Schedule A

(See Clause 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

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

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

1.3 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 8.2.1 of this Agreement.

1.4 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 modified.

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

Annex-I
(Schedule-A)
Site

1. **Site**

The Site of the Two-Lane Project Highway comprises the section of National Highway 37 commencing from Km 453.000 (Existing Km 453.000) to Km 490.800 (Existing Km 491.050) i.e. Jorhat- Near Jhanji section in the state of Assam. The land, carriageway and structures comprising the site are described below.

2. Land

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

Design Chainage (Km)		Total ROW (in m)	Remarks
From	To		
453.000	459.000	60	Jorhat
459.000	461.535	60	
461.535	461.550	55	
461.550	461.725	60	
461.725	461.770	60	
461.770	461.890	60	
461.890	462.000	60	
462.000	468.775	60	Toll plaza at km 468.725
468.775	468.800	58	
468.800	479.000	60	
479.000	481.000	60	Teok
481.000	487.000	60	
487.000	488.400	60	Jhanji
488.400	489.200	60	Realignment
489.200	490.800	60	

Note:- The Existing ROW is based on Village map/Revenue Map.

3. Carriageway

The present Carriageway of the project highway is 2-lane. The type of the existing pavement is flexible. Details of carriageway and pavement are as under.

Existing Chainage		Carriageway width in m (BT)	Earthen Shoulders	
From	To		Left	Right
453.000	453.200	7	1.0	1.0
453.200	453.400	14	2.0	1.5
453.400	457.000	7	2.0	1.5
457.000	458.000	7	1.5	1.0
458.000	459.000	7	1.5	1.5
459.000	463.000	7	2.0	1.5
463.000	464.000	7	1.0	1.0
464.000	465.000	7	1.5	1.5

465.000	466.000	7	1.0	1.4
466.000	468.000	7	1.5	1.4
468.000	471.000	7	2.0	1.4
471.000	472.000	7	2.0	1.5
472.000	473.000	7	2.0	2.0
473.000	474.000	7	2.0	1.5
474.000	475.000	7	2.0	2.0
475.000	476.000	7	1.5	1.5
476.000	478.000	7	2.0	1.5
478.000	479.000	7	1.5	1.0
479.000	480.000	7	1.0	1.0
480.000	485.000	7	2.0	1.5
485.000	487.000	7	1.5	1.2
487.000	488.600	7	1.0	1.0
488.600	488.800	8	2.0	1.0
488.800	489.200	7	1.0	1.0
489.200	491.050	7	1.8	1.4

Road Work Under Construction Stage (partially complete)

Widening Portion					
Sl. No	**Chainage (km)**		**Length (Km)**	**Side**	**Status**
	From	**To**			
1	484.100	486.400	2.300	RHS	Subgrade Complete
2	487.200	488.200	1.000	RHS	Subgrade Complete
Sub-Total			**3.300**		
Realignment Portion					
Sl. No	**Chainage (km)**		**Length (Km)**	**Side**	**Status**
	From	**To**			
1	465.940	466.200	0.260	RHS	Embankment Partially Complete
2	466.700	468.000	1.300	RHS	Embankment Partially Complete
3	468.500	469.400	0.900	RHS	Embankment Partially Complete
Sub-Total			**2.460**		**Embankment Partially Complete**
4	483.200	486.750	3.550	LHS	Subgrade Complete
5	483.850	484.100	0.250	RHS	Subgrade Complete
6	486.400	487.000	0.600	RHS	Subgrade Complete
7	486.900	488.200	1.300	LHS	Subgrade Complete
Sub- Total			**5.700**		**Subgrade Complete**
10	483.200	483.400	0.200	RHS	Sub-Grade Partially Complete
11	483.600	483.850	0.250	RHS	Sub-Grade Partially Complete
12	487.160	487.200	0.040	RHS	Sub-Grade Partially Complete
Sub- Total			**0.490**		**Sub-Grade Partially Complete**
13	483.360	483.700	0.340	LHS	GSB Partially Complete
14	484.080	484.830	0.750	LHS	GSB Partially Complete
15	485.000	485.490	0.490	LHS	GSB Partially Complete
16	485.680	486.290	0.610	LHS	GSB Partially Complete
17	486.470	486.760	0.290	RHS	GSB Partially Complete
18	486.980	487.560	0.580	LHS	GSB Partially Complete
19	487.770	487.920	0.150	LHS	GSB Partially Complete
Sub- Total			**3.210**		**GSB Partially Complete**

