SCHEDULE – A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

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

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

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

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

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

Annex I

(Schedule-A)

1. Site

1.1 The Site of the Two Lane Project Highway comprises the section of National Highway 29 (old NH-150) commencing from From existing km 76.320 (Near Mesulumi Village) to existing km 98.380 (near Chizami) i.e. Kohima – Manipur Border in the State of Nagaland. The Index Map is appended at the end of this **Schedule-A**.

The land, carriageway and structures comprising the site are described below

1.2 Chainage References (Existing Vs Design)

"Existing Chainage" means distance measured along existing roadway/vehicle pathway on the Project Highway. During topography survey, observations are made to these locations and after finalization of alignment by improving the existing geometry the chainage has been referred to "Design Chainage". The relationship between the "Existing Chainage" and the "Design Chainage" as per field surveys of the location for the "Project Highway" is given below:

S. No.	Existing (km)	Design Chainage
1	77	74891
2	78	75908
3	79	76921
4	80	77927
5	81	78915
6	83	80797
7	84	81804
8	85	82759
9	86	83759
10	88	84444
11	89	86691
12	90	87642
13	91	88544
14	92	89510
15	93	90470
16	94	91406
17	95	92376
18	96	93352
19	97	94346
20	98	95331

2. Land

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

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length in m (Design)	Existing/Available ROW (m)
	From	To	From	To		
1	76+320	98+380	74+200	95+700	21500	4-6 m

3. Carriageway

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

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length in m (Design)	Existing Lane Width* (m)	Remarks
	From	To	From	To			
1	76+320	98+380	74+200	95+700	21500	3.0 to 3.5	Lane width other than realignment portion

4. Major Bridges

The Site includes the following Medium Size Bridge:

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

5. Railway over-bridges (ROB)

The Site includes the following Railway Over Bridges

Sl. No.	Chainage (km)	Type of Structures			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Superstructure		
NIL						

6. Grade Separators

The Site includes the following Grade separators

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

7. Minor Bridges

The Site includes the following minor Bridges:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structures			No. of Spans with Span Length (m)	Total Width (m)
			Foundation	Sub-Structure	Super Structure		
1		81+100	Under Construction	Under Construction	Under Construction	1X33.5	Under Construction
2		91+410	Open	RCC Slab+Steel Girder	RCC	1x8	4.5

8. Railway level crossings / Railway Track

The Site includes the following railway level crossings:

Sl. No.	Road Segment	Existing Chainage (km)	Remarks
Nil			

9. Underpasses (vehicular, Non Vehicular)

The Site includes the following underpasses:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structure	No. of Spans with Span Length (m)	Width (m)
Nil					

10. Culverts

The Site includes 119 Nos. of culverts at the following locations and types:

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
1	76+383	Slab	1 x 3.0	7.50	Poor Condition
2	76+488	Pipe Arch	1 x 1.0	7.00	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
3	76+585	Pipe Arch	1 x 1.0	6.60	Poor Condition
4	76+758	Slab	1.500	7.30	Poor Condition
5	77+331	Slab	1 x 1.0	6.20	Fair Condition
6	77+423	Pipe Arch	1 x 1.0	-	Poor Condition
7	77+622	Pipe Arch	1 x 1.0	6.30	Poor Condition
8	78+154	Slab	1 x 1.5	8.80	Poor Condition
9	78+475	Pipe Arch	1 x 1.0	6.60	Poor Condition
10	78+698	Pipe Arch	1 x 1.5	8.70	Poor Condition
11	79+076	Pipe Arch	1 x 1.5	7.40	Poor Condition
12	79+293	Pipe Arch	1 x 1.0	6.60	Poor Condition
13	80+052	Pipe Arch	1 x 1.5	8.70	Poor Condition
14	80+139	Pipe Arch	1 x 1.5	7.40	Poor Condition
15	80+283	Slab	1 x 1.5	8.00	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
16	80+510	Pipe Arch	1 x 1.0	8.00	Poor Condition
17	80+601	Slab	1 x 1.5	8.00	Poor Condition
18	80+966	Slab	1 x 6.0	7.20	Poor Condition
19	81+205	Pipe Arch	1 x 1.0	8.00	Poor Condition
20	81+595	Slab	1 x 5.5	7.30	Poor Condition
21	81+767	Slab	1 x 2.0	6.10	Poor Condition
22	81+972	Pipe Arch	1 x 1.0	7.10	Poor Condition
23	82+193	Pipe	1 x 1.0	8.20	Poor Condition
24	82+531	Pipe Arch	1 x 1.0	9.50	Poor Condition
25	82+611	Pipe Arch	1 x 1.0	7.30	Poor Condition
26	82+718	Pipe Arch	1 x 1.0	7.40	Poor Condition
27	82+833	Pipe Arch	1 x 2.5	7.00	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
28	82+892	Pipe Arch	1 x 1.0	8.50	Poor Condition
29	82+927	Slab	1 x 1.5	9.50	Poor Condition
30	83+043	Pipe Arch	1 x 1.0	8.00	Poor Condition
31	83+259	Pipe Arch	1 x 1.0	7.10	Poor Condition
32	83+382	Pipe Arch	1 x 1.0	7.20	Poor Condition
33	83+474	Slab	1 x 1.5	9.50	Poor Condition
34	83+675	Pipe Arch	1 x 1.0	7.10	Poor Condition
35	83+757	Pipe Arch	1 x 1.0	7.20	Poor Condition
36	83+867	Pipe Arch	1 x 1.0	7.10	Poor Condition
37	83+924	Pipe Arch	1 x 1.0	7.20	Poor Condition
38	84+318	Pipe Arch	1 x 1.0	7.00	Poor Condition
39	84+437	Slab	1 x 1.5	8.10	Poor Condition
40	84+618	Pipe Arch	1 x 1.0	7.00	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
41	84+718	Pipe Arch	1 x 1.0	7.10	Poor Condition
42	84+780	Pipe Arch	1 x 1.0	7.10	Poor Condition
43	84+913	Pipe Arch	1 x 1.0	9.20	Poor Condition
44	84+973	Slab	1 x 1.5	7.20	Poor Condition
45	85+052	Pipe Arch	1 x 1.0	6.30	Poor Condition
46	85+082	Pipe Arch	1 x 1.0	11.10	Poor Condition
47	85+26	Pipe Arch	1 x 1.0	7.90	Poor Condition
48	85+283	Pipe Arch	1 x 1.0	7.90	Poor Condition
49	85+429	Pipe Arch	1 x 1.0	7.60	Poor Condition
50	85+475	Pipe Arch	1 x 1.0	7.20	Poor Condition
51	85+711	Slab	1 x 1.5	8.00	Poor Condition
52	85+777	Pipe Arch	1 x 1.0	6.00	Poor Condition
53	85+929	Pipe Arch	1 x 1.0	6.50	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
54	86+039	Pipe Arch	1 x 1.0	7.30	Poor Condition
55	86+150	Pipe Arch	1 x 1.0	8.50	Poor Condition
56	86+571	Pipe Arch	1 x 1.0	9.10	Poor Condition
57	86+747	Pipe Arch	1 x 1.0	10.80	Poor Condition
58	86+805	Pipe Arch	1 x 1.0	7.30	Poor Condition
59	86+931	Pipe Arch	1 x 1.0	10.70	Poor Condition
60	86+991	Pipe Arch	1 x 1.0	8.30	Poor Condition
61	87+107	Pipe Arch	1 x 1.0	8.10	Poor Condition
62	87+249	Pipe Arch	1 x 1.0	8.10	Poor Condition
63	87+331	Pipe Arch	1 x 1.0	8.10	Poor Condition
64	87+446	Pipe Arch	1 x 1.0	8.10	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
65	87+555	Slab	1 x 1.5	10.10	Poor Condition
66	87+821	Slab	1 x 1.5	7.60	Poor Condition
67	88+340	Pipe Arch	1 x 1.0	8.40	Poor Condition
68	88+485	Pipe Arch	1 x 1.0	6.70	Poor Condition
69	88+588	Pipe Arch	1 x 1.0	8.30	Poor Condition
70	88+699	Pipe Arch	1 x 1.0	8.10	Poor Condition
71	89+312	Pipe Arch	1 x 1.0	8.50	Poor Condition
72	89+522	Pipe Arch	1 x 1.0	10.90	Poor Condition
73	89+612	Pipe Arch	1 x 1.0	8.90	Poor Condition
74	89+635	Pipe Arch	1 x 1.0	8.90	Poor Condition
75	89+745	Slab	1 x 1.0	6.10	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
76	89+969	Slab	1 x 2.0	7.10	Poor Condition
77	90+041	Pipe Arch	1 x 1.0	8.30	Poor Condition
78	90+187	Pipe Arch	1 x 1.0	7.80	Poor Condition
79	90+269	Pipe Arch	1 x 1.0	7.60	Poor Condition
80	90+362	Pipe Arch	1 x 1.0	8.30	Poor Condition
81	90+615	Pipe Arch	1 x 1.0	7.50	Poor Condition
82	90+693	Pipe Arch	1 x 1.0	8.00	Poor Condition
83	90+882	Pipe Arch	1 x 1.0	9.30	Poor Condition
84	90+969	Pipe Arch	1 x 1.0	9.30	Poor Condition
85	91+334	Pipe Arch	1 x 1.0	6.50	Poor Condition
86	91+990	Pipe Arch	1 x 1.0	7.30	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
87	92+091	Pipe Arch	1 x 1.0	7.00	Poor Condition
88	92+146	Pipe Arch	1 x 1.0	7.00	Poor Condition
89	92+218	Pipe Arch	1 x 1.0	7.6	Poor Condition
90	92+512	Pipe Arch	1 x 1.0	7.6	Poor Condition
91	92+637	Pipe Arch	1 x 1.0	7.6	Poor Condition
92	92+922	Slab	1 x 3.0	7.2	Fair Condition
93	93+185	Pipe Arch	1 x 1.0	8.30	Poor Condition
94	93+205	Pipe Arch	1 x 1.0	6.60	Poor Condition
95	93+438	Pipe Arch	1 x 1.0	8.30	Poor Condition
96	93+849	Pipe Arch	1 x 1.0	6.60	Poor Condition
97	93+979	Pipe Arch	1 x 1.0	6.20	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
98	94+093	Pipe Arch	1 x 1.0	7.70	Poor Condition
99	94+219	Slab	1 x 1.5	7.30	Poor Condition
100	94+305	Slab	1 x 1.2	7.20	Poor Condition
101	94+503	Pipe Arch	1 x 1.0	6.70	Poor Condition
102	94+924	Pipe Arch	1 x 1.0	6.60	Poor Condition
103	95+047	Pipe Arch	1 x 1.0	8.00	Poor Condition
104	95+102	Slab	1 x 1.2	7.30	Poor Condition
105	95+392	Pipe Arch	1 x 1.0	7.00	Poor Condition
106	95+553	Pipe Arch	1 x 1.0	7.70	Poor Condition
107	95+603	Pipe Arch	1 x 1.0	5.40	Poor Condition
108	95+704	Pipe Arch	1 x 1.0	7.00	Poor Condition
109	95+784	Pipe Arch	1 x 1.0	6.40	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
110	96+131	Pipe Arch	1 x 1.0	5.40	Poor Condition
111	96+315	Pipe Arch	1 x 1.0	7.00	Poor Condition
112	96+518	Pipe Arch	1 x 1.0	6.40	Poor Condition
113	96+794	Slab	1 x 1.0	7.20	Poor Condition
114	97+104	Slab	1 x 2.0	7.00	Poor Condition
115	97+189	Slab	1 x 1.2	6.20	Poor Condition
116	97+859	Pipe Arch	1 x 1.0	6.20	Poor Condition
117	98+164	Pipe Arch	1 x 1.0	7.10	Poor Condition
118	98+221	Pipe Arch	1 x 1.0	6.00	Poor Condition
119	98+283	Pipe Arch	1 x 1.0	6.30	Poor Condition

11. Bus Shelters

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

Sl. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
NIL					

12. Truck Lay Bye

The details of truck lay byes on the Site are as follows:

Sl. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
NIL					

13. Road side drains.

The details of the road side drains on the Site are as follows:

Sl. No.	Existing Location		Side	Type	
	From (km)	To (km)		Masonry/CC (Pucca)	Earthen (Kutcha)
		nil			

14. Major Junctions

The details of major junctions are as follows:

Sl. No.	Location		At Grade	Separated	Category of Cross Roads			
	Existing km	Design km			NH	SH	MDR	Others
NIL								

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

15. Minor Junctions

The details of minor junctions are as follows:

S. No.	Existing (km)	Type	Leads Towards
1.	79.500	T	Meswumi Village
2.	79.931	T	Village
3.	80.990	T	Village
4.	85.400	T	Village
5.	86.374	T	Village
6.	87.700	+	Church Road/Village
7.	88.100	T	Play Ground

16. Bypasses

The details of bypass are as follows:

Sl. No.	Name of Proposed Bypass (Town)	Road Segment	Existing Chainage		Length (km)	Carriageway	
			From (km)	To (km)		Width m)	Type
NIL							

17. Other Structures/Details

The details of other structures are as follows:

Sl. No.	Type	Existing Chainage (km)	Length (m)	Width
Nil				

Annex-II
(Schedule-A)

Details for Providing Right of Way

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

Sl. No	Design Chainage		Length (Km)	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To			
1	74+200	95+700	21+500	20m - 24 m	90% working front of project highway shall be provided on appointed date .

