

**National Highway Infrastructure Development Corporation Ltd.**  
(Ministry of Road Transport & Highways)

**Engineering Procurement and Construction (EPC)**

**Agreement**

**For**

**Construction of Four Lane Badarpur Bypass from Design Chainage km 27+300 at crossing with NH-6 (Old NH-44) Near Siddeswar Pt.-I Village to Design Chainage km 38+400 on NH-37 (Old NH-44) at Kandigram Chaita Village in the State of Assam on EPC Mode under Bharatmala Pariyojana in Economic Corridors (Project Length – 11.1 km).**

**January-2023**

# **Schedule**

## **Schedule-A**

*(See Clauses 2.1 and 8.1)*

### **Site of the Project**

#### **0 The Site**

- (i) Site of the Four-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)

#### Site

#### 1. Site

The Site of the Four-Lane Project Highway comprises the section of National Highway 37 (Old NH-44) commencing from Design Chainage km 27+300 at crossing with NH-6 (Old NH-44) at its existing Chainage Km 197.280 Near Siddeswar Pt.-I Village to Design Chainage km 38+400 on NH-37 (Old NH-44) at its existing Chainage Km 210+500, Kandigram Chaita Village i.e., **Badarpur Bypass** in the State of Assam.

The project site of 10.400 Km length from Design Chainage Km 27+300 to Design Chainage Km 37+700 (Existing Chainage Km 209+850 of Old NH-44) is the greenfield section for the alignment and balance 0.700 km of the alignment is the brownfield section from Existing Chainage Km 209+850 (Design Chainage Km 37+950) to Existing Chainage Km 210+550 (Design Chainage Km 38+400) of Old NH-44. Centreline coordinates of main alignment are provided in Annex-V. The land, carriageway and structures comprising the Site are described below.

#### 2. Land

The Site of the Project Highway comprises the land (sum total of land already in possession and land to be possessed) as described below:

S. No.	Existing Chainage (Km)		Right of Way (m)	Remarks
	From	To		
Land details are provided in Annexure II of Schedule A				

#### 3. Carriageway

The present carriageway of the Project Highway including type of pavement is described below:

S. No.	Existing Chainage of Old NH-44(Km)		Carriageway Width (m)	Type of Pavement	Remarks
	From	To			
1	209+850	210+550	10.0	Flexible	

#### 4. Major Bridges

The Site includes the following Major Bridges:

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

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

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

S. No.	Existing Location (km)	New Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
			Foundation	Superstructure			
NIL							

**6. Grade separators**

The Site includes the following grade separators:

S. No.	Existing Location (km)	New Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	Flyover/ Underpass
			Foundation	Super structure			
NIL							

**7. Minor bridges**

The Site includes the following minor bridges:

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

**8. Railway level crossings**

The Site includes the following railway level crossings:

S. No.	Location (km)	Remarks
Nil		

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

The Site includes the following underpasses:

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

**10. Culverts**

The Site has the following culverts:

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

**11. Bus bays/Bus Shelters**

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

S. No.	Existing Chainage (Km)	Design Chainage (km)	Left Hand Side	Right Hand Side	Road Section
-	-	-	-	-	-
<b>Bus Shelters</b>					
-	-	-	-	-	-

**12. Truck Lay byes**

The details of truck lay byes are as follows:

S. No.	Existing Chainage (km)	Design Chainage (km)	Left Hand Side	Right Hand Side	Road Section
-	-	-	-	-	-

**13. Roadside drains**

The details of the roadside drains are as follows:

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

**14. Major junctions**

The project highway divided into greenfield and brownfield sections.

The details of major junctions in brownfield section and major crossroad in greenfield section are as follows:

S. No.	Existing Chainage of Old NH-44 (Km)	Design Chainage (Km)	At Grade	Separated	Category of Cross Road			
					NH	SH	MDR	Others
1	Greenfield	35+340	NA	NA	-	-	MDR	-

(NH: National Highway, SH: State Highway, MDR: Major District Road, NA: Not Applicable)

**15. Cross Roads i.e., Roads Crossing the Greenfield Alignment:**

S. No.	Existing Chainage of Old NH-44 (Km)	Design Chainage (Km)	Type	
			Junction	Cross road
1	Greenfield	27+350	X-Type	Cart Track
2	Greenfield	27+935	X-Type	Cart Track
3	Greenfield	27+955	X-Type	Cart Track

S. No.	Existing Chainage of Old NH-44 (Km)	Design Chainage (Km)	Type	
			Junction	Cross road
4	Greenfield	32+530	X-Type	Village Road
5	Greenfield	34+900	X-Type	Village Road
6	Greenfield	35+430	X-Type	Village Road
7	Greenfield	36+330	X-Type	Cart Track
8	Greenfield	36+840	X-Type	Cart Track
9	210+105	38+170	Y-Type LHS	Village Road
10	210+425	38+490	Y-Type LHS	Village Road

#### 16. Minor junctions

The project highway divided into greenfield and brownfield sections.

The details of minor junctions in brownfield section and minor crossroad in greenfield section are as follows:

S. No.	Existing Chainage of Old NH-44 (Km)	Design Chainage (Km)	Type	
			Junction	Cross road
NIL				

#### 17. Bypasses

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

S. No.	Name of Bypass (Town)	Existing Chainage of Old NH-44 From km to km	Design Chainage (km) From km to km	Length (In Km)
1	Badarpur Bypass	From NH-6 (Old NH-44) existing Chainage Km 197.280 near Siddeswar Pt.-I Village to Km 209+850 of Old NH-44.	Km 27+300 to Km 37+700	10.400

#### 18. Other structures]

(vi) Nil

#### 19. Utilities

(I) The Site includes the following Electrical Utilities: -

(a) Extra High-Tension Lines (EHT Lines):

Sl No.	Chainage (Km)		Length				Crossings			
	From	To	400 KV	220 KV	132 KV	66 KV	400 KV	220 KV	132 KV	66 KV
1	27+300	27+500	-	-	327	-	-	-	1	-

## (b) High-Tension/Low Tension Lines (HT/LT Lines):

SI No.	Chainage (Km)		Side of NH	Length (in Circuit Km)			Crossings			Transformers	
	From	To		33 KV	11 KV	LT	33 KV	11 KV	LT	No.	Capacity
1	27+300	30+590	Left	-	0.10	0.32	-	2	8	0	-
2	27+300	30+590	Right	-	0.25	0.20	-	1	5	0	-
3	30+590	31+990	Left	-	0.20	0.25	-	2	3	1	25 KVA – 1 no.
4	30+590	31+990	Right	-	0.40	0.30	-	2	2	0	-
5	32+990	36+240	Left	-	0.30	0.30	-	4	4	0	-
6	32+990	36+240	Right	-	0.25	0.20	-	4	4	0	-
7	36+740	38+440	Left	0.80	0.40	0.56	-	2	8	1	25 KVA – 1 no.
8	36+740	38+440	Right	-	0.70	0.90	-	2	8	2	100KVA -1 no.

## (II) Public Health Utilities (Water/Sewage Pipelines) \*

The Site includes the following public health utilities:

SI No.	Chainage (Km)		Length				Crossings			
	From	To	Water supply Line		Sewage Line		Water supply Line		Sewage Line	
			With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow
1	27+300	30+000	-	1440	-	-	180	-	-	-
2	32+240	34+740	-	-	-	-	180	-	-	-
3	34+740	36+240	-	-	-	-	370	-	-	-
4	36+240	38+400	-	-	-	-	600	-	-	-

## (iii) Any Other Line

## (a) Gas Pipeline

Sl. No.	Crossing Location (km)	Affected Length (m)	ROU of Gas Pipeline (m)	Remarks
1	35+100	100	20	IGGL

**Note:** Construction works in ROU of Gas Pipeline shall be carried out in consultation with IGGL and prior approval.

## Annex – II

(As per Clause 8.3 (i))

### (Schedule-A)

#### Dates for providing Right of Way of Construction Zone

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

Sl. No	From km to km	Length (km)	Width (m)	Date of providing Right of Way*
(1)	(2)	(3)	(4)	(5)
(i) Full Right of Way (full width)				90% Right of Way of Construction Zone to be handed over on appointed date and balance within 150 days from appointed date.
(a) Stretch	27+300 to 32+430	5+130	60	
(b) Stretch	32+430 to 32+500	0+070	40	
(c) Stretch	32+500 to 36+070	3+570	60	
(d) Stretch	36+070 to 36+590	0+520	35	
(e) Stretch	36+590 to 37+690	1+100	60	
(ii) Part Right of Way (part width)				On appointed date.
(a) Stretch	37+690 to 37+740	0+050	30	
(b) Stretch	37+740 to 38+400	0+660	30	
			(Average)	
(iii) Balance Right of Way (width)				90% Right of Way of Construction Zone to be handed over on appointed date and balance within 150 days from appointed date.
(a) Stretch	37+690 to 37+740	0+050	30	
(b) Stretch	37+740 to 38+400	0+660	15	
			(Average)	

## **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)*

### **Environment Clearances: Not Applicable**

Note: Environmental clearance is applicable only for New NH or Widening of exiting highways greater than 100km length and Land acquisition is greater than 40m on existing alignment and 60 m in realignment or bypass.

### **Forest Clearance: Not Applicable**

Note: Project stretch is not passing through any Protected/ Reserve Forest.

### **Wildlife Clearance: Not Applicable**

Note: Project stretch is not passing through any wildlife sanctuary, National Parks, Ecological Sensitive Zone etc.

**Annex – V***(Schedule-A)***Centreline Coordinates of the Project Road**

Sl. No.	Design Chainage (KM)	Centreline Coordinates		Sl. No.	Design Chainage (KM)	Centreline Coordinate	
		Easting (E)	Northing (N)			Easting (E)	Northing (N)
1	27+300	458120.125	2754402.347	41	29+300	456253.448	2754874.582
2	27+350	458071.858	2754415.383	42	29+350	456206.285	2754857.977
3	27+400	458024.175	2754430.418	43	29+400	456159.123	2754841.372
4	27+450	457977.161	2754447.426	44	29+450	456111.961	2754824.767
5	27+500	457930.896	2754466.378	45	29+500	456064.799	2754808.162
6	27+550	457885.460	2754487.240	46	29+550	456017.762	2754791.209
7	27+600	457840.723	2754509.568	47	29+600	455971.671	2754771.862
8	27+650	457796.038	2754532.002	48	29+650	455927.603	2754748.283
9	27+700	457751.353	2754554.435	49	29+700	455886.109	2754720.424
10	27+750	457706.668	2754576.868	50	29+750	455847.604	2754688.560
11	27+800	457661.983	2754599.302	51	29+800	455812.472	2754653.012
12	27+850	457617.298	2754621.735	52	29+850	455781.064	2754614.135
13	27+900	457572.613	2754644.168	53	29+900	455753.695	2754572.315
14	27+950	457527.928	2754666.602	54	29+950	455730.637	2754527.973
15	28+000	457483.244	2754689.035	55	30+000	455712.122	2754481.550
16	28+050	457438.559	2754711.469	56	30+050	455698.333	2754433.510
17	28+100	457393.874	2754733.902	57	30+100	455689.223	2754384.363
18	28+150	457349.189	2754756.335	58	30+150	455683.007	2754334.753
19	28+200	457304.504	2754778.769	59	30+200	455677.335	2754285.076
20	28+250	457259.819	2754801.202	60	30+250	455671.664	2754235.398
21	28+300	457215.134	2754823.635	61	30+300	455665.993	2754185.721
22	28+350	457170.449	2754846.069	62	30+350	455660.321	2754136.044
23	28+400	457125.671	2754868.314	63	30+400	455654.650	2754086.367
24	28+450	457080.133	2754888.949	64	30+450	455648.979	2754036.689
25	28+500	457033.622	2754907.284	65	30+500	455643.307	2753987.012
26	28+550	456986.252	2754923.272	66	30+550	455637.636	2753937.335
27	28+600	456938.143	2754936.873	67	30+600	455631.964	2753887.657
28	28+650	456889.414	2754948.052	68	30+650	455626.293	2753837.980
29	28+700	456840.187	2754956.782	69	30+700	455620.629	2753788.302
30	28+750	456790.586	2754963.041	70	30+750	455615.714	2753738.545
31	28+800	456740.734	2754966.812	71	30+800	455612.044	2753688.682
32	28+850	456690.755	2754968.088	72	30+850	455609.622	2753638.742
33	28+900	456640.775	2754966.864	73	30+900	455608.448	2753588.757
34	28+950	456590.919	2754963.143	74	30+950	455608.525	2753538.758
35	29+000	456541.311	2754956.936	75	31+000	455609.852	2753488.777
36	29+050	456492.076	2754948.257	76	31+050	455612.427	2753438.845
37	29+100	456443.335	2754937.128	77	31+100	455616.003	2753388.973
38	29+150	456395.212	2754923.576	78	31+150	455619.665	2753339.107
39	29+200	456347.775	2754907.783	79	31+200	455623.327	2753289.241
40	29+250	456300.610	2754891.187	80	31+250	455626.988	2753239.376