4. Major Bridges

The site includes the following Major Bridges:

Sl. No.	Existing Chainage (km)	Type of Structures			No. of Spans with span length in m	Width (m)
		Foundation	Sub Structure	Super Structure		
1	458.200	Well	RCC Wall	RCC Box Girder	21.6+29.8+21.6=73 m	11.4
2	488.400	Well	RCC Wall	RCC Box Girder	33.5+38.55+33.5=105.6m	11.4

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

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

Sl. No.	Chainage (km)	Type of Structures		No. of Spans with span length (m)	Total Width (m)	ROB/RUB
		Foundation	Super Structure			
Nil						

6. Grade Separators

The Site includes the following grade separators.

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

7. Minor bridges

The Site includes the following minor bridges.

Sl. No.	Existing Chainage (km)	Type of Structures			No. of Spans with span length in m	Width (m)	Status
		Foundation	Sub Structure	Super Structure			
1	455.150	Shallow	RCC Wall	Solid Slab	2 x 8 = 16 m	7.9	
2	455.370	Shallow	PCC Gravity Wall	Solid Slab	1 x 6.1 = 6.1 m	7.9	
3	457.375	Shallow	RCC Wall	Solid Slab	2 x 9.4 = 18.8 m	7.9	
4	459.190	Shallow	PCC Gravity Wall	Solid Slab	1 x 8.7 = 8.7 m	7.9	
5	468.175	Shallow	PCC Wall	Solid Slab	2 x 7.2 = 14.4 m	7.9	
6	471.495	Shallow	PCC Gravity Wall	Solid Slab	1 x 10.62 = 10.62 m	7.9	
7	474.270	Shallow	PCC Wall	Solid Slab	2 x 10 = 20 m	7.9	
8	476.260	Shallow	PCC Gravity Wall	Solid Slab	1 x 6.3 = 6.3 m	7.9	

9	478.000	Shallow	PCC Wall	Solid Slab	2 x 7.3 = 14.6 m	7.9	
10	480.320	Shallow	PCC Wall	Solid Slab	2 x 7.5 = 15 m	7.9	
11	481.150	Shallow	PCC Wall	Solid Slab	2 x 7.5 = 15 m	7.9	
12	482.850	Shallow	PCC Wall	Solid Slab	2 x 7.5 = 15 m	7.9	

Minor Bridge Work Under Construction Stage (Partially complete)

Sl. No.	Existing Chainage (km)	Type of Structures			No. of Spans with span length in m	Width (m)	Status
1	482.850	Shallow	RCC Wall	Solid Slab	1x 14.2 = 14.2 m	12	New 2-lane bridge partially complete for RHS Service Road

8. Railway level crossings

The Site includes the following railway level crossings**:**

Sl. No.	Existing chainage (km)	Number of Tracks	Remarks
		Nil	

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses.

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

10. Culverts

The Site includes the following culverts,

10.1 List of Pipe Culverts

Sr. No.	Existing Chainage	Design Chainage	Existing Type of Structure	Existing (m) span Arrangement	Existing Width in m
1	453+900	453+895	HP	1x 1m dia	13.0
2	454+100	454+096	HP	1x 1 m dia	13.2
3	454+856	454+856	HP	1x0.9m dia	13.4
4	455+043	455+039	HP	1x0.9m dia	13.5
5	455+757	455+756	HP	1x0.9m dia	13.4
6	455+788	455+786	HP	1x1.2m dia	13.2
7	456+133	456+133	HP	1x1.2m dia	13.2
8	456+496	456+496	HP	1x0.9m dia	13.1
9	456+809	456+809	HP	1x 1m dia	13.0
10	456+841	456+841	HP	1x 1m dia	12.9