Annex-III
(Schedule-A)

Alignment Plans

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

(i) The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL. In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.

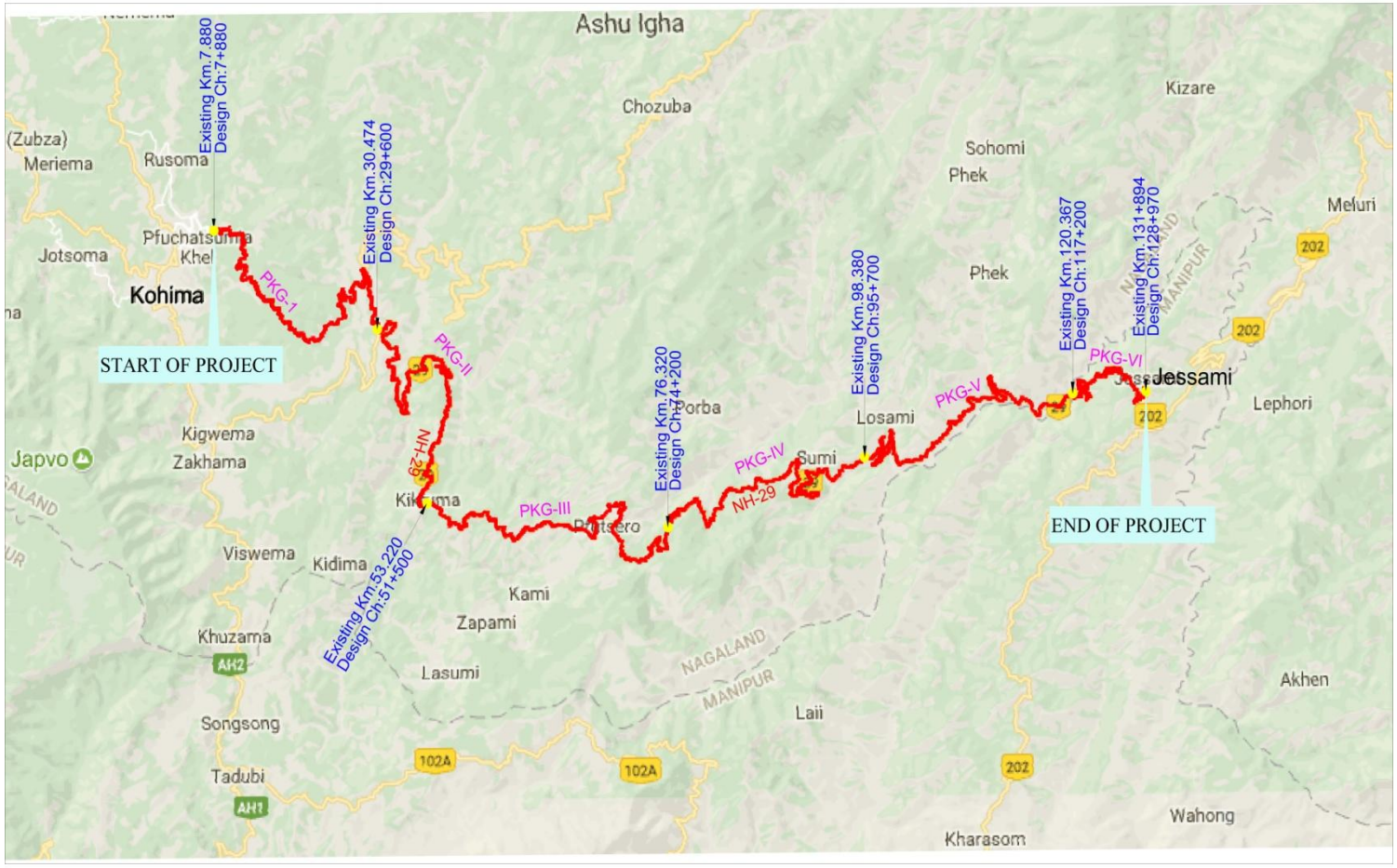
(ii) Traffic Signage plan of the Project Highway showing numbers & location of traffic signs is enclosed. The contractor shall, however, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per the relevant specifications/IRC Codes/Manual.

Annex-IV
(Schedule-A)

Environmental Clearances

Not applicable

INDEX MAP OF PROJECT HIGHWAY SECTION



SCHEDULE – B

(See Clause 2.1)

DEVELOPMENT OF THE PROJECT HIGHWAY

1 Development of the Project Highway

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

2 Rehabilitation and augmentation

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

3 Specifications and Standards

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

Annex I
(Schedule-B)

Description of Two Laning

The particulars specified in this Schedule – B are listed below as per the requirements of the Manual of Specifications and Standards for Two Laning of Highways (IRC SP:73-2018); referred to as the Manual. If any standards, specifications or details are not given in the Manual, the minimum design/construction requirements are specified in this Schedule or Schedule D.

1.0 SCOPE OF THE PROJECT

1.1 GENERAL

The following sections of this schedule briefly highlight the scope of the work of the 'Project'. The descriptions of the requirements for the various elements of the Project Highway given here in under are the bare minimum requirements for the 'Project'.

In the planning, design and execution of the works and other works in connection with the repair, maintenance or improvement of the Project Highway and functions associated with the construction of the Project Highway and roadside facilities, the Construction Contractor shall take all such actions and do all such things (including, but not limiting to, organizing itself, adopting measures and standards, executing procedures, including inspection procedures and highway patrol, and engaging and managing agents and employees) as will;

a. enable the NHIDCL to provide an acceptably safe highway in respect of its condition (structural safety) and use (road safety);

b. enable the NHIDCL to fulfill its statutory and common law obligations;

c. enable the NHIDCL to provide a congestion free uninterrupted flow of traffic on the Project Highway;

d. enable the NHIDCL to provide a level of highway service to the public not inferior to that provided on the trunk road during construction or improvement works;

e. enable the police, local authorities, and others with statutory duties or functions in relation to the Project Highway or adjoining roads to fulfill those duties and functions;

f. minimize the occurrence and adverse effects of accidents and ensure that all accidents and emergencies are responded to as quickly as possible;

g. minimize the risk of damage, destruction or disturbance to third party property;

h. ensure that members of the public are treated with all due courtesy and consideration;

i. provide a safe, clear and informative system of road signs;

j. comply with any specified programme requirements, including for the completion of the new road;

k. enable standards of reliability, durability, accessibility, maintainability, quality control and assurance, and fitness for purpose appropriate to a highway of the character of the Project Highway to be achieved throughout the Contract Period;

l. ensure adequate off-street parking facilities for both passenger and goods vehicles;

m. provide adequate bus bays for stopping of buses and bus shelters for commuters to wait under protection;

n. achieve a high standard in the appearance and aesthetic quality of the Project Highway and achieve integration of the Project Highway with the character of the surrounding landscape through both sensitive design and sensitive management of all visible elements including those on the existing road;

o. Undertake proper safety audit through an appropriate consultant (i.e. apart from the Authority Engineer)

p. Carry out accident recording and reporting (to NHIDCL) by type on regular basis; and

q. Ensure adequate safety of the Project Workers on the work site.

2.0 GEOMETRIC DESIGN AND GENERAL FEATURES

2.1.1 General

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

2.1.2 WIDENING OF THE EXISTING HIGHWAY

Notwithstanding the basic alignment plans enclosed with this document the Construction Contractor shall himself carryout and be responsible for engineering surveys, investigation and detailed engineering designs and prepare the working drawings for all the components relevant for the improvement and up-gradation of the Project Highway to fulfill the scope of the project as envisaged herein under. These shall comply with design specifications and standards given in **Schedule-D.** The designs for different project facilities shall follow the locations and indicative designs given in **Schedule-C** and shall comply with design specifications and standards outlined in **Schedule-D.** All the designs and drawings shall be reviewed by the Authority Engineer prior to execution.

The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex-III of Schedule-A. Geometric deficiencies, if any, in the existing

horizontal and vertical profiles shall be corrected as per the prescribed standards for [plain/rolling] terrain to the extent land is available.

2.1.3 Improvement of the existing road geometries

The hilly gradients shall be corrected in such a way so as to attain a limiting gradient of 6% in order to achieve longitudinal drainage. Also vertical curves shall be improved / introduced so that the vertical curves meet IRC: SP-73-2018 standards.

The horizontal alignment of the Project Highway shall be improved as per the standards set out in **Schedule-D.**

The improvement shall be done in consultation with the Authority Engineer / Project Company ensuring that the proposed improvements are accommodated within the land width available as far as practical otherwise action to acquire more land shall be resorted to through NHIDCL.

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

Locations where design speed is between 30 to 40 KMPH

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
74358.84	**30**	**30**	**Right**	**1.5**
74403.51	**30**	**30**	**Left**	**1.5**
74566.84	**55**	**30**	**Right**	**1.2**
74690.2	**70**	**30**	**Right**	**0.9**
74855.72	**80**	**30**	**Right**	**0.9**
74955.65	**100**	**35**	**Left**	**0.9**
75044.62	**60**	**30**	**Right**	**1.2**

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
75224.79	45	30	Right	1.2
75545	85	30	Left	0.9
75620.87	40	30	Right	1.5
75810.94	40	30	Left	1.5
75964.08	70	35	Right	0.9
76065.26	115	35	Left	0.6
76170.52	50	30	Right	1.2
76349.46	50	30	Right	1.2
76487.06	35	30	Right	1.5
76639.25	45	30	Left	1.2
77202.68	40	30	Right	1.5
77470.57	65	30	Right	0.9
77600.83	90	35	Left	0.9
77825.35	70	30	Left	0.9

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
77937.46	130	40	Right	0.6
78107.24	40	30	Left	1.5
78227.11	40	30	Left	1.5
78344.62	60	30	Left	1.2
78425.98	40	30	Left	1.5
78532.21	40	30	Left	1.5
78656.02	120	35	Right	0.6
78708.31	70	30	Left	0.9
79042.57	40	30	Right	1.5
79121.95	40	30	Left	1.5
79201.48	200	40	Right	0.6
79311.07	30	30	Right	1.5
79638.12	80	40	Right	0.9
79828.37	60	30	Left	1.2

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
79915.98	33	30	Right	1.5
80334.42	70	30	Left	0.9
80475.52	50	30	Right	1.2
80550.84	80	30	Right	0.9
80686.26	45	30	Left	1.2
81097.23	30	30	Left	1.5
81156.52	55	30	Right	1.2
81231.71	40	30	Right	1.5
81294.68	100	35	Left	0.9
81397.45	70	30	Right	0.9
81497.69	90	35	Left	0.9
81572.5	50	30	Right	1.2
81713.45	130	40	Left	0.6
81822.33	70	30	Left	0.9

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
81883.38	70	30	Right	0.9
81943.24	30	30	Left	1.5
82067.45	40	30	Right	1.5
82228.62	80	30	Right	0.9
82448.04	40	30	Left	1.5
82537.32	70	30	Right	0.9
82710.88	40	30	Right	1.5
82987.58	130	40	Right	0.6
83243.03	50	30	Left	1.2
83310.75	40	30	Right	1.5
83441.88	60	30	Right	1.2
83554.13	130	40	Left	0.6
83697.95	40	30	Left	1.5
83960.49	130	40	Left	0.6

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
84052.46	130	40	Right	0.6
84167	40	30	Right	1.5
84213.89	40	30	Left	1.5
84734.73	100	40	Left	0.9
84889.59	40	30	Right	1.5
85165.37	70	30	Left	0.9
85348.06	30	30	Right	1.5
85453.25	50	30	Left	1.2
85506.11	40	30	Right	1.5
85581.58	70	30	Left	0.9
85636.99	30	30	Right	1.5
85732.58	35	30	Right	1.5
85835.13	65	30	Left	0.9
85996.57	70	30	Right	0.9