Sl. No.	Design Chainage (KM)	Centreline Coordinates		Sl. No.	Design Chainage (KM)	Centreline Coordinate	
		Easting (E)	Northing (N)			Easting (E)	Northing (N)
81	31+300	455630.650	2753189.510	121	33+300	454299.466	2752065.845
82	31+350	455634.312	2753139.644	122	33+350	454250.127	2752057.866
83	31+400	455637.974	2753089.778	123	33+400	454200.285	2752053.997
84	31+450	455641.636	2753039.913	124	33+450	454150.332	2752051.833
85	31+500	455645.297	2752990.047	125	33+500	454100.374	2752049.786
86	31+550	455648.959	2752940.181	126	33+550	454050.416	2752047.739
87	31+600	455652.453	2752890.304	127	33+600	454000.458	2752045.691
88	31+650	455653.925	2752840.335	128	33+650	453950.511	2752043.403
89	31+700	455650.610	2752790.475	129	33+700	453900.719	2752038.961
90	31+750	455641.160	2752741.410	130	33+750	453851.529	2752030.115
91	31+800	455625.667	2752693.905	131	33+800	453803.437	2752016.496
92	31+850	455604.373	2752648.702	132	33+850	453756.362	2751999.657
93	31+900	455577.608	2752606.507	133	33+900	453709.604	2751981.946
94	31+950	455545.792	2752567.978	134	33+950	453662.850	2751964.225
95	32+000	455509.421	2752533.716	135	34+000	453616.095	2751946.504
96	32+050	455469.062	2752504.257	136	34+050	453569.321	2751928.838
97	32+100	455425.358	2752480.032	137	34+100	453522.066	2751912.518
98	32+150	455379.428	2752460.300	138	34+150	453473.653	2751900.117
99	32+200	455332.636	2752442.682	139	34+200	453424.110	2751893.624
100	32+250	455285.757	2752425.293	140	34+250	453374.143	2751893.359
101	32+300	455238.878	2752407.904	141	34+300	453324.467	2751898.866
102	32+350	455191.999	2752390.515	142	34+350	453275.284	2751907.847
103	32+400	455145.121	2752373.126	143	34+400	453226.278	2751917.766
104	32+450	455098.242	2752355.737	144	34+450	453177.274	2751927.696
105	32+500	455051.363	2752338.348	145	34+500	453128.270	2751937.625
106	32+550	455004.484	2752320.959	146	34+550	453079.240	2751947.425
107	32+600	454957.605	2752303.570	147	34+600	453029.901	2751955.481
108	32+650	454910.726	2752286.182	148	34+650	452980.098	2751959.746
109	32+700	454863.847	2752268.793	149	34+700	452930.109	2751960.018
110	32+750	454816.969	2752251.404	150	34+750	452880.150	2751958.027
111	32+800	454770.090	2752234.015	151	34+800	452830.201	2751955.748
112	32+850	454723.211	2752216.626	152	34+850	452780.253	2751953.470
113	32+900	454676.332	2752199.237	153	34+900	452730.305	2751951.191
114	32+950	454629.453	2752181.848	154	34+950	452680.357	2751948.913
115	33+000	454582.574	2752164.459	155	35+000	452630.409	2751946.634
116	33+050	454535.695	2752147.070	156	35+050	452580.461	2751944.356
117	33+100	454488.817	2752129.682	157	35+100	452530.513	2751942.077
118	33+150	454441.938	2752112.293	158	35+150	452480.565	2751939.799
119	33+200	454395.049	2752094.930	159	35+200	452430.617	2751937.520
120	33+250	454347.779	2752078.650	160	35+250	452380.669	2751935.241

Sl. No.	Design Chainage (KM)	Centreline Coordinates		Sl. No.	Design Chainage (KM)	Centreline Coordinate	
		Easting (E)	Northing (N)			Easting (E)	Northing (N)
161	35+300	452330.721	2751932.963	196	37+050	450764.661	2751221.539
162	35+350	452280.773	2751930.684	197	37+100	450722.282	2751195.004
163	35+400	452230.825	2751928.406	198	37+150	450679.904	2751168.470
164	35+450	452180.877	2751926.127	199	37+200	450637.525	2751141.936
165	35+500	452130.929	2751923.847	200	37+250	450595.147	2751115.402
166	35+550	452081.019	2751920.882	201	37+300	450552.768	2751088.867
167	35+600	452031.362	2751915.129	202	37+350	450510.390	2751062.333
168	35+650	451982.241	2751905.851	203	37+400	450468.012	2751035.799
169	35+700	451933.907	2751893.092	204	37+450	450425.633	2751009.265
170	35+750	451886.608	2751876.916	205	37+500	450383.255	2750982.730
171	35+800	451840.583	2751857.405	206	37+550	450340.876	2750956.196
172	35+850	451796.053	2751834.687	207	37+600	450298.498	2750929.662
173	35+900	451752.668	2751809.835	208	37+650	450256.119	2750903.128
174	35+950	451709.484	2751784.633	209	37+700	450213.743	2750876.590
175	36+000	451666.300	2751759.432	210	37+750	450171.682	2750849.557
176	36+050	451623.115	2751734.230	211	37+800	450130.170	2750821.687
177	36+100	451579.931	2751709.029	212	37+850	450089.224	2750792.994
178	36+150	451536.747	2751683.827	213	37+900	450048.860	2750763.487
179	36+200	451493.563	2751658.626	214	37+950	450008.779	2750733.595
180	36+250	451450.378	2751633.424	215	38+000	449968.699	2750703.702
181	36+300	451407.194	2751608.223	216	38+050	449928.619	2750673.810
182	36+350	451364.010	2751583.021	217	38+100	449888.538	2750643.917
183	36+400	451320.825	2751557.820	218	38+150	449848.323	2750614.206
184	36+450	451277.641	2751532.618	219	38+200	449808.059	2750584.561
185	36+500	451234.457	2751507.417	220	38+250	449767.796	2750554.916
186	36+550	451191.273	2751482.215	221	38+300	449727.532	2750525.271
187	36+600	451148.088	2751457.014	222	38+350	449687.269	2750495.625
188	36+650	451104.904	2751431.812	223	38+400	449647.005	2750465.980
189	36+700	451061.724	2751406.603				
190	36+750	451018.937	2751380.736				
191	36+800	450976.553	2751354.210				
192	36+850	450934.174	2751327.676				
193	36+900	450891.796	2751301.142				
194	36+950	450849.418	2751274.607				
195	37+000	450807.039	2751248.073				

## **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 Four-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 Four-Laning

**Construction of Four Lane Badarpur Bypass from Design Chainage km 27+300 at crossing with NH-6 (Old NH-44) Near Siddeswar Pt.-I Village to Design Chainage km 38+400 on NH-37 (Old NH-44) at Kandigram Chaita Village in the State of Assam on EPC Mode under Bharatmala Pariyojana in Economic Corridors (Project Length – 11.1 km).**

#### 1. Construction of the Existing Highway

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

(ii) Width of Carriageway

Four-Laning with paved shoulders shall be undertaken. The paved carriageway shall be 20.0 m (2x7.0 carriageway+2x2.5 Paved shoulders+2x0.50 Shyness) wide in accordance with the typical cross section's drawings in the Manual.

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

#### 2. Geometric Design and General Features

(i) General

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

(ii) Design speed

The design speed shall be the minimum design speed of 100 km per hr for plain/rolling terrain except given below locations where minimum design speed of 80 km per hr.

Sl. No.	Design Chainage (Km) (Centre Chainage of Curve)	Radius of Curvature in m	Remarks
-			

(iii) Improvement of the existing road geometrics

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

Sl. No.	Stretch (From km to km)	Type of deficiency	Remarks
NIL			

(iv) Right of Way

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

(v) Type of shoulders

In built-up sections, footpaths/fully paved shoulders shall be provided in the following stretches:

SI. No.	Stretch (From km to km)	Fully paved shoulders/ footpaths	Reference to cross section
Nil			

In open country, paved shoulders of 2.5 m width shall be provided for main highway and balance 1.50m width earthen shoulders shall be covered with 150 mm thick compacted layer of granular material for main highway, slip road, loops and ramps.

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

(vi) Lateral and vertical clearances at underpasses

Lateral and vertical clearances at underpasses and provision of guard rails/crash barriers shall be as per the provision of relevant Manual.

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

SI. No.	Design Chainage (Km)	Lateral Clearance (m)	Remarks
1	32+270	12.00	LVUP
2	34+640	12.00	LVUP
3	35+175	20.00	VUP

Vertical clearance: The height of the opening at the underpasses shall be as follows:

SI. No.	Design Chainage (Km)	Vertical Clearance (m)	Remarks
1	32+270	4.0	LVUP
2	34+640	4.0	LVUP
3	35+175	5.5	VUP

(vii) Lateral and vertical clearances at overpasses

Lateral and vertical clearances at overpasses shall be as per the provision of relevant Manual.

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

SI. No.	Design Chainage (Km) (From km to km)	Span/ opening (m)	Remarks
Nil			

(viii) Service Roads, Slip Roads, Connecting Roads, Loops & Ramps,

**Service Road:** Service Roads of 7.0 m carriageway width and 1.5 m both side earthen shoulders shall be constructed at the given below locations:

Sl. No.	Design Chainage (From km to km)	Side (RHS/LHS/Both)	Length (m)	Carriageway Width (m)
-	-	-	-	-

**Slip Road:** Slip Road of 7.5 m carriageway including Kerb sign edge and 1.5 m earthen shoulder shall be constructed at given below locations:

Sl. No.	Design Chainage (From km to km)	Side (RHS/LHS/Both)	Length (m)	Carriageway Width excluding Kerb Sign Edge (m)
1	37+140 to 38+090	Both sides	950.00	7.0

**Connecting Roads:** Connecting Roads of 7.0 m carriageway width and 1.5 m both side earthen shoulders shall be constructed at the given below locations:

Sl. No.	Design Chainage (From km to km)	Side (RHS/LHS/Both)	Length (m)	Carriageway Width (m)
1	35+015 to 35+185	LHS	170.00	7.0

**Loops & Ramps:** Loop and ramps shall be constructed at the Interchange location near km --+---. The length of loops and ramps indicated below:

Sl. No.	Design Chainage of Loop / Ramps (From km to Km)	Name of Loop / Ramps	Length (m) of Loop and Ramps
Nil			

**Note: -**

1. The length of Service Road, Slip Road, Connecting Road, Loops and Ramps are minimum and likely to get changed as per site requirement. Any change as per site requirement may not constitute change of scope.
2. The above lengths are tentative, and minimum specified without acceleration / deceleration lane and taper length. The acceleration / deceleration lane and taper shall be constructed as per Schedule D.

(ix) Grade separated structures

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

Sl. No.	Design Chainage of Grade Separated structure (Km)	Type of Grade Separator structure	Remarks
1	27+985	ROB	
2	32+270	LVUP	
3	34+640	LVUP	
4	35+175	VUP	
5	37+655	Grade Separator	

(x) Cattle and pedestrian underpass /overpass

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

(xi) Typical cross-sections of the Project Highway

Typical cross-sections schedule of the Main Highway: -

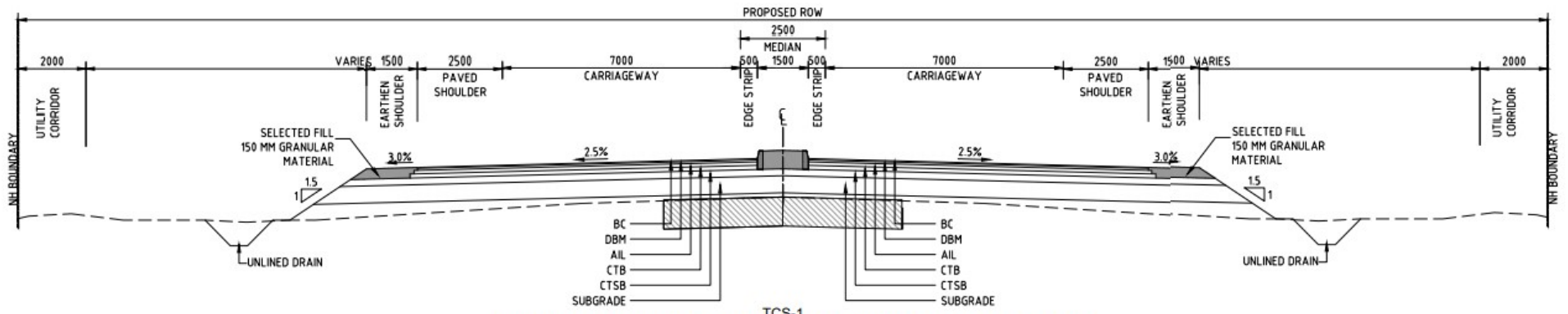
Sl. No.	Design Chainage (Km)		Length (Km)	TCS Type	TCS Description
	From	To			
1	27+300	27+905	605	TCS-2	4 Lane Divided Carriageway for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain
2	27+905	28+065	160	ROB	4 Lane Divided Carriageway Grade Separated Structure (Road Over Bridge)
3	28+065	28+960	895	TCS-2	4 Lane Divided Carriageway for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain
4	28+960	28+980	20	Minor Bridge	4 Lane Divided Carriageway Minor Bridge
5	28+980	29+360	380	TCS-2	4 Lane Divided Carriageway for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain
6	29+360	29+380	20	Minor Bridge	4 Lane Divided Carriageway Minor Bridge
7	29+380	29+505	125	TCS-2	4 Lane Divided Carriageway for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain
8	29+505	29+525	20	Minor Bridge	4 Lane Divided Carriageway Minor Bridge
9	29+525	32+264	2739	TCS-2	4 Lane Divided Carriageway for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain
10	32+264	32+276	12	LVUP	4 Lane Divided Carriageway Grade Separated Structure
11	32+276	32+845	569	TCS-2	4 Lane Divided Carriageway for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain
12	32+845	32+855	10	Minor Bridge	4 Lane Divided Carriageway Minor Bridge
13	32+855	34+634	1779	TCS-2	4 Lane Divided Carriageway for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain
14	34+634	34+646	12	LVUP	4 Lane Divided Carriageway Grade Separated Structure
15	34+646	35+015	369	TCS-2	4 Lane Divided Carriageway for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain
16	35+015	35+165	150	TCS-4B	4 Lane Divided Carriageway with LHS Connecting Road for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain
17	35+165	35+185	20	VUP	4 Lane Divided Carriageway Grade Separated Structure
18	35+185	36+060	875	TCS-2	4 Lane Divided Carriageway for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain
19	36+060	36+600	540	Major Bridge	4 Lane Divided Carriageway Major Bridge
20	36+600	37+140	540	TCS-2	4 Lane Divided Carriageway for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain

Sl. No.	Design Chainage (Km)		Length (Km)	TCS Type	TCS Description
	From	To			
21	37+140	37+625	485	TCS-3	4 Lane Divided Carriageway with Both Side Slip Road for New Construction of Bypass/Realignment in Open Country for Plain/Rolling Terrain (Approach of Grade Separated Structure)
22	37+625	37+685	60	Grade Separator	4 Lane Divided Carriageway Grade Separated Structure
23	37+685	38+090	405	TCS-3A	4 Lane Divided Carriageway with Both Side Slip Road in Brown Field Section for Plain/Rolling Terrain (Approach of Grade Separated Structure)
24	38+090	38+400	310	TCS-1	4 Lane Divided Carriageway for New Construction/Raising of Existing Road in Open Country for Plain/Rolling Terrain
<b>Total Length (Km)</b>			<b>11+100</b>		

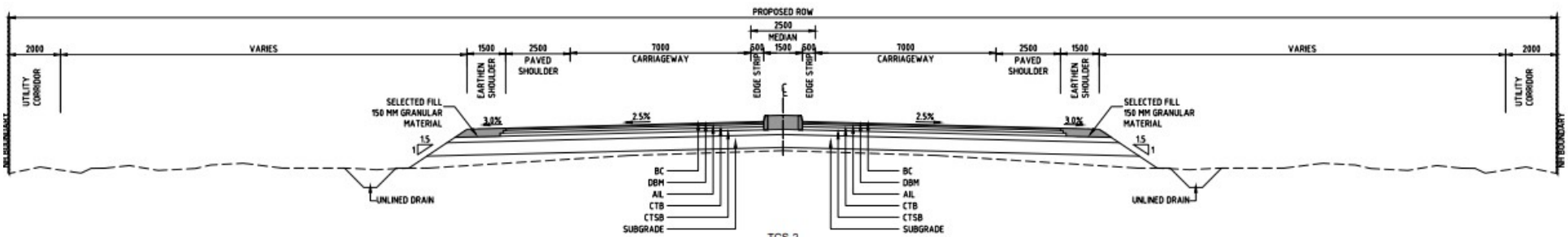
**Note:** TCS schedule as given above shall be treated as an approximate assessment. Actual length of the TCS schedule shall be prepared by the contractor based on detailed investigations and site requirements. Any variation in length of respective TCS specified in Schedule B shall not constitute a change of scope.

Road Construction works at Design Chainage km 35+100 within ROU (20.0 m) of Gas Pipeline shall be carried out in consultation and supervision of IGGL.

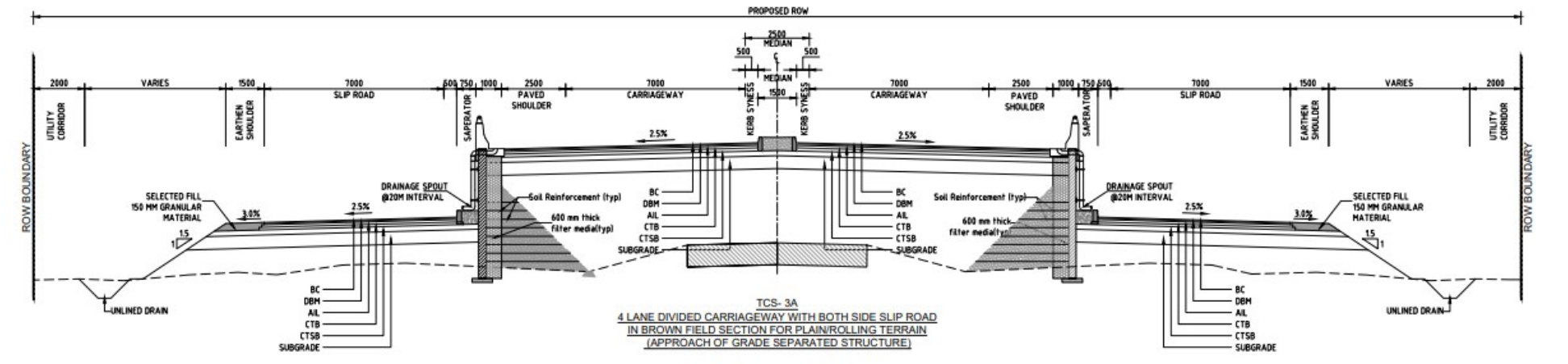
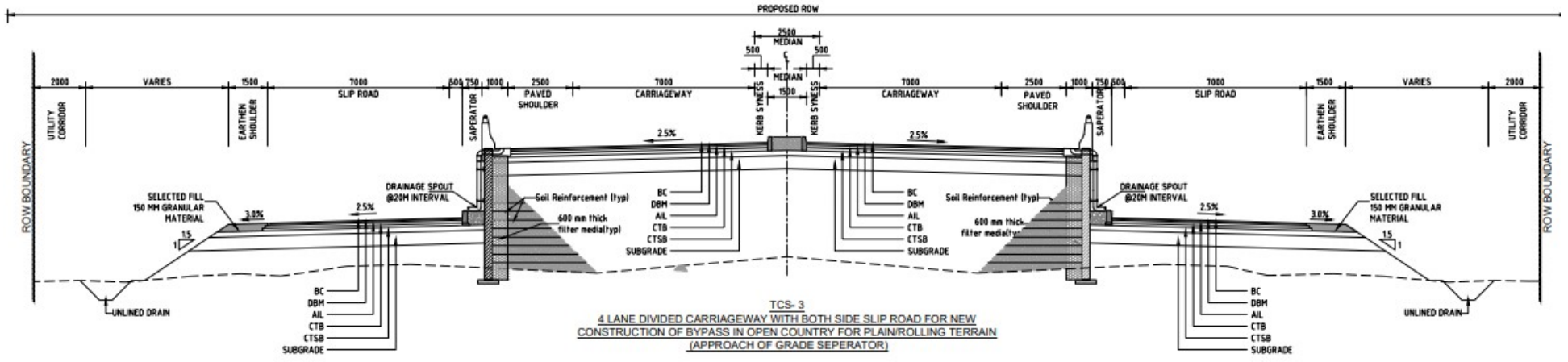
Figure of Typical Cross Section: -

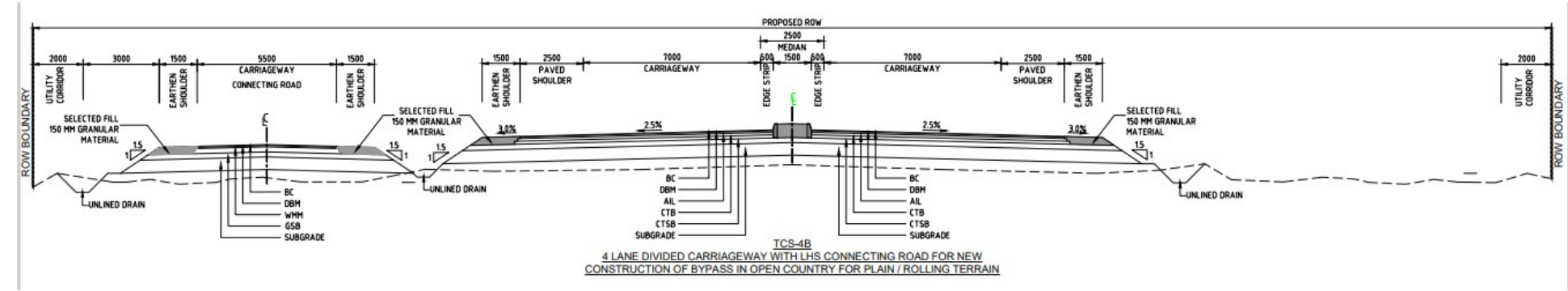
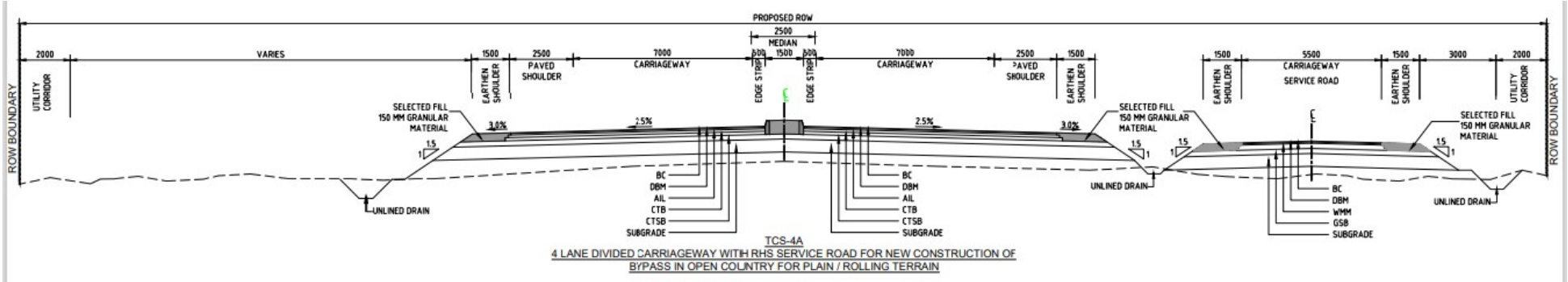


**TCS-1**  
**4 LANE DIVIDED CARRIAGEWAY FOR NEW CONSTRUCTION/RAISING OF EXISTING ROAD**  
**IN OPEN COUNTRY FOR PLAIN/ROLLING TERRAIN**



**TCS-2**  
**4 LANE DIVIDED CARRIAGEWAY FOR NEW CONSTRUCTION OF BYPASS**  
**IN OPEN COUNTRY FOR PLAIN/ROLLING TERRAIN**





### 3. Intersections and Grade Separators

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

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

(i) At-grade intersections

(ii) Major Junction: -

Sl. No.	Design Chainage (Km)	Type of intersection	Other features
1	37+655	At Grade-T Junction	Junction with Slip Road and Existing Road (New NH-37/Old NH-44)

(iii) Minor Junction: -

Sl. No.	Design Chainage (Km)	Type of intersection	Other features
1	35+175	X-Type	MDR Road (Improvement below VUP with Cross Road and Connecting Road)
2	37+910	Y-LHS	Village Road
3	38+230	Y-LHS	Village Road

(iv) **Note:** Any other junction not mentioned above but observed during the construction of the project shall be improved as per schedule D requirements. The same shall not constitute a Change of Scope.

(v) Grade separated intersection with/without ramps

Sl. No.	Design Chainage (Km)	Salient features	Minimum length of viaduct to be provided (m)	Road to be carried over/under the structures
1	37+655	Grade separator with both side Slip Road to interchange the traffic	60.00	Project Road Over the Structure and Cross Road under the structure

**Note:** Location and span arrangement of grade-separated structures are indicative and minimum specified. Exact location may be decided in consultation with Authority Engineer. Any Change in span arrangement shall not constitute a change of scope.