Sr. No.	Existing Chainage	Design Chainage	Existing Type of Structure	Existing (m) span Arrangement	Existing Width in m
11	457+260	457+254	HP	1x 1m dia	13.0
12	458+735	458+700	HP	1x 1m dia	13.1
13	459+190	459+147	HP	1x 1m dia	13.2
14	459+260	459+217	HP	1x 1m dia	13.1
15	459+768	459+725	HP	1x 1m dia	13.2
16	460+007	459+956	HP	1x 1m dia	13.0
17	460+157	460+107	HP	1x 1m dia	13.2
18	460+327	460+277	HP	1x 1m dia	13.2
19	460+455	460+405	HP	1x 1m dia	13.1
20	460+596	460+546	HP	1x 1m dia	13.2
21	460+718	460+667	HP	1x 1m dia	13.1
22	460+887	460+836	HP	1x 1m dia	13.0
23	461+305	461+251	HP	1x 1m dia	12.9
24	461+577	461+525	HP	1x 1m dia	12.9
25	461+811	461+757	HP	1x 1m dia	12.9
26	461+926	461+872	HP	1x 1m dia	12.8
27	462+090	462+032	HP	1x 1m dia	12.9
28	462+285	462+228	HP	1x 1m dia	12.7
29	462+610	462+550	HP	1x 1m dia	12.9
30	476+515	476+530	HP	2x1.2m dia	16.5
31	477+175	477+193	HP	2x1.2m dia	16.5
32	477+276	477+295	HP	2x1.2m dia	17.4
33	477+543	477+563	HP	2x1.2m dia	17.6
34	478+562	478+590	HP	2x1.2m dia	15.2
35	479+110	479+136	HP	2x1.2m dia	15.3

Pipe Culvert Work Under Construction Stage (partially complete)

Sr. No.	Existing Chainage	Design Chainage	Site Chainage	Existing Type of Structure	Existing (m) span Arrangement	Existing Width in m	Status
1	454+100	454+096	454+097	HP	1x 1 m dia	13.2	Completed in R/S except Protection work
2	454+856	454+856	454+856	HP	1x0.9m dia	13.4	Completed in R/S except Protection work
3	455+043	455+039	455+041	HP	1x0.9m dia	13.5	Completed in R/S except Protection work
4	455+757	455+756	455+756	HP	1x0.9m dia	13.4	Up to Cradle Concrete Completed in R/S except Head Wall & Protection Work
5	455+788	455+786	455+786	HP	1x1.2m dia	13.2	Up to Cradle Concrete Completed in R/S except Head Wall & Protection Work
6	456+133	456+133	456+131	HP	1x1.2m dia	13.2	Completed in R/S except Protection work

Sr. No.	Existing Chainage	Design Chainage	Site Chainage	Existing Type of Structure	Existing (m) span Arrangement	Existing Width in m	Status
7	456+496	456+496	456+496	HP	1x0.9m dia	13.1	Completed in R/S except Protection work
8	456+809	456+809	456+808	HP	1x 1m dia	13.0	Completed in R/S except Protection work
9	456+841	456+841	456+840	HP	1x 1m dia	12.9	Completed in R/S except Protection work
10	457+260	457+254	457+254	HP	1x 1m dia	13.0	Completed in R/S except Protection work
11	459+190	459+147	459+147	HP	1x 1m dia	13.2	Completed in R/S except Protection work
12	459+260	459+217	459+208	HP	1x 1m dia	13.1	Up to Cradle Concrete Completed in R/S except Head Wall & Protection Work
13	459+768	459+725	459+725	HP	1x 1m dia	13.2	Completed in R/S except Protection work
14	460+007	459+956	459+956	HP	1x 1m dia	13.0	Completed in R/S except Protection work
15	460+157	460+107	460+109	HP	1x 1m dia	13.2	Completed in R/S except Protection work
16	460+718	460+667	460+669	HP	1x 1m dia	13.1	Completed in R/S except Protection work
17	460+887	460+836	460+839	HP	1x 1m dia	13.0	Completed in R/S except Protection work
18	461+305	461+251	461+251	HP	1x 1m dia	12.9	Completed in R/S except Protection work
19	461+811	461+757	461+757	HP	1x 1m dia	12.9	Completed up to PCC R/S & Head Wall Ist Lift R/S completed.
20	461+926	461+872	461+872	HP	1x 1m dia	12.8	Completed up to PCC R/S & Head Wall Ist Lift R/S completed.
21	476+515	476+530	476+536	HP	2x1.2m dia	16.5	Exv. & PCC B/S Completed, Head Wall Ist Lift B/S completed
22	477+543	477+563	477+570	HP	2x1.2m dia	17.6	Up to Head Wall B/S Completed only protection work balance
23	478+562	478+590	478+596	HP	2x1.2m dia	15.2	Up to Head Wall B/S Completed only protection work balance
24	479+110	479+136	479+145	HP	2x1.2m dia	15.3	Up to Head Wall B/S Completed only protection work balance