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
86211.18	40	30	Left	1.5
86283.03	130	40	Left	0.6
86346.21	40	30	Right	1.5
86707.61	40	30	Right	1.5
86812.81	180	40	Left	0.6
86937.52	35	30	Right	1.5
87101.59	50	30	Right	1.2
87206.33	40	30	Left	1.5
87425.26	55	30	Right	1.2
87678.64	50	35	Left	1.2
87805.06	80	30	Left	0.9
87962.48	40	30	Left	1.5
88018.35	50	30	Right	1.2
88122.81	35	30	Right	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
88191.2	35	30	Left	1.5
88361.98	35	30	Right	1.5
88463.1	80	30	Left	0.9
88600.42	40	30	Left	1.5
88686.88	35	30	Right	1.5
88775.98	55	30	Left	1.2
89129.67	56	35	Right	1.2
89575.92	80	35	Left	0.9
89758.29	30	30	Right	1.5
90000.5	100	35	Left	0.9
90065.6	100	35	Right	0.9
90141.41	65	30	Left	0.9
90548.11	50	30	Right	1.2
90618.75	40	30	Left	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
90718.4	70	30	Right	0.9
90829.4	130	40	Left	0.6
91006.96	45	30	Right	1.2
91130.08	110	35	Left	0.6
91299.71	60	30	Left	1.2
91401.16	35	30	Left	1.5
91576.1	100	35	Right	0.9
91834.37	100	35	Left	0.9
91946.23	30	30	Left	1.5
92034.99	50	30	Right	1.2
92088.36	60	30	Right	1.2
92205.89	40	30	Left	1.5
92295.82	130	40	Left	0.6
92663.7	30	30	Right	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
92778.5	50	30	Left	1.2
92965	35	30	Left	1.5
93079.15	35	30	Right	1.5
93237.6	35	30	Right	1.5
93331.29	70	30	Left	0.9
93398.92	70	30	Right	0.9
93499.13	50	30	Left	1.2
93591.92	47	30	Right	1.2
93694.81	100	35	Left	0.9
93931.95	35	30	Right	1.5
94048.28	40	30	Left	1.5
94157.13	30	30	Left	1.5
94284.2	40	30	Right	1.5
94734.22	100	40	Right	0.9

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
94878.97	40	30	Left	1.5
94938.46	60	30	Right	1.2
95013.39	40	30	Left	1.5
95116.86	70	30	Left	0.9
95193.78	80	30	Left	0.9
95302.69	35	30	Right	1.5
95399.04	38	30	Right	1.5
95529.17	35	30	Left	1.5
95637.28	80	30	Right	0.9

Table 1–1: locations where design speed is less than 30 KMPH

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
74298.22	**23**	**20**	**Left**	**1.5**
75101.55	**15**	**20**	**Left**	**1.5**
75716.18	**15**	**20**	**Right**	**1.5**
78899.08	**21**	**20**	**Left**	**1.5**
79453.27	**20**	**20**	**Left**	**1.5**
80888.89	**20**	**20**	**Left**	**1.5**
80996.12	**15**	**20**	**Right**	**1.5**
82615.51	**15**	**20**	**Left**	**1.5**
83066.27	**20**	**20**	**Left**	**1.5**
83378.56	**20**	**20**	**Left**	**1.5**
84969.64	**20**	**20**	**Left**	**1.5**
85053.72	**20**	**20**	**Left**	**1.5**
85278.07	**20**	**20**	**Left**	**1.5**

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
85903.04	22	20	Right	1.5
86067.05	15	20	Left	1.5
86139.7	20	20	Right	1.5
87309.65	20	20	Left	1.5
90232.82	18	20	Left	1.5
90340.64	20	20	Right	1.5
90412.08	15	20	Left	1.5
91468.85	25	20	Right	1.5
91527.02	20	20	Left	1.5
92483.1	25	20	Right	1.5
94469.78	20	20	Left	1.5

2.2 Design speed

The design speed shall be as per IRC 73-2018 however in exceptional cases the minimum design speed of [30 km per hour for hilly and mountainous terrain and 20 km per hour for hair pin bend locations]. The Location of Hair Pin Bends have been shown in Plan & Profile Drawings.

2.3 Proposed Right of Way

Contractor has to design and construct the road, if required by provision of retaining walls and/or breast walls/slope stabilization/protection measures within the Right of Way given above and provision of the same shall not constitute a change of scope.

2.4 Type of Shoulders

a) In built-up sections, footpaths/fully paved shoulders shall be provided in accordance with para 2.10 of Annexure I of Schedule B above.

b) In open country, Hard Shoulder shall be provided with cementitious base as shown in typical cross-section given in para 2.10 of Annex-I of Schedule B.

(c) Earthen shoulder shall be covered with 150 mm thick compacted layer of granular material as shown in typical cross-section given in para 2.10 of Annex-I of Schedule B.

2.5 Width of Carriageway/Roadway width

2.5.1 Two-Laning with hard shoulders shall be undertaken. The carriageway shall be [7(seven) m] wide and hard shoulder in accordance with the typical cross sections drawings in the Manual.

2.5.2 Except as otherwise provided in this Agreement, the width of the hard shoulder carriageway and cross-sectional features shall conform to Section 2 of the manual.

2.6 Lateral and vertical clearances at underpasses

2.6.1 Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per paragraph 2.10 of the Manual.

2.6.2 Lateral Clearance:

The width of the opening at the underpasses shall be as follows:

Sl. No.	Location [Chainage (km)]		Span/Opening (m)	Remarks
	From	To		
Nil				

2.7 Lateral and vertical clearances at overpasses

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

2.7.2 *Lateral clearance*: The width of the opening at the overpasses shall be as follows:

Sl No.	Location [Chainage(km)]		Span/Opening (m)	Remarks
	From	To		

Sl No.	Location [Chainage(km)]		Span/Opening (m)	Remarks
	From	To		
Nil				

2.8 **Service roads**

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

Sl. No.	Location of Service Road (km)		Right Hand Side (RHS) / Left Hand Side (LHS) / Both Sides	Length (km) of Service Road
	From	To		
Nil				

2.9 Grade Separated Structures

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

Sl. No.	Location of Structure	Length (m)	Number and Length of Spans (m)	Approach Gradient	Remarks, if any
Nil					

2.9.2 In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows:

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

2.9.3 Cattle and pedestrian underpass / Overpass

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

Sl. No.	Location	Type of Crossing
Nil		

2.10 Typical cross-sections of the Project Highway

2 lanes Section: Cross-section has been developed on the basis of IRC:SP:-73: 2018. 7 / 7.5 m carriageway having lane width of 3.5m has been provided. The hard shoulder width of 0.9 m on both sides is provided. The earthen shoulder of 1m on valley side has been provided at locations where normal embankments slope are provided. Drain has been provided on hill side and parapet wall/ W- beam crash barrier are provided on valley side along with retaining wall

The cross section schedule shall be as follows:

Chaiange		Length	Description	TCS
From	To			
74200	75130	930	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
75130	75250	120	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
75250	75460	210	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
75460	75530	70	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
75530	75570	40	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
75570	75630	60	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
75630	75940	310	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
75940	75990	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
75990	76060	70	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
76060	76110	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
76110	76280	170	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
76280	76330	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
76330	76890	560	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
76890	76940	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
76940	77170	230	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
77170	77240	70	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
77240	77460	220	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3

Chaiange		Length	Description	TCS
From	To			
77460	77700	240	Typical Cross Section of 2- lane Widening in Built-up area	4
77700	78050	350	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
78050	78170	120	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
78170	78660	490	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
78660	78710	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
78710	79150	440	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
79150	79200	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
79200	80120	920	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
80120	80215	95	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
80215	80249	34	Typical cross section of Minor Bridge Retained	6
80249	80960	711	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
80960	81030	70	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
81030	81160	130	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
81160	81200	40	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
81200	81380	180	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
81380	81450	70	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
81450	82340	890	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
82340	82390	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2

Chaiange		Length	Description	TCS
From	To			
82390	82720	330	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
82720	82770	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
82770	82880	110	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
82880	83435	555	Typical Cross Section of 2- lane Widening in Built-up area	4
83435	83490	55	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
83490	83550	60	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
83550	83680	130	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
83680	83730	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
83730	83980	250	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
83980	84060	80	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
84060	84290	230	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
84290	84340	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
84340	85100	760	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
85100	86300	1200	Typical Cross Section of 2- lane Widening in Built-up area	4
86300	86440	140	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
86440	86480	40	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
86480	90231	3751	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
90231	90239	8	Re-Construction	6
90239	90290	51	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3

Chaiange		Length	Description	TCS
From	To			
90290	90400	110	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
90400	90780	380	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
90780	90870	90	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
90870	90930	60	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
90930	91000	70	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
91000	91840	840	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
91840	91930	90	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
91930	92200	270	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
92200	92250	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
92250	92360	110	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
92360	92400	40	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
92400	94010	1610	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
94010	94060	50	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
94060	94370	310	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3
94370	94440	70	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
94440	95700	1260	Typical Cross Section in Reconstruction of 2 lane with hard shoulder in rural areas	3

Note: The extent of cross section type is indicative and shall be reviewed in consultation with the Authority Engineer at the time of construction as per the site condition. Type I Cross section consist of two variants as I (a) without retaining wall on valley side and 1(b)

with retaining wall on valley side as detailed in figure B1 & B2 respectively. The locations please refer designed cross section @ 50 m interval detailed in Annexure III of Schedule A.

The alternative cross section of the Project Highway at the cross drainage structures shall follow the typical cross section in consultation with the Authority Engineer at the time of construction.

2.11 Longitudinal Section

As a minimum, the Construction Contractor shall achieve the proposed finished road level as indicated in the plan and profile drawings for this purpose in FFSR. However, the final finished road levels (FRL) will be finalized as per site conditions in consultation with NHIDCL.

2.12 Built-Up Areas

The alignment passes through Built up areas as tabulated below.

Sl. No.	Design Chainage (km)		Name of Village/town
	From	To	
1	77460	77700	Mesulumi
2	82880	83435	Enhulumi
3	85100	86300	Chizami

3.0 INTERSECTIONS AND GRADE SEPARATORS

All intersections shall be as per Section3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

There are no intersections with cross roads having bituminous surfacing. The cross roads fall into the category VRs. The Construction Contractor has to construct the following:

i) Typical junction treatments as specified in Final Project Report shall be applied. Design types of intersections are as given below:

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

(a) At-grade Intersections

(i) Major Intersections

Sl. No.	Location of Intersection	Intersection Towards	Existing Configurations				Type of Intersection	Figure No.	Other Features
			Location	Type	Width (m)	Surface			
NIL									

Details of junction improvement shall be as per IRC: SP:73-2018

(ii) Minor Intersections

S. No.	Existing (km)	Design Chainage	Type	Leads Towards
1	79.936	77+872	T	Village Road
2	80.943	78+871	Y	Village Road
3	83.562	81+400	T	Village Road
4	84.596	82+434	Y	Village Road
5	85.402	83+180	T	Village Road
6	85.415	83+200	T	Village Road BT
7	85.531	83+300	Y	Village Road
8	86.000	83+800	Y	Village Road
9	86.370	84+143	T	Village Road
10	86.431	84+200	Y	Village Road
11	86.965	84+715	Y	Village Road
12	87.185	84+926	Y	Village Road
13	87.185	84+926	Y	Road towards Church
14	87.547	85+277	T	Concrete Road towards Church
15	87.615	85+345	Y	Road towards School
16	87.812	85+532	T	Road towards Chizami Khuzhabe Netho
17	88.013	85+730	T	Concrete Road towards Chizami Khuzhabe Netho

Details of junction improvements shall be as per IRC SP: 73-2018.

(b) Grade Separated Intersections with/without Ramps

Sl No.	Location (km)	Salient Features	Minimum Length of Viaduct to be Provided (m)	Road to be Carried Over/Under the Structures
Nil				

4.0 ROAD EMBANKMENT AND CUT SECTION

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

4.2 Raising of the existing road

The existing road shall be raised in the following sections:

Sl No.	Section (km)		Length (km)	Extent of Raising*	Remarks
	From	To			
Nil					

5.0 PAVEMENT DESIGN

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

5.2 Type of pavement

Main carriageway of entire length of project highway including, realignment, reconstruction shall be constructed with Flexible pavement as per IRC: 37-2018.

5.3 Design requirements

Design requirement for the flexible pavement shall be in accordance with IRC: 37-2018. Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for minimum design traffic of 5 million standard axles BC & DBM and 20 million standard axles for granular base and sub-base courses. VG 40 grade of bitumen shall be used for BC and DBM layers. However, in no case the pavement thickness shall be less than as given below;;

Pavement Composition	Pavement Type	Thickness (mm)
BC	Flexible pavement with granular base and sub-base layers (Non Cementitious)	30
DBM		50
WMM		250
GSB		200

5.4 Reconstruction of stretches/ Realignment/ Bypass of Sections

5.4.1 Total Project Road shall be considered as full reconstruction as per IRC-37-2018 and Manual & Specifications.

5.4.3 Rigid Pavement

NIL

6.0 ROAD SIDE DRAINAGE

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

The longitudinal drain shall be provided as given below;

(i) Catch Water Drain – 19.505m
(ii) Open Drain – 19.505 m
(iii) Covered Drain – 1.995 m

Note: Above length of the Catch Water Drain/Open Drain/Covered Drain is indicative and minimum specified. The actual length of the Catch Water Drain/Open Drain/Covered Drain shall be determined by the Contractor in accordance with the IRC:SP:73 requirements with approval from the Authority's Engineer. Any increase in the length specified in this Clause of 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.

7.0 DESIGN OF STRUCTURES

7.1 General

7.1.1 The Project road from Mesulumi to Chezami from Km.74+200 to Km.95+700 (design chainages), includes provision of **129 box culverts.** All culverts and other structures shall be designed and constructed in accordance with section 7 of the Manual and shall conform to the cross-sectional features and other details specified therein. New culverts shall be constructed wide enough to accommodate the adjacent road cross section as given in this Schedule-B. The details of existing culverts are given in Schedule–A.