#### 4. Road Embankment and Cut Section

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

The existing road shall be raised in the following sections:

Sl. No.	Design Chainage (From km to km)	Length (Km)	Extent of raising [Top of finished road level]
1	37+700 to 38+400	0.700	Raising with the reference of Clause no 4.2.1 Para (i) of IRC: SP:84-2019 (HFL for this location is 15.4 m)

#### 5. Pavement Design

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

Main carriageway including loops & ramps, raising of existing road, bypasses, realignment, reconstruction, Truck Lay Bys, Rest Areas, Bus Bays, Slip Road sections are proposed to be constructed with flexible pavement with Cement Treated Base (CTB) and Cement Treated Sub-base (CTSB) and Service Road, Connecting Road for conventional pavement. However, the design is in the scope of EPC Contractor and alternate design can be proposed which shall conform to the specification and standards. Moreover, this will not qualify for Change of Scope.

- (iii) Design requirements

Pavement design shall be carried out in accordance with IRC: 37-2018.

Design Period and strategy

Flexible pavement for new pavement, raising of existing road, reconstruction of existing road, widening, and strengthening of the existing road, Slip Road, Service Road, Connecting Road, Ramps and Loops shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall carry out Traffic Survey, Axle load survey and calculate design traffic for pavement design but design traffic shall not be less than 70 million standard axles (MSA) for main carriageway, 20 million standard axles (MSA) for Slip Road, Loops and Ramps of Interchanges/Grade separator and 10 million standard axles (MSA) for Service Road and Connecting Road.

Minimum specified crust composition for flexible pavement with Cement Treated Base (CTB) and Cement Treated Sub-base (CTSB) are presented below.

However, the EPC contractor proposing alternate design shall be maintain minimum total thickness mentioned in the table below.

Bypass, Realignment, Reconstruction of Existing Road, Raising of Existing Road for Main Carriageway including paved shoulders: -

Design Chainage (km)	Proposed Flexible Pavement Thickness (mm)					Total (mm)
	BC	DBM	AIL	CTB	CTSB	
Km 27+300 to 38+600	40	60	100	155	200	555

Slip Roads, Loops and Ramps:

Design Chainage (km)	Proposed Flexible Pavement Thickness (mm)					Total (mm)
	BC	DBM	AIL	CTB	CTSB	
Km 27+300 to 38+600	40	50	100	100	200	490

Service Road and Connecting Road:

Design Chainage (km)	Proposed Flexible Pavement Thickness (mm)				Total (mm)
	BC	DBM	WMM	GSB	
Km 27+300 to 38+600	40	50	250	200	540

(iv) Reconstruction of stretches

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

Sl. No.	From (Km)	To (Km)	Length (Km)	Remarks
Nil				

**6. Roadside Drainage**

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per the provision of relevant Manual and IRC Code. However, minimum 13381.0 RM chute drain shall be provided at slope of high embankment area.

The above length is indicative & any increase in length shall not qualify for COS.

**7. Design of Structures**

(i) General

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

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

Sl. No.	Bridge at Design Chainage km	Minimum Width of carriageway and cross-sectional features
1	Minor Bridge at Km 28+970	2X12.5
2	Minor Bridge at Km 29+370	2x12.5
3	Minor Bridge at Km 29+515	2x12.5
4	Minor Bridge at Km 32+850	2x12.5
5	Major Bridge at Km 36+330	2x12.5

Note: MCW – Main Carriageway, SR – Slip Road

The following structures shall be provided with footpaths:

Sl. No.	Location at km	Remarks
All Bridges to be Designed with footpaths.		

All bridges shall be high-level bridges.

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

Sl. No.	Bridge at km	Utility service to be carried	Remarks
All Bridges to be Designed to carry Utility Services.			

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

(ii) Culverts

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

Reconstruction of existing culverts:

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

Sr. No.	Design Chainage (Km)	Proposed Type of Structure	Proposed Span Arrangement (m)	Remarks
-	-	-	-	-

Widening of existing culverts:

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in the provision of

relevant Manual. Repairs and strengthening of existing structures where required shall be carried out.

Sr. No.	Design Chainage (Km)	Proposed Span Arrangement (m)	Proposed Type of Structure	Remarks
NIL				

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

Sr. No.	Design Chainage (Km)	Minimum Span Arrangement (m)	Type of Structure	Remarks
1	27+320	1x5x4	RCC Box	Cart Track
2	27+660	1x5x4	RCC Box	-
3	28+220	1x3x3	RCC Box	-
4	28+430	1x4x3	RCC Box	-
5	28+650	1x2x2	RCC Box	-
6	29+155	1x3x3	RCC Box	-
7	29+220	1x3x3	RCC Box	-
8	29+750	1x5x3	RCC Box	-
9	30+000	1x2x2	RCC Box	-
10	30+170	1x5x3	RCC Box	-
11	30+230	1x5x3	RCC Box	-
12	30+340	1x5x3	RCC Box	-
13	30+440	1x5x3	RCC Box	-
14	30+540	1x5x3	RCC Box	-
15	30+640	1x5x3	RCC Box	-
16	30+730	1x2x2	RCC Box	-
17	31+110	1x2x2	RCC Box	-
18	30+850	1x2x2	RCC Box	-
19	31+090	1x2x2	RCC Box	-
20	31+310	1x4x4	RCC Box	-
21	31+590	1x2x2	RCC Box	-
22	31+840	1x2x2	RCC Box	-
23	32+090	1x2x2	RCC Box	-
24	32+500	1x5x4	RCC Box	Crossing Village Road
25	32+650	1x2x2	RCC Box	-
26	33+050	1x2x2	RCC Box	-
27	33+290	1x3x3	RCC Box	-
28	33+640	1x5x3	RCC Box	-
29	33+900	1x3x3	RCC Box	-
30	34+200	1x3x3	RCC Box	-

Sr. No.	Design Chainage (Km)	Minimum Span Arrangement (m)	Type of Structure	Remarks
31	34+340	1x3x3	RCC Box	-
32	34+780	1x2x2	RCC Box	-
33	35+000	1x2x2	RCC Box	-
34	35+400	1x2x2	RCC Box	-
35	35+700	1x5x3	RCC Box	-
36	36+805	1x5x3	RCC Box	-
37	37+055	1x2x2	RCC Box	-
38	37+305	1x2x2	RCC Box	-
39	37+535	1x2x2	RCC Box	-
40	37+805	1x2x2	RCC Box	-
41	38+055	1x2x2	RCC Box	-
42	38+295	1x2x2	RCC Box	-

**Note:** Location of the above culverts are indicative and span arrangement is minimum specified. Exact location of these culverts shall be decided in consultation with Authority Engineer. The actual vent way/span arrangements of culverts shall be determined based on detailed investigations by the Contractor in accordance with the Specifications and Standards. Any variations in vent way/span arrangements specified in this Schedule-B shall not constitute a Change of Scope.

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

Sr. No.	Design Chainage (Km)	Proposed Type of Structure	Proposed Span Arrangement (m)	Remarks
NIL				

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

(iii) Bridges

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

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

**Major Bridge to be Reconstructed:**

Sl. No	Existing Location (km)	Design Chainage (km)	Existing Span (m)	Existing Width (m)	Proposed Span (m)	Proposed Total Width (m)	Salient details of existing bridge	Adequacy or otherwise of the existing waterway, vertical clearance, etc*	Remarks
NIL									

**Minor Bridge to be Re-constructed:**

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	Existing Span Arrangement (m)	Existing Total Width (m)	Proposed Span Arrangement (m)	Proposed Type of Structure	Proposed Total Width (m)	Adequacy or otherwise of the existing waterway, vertical clearance, etc*	Remarks
NIL									

(ii) The following narrow bridges shall be widened:

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Existing Span Arrangement (m)	Existing width (m)	Proposed Span Arrangement (m)	Proposed Type of Structure	Cross-section at deck level for widening @	Remarks
NIL								

Additional new bridges

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

**Additional New Major Bridge parallel to the existing Major Bridge**

Sr. No.	Design Chainage (Km)	Proposed Span (m)	Proposed Type of Structure	Proposed Span Arrangement (m)	Remarks
NIL					

**Additional New Minor Bridges parallel to the existing Minor Bridge**

Sr. No.	Design Chainage (Km)	Existing Span Arrangement (m)	Existing Total Width (m)	Proposed Span Arrangement (m)	Proposed Type of Structure	Proposed Total Width (m)	Remarks
NIL							

**Additional New Major Bridges:**

Sr. No.	Design Chainage (Km)	Minimum Span Arrangement (m)	Proposed Type of Structure	Minimum Total Width (m)	Remarks
1	36+330	9x60.0	PSC Box Girder	2x12.5	Bridge across Barak River.

Note: -

- ❖ Minimum 8.0 m vertical clearance shall be required from HFL of Barak River for PSC Box Girder Major Bridge at Chainage km 36+330 for navigation as per classification of NW-16 of Inland Waterway Authority of India. (Span A1-A2)
- ❖ Minimum 50.0 m horizontal clearance shall be required for Major Bridge across Barak River at Chainage km 36+330 for navigation as per classification of NW-16 of Inland Waterway Authority of India. (Span A1-A2)

**Additional New Minor Bridges:**

Sr. No.	Design Chainage (Km)	Minimum Span Arrangement (m)	Proposed Type of Structure	Minimum Total Width (m)	Remarks
1	28+970	1x20.0	RCC I-Girder	2x12.5	For MCW
2	29+370	1x20.0	RCC I-Girder	2x12.5	For MCW
3	29+515	1x20.0	RCC I-Girder	2x12.5	For MCW
3	32+850	1x10.0	RCC Box	2x12.5	For MCW

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

Sl. No.	Location at km	Remarks
NIL		

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

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

Sl. No.	Location at km	Remarks
Nil		

**Note:** Location of the above bridges (Major and Minor) are indicative and span arrangement is minimum specified. Exact location of these bridges shall be decided as per detailed design, in consultation with Authority Engineer and as per site requirement. The actual span arrangements of the bridges shall be determined based on detailed investigations by the Contractor in accordance with the Specifications and Standards. Any variations in span arrangements specified in this Schedule-B shall not constitute a Change of Scope.

Drainage system for bridge decks

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

Structures in marine environment

(iv) Rail-road bridges

Design, construction and detailing of ROB/RUB shall be as specified in the provision of relevant Manual.

Road over-bridges

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

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Minimum Span Arrangement (SK) (m)	Minimum Total Width (m)	Remarks
1	Bypass	27+985	RCC I Girder+ Steel Composite Girder	1x21.750 +3x37.20 (Railway ROW- Steel Composite Girder) + 1x21.750	2x13.5	-

Road under-bridges

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

Sr. No.	Design Chainage (Km)	Name of Bridge	Proposed Type of Structure	Proposed Span Arrangement (SK)(m)	Proposed Total Width (m)	Remarks
NIL						

**Note:** Location of the above structures (Road over Bridges/Road under Bridges) are indicative and span arrangement is minimum specified. Exact location and Span arrangement shall be constructed as per approval from Railway. Any variations in span arrangements specified in this Schedule-B shall not constitute a Change of Scope.

(v) **Low Height Subway (LHS) (Adjacent to ROB at Km 27+985)**

Low Height Subway (LHS) for connecting Village Road Gangapur near Design Chainage Km 27+985 (Railway Chainage Km162+524) between HLX-SQF station. Size of LHS 5.0 m clear width and 2.50 m clear height with approach road and cover shed and drain arrangement.

**Note:** Location of the above structures (Low Height Subway) are indicative and span arrangement is minimum specified. Exact location and Span arrangement shall be constructed as per approval from Railway. Any variations in span arrangements specified in this Schedule-B shall not constitute a Change of Scope.

(vi) **Grade separated structures**

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

**Additional New Flyover/Grade Separator:**

Sr. No.	Design Chainage (Km)	Minimum Length (m)	Proposed Type of Structure	Skew Angle	Minimum Span Arrangement (m)	Minimum Total Width (m)	Remarks
1	37+655	60	PSC I- Girder	-	2x30 (Clear Span)	2x11.0	Grade separator at End point of Bypass

**Additional New VUP:**

Sr. No.	Design Chainage (Km)	Proposed Type of Structure	Skew Angle	Minimum Span Arrangement (m)	Minimum Total Width (m)	Remarks
1	35+175	RCC I-Girder	-	1x20 (Clear Span)	2x11.0	For MCW

**Additional New LVUP:**

Sr. No.	Design Chainage (Km)	Proposed Type of Structure	Skew Angle	Minimum Span Arrangement (m)	Minimum Total Width (m)	Remarks
1	32+270	RCC Box	29 <sup>0</sup>	1x12 (Clear Span)	26.5	For MCW
2	34+640	RCC Box	-	1x12 (Clear Span)	26.5	For MCW

**Note:** Location of the above structures (Flyover/Grade Separator, VUP and LVUP) are indicative and span arrangement is minimum specified. Exact location of these structures shall be decided as per detailed design, in consultation with Authority Engineer and as per site requirement. The actual span arrangements of the structures shall be determined based on detailed investigations by the Contractor in accordance with the Specifications and Standards. Any variations in span arrangements specified in this Schedule-B shall not constitute a Change of Scope.