10.2 List of Slab/Box/Arch Culverts

Sr. No.	Existing Chainage	Design Chainage	Existing Type of Structure	Existing (m) span Arrangement	Existing Width in m
1	453+171	453+171	Slab	1x1.9x1.6	11.0
2	463+597	463+536	Slab	1x1.5x2.0	11.0
3	464+649	464+586	Slab	1x1x1.5	10.6
4	465+570	465+507	Box	1x1.5x1.5	10.9
5	465+965	465+902	Box	1x1.5x1.5	10.8
6	467+234	467+206	Box	1x1.5x1.5	11.0
7	469+018	469+002	Box	1x1.5x1.5	10.6
8	469+684	469+667	Slab	1x3.0x1.5	10.3
9	470+472	470+460	Box	1x1.2x1.2	11.0
10	470+827	470+815	Slab	1x3.0x2	11.4
11	471+116	471+100	Box	1x1.5x1.5	11.2
12	472+351	472+351	Slab	1x6.0x3.0	10.3
13	472+953	472+953	Box	1x1.5x1.5	10.7
14	473+543	473+543	Box	1x1.5x1.5	10.3
15	473+934	473+943	Box	1x3.0x5.0	11.2
16	474+604	474+614	Slab	1x3.0x2.5	11.0
17	475+328	475+338	Slab	1x3.0x4.0	10.6
18	476+900	476+916	Slab	1x3.0x2.5	10.5
19	478+953	478+980	Slab	1x3.0x3.0	11.7
20	480+701	480+732	Box	1x1.5x1.0	11.5
21	481+693	481+821	Box	1x1.5x2.0	11.5
22	483+775	483+866	Box	1x3.0x2.0	13.1
23	484+856	484+931	Slab	1x0.9x3.0	12.1
24	485+571	485+646	Slab	1x6.0x4.0	19.0
25	487+871	487+920	Box	1x1.5x1.5	11.6

Box and Slab Culvert Work Under Construction Stage

Sr. No.	Existing Chainage	Design Chainage	Site Chainage	Existing Type of Structure	Existing (m) span Arrangement	Existing Width in m	Present Status
1	465+570	465+507	465+513	Box	1x1.5x1.5	10.9	12.500 m completed up to PCC out of scope 14.300 m
2	465+965	465+902	465+908	Box	1x1.5x1.5	10.8	14.930 m completed up to PCC out of scope 18.567 m
3	469+018	469+002	469+009	Box	1x1.5x1.5	10.6	11.800 m completed up to PCC out of scope 14.800 m
4	469+684	469+667	469+665	Slab	1x3.0x1.5	10.3	12.400 m completed up to PCC out of scope 14.400 m
5	470+827	470+815	470+822	Slab	1x3.0x2	11.4	31.218 m completed up to PCC out of scope 31.218 m
6	472+351	472+351	472+358	Slab	1x6.0x3.0	10.3	12.000 m completed up to PCC out of scope 14.100 m
7	476+900	476+916	476+924	Slab	1x3.0x2.5	10.5	14.579 m completed up to Slab out of scope 14.579 m & parapet wall not completed
8	478+953	478+980	478+987	Slab	1x3.0x3.0	11.7	14.700 m completed up to Slab out of scope 14.700 m & parapet wall not completed
9	481+693	481+821	481+829	Box	1x1.5x2.0	11.5	31.165 m completed up to Slab out of scope 31.165 m