7.1.2 Width of the carriageway of new bridges and Structures shall be as per Clause 7.3 of the Manual.

7.1.3 All bridges shall be high-level bridges.

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

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

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

7.2 Culverts

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

7.2.2 **Reconstruction of existing culverts**

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

These are guidelines for minimum provisions. However, contractor has to design as per requirement of road in accordance with manual.

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposed Size (m)	Proposal
1	76+383	74+285	1x2x1.5	RCC Box
2	76+488	74+391	1x2x1.5	RCC Box
3	76+585	74+489	1x2x1.5	RCC Box
4	76+758	74+651	1x2x1.5	RCC Box
5	77+423	75+360	1x2x1.5	RCC Box
6	77+622	75+555	1x2x1.5	RCC Box
7	78+154	76+092	1x2x1.5	RCC Box
8	78+475	76+414	1x2x1.5	RCC Box
9	78+698	76+639	1x2x1.5	RCC Box
10	79+076	77+018	1x2x1.5	RCC Box
11	79+293	77+235	1x2x1.5	RCC Box
12	80+052	77+993	1x2x1.5	RCC Box
13	80+139	78+080	1x2x1.5	RCC Box
14	80+283	78+227	1x2x1.5	RCC Box
15	80+510	78+451	1x2x1.5	RCC Box
16	80+601	78+533	1x2x1.5	RCC Box
17	80+966	78+892	1x2x1.5	RCC Box
18	81+205	79+133	1x2x1.5	RCC Box
19	81+595	79+448	1x2x1.5	RCC Box
20	81+767	79+616	1x2x1.5	RCC Box
21	81+972	79+806	1x2x1.5	RCC Box
22	82+193	80+024	1x2x1.5	RCC Box
23	82+531	80+374	1x2x1.5	RCC Box
24	82+611	80+453	1x2x1.5	RCC Box
25	82+718	80+558	1x2x1.5	RCC Box
26	82+833	80+674	1x2x1.5	RCC Box
27	82+927	80+765	1x2x1.5	RCC Box
28	83+043	80+884	1x2x1.5	RCC Box
29	83+259	81+108	1x2x1.5	RCC Box
30	83+382	81+233	1x2x1.5	RCC Box
31	83+474	81+324	1x2x1.5	RCC Box
32	83+675	81+523	1x2x1.5	RCC Box
33	83+757	81+605	1x2x1.5	RCC Box
34	83+867	81+715	1x2x1.5	RCC Box
35	83+924	81+772	1x2x1.5	RCC Box
36	84+318	82+156	1x2x1.5	RCC Box
37	84+437	82+274	1x2x1.5	RCC Box
38	84+618	82+451	1x2x1.5	RCC Box
39	84+718	82+551	1x2x1.5	RCC Box

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposed Size (m)	Proposal
40	84+780	82+612	1x2x1.5	RCC Box
41	84+913	82+720	1x2x1.5	RCC Box
42	84+973	82+810	1x2x1.5	RCC Box
43	85+082	82+853	1x2x1.5	RCC Box
44	85+26	83+031	1x2x1.5	RCC Box
45	85+429	83+200	1x2x1.5	RCC Box
46	85+475	83+248	1x2x1.5	RCC Box
47	85+711	83+483	1x2x1.5	RCC Box
48	85+777	83+550	1x2x1.5	RCC Box
49	85+929	83+700	1x2x1.5	RCC Box
50	86+039	83+811	1x2x1.5	RCC Box
51	86+150	83+923	1x2x1.5	RCC Box
52	86+571	84+318	1x2x1.5	RCC Box
53	86+747	84+492	1x2x1.5	RCC Box
54	86+805	84+548	1x2x1.5	RCC Box
55	86+931	84+660	1x2x1.5	RCC Box
56	86+991	84+710	1x2x1.5	RCC Box
57	87+107	84+860	1x2x1.5	RCC Box
58	87+249	84+966	1x2x1.5	RCC Box
59	87+331	85+051	1x2x1.5	RCC Box
60	87+446	85+166	1x2x1.5	RCC Box
61	87+821	85+537	1x2x1.5	RCC Box
62	88+340	86+062	1x2x1.5	RCC Box
63	88+485	86+210	1x2x1.5	RCC Box
64	88+588	86+309	1x2x1.5	RCC Box
65	88+699	86+415	1x2x1.5	RCC Box
66	89+312	87+010	1x2x1.5	RCC Box
67	89+522	87+217	1x2x1.5	RCC Box
68	89+635	87+328	1x2x1.5	RCC Box
69	89+745	87+436	1x2x1.5	RCC Box
70	89+969	87+648	1x2x1.5	RCC Box
71	90+041	87+711	1x2x1.5	RCC Box
72	90+187	87+812	1x2x1.5	RCC Box
73	90+269	87+883	1x2x1.5	RCC Box
74	90+362	87+940	1x2x1.5	RCC Box
75	90+615	88+178	1x2x1.5	RCC Box
76	90+693	88+252	1x2x1.5	RCC Box
77	90+882	88+442	1x2x1.5	RCC Box
78	90+969	88+573	1x2x1.5	RCC Box

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposed Size (m)	Proposal
79	91+334	88+892	1x2x1.5	RCC Box
80	91+990	89+519	1x2x1.5	RCC Box
81	92+091	89+610	1x2x1.5	RCC Box
82	92+146	89+668	1x2x1.5	RCC Box
83	92+218	89+737	1x2x1.5	RCC Box
84	92+512	90+060	1x2x1.5	RCC Box
85	92+637	90+140	1x2x1.5	RCC Box
86	93+205	90+638	1x2x1.5	RCC Box
87	93+438	90+875	1x2x1.5	RCC Box
88	93+849	91+286	1x2x1.5	RCC Box
89	93+979	91+396	1x2x1.5	RCC Box
90	94+093	91+512	1x2x1.5	RCC Box
91	94+219	91+638	1x2x1.5	RCC Box
92	94+305	91+717	1x2x1.5	RCC Box
93	94+503	91+905	1x2x1.5	RCC Box
94	94+924	92+322	1x2x1.5	RCC Box
95	95+047	92+445	1x2x1.5	RCC Box
96	95+102	92+480	1x2x1.5	RCC Box
97	95+392	92+773	1x2x1.5	RCC Box
98	95+553	92+933	1x2x1.5	RCC Box
99	95+603	92+979	1x2x1.5	RCC Box
100	95+704	93+079	1x2x1.5	RCC Box
101	95+784	93+159	1x2x1.5	RCC Box
102	96+131	93+507	1x2x1.5	RCC Box
103	96+315	93+690	1x2x1.5	RCC Box
104	96+518	93+883	1x2x1.5	RCC Box
105	96+794	94+157	1x2x1.5	RCC Box
106	97+104	94+468	1x2x1.5	RCC Box
107	97+189	94+551	1x2x1.5	RCC Box
108	97+859	95+220	1x2x1.5	RCC Box
109	98+164	95+525	1x2x1.5	RCC Box
110	98+221	95+600	1x2x1.5	RCC Box
111	98+283	95+644	1x2x1.5	RCC Box

* All box culverts (excluding the box culverts in cushion) shall be provided with approach slabs on both sides. Moreover upstream and downstream protection works, including chute drains connecting stream with the culvert, catch pits; baffle piers/blocks etc. shall be provided which must be ascertained as per the site conditions and details given in drawings of culvert.

7.2.3 Additional new culverts shall be constructed as per particulars given in the table

below:

CULVERT DETAILS

Sl.No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Proposed Size (m)
1	-	74+950	Box	1x2x1.5
2	-	75+830	Box	1x2x1.5
3	-	76+500	Box	1x2x1.5
4	-	76+818	Box	1x2x1.5
5	-	77+472	Box	1x2x1.5
6	-	77+671	Box	1x2x1.5
7	-	79+270	Box	1x2x1.5
8	87+555	85+273	Box	1x2x1.5
9	-	85+917	Box	1x2x1.5
10	-	86+698	Box	1x2x1.5
11	-	89+250	Box	1x2x1.5
12	-	90+280	Box	1x2x1.5
13	-	92+140	Box	1x2x1.5
14	-	92+687	Box	1x2x1.5
15	-	94+283	Box	1x2x1.5
16	-	95+030	Box	1x2x1.5

* Existing chainages of proposed culverts along the realignment section have been left blank.

Widening of Culverts:

Sl.No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Proposed Size(m)
1	77+331	75+269	Box	1x1
2	92+922	90+404	Box	1x3x1

Culverts Under-Construction

Sl.No.	Existing Chainage (km)	Design Chainage (km)	Proposed Span (m)	Proposal
NIL				

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

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Proposed Span
NIL				

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

7.3 Bridges

7.3.1 The existing bridges to be reconstructed/widened

(i) The existing bridges at the following locations shall be reconstructed as new structures (Minor Bridge)

Sl No.	Existing Chainage (KM)	Design Chainage (KM)	Proposed Span(m)	Proposed Width(m)	Remarks
1	92.744	90+235	1x8	12	Reconstruction

7.3.2 The following structures shall be provided with footpaths:

Sl. No.	Location (km)	Remarks
NIL		

7.3.3 **Additional New Minor Bridges**

New minor bridges at the following locations on the project highways shall be constructed in Package as per manual

Sr. No.	Designed Chainage (km)	River/ Nallah Name	Proposed Span Arrangement (m)
NIL			

7.3.4 **Additional new Major bridges**

Sl. No.	Location Designed (km)	Total Length (m)	Remarks
NIL			

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

Sl. No.	Location (km)	Remarks
Nil		

7.3.6 Repairs/replacements of railings/parapets of the existing bridges shall be undertaken as follows:

Sl. No.	Location (km)	Remarks
Nil		

7.3.7 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.20 of the Manual

7.3.8 Structures in marine environment

7.4 Rail-road Bridges

7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual.

7.4.2 **Road over-bridges**

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

Sl No.	Location of Level Crossing (km)	Length of Bridge (m)
Nil		

7.4.3 **Road under-bridges**

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

Sl No.	Location of Level Crossing (km)	Number and Length of Span (m)
Nil		

7.5 Grade Separated Structures

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

7.6 Underpasses/Overpasses

There is no Underpass/Overpass proposed on the Project Highway.

7.7 Repairs and strengthening of bridges and structures

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

A. Bridges

Sl. No.	Location of Bridge (km)	Span Arrangement	Remarks
1	80+232	1x33.50 m	Bridge is under construction and proposed to be retained

B. ROB / RUB

Sl No.	Location of Bridge (km)	Nature and Extent of Repairs/Strengthening to be Carried out
Nil		

C. Overpasses / Underpasses and Other Structures

Sl No.	Location of Bridge (km)	Nature and Extent of Repairs/Strengthening to be Carried out
Nil		

7.8 List of Major Bridges and Structures

The following is the list of Major Bridges on Package

Sl No.	Location Design (km)	Total Length (m)	Remarks
NIL			

8.0 TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

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

8.2 Specifications of the reflective sheeting: shall be provided in accordance with IRC:SP:73-2018

8.3 The minimum quantity of Traffic signages and pavement marking are tabulated here for Package

Sr.No.	CAUTIONARY WARNING SIGNS	Numbers
1	One way Object Hazard Marker (OHM)	238
2	Stop Sign (R1-1)	
3	Give way Sign (R1-2)	
4	Series of Bands (W-42)	57
5	Left Curve (W-19L)	12
6	Right Curve (W-19R)	12
7	over Head Cables (W-27)	42
8	Left Hairpin Band (W-33L)	3
9	Right Hairpin Band (W-33R)	3
10	School Ahead (W-41)	2
11	Side Road Right (W-43)	
12	Side Road Left(W-44)	
13	T-Intersection (W-52)	
14	Y-Intersection (W-60L)	
15	Pedestrian Crossing (W-28)	1
Sr.No.	**SPEED LIMIT & VEHICLE CONTROL SIGN**	**Numbers**
12	Speed Limit Signs (R4-5B)	5
Sr.No.	**ROUTE MARKER SIGN**	**Numbers**
1	National Highway Route Sign (I8-1)	5
Sr.No.	**DIRECTION & PLACE IDENTIFICATION SIGNS**	**Numbers**
1	SP- 19(A)	
2	IA- 1A	
3	I1-3	10
4	SP- 19(C)	
	TOTAL	**390**

9.0 ROAD SIDE FURNITURE

9.1 Roadside furniture shall be provided in accordance with the provisions of Section 11of the Manual IRC: SP: 73-2018.

9.2 Overhead traffic signs: location and size

The overhead signs shall be the reflectorized type with high intensity retro-reflective sheeting conforming to ASTM D 4956-01, type VIII and /or type IX of micro prismatic type. The retro reflected sheets of Engineering Grade and high intensity grade (ordinary) shall not be used. The height, lateral clearance, location and instillation shall be as per relevant clauses of MoRTH specifications. Overhead sign shall be installed ahead of major intersections and urban areas as per detailed design requirements.