## (vii) 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:

## Bridges

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

## ROB / RUB

Sl. No.	Existing Chainage	Proposed Chainage	Name of Bridge	Nature and extent of repairs /strengthening to be carried out
NIL				

## Overpasses/Underpasses and other structures

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

(viii) List of Major Bridges and Structures

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

**Major Bridges**

Sl. No.	Location
1	36+330 (Across Barak River)

**ROB**

Sl. No.	Location
1	27+985

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

- (i) Traffic control devices and road safety works shall be provided in accordance with the provision of relevant Manual.
- (ii) Specifications of the reflective sheeting. specifications of the reflective sheeting shall be as specified in the manual.

**(a) Traffic Signs:**

Traffic signs include roadside signs, overhead signs and curb mounted signs along the entire Project Highway.

**(b) Pavement Marking:**

Pavement markings shall cover road marking for the entire Project Highway.

**(c) Safety Barrier:**

THRIE- Metal Beam crash barriers shall be provided in entire project length as per schedule D, however minimum 17100.00 Rm shall be provided.

**9. Roadside Furniture**

- (i) Roadside furniture like km/Hectometer Stones, Railings, Traffic Impact Attenuators, Delineator shall be provided in accordance with the provision of relevant Manual and Traffic Signage plan as indicated in Annexure-III of Schedule-A and deemed to be part of this Schedule-B.
- (ii) RCC boundary pillar shall be provided along the entire length on either side of the project highway.
- (iii) Traffic Signs boards shall be provided as per the road signage plan indicated in Annexure-III of Schedule-A which shall be deemed to be part of this Schedule-B.
- (iv) Overhead traffic signs: Overhead signs shall be provided as per Section 9 of IRC: SP:84-2019.

**Note:** The type, numbers and location of Traffic Signages shown in Traffic Signage plan as indicated in Annexure-III of Schedule-A are tentative and minimum specified. The actual numbers and location of Traffic Signages shall be determined by the Contractor in accordance with the requirement of the manual with approval from the NHIDCL/Authority's Engineer. Any variation in the number and type of road sign boards specified in this Clause of Schedule-B shall not constitute a Change of Scope.

**10. Compulsory Afforestation**

NIL

**11. Hazardous Locations**

The safety barriers shall also be provided at the following hazardous locations as per site requirement in consultation with the NHIDCL/Authority Engineer and in accordance with the provisions of manual.

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

Sl. No.	Location from Km 27+300 to km 38+400	LHS and RHS
Safety Barriers shall be provided as per manual.		

**12. Retaining Wall/Toe Wall/RE Wall/Embankment Protection**

**Retaining Wall:** Retaining Wall shall be provided as per the requirement of site conditions to restrict the right of way; however minimum 2150 m length shall be provided.

**Toe Wall:** Toe Wall shall be provided as per the requirement of site conditions to restrict the right of way; however minimum 1400 m length shall be provided.

**Reinforced Earth Wall:** Reinforced Earth Wall shall be provided as per the requirement of site conditions; however minimum 1780 m length shall be provided between Main carriageway and Slip Road/Ramp.

**Embankment Protection:** High embankment slop protection shall be provided as per the requirement of the site as per manual, however minimum 9300.00 cum stone boulder pitching shall be provided in the embankment slop.

**Note:**

1. Above length and height of Retaining wall, Toe wall, Reinforced Earth Wall is tentative and minimum specified. The actual length and height of Retaining wall/ Toe wall / Reinforced Earth Wall shall be determined by the Contractor in accordance with the requirements of the manual with approval from the NHIDCL/Authority's Engineer. Any variation in the length and height specified in this Clause of Schedule-B shall not constitute a Change of Scope.
2. Above quantity of protection measure for embankment protection is tentative and minimum specified. The actual length of boulder pitching shall be determined by the Contractor in accordance with the requirements of manual based on site investigations with approval from the NHIDCL/Authority's Engineer. Any variation in the quantity specified in this Clause of Schedule-B shall not constitute a Change of Scope.
3. Any requirement of Ground Improvement at the locations of proposed Retaining Wall / Toe Wall/ Reinforced Earth Wall/ High Embankment shall not be treated as COS and will be incidental to work.

**13. Special Requirement for Hill Roads:** Project Road passing through plain and rolling terrain therefore special requirement for Hill Roads is not applicable.

**14. Change of Scope**

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

**(Schedule B-1)**

**OF UTILITIES AND FELLING OF TREES**

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

<b>Sr. No</b>	<b>Type of Utility</b>	<b>Unit</b>	<b>Quantity</b>	<b>Remarks</b>
A	Electrical Utilities			
A1	Electrical Poles 11Kv/ LT 3 phase 4 wire line Composite/ LT 3 phase 4 wire line/33 Kv/ 11KV-33 Kv Composite	Nos.	514	Circuit Km Length - 11Kv/ LT 3 phase 4 wire line Composite/ LT 3 phase 4 wire line/33 Kv/ 11KV-33 Kv Composite - 20.70 km
A2	Transformers/DTR (25 Kva/63kVA/100Kva)	Nos.	09	(25 Kva/63kVA/100Kva)
A3	11 Kv Underground lines crossing location	Nos.	05	0.690m (underground Cable crossing) 20 poles
B	Water/Sewage pipeline			
B1	Hand pumps	Nos.	00	00/00
B2	Water supply (Different Dia)	meters	3850	PVC/GI/DI Pipe
C	Telephones & OFC			
C1	Telephones	Nos.	04	04/00
C2	OFC	Nos	00	00/00
D	Felling of Tress	Nos.	708	
E	Gas Pipeline (IGGL)	Nos	1	100 m at Km 35+100

**Note:** Construction works in ROU (20.0 m) of Gas Pipeline shall be carried out in consultation and supervision of IGGL.

The details of items/quantities/works to be executed for shifting of utilities is tentative. All works/quantities/ miscellaneous items to be executed at site as per detailed estimate of utility owning department, without any additional claim/Change of Scope.

## SCHEDULE – C

(See Clause 2.1)

### PROJECT FACILITIES

#### 1 Project Facilities

This schedule indicates the minimum spatial and functional requirements of the facilities to be provided on the **Project Highway (Total length of 11.10 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 shall include:

- (a) Roadside furniture
- (b) Pedestrian facilities
- (c) Bus shelters
- (d) Passing Places
- (e) Truck lay byes and
- f) Tree plantation and landscaping
- (g) Others to be specified

#### 2 Description of Project Facilities

Each of the Project Facilities is described below:

- a) Toll plaza

Sl. No.	Toll Plaza Location		Remarks
	Existing Chainage (Km)	Design Chainage (Km)	
			Nil

- b) Roadside furniture,

The roadside furniture shall include the provision of:

- a) **Traffic Signs:**

Traffic signs include roadside signs, overhead signs, kerb mounted signs, etc. shall be provided for the entire project highway as per the manual.

- b) **Pavement Markings:**

Pavement markings shall be provided for the entire project highway as per the manual.

- c) **LED Traffic Blinkers:**

LED Traffic Blinkers shall be provided for the entire project highway as per at the Manual.

**d) Crash barrier**

Crash Barrier shall be provided as per the manual.

**e) Delineators**

Delineators shall be provided for the entire project highway as per the Manual.

**f) Hectometer / Kilometer Stones,**

Hectometer/ Kilometer Stones shall be provided for the entire project highway as per the Manual.

**g) Retro-Reflectorized Road Indicator**

Retro-Reclectorised Road indicators shall be provided for the entire Project highway as per the Manual.

**c) 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.

**d) 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.

Bus shelters shall be provided on the Project Highway at 3 locations (Total 6 No) as mentioned herein under. Bus shelters shall be constructed as per Manual on both sides (staggered arranged) of the Project Highway. These bus shelters will also have passenger's facility.

**Location of Bus shelters**

S. No.	Design Chainage (Km)	SIDE
1	30+740	Both side
2	35+090	Both side
3	37+540	Both Side

**e) Truck lay-byes,**

Truck lay-byes shall be provided at given below locations.

Sl. No.	Truck lay-byes Location		Remarks
	Existing Chainage (Km)	Design Chainage (Km)	
Nil			

**f) Tree Plantation and Landscaping,**

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 3750 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 Assam, 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.

**g) Others,**

**Highway Lighting**

Lighting shall be provided at the following locations:

- (i) Lighting shall be provided at the Project Highway as per provisions of Manual & IRC Codes

## **SCHEDULE – D**

*(See Clause 2.1)*

### **SPECIFICATIONS AND STANDARDS**

#### **1. Construction**

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

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

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

Manual of Specifications and Standards for Four Laning of highways (IRC: SP:84 – 2019) referred to herein as the manual.

Annex – I

*(Schedule – D)*

**Specifications and Standards for Construction**

**1 Specifications and Standards**

All materials, works and construction operations shall conform to the Four Lane Manual (IRC: SP:84–2019) of Specifications and Standards for Four Laning (IRC: SP: 84–2019), referred as the Two-Lane Manual (IRC: SP: 84–2019), 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 Four Lane Manual (IRC: SP: 84-2019) shall be deemed to be substituted by the terms '**Contractor**', '**Authority's Engineer**' and '**Agreement**' respectively.

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:

<b>S. No.</b>	<b>Clause No</b>	<b>Item</b>	<b>Provision as per Manual (IRC: SP: 84-2019)</b>	<b>Modified Provision</b>
1	2.2	Design Speed	Minimum Design Speed 80 km per hr. for plane and rolling terrain	Minimum Design speed shall be 100 km per hr. for plane and rolling terrain except at locations as mentioned in Schedule B section 2(ii) of this document.
2	2.3	Right of Way	A minimum Right of Way (ROW) of 60 m should be available for development of a 4-lane highway.	Right of Way (ROW) shall be available as per Annex-II of Schedule-A.
3	2.5.1	Width of Raised Median in Open country with isolated built-up area and Approach to grade separated structures for Plain and Rolling Terrain	5.0 m including Kerb shyness of 0.5 m on either side.	2.5 m including Kerb shyness of 0.5 m on either side.
4	7.3	Width of Structure	13.50 m (Cross-Section of Bridge at Deck Level-with Footpath 4-Lane Divided Highway)	Width of structure shall be as per width specified in Schedule B of Annex-I.
5	-	Carriageway Width of Slip Road, Loops, Ramps, Service Road and Connecting Roads.	-	Carriageway Width of Slip Road, Loops, Ramps shall be 7.0 m width excluding kerb shyness and 5.5 m width for Connecting Road.
6	-	Earthen Shoulders of Slip Road, Loops, Ramps, Service Road and Connecting Roads.	-	Earthen Shoulders of Slip Road, Loops, Ramps, Service Road and Connecting Roads shall be 1.5 m width.
7	5.4.1 (i)	Flexible Pavement Design Period	Flexible Pavement shall be design for a minimum design period of 15 years.	Flexible Pavement shall be design for a minimum design period of 20 years.

## **Schedule - E**

*(See Clauses 2.1 and 14.2)*

### **Maintenance Requirements**

1. Maintenance Requirements

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

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

Notwithstanding anything to the contrary contained in this Schedule-E, if any Defect,

deficiency or deterioration in the Project Highway poses a hazard to safety or risk of damage to property, the Contractor shall promptly take all reasonable measures for eliminating or minimizing such danger.

**6.** Daily inspection by the Contractor

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

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

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

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

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

**Annex - I**

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

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

**Table -1: Maintenance Criteria for Pavements:**

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
<b>Flexible Pavement</b> <b>(Pavement of MCW, Service Road, approach)</b>	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 ( <a href="http://www.tfrc.com/pavement/ltp/reports/03031/">http://www.tfrc.com/pavement/ltp/reports/03031/</a> )	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					
			up 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
	<b>Rigid Pavement (Pavement of MCW, Service Road, Grade structure,</b>	Roughness BI	2200m m/km	2400mm /km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 -94: 2000	180 days
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83-2008

AssetType	PerformanceParameter	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 $d > D/2$
<b>CRACKING</b>						
1	<b>Single Discrete Cracks Not intersecting with any joint</b>	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if L > 1m.
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
2	Single Transverse (or Diagonal) Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	4	w = 1.5 - 3.0 mm	Seal, and stitch if L > 1 m.	Staple or Dowel Bar Retrofit, FDR for affected portion.
			5	w > 3 mm.		
			0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy.	Staple or Dowel Bar Retrofit.
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle	Within 7 days	Within 15 days
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1m. 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	$w = 3.0 - 6.0 \text{ mm}$	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstructaffected.  Portion with norms and specifications - See Para 5.5 & 9.2
			5	$w > 6 \text{ mm}$ , usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Within 15 days
			0	Nil, not discernible	No Action	
3	<b>Single Longitudinal Crack intersecting with one or more joints</b>	$w$ = width of crack $L$ = length of crack $d$ = depth of crack $D$ = depth of slab	1	$w < 0.5 \text{ mm}$ , discernible from slow moving vehicle	Seal with epoxy, if $L > 1$ m.  Within 7 days	Staple or dowel bar retrofit.  Within 15 days