Sr. No.	Existing Chainage	Design Chainage	Site Chainage	Existing Type of Structure	Existing (m) span Arrangement	Existing Width in m	Present Status
							& parapet wall not completed
10	483+775	483+866	483+882	Box	1x3.0x2.0	13.1	21 m completed up to Slab out of scope 21 m & parapet wall not completed
11	484+856	484+931	484+944	Slab	1x0.9x3.0	12.1	14.270 m completed up to Slab out of scope 14.270 m & Return Wall & Parapet Wall L/S Completed
12	485+571	485+646	485+659	Slab	1x6.0x4.0	19.0	14.600 m completed up to Slab out of scope 14.600 m
13	487+871	487+920	487+940	Box	1x1.5x1.5	11.6	15.545 m completed up to Slab out of scope 15.545 m & parapet wall not completed

11. Bus Bays

The details of existing bus bays on the site are as follows:-

Sl. No.	Chainage (km)	Left Hand Side	Right hand side
Nil			

12. Truck Lay byes

The details of truck lay byes are as follows:

Sl. No.	Chainage (km)	Left Hand Side	Right hand side
Nil			

13. Road side drains

The details of road side drains are noted on the existing alignment; the maximum location has been open drain/line drain and in built-up location covered drain

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Drain Work Under Construction Stage (partially complete)

Drain Status RHS					
Sl.No.	Chainage		Length (Km)	Present Status	Remarks
	From	To			
1	480.450	480.500	0.050	Wall Completed	
2	480.500	480.700	0.200	Slab Completed	
3	480.700	480.760	0.060	Wall Completed	
4	480.790	480.840	0.050	Wall Completed	
5	480.880	480.960	0.080	PCC Completed	
6	480.960	481.040	0.080	Slab Completed	
7	481.040	481.060	0.020	Wall Completed	
8	481.060	481.120	0.060	Slab Completed	
9	481.120	481.170	0.050	Wall Completed	
10	481.400	481.500	0.100	Wall Completed	
11	481.500	481.610	0.110	Slab Completed	
12	481.610	481.830	0.220	Wall Completed	

13	481.850	482.210	0.360	Wall Completed	
14	482.210	482.250	0.040	Raft Completed	
15	482.250	482.300	0.050	PCC Completed	
16	482.390	482.460	0.070	Wall Completed	
17	482.460	482.490	0.030	Raft Completed	
18	482.520	482.550	0.030	Raft Completed	
19	482.550	482.600	0.050	PCC Completed	
20	482.750	482.780	0.030	Raft Completed	
21	482.780	482.850	0.070	Wall Completed	
22	483.060	483.100	0.040	Raft Completed	

Drain Status LHS

Sl.No.	Chainage		Length (Km)	Description	**Remarks**
	From	To			
1	480.520	480.570	0.050	Slab Completed	
2	480.570	480.680	0.110	Wall Completed	
3	480.900	481.030	0.130	Slab Completed	
4	481.030	481.090	0.060	Wall Completed	
5	481.090	481.110	0.020	PCC Completed	
6	481.270	481.320	0.050	Raft Completed	
7	481.400	481.490	0.090	Wall Completed	
8	481.520	482.220	0.700	Wall Completed	
9	482.240	482.270	0.030	Wall Completed	
10	482.270	482.320	0.050	Raft Completed	
11	482.370	482.390	0.020	Wall Completed	
12	482.450	482.500	0.050	Raft Completed	
13	483.090	483.100	0.010	Wall Completed	

14. Major junctions

The details of major junctions are as follows:-

Sl. No	Existing Chainage	Design Chainage	Category of Road	Type of Junction	Remarks
1	457+200	457+250	-	4-legged	BaligaonCharali
2	461+600	461+500	-	4-legged	Nimatighat
3	479+950	479+950	ODR	3-legged	Baloma Junction
4	486+700	486+800	Village Road	4-legged (Shrugged)	Hanschara Village