10.0 COMPULSORY AFFORESTATION

Minimum 3696 no. of trees are required to be planted by the contractor as

compensatory afforestation in accordance with IRC:SP:73 keeping in view IRC:SP:21-2009. Any increase in no. of trees shall not be treated as change of scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

11.0 HAZARDOUS LOCATIONS

i) Metal Beam crash barrier length of minimum 17540 (single runner, heavy duty and W-shape) shall be provided at the locations of bridge approaches and high embankments (3.0m and more), at sharp curves on both sides. Heavy duty metal beam crash barriers shall be provided on this project by the Construction Contractor at the locations finalized in consultation with NHIDCL. Typical details of metal crash barrier are given in as per manual.

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

W-Beam Crash Barrier

Sl No.	Design Chainage(m)		Length (m)
	From	To	
1	74200	75130	930
2	75250	75460	210
3	75530	75570	40
4	75630	75940	310
5	75990	76060	70
6	76110	76280	170
7	76330	76890	560
8	76940	77170	230
9	77240	77460	220
10	77700	78050	350
11	78170	78660	490
12	78710	79150	440
13	79200	80120	920
14	80215	80249	34

Sl No.	Design Chainage(m)		Length (m)
	From	To	
15	80249	80960	711
16	81030	81160	130
17	81200	81380	180
18	81450	82340	890
19	82390	82720	330
20	82770	82880	110
21	83435	83490	55
22	83550	83680	130
23	83730	83980	250
24	84060	84290	230
25	84340	85100	760
26	86300	86440	140
27	86480	90231	3751
28	90231	90239	8
29	90239	90290	51
30	90400	90780	380
31	90870	90930	60
32	91000	91840	840
33	91930	92200	270
34	92250	92360	110
35	92400	94010	1610
36	94060	94370	310
37	94440	95700	1260

Parapet wall

Sl No.	Design Chainage(m)	Length (m)

	From	To	
1	75130	75250	120
2	75460	75530	70
3	75570	75630	60
4	75940	75990	50
5	76060	76110	50
6	76280	76330	50
7	76890	76940	50
8	77170	77240	70
9	77460	77700	240
10	78050	78170	120
11	78660	78710	50
12	79150	79200	50
13	80120	80215	95
14	80960	81030	70
15	81160	81200	40
16	81380	81450	70
17	82340	82390	50
18	82720	82770	50
19	82880	83435	555
20	83490	83550	60
21	83680	83730	50
22	83980	84060	80
23	84290	84340	50
24	85100	86300	1200
25	86440	86480	40
26	90290	90400	110

Sl No.	Design Chainage(m)		Length (m)
	From	To	
27	90780	90870	90
28	90930	91000	70
29	91840	91930	90
30	92200	92250	50
31	92360	92400	40
32	94010	94060	50
33	94370	94440	70

The safety barriers, protective works shall also be provided at the hazardous location/lengths.

12.0 SPECIAL REQUIREMENT FOR HILL ROADS

In accordance with section 13 of the manual (from IRC: SP: 73-2018), IRC: SP-1998 and Recommended practices for Treatment of Embankment and Roadside slopes for Erosion control (First Revision), IRC: 56-2011 and relevant IRC codes.

12.1 Slope Protection

As the project involves cutting of existing hill slopes, it is imperative that slopes are stabilized for ensuring longevity of the slope and the road. Slope stability, erosion control and landslide correction shall be accomplished in accordance with IRC: SP: 48-1998. Reference may be drawn from IRC: 56-2011.

(i) The **minimum quantity** of protection work may be taken as below:

Type of Protection Work		
Protection Work	**Unit**	**Quantity**
Parapet Wall	Rm	3395
Breast wall with Stone/PCC/RCC	Rm	12610
RCC Retaining Wall (with application of Geo – synthetic)	Rm	2220
RE Wall with Geo – synthetic	Sqm	nil
Geo Synthetic Mat for Erosion Control, Soil Nailing & Fencing lengths	Sqm	nil
Seeding and Mulching with Polymer Net	Sqm	97525
Hydroseeding	Sqm	48762
Covered Drain	Rm	1995
Chute for Culvert		At Every Culvert Location
Soil Nailing to protect the slope	Sqm	39010

Note- *The Contractor shall be responsible for accurate assessment of the actual requirement as per site situation & prepare designs for slope protection & stabilization as per the specifications & standards stipulated in schedule 'D' and submit the same to the AE for review through the proof consultant and implement it accordingly thereafter.*

Any increase in quantity over and above the tentative qty. ***as mentioned in above table or through change in specifications will not be considered as change of scope****. Therefore contractor shall make thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features at his own before submission of bid.*

12.2 ROAD LAND BOUNDARY (Clause 12.2 IRC SP: 73 : 2018)

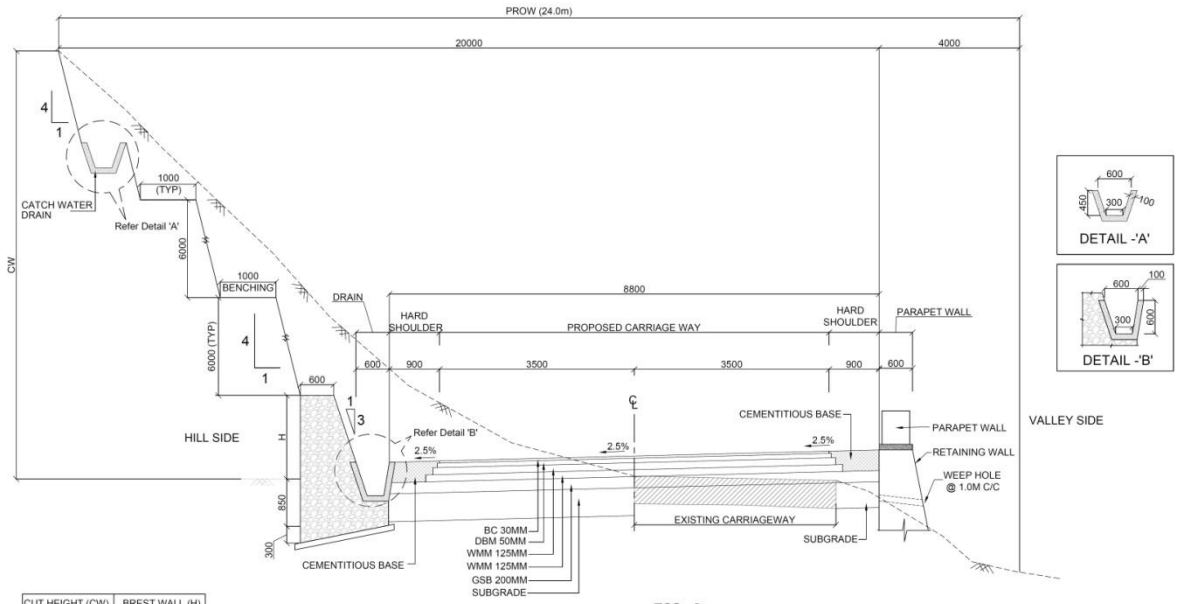
Road land (ROW) boundary shall be demarcated by putting RCC boundary pillars of size 60cm x 15cm x 15 cm embedded in concrete (as per IRC:25) along the Project Highway at 200 m interval on both sides. All the components used in delineating road land boundary shall be aesthetically pleasing, sturdy and vandal proof. The road land boundary shall be demarcated in consultation with NHIDCL.

12.3 Disposal of Debris: - As per Manual

13.0 CHANGE OF SCOPE

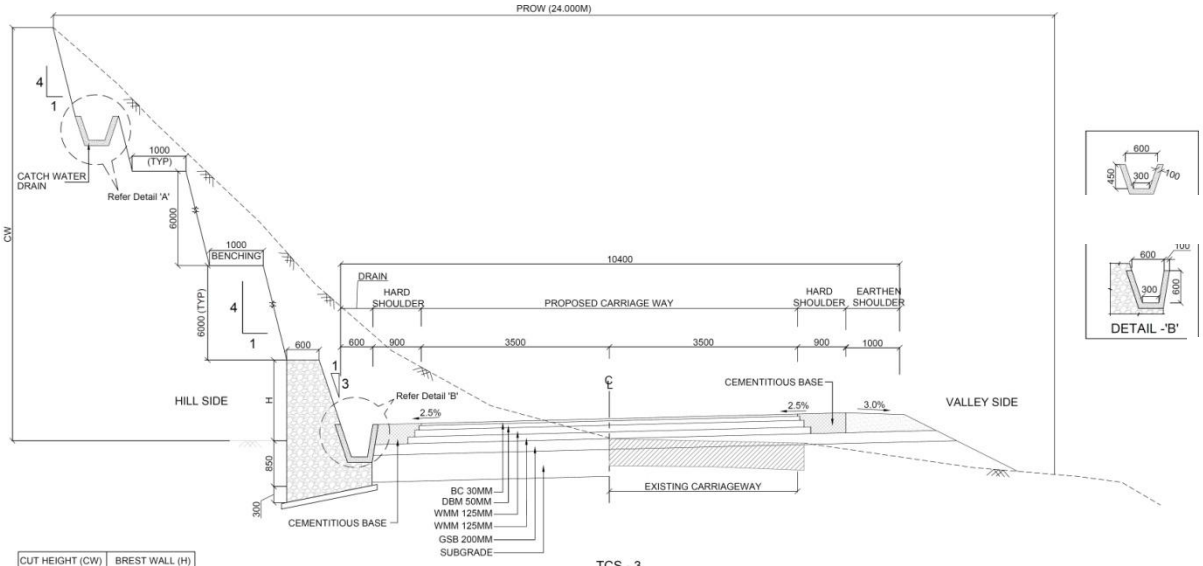
The size of Structures, bridges, culverts and slope protection works whatsoever in terms of retaining wall, breast wall, gabion wall, RE wall, chute drain, catch pit, baffle piers/blocks etc. under special requirement of hill slope specified hereinabove shall be treated as an approximate assessment. The actual lengths, heights and widths 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, heights and widths and specifications in this Schedule-B shall not constitute a Change of Scope, save and except any variations in the length, height and width arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

Typical Cross Section drawing



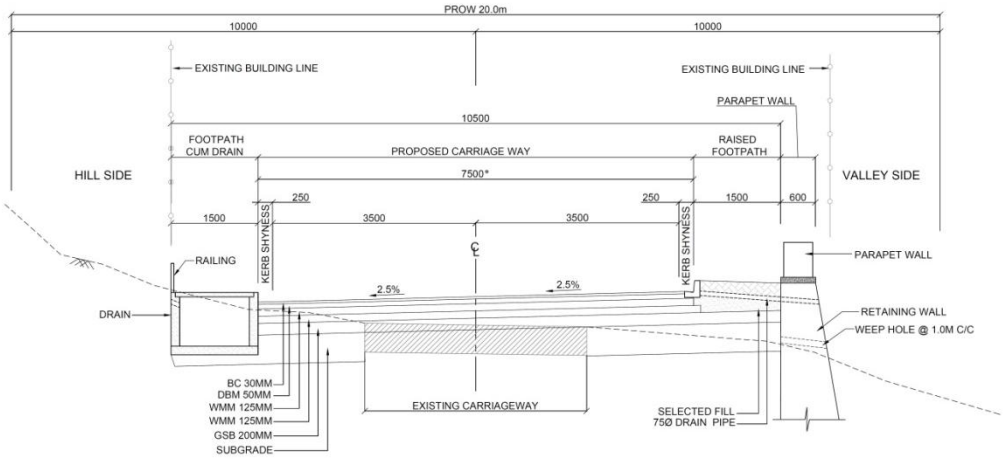
CUT HEIGHT (CW)	BREST WALL (H)
UPTO 3m	Nil
3m<CW<13.5m	1.5m
CW>13.5m	3.0m

TCS - 2
TYPICAL CROSS SECTION RECONSTRUCTION / WIDENING OF 2 LANE WITH HARD SHOULDER IN RURAL AREA
(WITH BREST WALL ON HILL SIDE AND RETAINING WALL ON VALLEY SIDE)



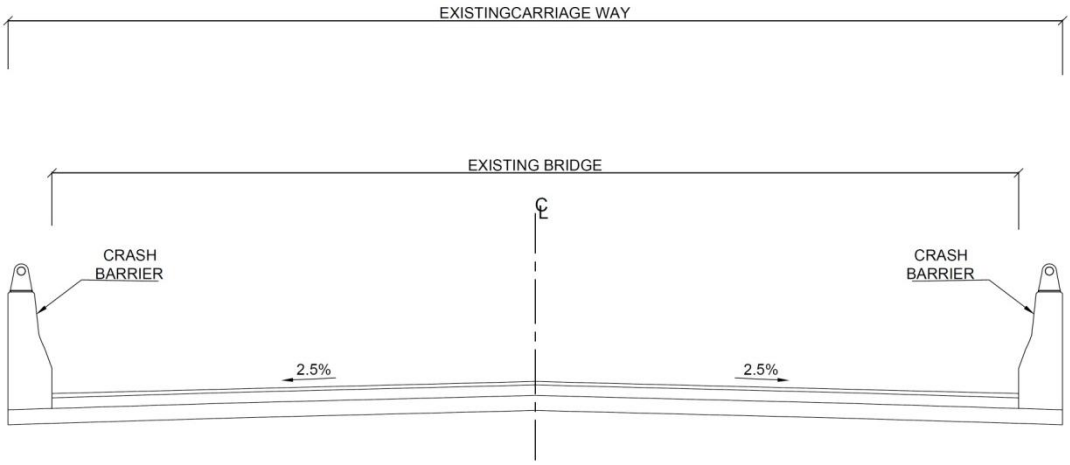
CUT HEIGHT (CW)	BREST WALL (H)
UPTO 3m	Nil
3m<CW<13.5m	1.5m
CW>13.5m	3.0m

TCS - 3
TYPICAL CROSS SECTION RECONSTRUCTION / WIDENING OF 2 LANE WITH HARD SHOULDER IN RURAL AREA
(WITH BREST WALL ON HILL SIDE AND NORMAL EMBANKMENT ON VALLEY SIDE)



TCS - 4

TYPICAL CROSS SECTION OF 2-LANE WIDENING IN BUILT-UP AREA (RECONSTRUCTION)



TCS - 6

TYPICAL CROSS SECTION OF MINOR BRIDGE (RETAINED)

SCHEDULE – C

(See Clause 2.1)

PROJECT FACILITIES

4 Project Facilities

This schedule indicates the minimum spatial and functional requirements of the facilities to be provided on the **Project Highway (Total length of 21.50 km)** with an aim to cater to the envisaged demand till the end of the concession period.