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

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 > 1 m.	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle	Within 15 days	
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken		
					Dismantle, Reinstatement subbase, Reconstruct whole slab as per specifications within 30 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
				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	Seal with epoxy seal with epoxy
			2	w < 1.5 mm; L < 0.6 m, only one corner broken	Within 7 days	Within 7 days
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008)	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	three or four corners broken	Within 15 days	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/m <sup>2</sup> )	0	Nil, not discernible		No Action
			1	$w < 0.5 \text{ mm}; L < 3 \text{ m/m}^2$	Not Applicable, as it may be fulldepth	Seal with low viscosity epoxy to secure broken parts.
			2	either $w > 0.5 \text{ mm}$ or $L < 3 \text{ m/m}^2$		Within 15days
			3	$w > 1.5 \text{ mm}$ and $L < 3 \text{ m/m}^2$		
			4	$w > 3 \text{ mm}$ , $L < 3 \text{ m/m}^2$ and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement.
			5	$w > 3 \text{ mm}$ , $L > 3 \text{ m/m}^2$ and deformation		Within 30days

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

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 $h > 25\text{ mm}$	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	Scaling	$r = \frac{\text{damaged surface}}{\text{total surface of slab}} (\%)$ $h = \text{maximum depth of damage}$	0	Nil, not discernible	Short Term No action.	Long Term
			1	$r < 2\%$	Local repair of areas damaged	Not Applicable
			2	$r = 2 - 10\%$	and liable to be damaged. 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 $d > D/2$
			3	$r = 10 - 20\%$	Bonded Inlay within 15 days	
			4	$r = 20 - 30\%$		
			5	$r > 30\%$ and $h > 25\text{ mm}$	Reconstruct slab within 30 days	
			0		No action.	
			1	$t > 1\text{ mm}$		
9	<b>Polished Surface/Glazing</b>	t = texture depth, sand patchtest	2'	$t = 1 - 0.6\text{ mm}$	Monitor rate of deterioration	Not Applicable
			3	$t = 0.6 - 0.3\text{ mm}$		
			4	$t = 0.3 - 0.1\text{ mm}$		

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	$t < 0.1 \text{ mm}$	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	$n = \text{number}/\text{m}^2$ $d = \text{diameter}$ $h = \text{maximum depth}$	0	$d < 50 \text{ mm}; h < 25 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	No action.	Not Applicable
			1	$d=50-100\text{mm}; h<50\text{mm}; n<1 \text{ per } 5 \text{ m}^2$	Partial depth repair 65 mm deep.	
			2	$d=50-100\text{mm}; h>50\text{mm}; n<1 \text{ per } 5 \text{ m}^2$	Within 15 days	

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

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

				and trapping incompressible material.		
12	<b>Spalling of Joints</b>	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	<b>Faulting (orStepping)</b>	f = difference of level	0	not discernible, < 1 mm	No action.	No action.

	<b>in Cracks or Joints</b>		1	$f < 3 \text{ mm}$		
			2	$f = 3 - 6 \text{ mm}$	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30days
			3	$f = 6 - 12 \text{ mm}$	Diamond Grinding	
			4	$f = 12 - 18 \text{ mm}$	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	$f > 18 \text{ mm}$	Strengthen subgrade and sub-base by grouting and raising sunken slab	
14	<b>Blowup or Buckling</b>	h = vertical displacement from normal profile	0	Nil, not discernible	<b>Short Term</b>	<b>Long Term</b>
					No Action	
			1	$h < 6 \text{ mm}$		
			2	$h = 6 - 12 \text{ mm}$	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 morepieces	Replace broken slabs. Within 30 days	
15	<b>Depression</b>	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	$h > 100 \text{ mm}$	if $L < 20 \text{ m}$ . Within 30 days	
16	<b>Heave</b>	h = positive vertical displacement from normal profile.  L = length	0	Not discernible. $h < 5 \text{ mm}$	<b>Short Term</b>	scrabble
					No action.	
			1	$h = 5 - 15 \text{ mm}$	Follow up.	
			2	$h = 15 - 30 \text{ mm}$ , Nos $< 20\%$ joints	Install Signs to Warn Traffic  within 7 days	
			3	$h = 30 - 50 \text{ mm}$		
			4	$h > 50 \text{ mm}$ or $> 20\%$ joints	Stabilise subgrade. Reinstate pavement at normal level if length $< 20 \text{ m}$ . Within 30 days	
			5	$h > 100 \text{ mm}$		
17	<b>Bump</b>	h = vertical	0	$h < 4 \text{ mm}$	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	<b>Lane to Shoulder Dropoff</b>	f = difference of level	0	Nil, not discernible < 3mm	<b>Short Term</b>	<b>Long Term</b>
					No action.	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder	

			4	f = 50 - 75 mm	within 7 dayss	For any 100 m stretch Reconstruct shoulder, if a
			5	f > 75 mm		Within 30days
<b>Drainage</b>						
19	<b>Pumping</b>	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	<b>Ponding</b>	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do-	

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

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

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



Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Initial 7 days Retro reflectivity: 100 mcd/m <sup>2</sup> /lux Minimum Threshold Level: 50 mcd/m <sup>2</sup> /lux					
	Skid Resistance	Initial and Minimum performance for SkidResistance: 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	change of signboard	48 hours in case of Mandatory	IRC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.		Signs, Cautionary and Informatory Signs (Single and Dual postsigns)  1 Month in case of Gantry/Cantilever Sign boards	
<b>Kerb</b>	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	<u>Functionality:</u> Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
<b>Other Road Furniture</b>	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014,IRC:35-2015
	Pedestrian Guardrail	<u>Functionality:</u> Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	<u>Functionality:</u> Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of	<u>Functionality:</u> 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	<u>Functionality:</u> Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119-2015
	Guard Posts and Delineators	<u>Functionality:</u> Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	<u>Functionality:</u> Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
<b>Highway Lighting System</b>	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	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	

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

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/lab 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 Delamination of concrete not more than 0.25 sq.m. Cracks wider than 0.3 mm not more than 1m aggregate length	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

	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.
<b>Bridges including ROBs Flyover etc. as applicable</b>	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
<b>Bridge -Super Structure</b>	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3 days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 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 load 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 gap thoroughly	3 days	MORTH specifications 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 drainagespout if any leakages observed.	3 days	MORTH specification 2700.
<b>Bridge-substructure</b>	Cracks/spalling of concrete/rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to 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.
<b>Bridge Foundations</b>	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH 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.	
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**Note:** Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.

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

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

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

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

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

**A. Flexible Pavement**

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

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
<b>(f) Rest area</b>		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
<b>(g) [TollPlaza]</b>		
<b>(h) Other Project Facilities and Approach roads</b>		
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobilecrane	4 (four) hours
<b>Bridges</b>		
<b>(a) Superstructure</b>		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
<b>(b) Foundations</b>		

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

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

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

## **Schedule - F**

*(See Clause 4.1 (vii)(a))*

### **Applicable Permits**

#### **1. Applicable Permits**

- (i) The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:
  - (a) Permission of the State Government for extraction of boulders from quarry;
  - (b) Permission of Village 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]

**National Highways & Infrastructure Development Corporation Ltd.**  
**PTI Building, 3rd Floor,**  
**4, Parliament Street**  
**New Delhi - 110001**

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 Four Lane Badarpur Bypass from Design Chainage km 27+300 at crossing with NH-6 (Old NH-44) Near Siddeswar Pt.-I Village to Design Chainage km 38+400 on NH-37 (Old NH-44) at Kandigram Chaita Village in the State of Assam on EPC Mode under Bharatmala Pariyojana in Economic Corridors (Project Length - 11.1 km) 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 Rscr. (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 & Infrastructure Development Corporation Ltd],

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

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder
8. The Guarantee shall cease to be in force and effect on \*\*\*\*\$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall

be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
12. This guarantee shall also be operatable at our ..... Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment 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:-

S. 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 CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1 <sup>st</sup> 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.
-

## Annex – II

(Schedule - G)

(See Clause 19.2)

### Form for Guarantee for Advance Payment

**National Highways & Infrastructure Development Corporation Ltd.  
PTI Building, 3rd Floor,  
4, Parliament Street,  
New Delhi - 110001**

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 Four Lane Badarpur Bypass from Design Chainage km 27+300 at crossing with NH-6 (Old NH-44) Near Siddeswar Pt.-I Village to Design Chainage km 38+400 on NH-37 (Old NH-44) at Kandigram Chaita Village in the State of Assam on EPC Mode under Bharatmala Pariyojana in Economic Corridors (Project Length – 11.1 km) 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 installment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

2. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
3. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
4. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
5. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.
6. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in

writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

7. The Guarantee shall cease to be in force and effect on \*\*\*\*. Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.
8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
10. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
11. This guarantee shall also be operatable at our ..... Branch at Guwahati, 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 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:-

S. No.	Particulars	..... Details
1	Name of the Beneficiary	RO NHIDCL PROJECTS
2	Beneficiary Bank Account No.	73653210000013
3	Beneficiary Bank Branch	Canara Bank [IFSC : CNRB0017365]
4	Beneficiary Bank Branch Name	Dispur, Guwahati
5	Beneficiary Bank Address	Upasana Complex, Dr. R. P. Road, Ganeshguri, Dispur, Guwahati

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 Clauses 10.1.4 and 19.3)

### CONTRACT PRICE WEIGHTAGES

1.1 The Contract Price for this Agreement is Rs. \_\_\_\_\_/-

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

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
1	2	3	4
Road Works including Culverts, widening and repair of culverts	55.81%	<b>A- Widening and strengthening of existing road</b>	
		(1) Earthwork up to top of the sub-grade	-
		(2) Sub-base Course	-
		(3) Non bituminous Base course	-
		(4) Bituminous Base course	-
		(5) Wearing Coat	-
		(6) Widening and Repair of Culverts	-
		<b>B.1- Reconstruction/New Intermediate 4-Lane Realignment / Bypass (Flexible Pavement)</b>	
		(1) Earthwork up to top of the sub-grade	46.30%
		(2) Sub-base Course	12.93%
		(3) Non bituminous Base course	11.67%
		(4) Bituminous Base course	9.56%
		(5) Wearing Coat	5.14%
		<b>B.2- Reconstruction/New Intermediate 4-Lane Realignment / Bypass (Rigid Pavement)</b>	
		(1) Earthwork up to top of the sub-grade	-
		(2) Sub-base Course	-
		(3) Dry Lean Concrete (DLC) Course	-
		(4) Pavement Quality Control (PQC) Course	-
		<b>C.1- Reconstruction/ New Service Road/ Slip Road (Flexible Pavement)</b>	
		(1) Earthwork up to top of the sub-grade	0.25%
(2) Sub-base Course	0.90%		
(3) Non bituminous Base course	0.63%		
(4) Bituminous Base course	0.54%		
(5) Wearing Coat	0.35%		

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
1	2	3	4
		<b>C.2- Reconstruction/New Service Road (Rigid Pavement)</b>	
		(1) Earthwork up to top of the sub-grade	-
		(2) Sub-base Course	-
		(3) Dry Lean Concrete (DLC) Course	-
		(4) Pavement Quality Control (PQC) Course	-
		<b>D- Reconstruction &amp; New Culverts on existing road, realignments, bypasses</b>	
		Culverts (length <6m)	11.73%
<b>Total of "Road Works including Culverts, widening and repair of culverts"</b>			<b>100.00%</b>
<b>Minor bridge/Underpasses/ Overpasses</b>	<b>5.95%</b>	<b>A.1- Widening and repairs of Minor Bridges (length&gt;6m &amp;&lt;60m)</b>	
		Minor Bridges (Repair)	-
		<b>A.2- New Minor bridges (length &gt;6 m and &lt; 60 m)</b>	
		(1) Foundation: On completion of the foundation work including foundations for wing and return walls.	41.70%
		(2) Sub-Structure: On completion of the abutments, piers up to the abutment/pier cap.	6.75%
		(3) Super-structure: Including Girder, deck Slab, bearing (excluding wearing coat and expansion joints).	
		3 (a) Super -Structure: Casting of Girder/Fabrication of Girders (Steel)	4.65%
		3 (b) Super -Structure: Erection of Girders, deck slab and bearings	7.74%
		(4) Other Ancillary Works: Wearing Coat, expansion joints, hand rails, crash barriers, tests on completion etc. Complete in all respect.	3.10%
(5) Approaches: Oncompletion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	4.34%		

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
1	2	3	4
		(6) Guide Bunds, Gabion Protection and River Training Works: On completion of Guide Bunds and river Training Works complete in all respects	-
		<b>B.1- Widening and repairs of underpasses/Overpasses</b>	
		Underpasses/ Overpasses	-
		<b>B.2- New Underpasses /Overpasses</b>	
		(1) Foundation: On completion of the foundation work including foundations for wing and return walls.	15.61%
		(2) Sub-Structure: On completion of the abutments, piers up to the abutment/ pier cap.	5.11%
		(3) Super-structure: Including girder, deck slab, bearings (excluding wearing coat and expansion joints)	8.54%
		(4) Other Ancillary Works: Wearing coat#, expansion joints, hand rails, crash barriers, test on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass- rigid pavement including drainage facility complete in all respects as specified as specified.	2.14%
		(4) Approaches: On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	0.32%
<b>Total of "Minor bridge/Underpasses/Overpasses "</b>			<b>100.00%</b>
<b>Major bridge(length&gt;60m) works and ROB/RUB/elevated sections/flyovers including viaducts if any</b>	<b>27.03%</b>	<b>A.1- Widening and repairs of Major Bridges</b>	
		(1) Foundation	-
		(2) Sub-structure	-
		(3) Super-structure (including bearings)	-
		(4) Wearing Coat including expansion joints	-