15. Minor Junctions

The details of minor junctions are noted below:-

Sl. No	Design Chainage	Side (Left/Right)	Carriageway Width in m	
			Left	Right
1	455+772	Both Side	4.00	4.00
2	456+067	Right		7.00
3	458+200	Both Side	4.00	4.00
4	459+000	Left	3.50	
5	459+160	Both Side	3.50	3.50
6	460+000	Right		3.50
7	460+600	Left	3.50	
8	460+610	Right		3.50
9	460+810	Left	4.00	
10	464+000	Left	3.50	
11	465+300	Right		3.50
12	466+610	Right		3.50
13	466+876	Right		3.50
14	468+270	Left	3.50	
15	468+800	Left	3.50	
16	470+000	Right		3.50
17	471+636	Right		3.50
18	472+210	Left	3.50	
19	472+720	Both side	3.50	3.50
20	473+520	Left	4.00	
21	474+920	Left	4.00	
22	477+800	Left	4.50	
23	480+700	Left	5.00	
24	481+020	Left	4.50	
25	481+500	Left	4.00	
26	484+580	Right		3.50
27	489+920	Right		3.50

16. Bypasses

The details of bypasses are as follows :-

Sl. No	Name of Bypass (town)	Chainage (km) from…. to	Length in Km	Carriageway	
				Width (m)	Type
Nil					

17. Other Structures

Nil

Annex-II

(Schedule-A)

Dates for Providing Right of Way

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

Sl. No		From km to km	Length (In km)	Width (m)	Date of providing ROW
1		2	3	4	5
i)	Full Right of Way (full width) a) Stretch 1	Km 453 to km 490.800	34.400	60	At Appointed date
ii)	Part Right of Way(part width) a) Stretch 1	Toll Plaza at km 468.725	0.400	60	After 150 days from appointment date
iii)	Balance Right of way (Width) a) Stretch 1	Km 453 to km 490.800	3.000	60	After 150days from appointment date

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

Annex-III

(Schedule-A)
Alignment Plans

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

Annex-IV

(Schedule-A)
Environment Clearances

The expected dates of receiving the following Environment Clearances are:

Final Environmental clearances approval from MoEF has been accorded

(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-1 of this Schedule-B and in Schedule-C .

3 Specification 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 and strengthening

1. Widening of the Existing Highway

1.1 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 terrain to the extent land is available.

1.2 Width of carriageway

1.2.1 The paved carriageway shall be 17.5 (seventeen point five) metre wide excluding the median as per IRC: SP: 84-2009.

Provided that in following Built-up/urban stretches, the service road shall be provided with the main carriageway as per IRC: SP: 84-2009.

Sl. No	Name of Township	Existing Chainage (km)		Design Chainage (km)	
		From	To	From	To
1	Jorhat, BahatiaGaon	453+140	454+078	453+140	454+080
2	Shantipur	458+950	459+350	458+985	459+385
3	Lurkihat	462+197	464+363	462+140	464+300
4	Cheniamguri	466+230	467+349	466+200	467+320
5	Latugarh, DhekiaKhoa	470+013	471+213	470+000	471+200
6	Dihapool	472+700	474+140	472+700	474+150
7	Kakajan, KamarKhatoal	474+490	475+340	474+500	475+350
8	Teok, Midhaghat	479+932	483+000	479+950	483+100
9	Jhanji	488+527	489+000	488+575	489+050

1.2.2 Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.1 above.

1.2.3 Design Chainage corresponding to Existing Chainage

Kilometre stones are existing in entire length of the project highway. It is called the "Existing Chainage". During topography survey with Total Station, observations are made to these Km stones and after finalization of alignment by improving the existing geometry the chainage has been referred to "Design Chainage". The relationship between the "Existing Chainage" and the "Design Chainage" as per field surveys of the location of existing Km stones using the total station for the "Project Highway" is given blew.