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

(a) Roadside furniture

(b) Pedestrian facilities

(c) Tree plantation

(d) Bus shelters

(e) Passing Places

(f) Truck lay byes and

(g) Others to be specified

5 Description of Project Facilities

Toll Plaza

NIL

Bus Shelters

To ensure orderly movement of the through traffic, bus shelters have been proposed outside the residential area, away from bridges, and high embankments and not too close to the road intersections. The bus stops have been proposed on one side of the road.

Bus shelters shall be provided on the Project Highway at 12 locations as mentioned herein under. Bus shelters shall be constructed as per Manual on both sides of the Project Highway. These bus shelters will also have passenger shelter.

Details of Bus shelters

S.No.	Chainage	SIDE

1	77+780	LHS
2	77+952	RHS
3	78+750	LHS
4	78+992	RHS
5	83+105	LHS
6	83+225	RHS
7	84+845	LHS
8	85+023	RHS
9	85+240	LHS
10	85+654	LHS
11	85+805	RHS
12	85+991	RHS

Pedestrian Facilities

Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with NHIDCL. This should include (a) minimum Zebra Crossing with flashing Beacon or (b) Zebra Crossing with separate pedestrian phase or (c) any other provision as approved by NHIDCL.

Landscaping and Tree Plantation

Landscape treatment of the Project Highway shall be undertaken through planting of trees and ground cover of appropriate varieties and landscaping on surplus land in the ROW. The Construction Contractor should plant at least 14652 nos. of trees of minimum 6 ft. height with tree guard made up of MS sections.

Plantation scheme shall be prepared in consultation with the Forest Department of the Government of Arunachal Pradesh, and the Independent Consultant/ NHIDCL.

Environment

The Project Highway during design, construction and maintenance during implementation period shall conform to the environmental rules and regulations in force. The Construction Contractor shall be responsible for the same.

SCHEDULE – D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1. Construction

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

2. Design Standards

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

Two Lane Manual (IRC: SP 73 – 2018) of Specifications and Standards for Two Laning published by IRC and Hill Road Manual IRC SP 48:1998

Annex – I
(Schedule – D)

Specifications and Standards for Construction

1 Specifications and Standards

All materials, works and construction operations shall confirm to the Two Lane Manual (IRC: SP 73 – 2018) of Specifications and Standards for Two Laning (IRC: SP: 73 – 2018), referred as the Two Lane Manual (IRC: SP: 73 – 2018), and MORTH Specifications for Road and Bridge Works, IRC: SP: 48-1998 and IRC 56-2011. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2 Deviations from the Specifications and Standards

2.1 The terms 'Concessionaire', 'Independent Engineer' and 'Concession Agreement' used in the Two Lane Manual (IRC: SP 73-2018) shall be deemed to be substituted by the terms **'Contractor', 'Authority's Engineer' and 'Agreement'** respectively.

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

S.No.	Clause	Provision as per Manual (IRC:SP:73-2018)	Modified Provision
1	2.16	Typical Cross-Sections	Typical Cross-Sections of the Project Highway shall be as specified in Annexure I of Schedule B
2	2.2	**Design Speed:** Ruling or minimum Design speed shall be followed	Design speed shall be 30 km/h for project highway excepting hair pin bend locations wherein design speed shall be 20 km/h. The same is mentioned in the Plan & Profile drawings given in **Annexure-III** of **Schedule A.**
3	2.7.2	**Roadway Width:** On horizontal curves with radius up to 300 m width of pavement and roadway shall be increased as per Table 2.4	On horizontal Curves with radius up to 300 m width of pavement and roadway shall be increased as per Plan & Profile drawings given in Annexure – III of Schedule A
4	2.9.4	**Radius of Horizontal Curves:**	Radius of Horizontal curves shall be as per the alignment plan shown in Plan & Profile drawings given in **Annexure-III** of **Schedule**

S.No.	Clause	Provision as per Manual (IRC:SP:73-2018)	Modified Provision
			A.
5	7.3	**Width of structures**	Width of the structures shall be as specified in Annexure I of Schedule B

Locations where design speed is between 30 to 40 KMPH

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
74358.84	**30**	**30**	**Right**	**1.5**
74403.51	**30**	**30**	**Left**	**1.5**
74566.84	**55**	**30**	**Right**	**1.2**
74690.2	**70**	**30**	**Right**	**0.9**
74855.72	**80**	**30**	**Right**	**0.9**
74955.65	**100**	**35**	**Left**	**0.9**
75044.62	**60**	**30**	**Right**	**1.2**
75224.79	**45**	**30**	**Right**	**1.2**
75545	**85**	**30**	**Left**	**0.9**
75620.87	**40**	**30**	**Right**	**1.5**

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
75810.94	40	30	Left	1.5
75964.08	70	35	Right	0.9
76065.26	115	35	Left	0.6
76170.52	50	30	Right	1.2
76349.46	50	30	Right	1.2
76487.06	35	30	Right	1.5
76639.25	45	30	Left	1.2
77202.68	40	30	Right	1.5
77470.57	65	30	Right	0.9
77600.83	90	35	Left	0.9
77825.35	70	30	Left	0.9
77937.46	130	40	Right	0.6
78107.24	40	30	Left	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
78227.11	40	30	Left	1.5
78344.62	60	30	Left	1.2
78425.98	40	30	Left	1.5
78532.21	40	30	Left	1.5
78656.02	120	35	Right	0.6
78708.31	70	30	Left	0.9
79042.57	40	30	Right	1.5
79121.95	40	30	Left	1.5
79201.48	200	40	Right	0.6
79311.07	30	30	Right	1.5
79638.12	80	40	Right	0.9
79828.37	60	30	Left	1.2
79915.98	33	30	Right	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
80334.42	70	30	Left	0.9
80475.52	50	30	Right	1.2
80550.84	80	30	Right	0.9
80686.26	45	30	Left	1.2
81097.23	30	30	Left	1.5
81156.52	55	30	Right	1.2
81231.71	40	30	Right	1.5
81294.68	100	35	Left	0.9
81397.45	70	30	Right	0.9
81497.69	90	35	Left	0.9
81572.5	50	30	Right	1.2
81713.45	130	40	Left	0.6
81822.33	70	30	Left	0.9

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
81883.38	70	30	Right	0.9
81943.24	30	30	Left	1.5
82067.45	40	30	Right	1.5
82228.62	80	30	Right	0.9
82448.04	40	30	Left	1.5
82537.32	70	30	Right	0.9
82710.88	40	30	Right	1.5
82987.58	130	40	Right	0.6
83243.03	50	30	Left	1.2
83310.75	40	30	Right	1.5
83441.88	60	30	Right	1.2
83554.13	130	40	Left	0.6
83697.95	40	30	Left	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
83960.49	130	40	Left	0.6
84052.46	130	40	Right	0.6
84167	40	30	Right	1.5
84213.89	40	30	Left	1.5
84734.73	100	40	Left	0.9
84889.59	40	30	Right	1.5
85165.37	70	30	Left	0.9
85348.06	30	30	Right	1.5
85453.25	50	30	Left	1.2
85506.11	40	30	Right	1.5
85581.58	70	30	Left	0.9
85636.99	30	30	Right	1.5
85732.58	35	30	Right	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
85835.13	65	30	Left	0.9
85996.57	70	30	Right	0.9
86211.18	40	30	Left	1.5
86283.03	130	40	Left	0.6
86346.21	40	30	Right	1.5
86707.61	40	30	Right	1.5
86812.81	180	40	Left	0.6
86937.52	35	30	Right	1.5
87101.59	50	30	Right	1.2
87206.33	40	30	Left	1.5
87425.26	55	30	Right	1.2
87678.64	50	35	Left	1.2
87805.06	80	30	Left	0.9

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
87962.48	40	30	Left	1.5
88018.35	50	30	Right	1.2
88122.81	35	30	Right	1.5
88191.2	35	30	Left	1.5
88361.98	35	30	Right	1.5
88463.1	80	30	Left	0.9
88600.42	40	30	Left	1.5
88686.88	35	30	Right	1.5
88775.98	55	30	Left	1.2
89129.67	56	35	Right	1.2
89575.92	80	35	Left	0.9
89758.29	30	30	Right	1.5
90000.5	100	35	Left	0.9

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
90065.6	100	35	Right	0.9
90141.41	65	30	Left	0.9
90548.11	50	30	Right	1.2
90618.75	40	30	Left	1.5
90718.4	70	30	Right	0.9
90829.4	130	40	Left	0.6
91006.96	45	30	Right	1.2
91130.08	110	35	Left	0.6
91299.71	60	30	Left	1.2
91401.16	35	30	Left	1.5
91576.1	100	35	Right	0.9
91834.37	100	35	Left	0.9
91946.23	30	30	Left	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
92034.99	50	30	Right	1.2
92088.36	60	30	Right	1.2
92205.89	40	30	Left	1.5
92295.82	130	40	Left	0.6
92663.7	30	30	Right	1.5
92778.5	50	30	Left	1.2
92965	35	30	Left	1.5
93079.15	35	30	Right	1.5
93237.6	35	30	Right	1.5
93331.29	70	30	Left	0.9
93398.92	70	30	Right	0.9
93499.13	50	30	Left	1.2
93591.92	47	30	Right	1.2

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
93694.81	100	35	Left	0.9
93931.95	35	30	Right	1.5
94048.28	40	30	Left	1.5
94157.13	30	30	Left	1.5
94284.2	40	30	Right	1.5
94734.22	100	40	Right	0.9
94878.97	40	30	Left	1.5
94938.46	60	30	Right	1.2
95013.39	40	30	Left	1.5
95116.86	70	30	Left	0.9
95193.78	80	30	Left	0.9
95302.69	35	30	Right	1.5
95399.04	38	30	Right	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
95529.17	35	30	Left	1.5
95637.28	80	30	Right	0.9

Table 1–2: locations where design speed is less than 30 KMPH

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
74298.22	23	20	Left	1.5
75101.55	15	20	Left	1.5
75716.18	15	20	Right	1.5
78899.08	21	20	Left	1.5
79453.27	20	20	Left	1.5
80888.89	20	20	Left	1.5
80996.12	15	20	Right	1.5
82615.51	15	20	Left	1.5
83066.27	20	20	Left	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
83378.56	20	20	Left	1.5
84969.64	20	20	Left	1.5
85053.72	20	20	Left	1.5
85278.07	20	20	Left	1.5
85903.04	22	20	Right	1.5
86067.05	15	20	Left	1.5
86139.7	20	20	Right	1.5
87309.65	20	20	Left	1.5
90232.82	18	20	Left	1.5
90340.64	20	20	Right	1.5
90412.08	15	20	Left	1.5
91468.85	25	20	Right	1.5
91527.02	20	20	Left	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
92483.1	25	20	Right	1.5
94469.78	20	20	Left	1.5

Schedule - E

(See Clauses 2.1 and 14.2)

1. Maintenance Requirements

1. Maintenance Requirements

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

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

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

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

repaired or rectified by the Contractor within the time limit specified by the Authority's Engineer.

