the Contractor, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Authority's Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule-K.

#### **2. Tests**

- (i) Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [\*\*\*].
- (ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a Network Survey Vehicle (NSV) fitted with latest equipments and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometer.
- (iii) Tests for bridges: All major and minor bridges shall be subjected to the rebound hammer and ultrasonic pulse velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway Research Board on Nondestructive Testing Techniques, at two spots in every span, to be chosen at random by the Authority's Engineer. Bridges with a span of 15 (fifteen) metres or more shall also be subjected to load testing.

- (iv) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards, except tests as specified in clause 5, but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.
- (v) Environmental audit: The Authority's Engineer shall carry out a check to determine conformity of the Project Highway with the environmental requirements set forth in Applicable Laws and Applicable Permits.
- (vi) Safety Audit: The Authority's Engineer shall carry out, or cause to be carried out, a safety audit to determine conformity of the Project Highway with the safety requirements and Good Industry Practice.

**3. Agency for conducting Tests**

All Tests set forth in this Schedule-K shall be conducted by the Contractor 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 Contractor will carry out tests with following equipment at his own cost in the presence of contractor's representative.

S.No.	Key metrics of Asset	Equipment to be used	Frequency of condition survey
1	Surface defects of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
2	Roughness of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
3	Strength of pavement	Falling Weigh	At least once a year

S.No.	Key metrics of Asset	Equipment to be used	Frequency of condition survey
4	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey months defined for the state basis rainy season)
5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basis rainy season)

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

**Schedule - L**

*(See Clause  
12.2)*

**Completion Certificate**

- 1 I, ..... (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated ..... (the "**Agreement**"), for [construction of the \*\*\*\*section (km \*\* to km \*\*) of National Highway No. \*\*\*] (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through ..... (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.
- 2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the ..... day of ..... 20.... , Scheduled Completed Date for which was the ..... day of .....20....

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name)

(Designation)

(Address)

**Schedule - M**

*(See Clauses 14.6, 15.2 and 19.7)*

**Payment Reduction for Non-Compliance**

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

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

**2. Percentage reductions in lump sum payments on monthly basis**

- (i) The following percentages shall govern the payment reduction:

S.No	Item/Defect/Deficiency	Percentage
<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 cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, rain cuts, 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%

<b>S. No.</b>	<b>Item/Defect/Deficiency</b>	<b>Percentage</b>
(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/5 <sup>th</sup> 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	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
<b>(g)</b>	<b>Defects in Other Project Facilities</b>	5%

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

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

Where

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

M1= Monthly lump-sum payment in accordance para 1.2 above of this

Schedule M2= Monthly lump-sum payment in accordance para 1.2 above of

this Schedule L1= Non-complying length L = Total length of the road,

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

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

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

## **Schedule - N**

*(See Clause 18.1 (i))*

### **Selection of Authority's Engineer**

#### **1. Selection of Authority's Engineer**

- (i) The provisions of the Model Request for Proposal for Selection of Technical Consultants, issued by the Ministry of Finance in May 2009, or any substitute thereof shall apply for selection of an experienced firm to discharge the functions and duties of an Authority's Engineer.
- (ii) In the event of termination of the Technical Consultants appointed in accordance with the provisions of Paragraph 1.1, the Authority shall appoint another firm of Technical Consultants forthwith and may engage a government-owned entity in accordance with the provisions of Paragraph 3 of this Schedule-N.

#### **2. Terms of Reference**

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

#### **3. Appointment of Government entity as Authority's Engineer**

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

Annex – I

(Schedule -N)

**Terms of Reference for Authority's Engineer**

**1. Scope**

- (i) These Terms of Reference (the “**TOR**”) for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the “**Agreement**”), which has been entered into between the [name and address of the Authority] (the “**Authority**”) and  
..... (the “**Contractor**”)# for [Two-Laning] of the \*\*\*\* section (km \*\* to km \*\*) of National Highway No. \*\* in the State of \*\*\* on Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

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

**2. Definitions and interpretation**

- (i) The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.
- (ii) References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this TOR.
- (iii) The rules of interpretation stated in Article 1 of the Agreement shall apply, mutatis mutandis, to this TOR.

**3. General**

- (i) The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.
- (ii) The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:



- (a) any Time Extension;
  - (b) any additional cost to be paid by the Authority to the Contractor;
  - (c) the Termination Payment; or
  - (d) issuance of Completion Certificate or
  - (e) any other matter which is not specified in (a), (b), (c) or (d) above and which creates a financial liability on either Party.
- (iii) The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.
- (iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority's prior approval in accordance with the provisions of Clause 18.2.
- (v) The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.
- (vi) In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority's Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

#### **4. Construction Period**

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

- (ii) The Authority's Engineer shall review and approve any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.
- (iii) The Authority's Engineer shall review and approve the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty one) days stating the modifications, if any, required thereto.
- (iv) The Authority's Engineer shall complete the review and approve of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.
- (v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.
- (vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.
- (vii) The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.
- (viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.
- (ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

- (x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.
- (xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.
- (xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.
- (xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.
- (xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.
- (xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.
- (xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.
- (xvii) In the event that the Contractor carries out any remedial measures to secure

the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

- (xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

#### **5. Maintenance Period**

- (i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.
- (ii) The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.
- (iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.
- (iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.
- (v) The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause 14.5.

#### **6. Determination of costs and time**

- (i) The Authority's Engineer shall determine the costs, and/or their reasonableness,

that are required to be determined by it under the Agreement.

- (ii) The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.
- (iii) The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 18.5.

## **7. Payments**

- (i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2 (iv) (d).
- (ii) Authority's Engineer shall -
  - (a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and
  - (b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause 19.10.
- (iii) The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.
- (iv) The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

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

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

## **9. Miscellaneous**

- (i) A copy of all communications, comments, instructions, Drawings or Documents

sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.

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

## Schedule - O

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

### Forms of Payment Statements

#### 1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

#### 2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

- (a) the monthly payment admissible in accordance with the provisions of the Agreement;
- (b) the deductions for maintenance work not done;
- (c) net payment for maintenance due, (a) minus (b);
- (d) amounts reflecting adjustments in price under Clause 19.12; and
- (e) amount towards deduction of taxes

#### 3. Contractor's claim for Damages

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

**Schedule - P**

*(See Clause*

**20.1) Insurance**

**1. Insurance during Construction Period**

- (i) The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:
  - (a) insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] per cent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and
  - (b) Insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.
- (ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

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

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

**3. Insurance against injury to persons and damage to property**

- (i) The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount



stated below with no limit on the number of occurrences.

The insurance cover shall be not less than: Rs.

[\*\*\*\*\*]

- (ii) The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this Agreement excluding:
- (a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and
  - (b) damage which is an unavoidable result of the Contractor's obligations to execute the Works.

**4. Insurance to be in joint names**

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

### Schedule-Q

(See Clause 14.10)

#### Tests on Completion of Maintenance Period

**1. Riding Quality test:**

Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be [2,200 (two thousand and two hundred only)] mm for each 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  
**[Construction of LHS and its approaches in lieu of level crossing No.C-23/T-2 at  
km 221.050 on NH-65 (New NH-152) near Siwani town in the State of Haryana]**  
(the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis  
through ..... (Name of Contractor), hereby certify that the Tests on  
completion of Maintenance Period in accordance with Article 14 of the Agreement  
have been successfully undertaken to determine compliance of the Project Highway with  
the provisions of the Agreement and I hereby certify that the Authority has taken over  
the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's

Representative)

(Address)

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