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
1	2	3	4
		(5) Miscellaneous Items like handrails, crash barriers, road markings etc.)	-
		(6) Wing walls/return walls up to top	-
		(7) Guide bunds, River Training works etc.	-
		(8) Approaches (including Retaining walls, stone pitching and protection works)	-
		<b>A.2- New Major Bridges</b>	
		(1) Foundation	24.45%
		(2) Sub-structure	4.89%
		(3) Super-structure: Including Girder, deck Slab, bearing (excluding wearing coat and expansion joints).	
		(3) (a) Super -Structure: Casting of Girder/Fabrication of Girders (Steel)	10.08%
		(3) (b) Super -Structure: Erection of Girders, deck slab and bearings	15.12%
		(4) Wearing Coat including expansion joints	1.72%
		(5) Miscellaneous Items like handrails, crash barriers, road markings etc.)	2.23%
		(6) Wing walls/return walls up to top	-
		(7) Guide bunds, Gabion Works, River Training works etc.	-
		(8) Approaches (including Retaining walls, stone pitching and protection works)	5.48%
		<b>B.1- Widening and repairs of</b>	
		<b>(a) ROB</b>	
		<b>(b) RUB</b>	
		(1) Foundations	-
		(2) Sub-Structure	-
		(3) Super-Structure (Including bearings)	-
		(4) Wearing Coat (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	-
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	-
		(6) Wing walls/Return walls	-

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
1	2	3	4
		(7) Approaches (including Retaining walls, stone pitching and protection works)	-
		<b>B.2- New ROB/RUB/LHS</b>	
		(1) Foundations	8.99%
		(2) Sub-Structure	2.70%
		(3) Super-Structure (Including bearings)	
		a) Super -Structure: Casting of Girder/Fabrication of Girders (Steel)	5.45%
		b) Super -Structure: Erection of Girders, deck slab and bearings	8.17%
		(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 (c) in case of LHS-rigid pavement and wearing coat under LHS including drainage facility complete in all respects as specified	0.81%
		(5) Miscellaneous Items like handrails, crash barrier,Covershed(LHS), height gauge, road markings etc.	0.80%
		(6) Wing walls/Return walls	-
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.67%
		<b>C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators</b>	
		(1) Foundations	-
		(2) Sub-Structure	-
		(3) Super-Structure (Including bearings)	-
		(4) Wearing Coat (including expansion joints)	-
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	-
(6) Wing walls/Return walls	-		

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
1	2	3	4
		(7) Approaches and Other Ancillary Works (wearing coat, expansion joints, handrails, crash barriers, road signs & markings, stone pitching, protection works etc.)	-
		<b>C.2- New Elevated Section/Flyovers/Grade Separators</b>	
		(1) Foundations	3.96%
		(2) Sub-Structure	0.83%
		(3) Super-Structure (Including bearings)	
		a) Super -Structure: Casting of Girder/Fabrication of Girders (Steel)	1.05%
		b) Super -Structure: Erection of Girders, deck slab and bearings	1.56%
		(4) Wearing Coat (including expansion joints)	0.33%
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	0.27%
		(6) Wing walls/Return walls	-
		(7) Approaches and Other Ancillary Works (road signs & markings, stone pitching, protection works etc.)	0.44%
<b>Total of "Major bridge(length&gt;60m) works and ROB/RUB/elevated sections/flyovers including viaducts"</b>			<b>100.00%</b>
<b>Other Works</b>	<b>8.75%</b>	(i) Toll Plaza	-
		(ii) Roadside drains	
		(a) Unlined Drain	0.56%
		(b) Covered Drain/ Lined drain	0.19%
		(iii) Road signs, markings, studs, Road Furniture, km stones, safety devices,	7.69%
		(iv) Crash Barrier/Pedestrian guard Rails	29.26%
		(iv) Project facilities	
		a) Bus Bays	2.74%
		b) Truck Lay-Byes	-
		c) Rest Areas	-
		<b>d) Others</b>	
		i) ATMS	-
		ii) Lighting	0.68%
		<b>e) Miscellaneous</b>	

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
1	2	3	4
		i) Utility Ducts	0.55%
		ii) Chequered Tiles	-
		f) Rainwater Harvesting	-
		(g) Roadside Plantation	1.57%
		(vi) Protection works other than approaches to the bridges, elevated sections/ flyovers/grade separators and ROB/RUBs.	
		(a) Retaining Wall / (b) Toe Wall	4.78%
		(c) Stone pitching work	15.58%
		(d) Breast Wall	-
		(e) RE Wall	
		Casting of Panel	9.66%
		Erection of Panel	14.48%
		(f) Hydroseeding	0.01%
		(g) Mulching	0.08%
		(h) Chute drain	7.89%
		(vii) Safety and traffic management during construction	
		a) Temporary diversion	0.78%
		(viii) Junctions	2.99%
		(ix) Maintenance of Road during Construction Period	-
		(viii) Other miscellaneous works including loop& Ramps, site clearances, repair & rehabilitation	0.51%
<b>Total of "Other Works"</b>			<b>100.00%</b>
<b>Utility Works</b>	<b>2.46%</b>	(i) EHT line	-
		(ii) EHT Line crossings	-
		(iii) Shifting of existing Electrical LT/11 KV/ 33 KV	51.53%
		(iv) HT/LT Crossings	42.54%
		(v) UG Cable / Crossings	
		(vi) Shifting of existing Water Supply pipelines	5.93%
		(vii) Water pipeline crossings	
		(viii) Sewage pipeline	-
		(ix) Sewage pipeline crossings	-

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
1	2	3	4
Total of "Utility Works"			100.00%

**1.3** Procedure of estimating the value of work done.

**1.3.1 Road works**

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

**Table 1.3.1**

Stage of Payment	Percentage Weightage	Payment Procedure
1	2	3
<b>A- Widening &amp; Strengthening of road</b>		
(1) Earthwork up to top of the sub-grade	-	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5 (five) percent of the total length.
(2) Sub-base Course	-	
(3) Non bituminous Base course	-	
(4) Bituminous Base course	-	
(5) Wearing Coat	-	
(6) Widening and Repair of Culverts	-	Cost of five completed culverts shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least five culverts.
<b>B.1- Reconstruction/New Intermediate 4-Lane Realignment / Bypass (Flexible Pavement)</b>		
(1) Earthwork up to top of the sub-grade	46.30%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 1 (one) km length whichever is less.
(2) Sub-Base Course	12.93%	
(3) Non-Bituminous Base course	11.67%	
(4) Bituminous Base course	9.56%	
(5) Wearing Coat	5.14%	
<b>B.2- Reconstruction/New Intermediate 4-Lane Realignment / Bypass (Rigid Pavement)</b>		
(1) Earthwork up to top of the sub-grade	-	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 1(one) km length, whichever is less.
(2) Sub-base Course	-	
(3) Dry Lean Concrete (DLC) Course	-	
(4) Pavement Quality Control	-	

Stage of Payment	Percentage Weightage	Payment Procedure
1	2	3
(PQC) Course		
<b>C.1- Reconstruction/ New Service Road/ Slip Road (Flexible Pavement)</b>		
(1) Earthwork up to top of the sub-grade	0.25%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 1(one) km length, whichever is less.
(2) Sub-Base Course	0.90%	
(3) Non-Bituminous Base course	0.63%	
(4) Bituminous Base course	0.54%	
(5) Wearing Coat	0.35%	
<b>C.2- Reconstruction/New Service Road (Rigid Pavement)</b>		
(1) Earthwork up to top of the sub-grade	-	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 1(one) km length, whichever is less.
(2) Sub-base Course	-	
(3) Dry Lean Concrete (DLC) Course	-	
(4) Pavement Quality Control (PQC) Course	-	
<b>D- Reconstruction &amp; New Culverts on existing road, realignments, bypasses</b>		
Culverts (length <6m)	11.73%	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:

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

Where,

P = Contract Price

L = Total 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**

### 1.3.2 Minor Bridges and Underpasses/Overpasses

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

**Table 1.3.2**

Stage of Payment	Weightage	Payment Procedure
1	2	3
<b>A.1- Widening and repairs of Minor Bridges (length&gt;6m &amp;&lt;60m)</b>	-	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of widening & repair works of a minor bridge
<b>A.2- New Minor Bridges (length&gt;6m &amp;&lt;60m)</b>		
(1) Foundation: On completion of the foundation work including foundations for wing and return walls.	41.70%	(i) 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 subject to completion of at least one 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 the abutments, piers up to the abutment/pier cap.	6.75%	(i) 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 sub-structure of each bridge subject to completion of at least one sub-structure upto abutment/pier cap level of each bridge.
(3) Super-structure: Including Girder, deck slab, bearings (excluding wearing coat and expansion joints)		

Stage of Payment	Weightage	Payment Procedure
1	2	3
a) Super -Structure: Casting of Girder/Fabrication of Girders (Steel)	4.65%	<b>a) Super-structure (Casting of Girders):</b> Unit of Measurement is Numbers. Payment against casting of girders shall be made on pro-rata basis with respect of total numbers of girders required in the structure on completion of a stage i.e., Completion of Girder Casting of at least one Span.
b) Erection of Girders, deck slab and bearings	7.74%	<b>b) Super-Structure (Erection of Girders, deck slab and bearings)</b> Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including Bearing of at least one Span
<b>(4) Other Ancillary Works:</b> Wearing Coat, expansion joints, hand rails, crash barriers, tests on completion etc. Complete in all respect.	3.10%	Payment shall be made on pro-rata basis on Completion of the stage in all respect as specified
(5) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	4.34%	<b>Approaches:</b> Payment shall be made on pro-rata basis on completion of a stage i.e., completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause.
(6) Guide Bunds, gabion Protection and River Training Works: On completion of Guide Bunds and river training works complete in all respects	-	<b>Guide Bunds and River Training Works:</b> Payment shall be made on pro-rata basis on completion of a stage i.e., completion of Guide Bunds and River training Works in all respects as specified
<b>B.1- Widening and repairs of underpasses/overpasses</b>		
<b>Underpasses/ Overpasses</b>	-	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/ overpasses. Payment shall be made on the completion of widening & repair works of an underpass/overpass.

Stage of Payment	Weightage	Payment Procedure
1	2	3
<b>B.2- New Underpasses/Overpasses</b>		
<p><b>(1) Foundation:</b> On completion of the foundation work including foundations for wing and return walls.</p>	15.61%	<p><b>(i) Foundation:</b> Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length (m) of the underpass/overpass.</p> <p>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 underpass/overpass subject to completion of at least one foundation of each underpass/overpass.</p> <p>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.</p>
<p><b>(2) Sub-Structure:</b> On completion of the abutments, piers up to the abutment/pier cap.</p>	5.11%	<p><b>(ii) Sub-Structure:</b> Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length (m) of the underpass/overpass.</p> <p>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 sub-structure of each underpass/overpass subject to completion of at least one sub-structure upto abutment/pier cap level of each underpass/overpass.</p>
<p><b>(3) Super-structure:</b> Including girder, deck slab, bearings (excluding wearing coat and expansion joints) specified</p>	8.54%	<p><b>(iii) Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. 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.</p>

Stage of Payment	Weightage	Payment Procedure
1	2	3
<p><b>(4) Other Ancillary Works:</b> Wearing coat#, expansion joints, hand rails, crash barriers, test on completion etc. complete in all respect.</p> <p>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</p>	2.14%	<p><b>(iv) Other Ancillary Works:</b> Payment shall be made on Pro rata basis on completion of a stage</p>
<p><b>(4) Approaches:</b> On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.</p>	0.32%	<p><b>(i) Approaches:</b> Payment shall be made on pro-rata basis on completion of a stage i.e., completion of approaches in all respect as specified.</p>

### 1.3.3 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	Weightage	Payment Procedure
1	2	3
<b>A.1- Widening and repairs of Major Bridges</b>		
(1) Foundation:	-	(i) 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 prorata basis on completion of a stage i.e., not less than 25% of the scope of foundation of the major Bridge subject to completion of at least two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure:	-	(ii) Sub-Structure: Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e., not less than 25% of the scope of substructure of the major bridge subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the major bridge.
(3) Super-structure: (including bearings)	-	<b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure including bearings of at least one span in all respects as specified.
(4) Wearing Coat including expansion joints	-	<b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	-	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(6) Wing walls/Return walls	-	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	-	<b>Guide Bunds, River Training works:</b> Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	-	<b>Approaches:</b> Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
<b>A.2- New Major Bridges</b>		
(1) Foundation: On completion of the foundation work including foundations for return walls, abutments, piers.	24.45%	(i) 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 prorata basis on completion of a stage i.e., not less than 25% of the scope of foundation of the major Bridge subject to completion of at least two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure:	4.89%	(ii) Sub-Structure: Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e., not less than 25% of the scope of substructure of the major bridge subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the major bridge.
(3) Super-structure: (including bearings)		<b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure including bearings of at least one span in all respects as specified.