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex – I

(Schedule-E) **Repair/rectification of Defects and deficiencies**

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

1.1.1 Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approache	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
s of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricte	Daily			7- 15 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
			d to 30 cm from the edge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure,	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83-2008

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
approaches of connecting roads, slip roads, lay byes etc. as applicable)		**Minimum SN**	**Traffic Speed (Km/h)**		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
Embankment/ Slope	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe	Daily			7-15 days	MORT&H Specification 408.4

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
			side slope					
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

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

2: **Maintenance Criteria for Rigid Pavements:**

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
CRACKING						
1	**Single Discrete Cracks Not intersecting with any joint**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if L > lm. Within 7days
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected. Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	
3	**Single Longitudinal Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > l m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15 days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications -

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
						See Para 5.6.4 Within 15 days
4	**Multiple Cracks intersecting with one or more joints**	**w = width of crack**	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken		

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
						slab as per norms and specifications within 30days
6	**Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w = width of crack L = length (m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m^2	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3 m/m^2		
			3	w > 1.5 mm and L < 3 m/m^2		
			4	w > 3 mm, L < 3 m/m^2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m^2 and deformation		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
Surface Defects						
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting.	
			4	r = 25 - 50 %		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
					Within 30 days	
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	**Scaling**	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			1	r < **2 %**	Local repair of areas damaged and liable to be damaged. Within 7days	
			2	r = 2 - 10 %		

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	**Popout (Small Hole), Pothole Refer Para 8.4**	n = number/m^2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m^2	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m^2		

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

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

			5	Severe; w > 3 mm negligible protection against ingress of water	Clean, widen and reseal the joint. Within 7 days	

				and trapping incompressible material.		
12	**Spalling of Joints**	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion.	
			2	w = 10 - 20 mm, L < 25%	Within 7 days	
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	**Faulting (or Stepping)**	f = difference of level	0	not discernible, < 1 mm	No action.	No action.

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

			3	h = 12 - 25 mm	within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstate pavement at normal level	

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

		displacement from normal profile	1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term** No action.	**Long Term**
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder	

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

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:

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="3">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th colspan="2">Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="5">Highway</td><td rowspan="5">Availability of Safe Sight Distance</td><td colspan="3">As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.</td><td rowspan="5">Monthly</td><td rowspan="5">Manual Measurements with Odometer along with video/ image backup</td><td colspan="3" rowspan="5">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.

In case of permanent structure or design deficiency:
Removal of obstruction/improvement of deficiency at the earliest
Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td rowspan="5">IRC:SP 84-2014</td></tr>
<tr><td>Design Speed, kmph</td><td>Desirable Minimum Sight Distance (m)</td><td>Safe Stopping Sight Distance (m)</td></tr>
<tr><td>100</td><td>360</td><td>180</td></tr>
<tr><td>80</td><td>260</td><td>130</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td colspan="3"><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
</table>

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td></td><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m²/lux
Bituminous Road - 100mcd/m²/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td>Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>
<table>
<tr><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m²/lux)</td></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<tr><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td>65 - 100</td><td>250</td><td>120</td></tr>
<tr><td>Above 100</td><td>350</td><td>150</td></tr>
</table>
<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u></td><td>Bi-Annually</td><td>As per Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Initial 7 days Retro reflectivity: 100 mcd/m²/lux Minimum Threshold Level: 50 mcd/m²/lux					
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	hange of ignboard	48 hours in case of Mandatory	RC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.		Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilever Sign boards	
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84-2014,

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pipe/box/slab culverts	Free waterway/ unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause 2800
		Delamination of concrete not more than 0.25 sq.m.					
		Cracks wider than 0.3 mm not more than 1m aggregate length					

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge -Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

	Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m					
	Delamination	Not more than 0.50 sq.m					
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.
	Deflection due to permanent loads and	Within design limits.	Once in every 10 years for spans more	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.

	live loads		than 40 m				
	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	No dust or debris in expansion joint	Monthly	Detailed condition survey as per IRC SP:35-1990 using	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specification s 2600 and

	expansion joint	gap.		Mobile Bridge Inspection Unit			IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
Bridge-substructure	Cracks/spalling of concrete/ rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.

	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2	IRC: SP 40-1993 and IRC:SP:13-2004.

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

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

Nature of Defect or deficiency		Time limit for repair/ rectification
(b)	**Granular earth shoulders, side slopes, drains and culverts**	
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban areas	24 (twenty four) hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Road side furniture including road sign and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro- reflectivity	48 (forty eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road lighting**	
(i)	Any major failure of the system	24 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e)	**Trees and plantation**	

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

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

Nature of Defect or deficiency		Time limit for repair/ rectification
(iii)	Snow requiring clearance	24 (twenty four) hours

[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

Schedule – F

(See Clause 4.1

(vii)(a)) **Applicable**

Permits

1. Applicable Permits

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

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

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

(c) Licence for use of explosives;

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

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

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

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

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

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

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

Schedule – G

(See Clauses 7.1 and 19.2)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

[MD, NHIDCL,

PTI Building] WHEREAS:

(A) _____[name and address of contractor] (hereinafter called the "**Contractor**") and [name and address of the authority], (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "**Agreement**") for the construction of the ***** section of [National Highway No. **] 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 right~~s 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 andthe Bank shall be relieved from its liabilities hereunder.

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

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

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

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

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

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

SI. No	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659

3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1st Parliament street, New Delhi-110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

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

Annex – II

(Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

[MD, NHIDCL,

PTI Building, 3rd Floor, 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 the ***** section of [National Highway No. **] on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

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

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

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

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

upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any 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 instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

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

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

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

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

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

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

12. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the details
below: -

SI. No	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi

5	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1st Parliament street, New Delhi-110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Schedule - H

(See Clauses10.1 (iv) and 19.3)

Contract Price Weightages

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

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

Item	Weightage in % of CP	Stage for Payment	Percentage Weightage
1	2	3	4
Road works including culverts, Widening and repair of culverts.	46.71%	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of the sub-grade	1.54%
		(3) Sub-Base Course	1.46%
		(4) Non-Bituminous Base course	1.71%
		(5) Bituminous Base course	1.05%
		(5) Wearing Coat	0.64%
		(7) Widening and repair of culverts	0.09%
		(7) Earthwork in shoulders	0.19%
		B.1- Reconstruction/New 2-lane realignment/bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	26.53%
		(3) Sub-Base Course	17.70%
		(4) Non-Bituminous Base course	17.60%
		(5) Bituminous Base course	10.83%
		(5) Wearing Coat	6.47%
		(6) Earthwork in shoulders	1.84%
		B.2- Reconstruction/New 2-lane realignment/bypass (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Earthwork in shoulders	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Concrete (PQC) Course	0.00%
		C.1- Reconstruction/New Service Road (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Earthwork in shoulders	0.00%
		(3) Sub-Base Course	0.00%

		(4) Non-Bituminous Base course	0.00%
		(5) Bituminous Base course	0.00%
		(6) Wearing Coat	0.00%
		C.2- Reconstruction/New Service Road (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-Base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Concrete (PQC) Course	0.00%
		D- Reconstruction and New Culverts on existing road, realignments, bypasses Culverts (Length < 6m)	12.35%
Minor Bridges, Underpasses, Overpasses,	0.30%	**A.1-Widening and repair of Minor Bridges (Length>6 m and <60 m)**	
		Minor Bridges	10.00%
		A.2-New Minor Bridges (Length>6 m and <60 m)	
		(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	33.33%
		(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to top	13.33%
		(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	23.33%
		(4) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect, tests on completion in all respect and fit for use	10.00%
		(5) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	6.67%
		(6) Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion in all respect.	3.34%
		B.1-Widening and Repair of Underpasses / Overpasses	
		Underpasses/Overpasses	0.00%
		B.2- New Underpasses /Overpasses	
		(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.00%
		(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to top	0.00%
		(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%

		(4) On completion of Retaining / Reinforced earth walls, complete in all respect and fit for use	0.00%
		(5) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, stone pitching, protection works, road signs & markings, tests on completion in all respect.	0.00%
		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	0.00%
Major Bridge (Length>60m)works and ROB/RUB, Elevated Sections, Flyovers including Viaducts, if any	0.00%	**A.1- Widening and repairs of Major Bridges**	
		(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.00%
		(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to top	0.00%
		(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%
		(4) Wearing Coat including expansion joints.	0.00%
		(5) Miscellaneous Items (like hand rails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Guide Bund, River Training works etc.	0.00%
		(8) approaches (including retaining walls, stone pitching and protection works)	0.00%
		A.2 – New Major Bridges:	
		(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.00%
		(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to top	0.00%
		(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%
		(4) Wearing Coat including expansion joints.	0.00%
		(5) Miscellaneous Items (like hand rails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Guide Bund, River Training works etc.	0.00%

		(8) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		B.1-Widening and repair of	
		(a) ROB	
		(b) RUB	
		(1) Foundations	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(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	0.00%
		(5) Miscellaneous Items (like hand rails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Retaining/Reinforced earth walls	0.00%
		(8) Approaches and Other Ancillary Works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.)	0.00%
		B.2- New ROB/RUB	
		1) Foundations	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(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.	0.00%
		(5) Miscellaneous Items (like hand rails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Retaining/Reinforced earth walls	0.00%
		(8) Approaches and Other Ancillary Works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.)	0.00%
		C.1-Widening and repair of Elevated sections/Flyover/Grade separators	
		1) Foundations	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing coat **including** expansion joints	0.00%

		(5) Miscellaneous Items (like hand rails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Retaining/Reinforced earth walls	0.00%
		(8) Approaches and Other Ancillary Works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.)	0.00%
		C.2-New Elevated section/ Flyovers/ Grade Separators.	
		(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.00%
		(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to top	0.00%
		(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings.	0.00%
		(4) Wearing coat (including expansion joints	0.00%
		(5) Miscellaneous Items (like hand rails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Retaining/Reinforced earth walls	0.00%
		(8) Approaches and Other Ancillary Works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.)	0.00%
Other works	52.99%	(1) Toll Plaza	0.00%
		(2) Road side drains	
		Lined Drain	0.00%
		Unlined Drain	0.00%
		Covered Drain	12.78%
		Catchpit Drain	0.42%
		(3) Road signs, safety Devices, Road Furniture etc.	0.55%
		(4) Road markings & Studs	2.49%
		(5) Crash Barrier	6.36%
		(6) Project facilities	0.00%
		(a) Bus Bays	0.09%
		(b) Wayside Amenities excluding Slip Roads & but including all internal roads (Service areas including Truck Lay-Byes)	0.00%
		(c) Toe wall	0.00%
		(7) RCC Retaining Wall	22.57%
		(8) Stone Masonry Breast wall	36.69%
		(9) Parapet Wall	0.96%
		(10) RE Wall	0.00%

		(11) Street Lighting	0.00%
		(12) Chequered Tiles	0.64%
		(13) Boundary Wall	0.00%
		(14) ATMS	0.00%
		(15) Rain Water Harvesting	0.00%
		(16) Road side Plantation including Horticulture in Wayside Amenities	0.00%
		(17) Protection Works other than approaches to the bridges, elevated sections/ flyover/ grade separators and ROBs/ RUBs	0.00%
		a) Hydroseeding	0.13%
		b) Mulching	3.30%
		c) Soil nailing for slope protection and copping	12.47%
		(18) Safety & Traffic Management during const.	0.00%
		(19) Other miscellaneous works including Connecting road & Junction under Grade separator	
		(20) Connecting Road Etc	0.00%
		Junction under Grade separator	0.23%
		(21) Site clearance and Dismantling	0.32%
		(22) Maintenance of Road	0.00%

Procedure of estimating the value of work done

(i) Road works

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

Table 1.3.1

Stage of Payment	Percentage - Weightage	Payment Procedure
1	**2**	**3**
A-Widening and strengthening of Existing Road		
(1) Earthwork up to top of the sub-grade	0.72%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (Five) percent of the total length.
(3) Sub-Base Course	0.68%	
(4) Non-Bituminous Base course	0.80%	
(5) Bituminous Base course	0.49%	
(5) Wearing Coat	0.30%	
(7) Widening and repair of culverts	0.04%	
(7) Earthwork in shoulders	0.09%	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 5 culverts.
B.1- Reconstruction/New 8-lane realignment/bypass (Flexible Pavement)		
(1) Earthwork up to top of the sub-grade	12.39%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (Five) percent of the total length.
(3) Sub-Base Course	8.27%	
(4) Non-Bituminous Base course	8.22%	
(5) Bituminous Base course	5.06%	
(5) Wearing Coat	3.02%	
(6) Earthwork in shoulders	0.86%	
B.2- Reconstruction/New 8-lane realignment/bypass (Rigid Pavement)		
(1) Earthwork up to top of the sub-grade	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (Five) percent of the total length.
(2) Sub-Base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	

(4) Pavement Quality Concrete (PQC) Course	0.00%	
C.1- Reconstruction/New Service Road (Flexible Pavement)		
(1) Earthwork up to top of the sub-grade	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (Five) percent of the total length.
(2) Earthwork in shoulders	0.00%	
(3) Sub-Base Course	0.00%	
(4) Non-Bituminous Base Course	0.00%	
(5) Bituminous Base Course	0.00%	
(6) Wearing Coat	0.00%	
C.2- Reconstruction/New Service Road (Rigid Pavement)		
(1) Earthwork up to top of the sub-grade	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (Five) percent of the total length.
(2) Sub-Base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Concrete (PQC) Course	0.00%	
D- Reconstruction and New Culverts on existing road, realignments, bypasses:		
(1) Culverts (Length < 6m)	5.77%	Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least five culverts.