Existing Chainage (Km)	Design Chainage (Km)	Name of Place
453+000	453+000	Jorhat
454+000	454+004	Jorhat
455+000	455+002	
456+000	455+998	
457+000	456+995	

458+000	457+200 to 458+100 (Realignment)	Lurukihat
459+000	458+957	Hatigarh
460+000	459+949	Chenijan
461+000	460+946	
462+000	461+400 to 462+300 (Realignment)	
463+000	462+940	
464+000	463+937	
465+000	464+938	
466+000	465+971	
467+000	466+970	
468+000	467+980	
469+000	468+984	Lattugarh
470+000	469+988	Lattugarh
471+000	470+986	Mellin/Sipaikula
472+000	472+000	Kakajan
473+000	473+003	
474+000	474+010	
475+000	475+010	
476+000	476+016	Badolipukdi
477+000	477+019	
478+000	478+026	Mudoijan
479+000	479+027	Teok
480+000	480+035	
481+000	481+130	
482+000	482+117	
483+000	482+800 to 484+100 (Realignment)	Jogduar
484+000		Kalaipani
485+000	485+074	
486+000	486+071	
487+000	486+500 to 487+200 (Realignment)	
488+000		Jhanji
489+000	488+700 to 489+700 (Realignment)	
490+000	489+971	
491+000	490+751	
491+050	490+800	

2. Geometric Design and General Features

2.1 General

Geometric Design and General Features shall be feature of the Project Highway shall be in accordance with Section-2 of the Manual.

2.2 Design Speed

The design speed shall be the minimum design speed of 80 km per hr for plain terrain except at the following location where design speed is restricted as given in the table.

Sl. No.	Chainage km Location	Minimum Design Speed in KMPH	Curve Type
1	453.539	80	LHC
2	481.956	80	LHC
3	482.207	80	RHC
4	488.722	80	LHC

2.3 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.

Design Chainage in km		Length in m	Type of Deficiency	Remarks
From	To			
453+000	453+140	140	Merging Stretch	
457+200	458+000	800	Curve Improvement	
461+400	462+140	740	Curve Improvement	
462+140	462+250	110	VUP at km 462+460	
479+200	479+600	400	Curve Improvement	
483+100	484+100	1000	Geometry Improvement	
486+400	487+200	800	Curve Improvement	
489+050	489+700	650	Built-up area	Jhanji

2.4 Right of Way

The proposed ROW is 60.0 m.

2.5 Type of Shoulders

(a) In built-up sections, footpath/fully paved shoulders shall be provided in the following stretches :

Sl. No.	Design Chainage (km)		Reference to cross section	Remarks
	From	To		
1	453+140	454+080	Figure 2.5/2.6	Jorhat, Bahatia Gaon
2	458+985	459+385	Figure 2.5/2.6	Shantipur
3	462+140	464+300	Figure 2.5/2.6	Lurkihat
4	466+200	467+320	Figure 2.5/2.6	Cheniamguri
5	470+000	471+200	Figure 2.5/2.6	Latugarh, DhekiaKhoa
6	472+700	474+150	Figure 2.5/2.6	Dihapool
7	474+500	475+350	Figure 2.5/2.6	Kakajan, KamarKhatoal
8	479+950	483+100	Figure 2.5/2.6	Teok, Midhaghat
9	488+575	489+050	Figure 2.5/2.6	Jhanji

Note: For Figure 2.5 and Figure 2.6 refer Manual IRC:SP:84-2009 of clause 2.16

(b) In built-up section and approaches to grade separated structures, the shoulder should be paved in the full with.

(c) Earthen shoulders of 2m wide shall be covered with 150mm thick compacted layer of granular material confirming to the requirements given in clause 401 of MORTH.

(d) Design and specifications of paved shoulders and granular material shall confirm to the requirement specified in paragraphs 5.5.9 and 5.9.10 of the Manual.

2.6 Lateral and Vertical Clearances at Underpasses

2.6.1 Lateral and vertical clearances at underpasses and provision of guardrails/ crash barriers shall be as per the paragraph 2.11 of the Manual.