Stage of Payment	Weightage	Payment Procedure
1	2	3
a) Super -Structure: Casting of Girder/Fabrication of Girders (Steel)	10.08%	a) Super-structure (Casting of Girders): Unit of Measurement is Numbers. Payment against casting of girders shall be made on pro-rata basis with respect of total numbers of girders required in the structure on completion of a stage i.e., Completion of Girder Casting of at least one Span.
b) Super -Structure: Erection of Girders, deck slab and bearings	15.12%	b) Super-Structure (Erection of Girders, deck slab and bearings) Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including Bearing of at least one Span
(4) Wearing Coat including expansion joints	1.72%	<b>Wearing Coat:</b> Payment shall be made on completion of wearingcoat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	2.23%	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/Return walls	-	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	-	<b>Guide Bunds, River Training works:</b> Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	5.48%	<b>Approaches:</b> Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
<b>B.1- Widening and repairs of</b> <b>(a) ROB</b> <b>(b) RUB</b>		

Stage of Payment	Weightage	Payment Procedure
1	2	3
(1) Foundation:	-	<p>(i) Foundation: Cost of each Major Bridge 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 prorata basis on completion of a stage i.e., not less than 25% of the scope of foundation of the ROB/RUB subject to completion of at least two foundations of the ROB/RUB.</p> <p>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.</p>
(2) Sub-structure:	-	<p>(ii) Sub-Structure: Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e., not less than 25% of the scope of substructure of the ROB/RUB subject to completion of at least two sub-structures of abutments/piers up to abutment/ pier cap level of the ROB/RUB.</p>
(3) Super-structure: (including bearings)	-	<p><b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure including bearings of at least one span in all respects as specified.</p>
(4) Wearing Coat including expansion joints	-	<p><b>Wearing Coat:</b> Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified as specified.</p>
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	-	<p><b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.</p>
(6) Wing walls/Return walls	-	<p><b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.</p>

Stage of Payment	Weightage	Payment Procedure
1	2	3
(7) Approaches (including Retaining walls, stone pitching and protection works)	-	<b>Approaches:</b> Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
<b>B.2- New ROB/ RUB/LHS</b>		
(1) Foundation:	8.99%	(i) Foundation: Cost of each Major Bridge 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 prorata basis on completion of a stage i.e., not less than 25% of the scope of foundation of the ROB/RUB/LHS subject to completion of at least two foundations of the ROB/RUB/LHS. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure:	2.70%	(ii) Sub-Structure: Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e., not less than 25% of the scope of substructure of the ROB/RUB subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the ROB/RUB/LHS.
(3) Super-structure: (including bearings)		
a) Super -Structure: Casting of Girder/Fabrication of Girders (Steel)	5.45%	<b>a) Super-structure (Casting of Girders):</b> Unit of Measurement is Numbers. Payment against casting of girders shall be made on pro-rata basis with respect of total numbers of girders required in the structure on completion of a stage i.e., Completion of Girder Casting of at least one Span.
b) Super -Structure: Erection of Girders, deck slab and bearings	8.17%	<b>b) Super-Structure (Erection of Girders, deck slab and bearings)</b> Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including Bearing of at least one Span

Stage of Payment	Weightage	Payment Procedure
1	2	3
(4) Wearing Coat including expansion joints	0.81%	<b>Wearing Coat:</b> Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified. <b>(c)</b> in case of LHS- rigid pavement under LHS and wearing coat including drainage facility complete in all respects as specified as specified.
(5) Miscellaneous Items like handrails, crash barriers, road markings, Cover Shed (LHS), height gauge etc.	0.80%	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings, Cover Shed (LHS), height gauge etc. complete in all respects as specified.
(6) Wing walls/Return walls	-	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls, stone pitching and protection works)	0.67%	<b>Approaches:</b> Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified including Drain work.
<b>C.1- Widening and repairs of Elevated Section/ Flyovers/ Grade Separators</b>		
(1) Foundation	-	(i) Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on prorata basis on completion of a stage i.e., not less than 25% of the scope of foundation of the structure subject to completion of at least two foundations of the structure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(2) Sub-structure	-	Sub-structure: Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e., not less than 25% of the scope of substructure of the structure subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the structure.
(3) Super-structure: (including bearings)	-	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.
(4) Wearing Coat including expansion joints	-	<b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	-	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	-	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls, stone pitching and protection works)	-	<b>Approaches:</b> Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
<b>C.2- New Elevated Section/ Flyovers/ Grade Separators</b>		
(1) Foundation	3.96%	(i) Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on prorata basis on completion of a stage i.e., not less than 25% of the scope of foundation of the structure subject to completion of at least two foundations of the structure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(2) Sub-structure	0.83%	Sub-structure: Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e., not less than 25% of the scope of substructure of the structure subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the structure.
(3) Super-structure: (including bearings)		
a) Super -Structure: Casting of Girder/Fabrication of Girders (Steel)	1.05%	a) Super-structure (Casting of Girders): Unit of Measurement is Numbers. Payment against casting of girders shall be made on pro-rata basis with respect of total numbers of girders required in the structure on completion of a stage i.e., Completion of Girder Casting of at least one Span.
b) Super -Structure: Erection of Girders, deck slab and bearings	1.56%	b) Super-Structure (Erection of Girders, deck slab and bearings) Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including Bearing of at least one Span
(4) Wearing Coat including expansion joints	0.33%	<b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	0.27%	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	-	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls, stone pitching and protection works)	0.44%	<b>Approaches:</b> Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.

### 1.3.4 OtherWorks.

Procedureforestimatingthevalueofotherworksdonehallbeasstatedintable 1.3.4:

**Table1.3.4**

Stage of Payment	Weightage	Payment Procedure
1	2	3
(i) Toll Plaza	-	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(ii) Roadside drains		Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(a) Unlined Drain	0.56%	
(b) Covered Drain/ Lined drain	0.19%	
(iii) Road signs, markings, studs, Road Furniture, km stones, safety devices,	7.69%	
(iv) Crash Barrier/Pedestrian guard Rails	29.26%	
(iv) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus Bays	2.74%	
b) Truck Lay-Byes	-	
c) Rest Areas	-	
<b>d) Others</b>		
i) ATMS	-	
ii) Lighting	0.68%	
<b>e) Miscellaneous</b>		
i) Utility Ducts	0.55%	
ii) Chequered Tiles	-	
f) Rainwater Harvesting	-	Cost of each Rainwater Harvesting Unit shall be determined on pro- rata basis with respect to the total number of Rainwater Harvesting Unit. Payment shall be made on the completion of Ten Numbers.
(g) Roadside Plantation	1.57%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(vi) Protection Works other than approaches to the bridges, elevated sections/ flyover/ grade separators and ROBs/ RUBs		
(a) Retaining Wall/(b) Toe Wall	4.78%	Payments shall be made on pro rata basis on completion of 20% of the total area.
(c) Stone pitching work	15.58%	Payments shall be made on pro rata basis on completion of 20% of the total area.
(d) Breast Wall	-	

Stage of Payment	Weightage	Payment Procedure
1	2	3
(e) RE Wall		
a) Panel Casting	9.66%	a) Panel Casting: Unit of Measurement is area in Sqm. Payment against casting of panels shall be made on pro rata basis with respect to total area of panels required for the structure on completion of a stage i.e., not less than completion of 25% of scope of RE Wall panel.
b) Erection of Panel	14.48%	b) Erection of Panel: Payment shall be made on pro-rata basis on completion of a stage i.e., completion of erection of panels for structure complete in all respect.
(f) Hydroseeding	0.01%	Payments shall be made on pro rata basis on completion of 20% of the total area.
(g) Mulching	0.08%	Payments shall be made on pro rata basis on completion of 20% of the total area.
(h) Chute Drain	7.89%	Payments shall be made on pro rata basis on completion of 20% of the total area.
(vii) Safety and traffic management during construction		Payment shall be made on prorata basis every six months.
a) Temporary diversion	0.78%	
(viii) Junctions	2.99%	Cost of each Junction shall be determined on pro- rata basis with respect to the total number of Junctions. Payment shall be made on the completion of Ten numbers.
(ix) Maintenance of Road during Construction Period	-	Unit of measurement is linear length in km. Payment shall be made on pro-rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(viii) Other miscellaneous works including loop& Ramps, site clearances, repair & rehabilitation	0.51%	Payment should be made on pro rata basis on completion of each stage

### 1.3.5 Utility Shifting

Stage of Payment	Weightage	Payment Procedure
1	2	3
(i) (i) EHT line	-	Payment shall be made on pro rata basis on completion of 5% work of shifting of utilities.
(ii) (ii) EHT Line crossings	-	Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings.
(iii) Shifting of existing Electrical LT/11 KV/ 33 KV Lines	51.53%	Payment shall be made on pro rata basis on completion of 5% work of shifting of utilities.
(iv) HT/LT Crossings	42.54%	Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings.
(v) UG Cable / Crossings		
(vi) Shifting of existing Water Supply pipelines	5.93%	Payment shall be made on pro rata basis on completion of 5% work of shifting of utilities.
(vii) Water pipeline crossings		Payment shall be made on pro rata basis on completion of 5% work of shifting of utilities.

## 2. Procedure for payment for Maintenance

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

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

## **Schedule - I**

**(See Clause 10.2 (iv))**

### **Drawings**

#### **1. Drawings**

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

#### **2. Additional Drawings**

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

## **Annex – I**

**(Schedule - I)**

### **List of Drawings**

A minimum list of drawings of the various components/elements of the Project Highway and Project Facilities required to be submitted by the contractor is given below;

- (a) Drawing of horizontal alignment, vertical profile and cross sections
- (b) Drawings of cross drainage works
- (c) Drawings of interchanges, major intersections
- (d) Drawing of Toll Plaza layout, toll collection systems and roadway near toll plaza.
- (e) Drawing of control centre
- (f) Wayside Amenities/Service area/Parking area
- (g) Drawing of a truck parking lay bye with furniture and drainage system
- (h) Drawings of road furniture items including traffic signage, marking, safety barriers, etc.
- (i) Drawings of traffic diversions plans and traffic control measures
- (j) Drawings of road drainage measures
- (k) Drawings of typical details slope protection measures
- (l) Drawings of landscaping and horticulture
- (m) Drawings of street lighting
- (n) General arrangement showing area of base camp and administrative block.
- (o) Another drawings relevant to the project as desired by Authority Engineer.

## Schedule - J

(See Clause 10.3 (ii))

### Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

- (i) Project Milestone-I shall occur on the date falling on the **320<sup>th</sup>** 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 **548<sup>th</sup>** 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 **776<sup>th</sup>** 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 **913<sup>th</sup> day** from the Appointed Date.

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

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

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name)

(Designation) (Address)

## Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

### Payment Reduction for Non-Compliance

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

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

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

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

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

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

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

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

Where,

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

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

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

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

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

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

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

## **Schedule - N**

*(See Clause 18.1 (i))*

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

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

**1. Scope**

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

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

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

**2. Definitions and interpretation**

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

**3. General**

- (i) The Authority’s Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.
- (ii) The Authority’s Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:
- (a) any Time Extension;
  - (b) any additional cost to be paid by the Authority to the Contractor;

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

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

- (i) During the Construction Period, the Authority's Engineer shall review and approve the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1 (vi). The Authority's Engineer shall complete such review and approval and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.
- (ii) The Authority's Engineer shall review and approve any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.
- (iii) The Authority's Engineer shall review and approve the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty one) days stating the modifications, if any, required thereto.

- (iv) The Authority's Engineer shall complete the review and approve of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.
- (v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.
- (vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.
- (vii) The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.
- (viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.
- (ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.
- (x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.
- (xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.
- (xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.

- (xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.
- (xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.
- (xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.
- (xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.
- (xvii) In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.
- (xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

## **5. Maintenance Period**

- (i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.
- (ii) The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.

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

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

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

#### **7. Payments**

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

Contractor, after adjustments in accordance with the provisions of Clause 19.10.

- (iii) The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.
- (iv) The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

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

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

#### **9. Miscellaneous**

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

## **Schedule - 0**

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

### **Forms of Payment Statements**

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

The Stage Payment Statement for Works shall state:

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

#### **2. Monthly Maintenance Payment Statement**

The monthly Statement for Maintenance Payment shall state:

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

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

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

## **Schedule - P**

*(See Clause 20.1)*

### **Insurance**

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

(i) The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit on the number of occurrences.

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

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

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

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

## Schedule-Q

(See Clause 14.10)

### Tests on Completion of Maintenance Period

**1.** Riding Quality test:

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

**2.** Visual and physical test:

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

**Schedule-R**

*(See Clause 14.10)*

**Taking Over Certificate**

I, ..... (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated ..... (the "Agreement"), for [construction of the \*\*\*\*section (km \*\* to km \*\*) of

\*\*\*\*] (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

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