@ For calculation of payment stage for main-carriageway the project length shall be converted into equivalent 2 lane length. For example, if the total length of 4 lane main carriageway is 100 km, then the equivalent length for calculation of payment stage will be 2 x 100 km. Now, 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 equivalent 2-Lane length in km as defined above

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

(ii) Minor Bridges and Underpasses/Overpasses

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

Table 1.3.2

Stage of Payment	Percentage - Weightage	Payment Procedure
1	**2**	**3**
A.1. Widening and Repair of minor bridges (length >6m and < 60m)	0.03%	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 and repair works of a minor bridge.
A.2.- New Minor bridges		
(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.10%	**Foundation:** 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 shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to top	0.04%	**Sub-structure**: Cost of each minor bridge shall be determined on pro- rata basis with respect to the total linear length (m) of the minor bridges. Payment against 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 each bridge.
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.07%	**Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub- clause. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above

(4) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use	0.03%	**Approaches**: 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.
(5) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	0.02%	**Guide Bunds and River Training Works:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training Works in all respects as specified
(6) Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion in all respect.	0.01%	**Other Ancillary Works**: Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
B.1. Widening and repair of underpasses/overpasses		
Underpasses/Overpasses	0.00%	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 and repair works of a underpass/overpass.
B.2. New Underpasses/Overpasses		
(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.00%	**Foundation:** 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 shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of each Underpasses/ Overpasses. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to top	0.00%	**Sub-structure:** Cost of each Underpass/ Overpass shall be determined on pro- rata basis with respect to the total linear length (m) of the Underpasses/ Overpasses. Payment against 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 each Underpasses/Overpasses.

(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%	**Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4) On completion of Retaining / Reinforced earth walls complete in all respect and fit for use	0.00%	Payments shall be made on pro rata basis on completion of 20% of the total area.
(5) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works, tests on completion in all respect.	0.00%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
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	0.00%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified

(iii) Major Bridge works, ROB/RUB and Structures

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

Table 1.3.3

Stage of Payment	Percentage - Weightage	Payment Procedure
1	2	3
A.1.- Widening and Repairs of Major Bridges		
(1) Foundation: On completion of the foundation work including foundations for return walls, abutments, piers.	0.00%	**Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length(m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap	0.00%	**Sub-structure:** Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of major bridge.
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, Bearings	0.00%	**Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4). Wearing Coat including expansion joints	0.00%	**Wearing Coat:** 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.	0.00%	**Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.

(6) Wing walls/return walls up to top	0.00%	**Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	0.00%	**Guide Bunds, River Training works:** 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)	0.00%	**Approaches:** Payments shall be made on pro rata basis on completion of 10% of the scope of each stage.
A.2. New Major Bridges		
(1) Foundation: On completion of the foundation work including foundations for return walls, abutments, piers.	0.00%	**Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap	0.00%	**Sub-structure:** Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of major bridge.
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, Bearings	0.00%	**Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4). Wearing Coat including expansion joints	0.00%	**Wearing Coat:** 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.	0.00%	**Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls up to top	0.00%	**Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.

(7) Guide bunds, River Training works etc.	0.00%	**Guide Bunds, River Training works:** 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)	0.00%	**Approaches:** Payments shall be made on pro rata basis on completion of 10% of the scope of each stage.
B.1.- Widening and repairs of		
(a) ROB		
(b) RUB		
(1) Foundation	0.00%	**Foundation:** 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. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure	0.00%	**Sub-structure:** Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of ROB/RUB.
(3) Super-structure (including bearings)	0.00%	**Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(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	0.00%	**Wearing Coat:** 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.
(5) Miscellaneous Items (like hand rails, crash barriers road marking etc.)	0.00%	**Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls up to top	0.00%	**Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.

(7) On completion of Retaining/Reinforced earth walls complete in all respect and fit for use	0.00%	Payments shall be made on pro rata basis on completion of 20% of the total area.
(8) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works, tests on completion in all respect.	0.00%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
B.2.- New		
(a) ROB		
(b) RUB		
(1) Foundation	0.00%	**Foundation:** 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. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure	0.00%	**Sub-structure:** Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of ROB/RUB.
(3) Super-structure (including bearing)	0.00%	**Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4) Wearing Coat including expansion joints in case of ROB. In case of RUB-rigid pavement under RUB including drainage facility as specified	0.00%	**Wearing Coat:** 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.

(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%	**Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.00%	**Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) On completion of Retaining / Reinforced earth walls complete in all respect and fit for use	0.00%	Payments shall be made on pro rata basis on completion of 5 % of the total area.
(8) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works, tests on completion in all respect.	0.00%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
C.1- Widening and repairs of Elevated Section/Flyovers/Grade Separators		
(1) Foundation	0.00%	**Foundation:** Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of 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:	0.00%	**Sub-structure:** Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure.
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%	**Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above.

(4) Wearing Coat including expansion joints.	0.00%	**Wearing Coat:** 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 barriers, road markings etc	0.00%	**Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.00%	**Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) On completion of Retaining / Reinforced earth walls complete in all respect and fit for use	0.00%	Payments shall be made on pro rata basis on completion of 5 % of the total area.
(8) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works, tests on completion in all respect.	0.00%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
C.2- New Elevated Section/Flyovers/Grade Separators		
(1) Foundation	0.00%	**Foundation:** Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of 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:	0.00%	**Sub-structure:** Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure.

(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%	**Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4) Wearing Coat including expansion joints.	0.00%	**Wearing Coat:** 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 barriers, road markings etc	0.00%	**Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.00%	**Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) On completion of Retaining / Reinforced earth walls complete in all respect and fit for use	0.00%	Payments shall be made on pro rata basis on completion of 5 % of the total area.
(8) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works, tests on completion in all respect.	0.00%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified

Note:

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

(2) The Schedule for exclusive tunnel projects may be prepared as per sit requirements before bidding with due approval of MD, NHIDCl.

(iv) Other Works.

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

Table 1.3.4

Stage of Payment	Percentage -Weightage	Payment Procedure
1	**2**	**3**
(1) Toll Plaza	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(2) Road side drains	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (Five) percent of the total length.
Lined Drain	0.00%	
Unlined Drain	0.00%	
Covered Drain	6.77%	
Catchpit Drain	0.22%	
(3) Road signs, safety Devices, Road Furniture etc.	0.29%	
(4) Road markings & Studs	1.32%	
(5) Crash Barrier	3.37%	
(6) Project facilities	0.00%	Payment shall be made on pro rata basis for completed facilities.
(a) Bus Bays	0.05%	
(b) Wayside Amenities excluding Slip Roads & but including all internal roads (Service areas including Truck Lay-Byes)	0.00%	
(c) Toe wall	0.00%	Payments shall be made on pro rata basis on completion of 5 % of the total area.
(7) RCC Retaining Wall	11.96%	
(8) Stone Masonry Breast wall	19.44%	
(9) Parapet Wall	0.51%	
(10) RE Wall	0.00%	
(11) Street Lighting	0.00%	Payment shall be made on pro rata basis for completed facilities.
(12) Chequered Tiles	0.34%	
(13) Boundary Wall	0.00%	Payments shall be made on pro rata basis on completion of 5 % of the total area.
(14) ATMS	0.00%	Payment shall be made on pro rata basis for completed facilities.
(15) Rain Water Harvesting	0.00%	

(16) Road side Plantation including Horticulture in Wayside Amenities	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (Five) percent of the total length.
(17) Protection Works other than approaches to the bridges, elevated sections/ flyover/ grade separators and ROBs/ RUBs	0.00%	Payments shall be made on pro rata basis on completion of 5 % of the total area.
a) Hydroseeding	0.07%	
b) Mulching	1.75%	
c) Soil nailing for slope protection and copping	6.61%	
(18) Safety & Traffic Management during const.	0.00%	Payment shall be made on prorate basis every six months.
(19) Other miscellaneous works including Connecting road & Junction under Grade separator	0.00%	Payment shall be made on Prorate basis on completion of each stage
(20) Connecting Road Etc	0.00%	
Junction under Grade separator	0.12%	
(21) Site clearance and Dismantling	0.17%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (Five) percent of the total length.
(22) Maintenance of Road	0.00%	

2. Procedure for payment for Maintenance

(a) The cost for maintenance shall be as stated in Clause 14.1 (v).

(b) Payment for Maintenance shall be made in accordance with the provisions of Article 14 and Article 19

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 **[192nd]** day from the Appointed Date (the "**Project Milestone- I**").

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

3. Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the **[329th]** day from the Appointed Date (the "**Project Milestone- II**").

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

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the **[467th]** day from the Appointed Date (the "**Project Milestone- III**").

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

5. Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the [549 th] day from the Appointed Date.

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

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

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

2. Tests

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

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

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

(iv) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards, except tests as specified in clause 5,but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.

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

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

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

4	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey months defined for the state basis rainy season)
5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basis rainy season)

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

Schedule - L

(See Clause 12.2)

Completion Certificate

1 I, …….. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated.....(the "**Agreement**"), for **Construction of two lane with hard shoulder of Kohima-Jessami Road on NH-29 (Old NH-150) from existing km 76.320 (near Mesulumi Village) to existing km 98.380 (near Chizami Village) [Design Length – 21.50 Km] in the state of Nagaland Under Bharatmala Pariyojana on EPC Mode (Package IV)** (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby

certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the …… day of …… 20… , Scheduled Completed Date for which was the …… day of ……20…..

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name)

(Designation) (Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

(i) Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule-E.

(ii) Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shall continue to be made every month until compliance is done.

(iii) The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph 2.

2. Percentage reductions in lump sum payments on monthly basis

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

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	

(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
S. No.	**Item/Defect/Deficiency**	**Percentage**
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

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

Where,

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

M1= Monthly lump-sum payment in accordance para 1.2 above of this Schedule M2= Monthly lump-sum payment in accordance para 1.2 above of this Schedule L1= Non-complying length L = Total length of the road,

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

Terms of Reference for Authority's Engineer

1. Scope

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the [NHIDCL, PTI Building, Parliament Street, New Delhi-11001] (the "**Authority**") and

..... (the "**Contractor**")# for **Construction of two lane with hard shoulder of Kohima-Jessami Road on NH-29 (Old NH-150) from existing km 76.320 (near Mesulumi Village) to existing km 98.380 (near Chizami Village) [Design Length – 21.50 Km] in the state of Nagaland Under Bharatmala Pariyojana on EPC Mode (Package IV)** on Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

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

2. Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time Extension;

(b) any additional cost to be paid by the Authority to the Contractor;

(c) the Termination Payment; or

(d) issuance of Completion Certificate or

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

(iii) The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.

(iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority's prior approval in accordance with the provisions of Clause 18.2.

(v) The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.

(vi) In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority's Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

4. Construction Period

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

be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

(ii) The Authority's Engineer shall review and approve any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.

(iii) The Authority's Engineer shall review and approve the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty one) days stating the modifications, if any, required thereto.

(iv) The Authority's Engineer shall complete the review and approve of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.

(v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.

(vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.

(vii) The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.

(viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

(x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

(xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

(xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.

(xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.

(xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.

(xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.

(xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.

(xvii) In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

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

5. Maintenance Period

(i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.

(ii) The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.

(iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.

(iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.

(v) The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause 14.5.

6. Determination of costs and time

(i) The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.

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

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

7. Payments

(i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2 (iv) (d).

(ii) Authority's Engineer shall -

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

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

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

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

8. Other duties and functions

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

9. Miscellaneous

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

(ii) The Authority's Engineer shall retain at least one copy each of all Drawings and

Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.

(iii) Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as- built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

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

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

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with Clause 19.3 (i) subsequent to the last claim;

(b) amounts reflecting adjustments in price for the aforesaid claim;

(c) the estimated amount of each Change of Scope Order executed subsequent to the last claim;

(d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2 (iii) (a);

(e) total of (a), (b), (c) and (d) above;

(f) Deductions:

i. Any amount to be deducted in accordance with the provisions of the Agreement except taxes;

ii. Any amount towards deduction of taxes; and

iii. Total of (i) and (ii) above.

(g) Net claim: (e) – (f) (iii);

(h) The amounts received by the Contractor upto the last claim:

i. For the Works executed (excluding Change of Scope orders);

ii. For Change of Scope Orders, and

iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause 20.1)

Insurance

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

(i) The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit

per occurrence of not less than the amount stated below with no limit on the number of occurrences.

The insurance cover shall be not less than: Rs. [*****]

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

1.1.2.1 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)

2. 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 two lane with hard shoulder of Kohima-Jessami Road on NH-29 (Old NH-150) from existing km 76.320 (near Mesulumi Village) to existing km 98.380 (near Chizami Village) [Design Length – 21.50 Km] in the state of Nagaland Under Bharatmala Pariyojana on EPC Mode (Package IV)** (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests on completion of

Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

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