2.6.2 Lateral clearance:- The width/size of the opening at the underpasses shal be as follows:-

Sl. No.	Existing Chainage	Design Chainage	Span (No. x length x ht.) in m	Minimum Length of RE wall	Remarks
1	488.680	488.740	1x30	800	2-lane Flyover
2	453+575	453+515	1x12	500	VUP
3	455+770	455+770	1x12	500	VUP
4	459+200	459+150	1x12	500	VUP
5	462+525	462+460	1x12	500	VUP
6	470+490	470+475	1x12	500	VUP
7	473+180	473+180	1x12	500	VUP
8	464+050	464+000	1x7	344	PUP
9	466+800	466+400	1x7	344	PUP
10	475+000	475+000	1x7	344	PUP
11	480+515	480+550	1x7	344	PUP
12	482+303	482+420	1x7	344	PUP

Note: RE wall length includes wall in front of abutments.

2.7 Lateral and vertical clearance at overpasses

2.7.1 Lateral and vertical clearances at over passes shall be as per paragraph 2.12 of the Manual. No overpases

2.7.2 Lateral clearances: The size of the opening at the overpasses shall be as follows:

Sl. No.	Location (chainage) From km to km	Number and length of spans	Remarks
Nil			

2.8 Service roads/ Slip Road

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

Sl No.	Existing Chainage		Design Chainage		Length (m)	Width (m)	Side
	From	To	From	To			
1	453+140	454+078	453+140	454+080	940	7.0	LHS & RHS
2	458+950	459+350	459+985	459+385	400	7.0	LHS & RHS
3	462+197	464+363	462+140	464+300	2160	7.0	LHS & RHS
4	466+230	467+349	466+200	467+320	1120	7.0	LHS & RHS
5	470+013	471+213	470+000	471+200	1200	7.0	LHS & RHS
6	472+700	474+140	472+700	474+150	1450	7.0	LHS & RHS
7	474+490	475+340	474+500	475+350	850	7.0	LHS & RHS
8	479+932	483+000	479+950	483+100	3150	7.0	LHS & RHS
9	488+527	489+000	488+575	489+050	475	7.0	LHS & RHS

2.9 Grade separated structures

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

Sl.No.	Location of Structure	Design Chainage	Length (m)	Number and length of spans	Approach gradient	Remarks
1	Jhanji	488.740	800	1x30	2.5%	New 2-lane

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

Sl. No.	Location	Type of Structure Length(m)	Cross road at			Remarks
			Existing level	Raised Level	Lowered Level	
Nil						

2.10 Cattle and Pedestrian Underpass/Overpass

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

Sl. No.	Existing Chainage	Design Chainage	Proposed span arrangement	width in m	Minimum length of RE wall
1	464+050	464+000	1x7.0x3.5	27.5	344
2	466+800	466+400	1x7.0x3.5	27.5	344
3	475+000	475+000	1x7.0x3.5	27.5	344
4	480+515	480+550	1x7.0x3.5	27.5	344
5	482+303	482+420	1x7.0x3.5	27.5	344

2.11 Typical cross-sections of the Project Highway

Different type of cross sections for different segments of Four lane stretch shall be developed as provided in' Manual of Specifications & Standard for Four Laning of Highways through Public Private Partnership' (IRC:SP:84-2009) referred in schedule-D

Sl. No.	Design Km		Length of 4 Lane in (m)	Widening Side / Scheme (As per original)	Widening Side / Scheme (As per amendment)	Widen & Strengthen of existing road length in 2 lane (in km)
	From	To				
1	453+000	453+140	140	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	-
2	453+140	453+200	60	Concentric widening with service road	New 4 lane	-
3	453+200	453+800	600	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	-
4	453+800	454+080	280	Right side widening with service road	Widening of existing road in left Side	0.280
5	454+080	455+430	1,350	Eccentric (RHS) widening	Widening of existing road in left Side	1.350
6	455+430	456+110	680	VUPs/PUPs Approaches with RE Wall	New 4 lane (Raised portion)	-
7	456+110	457+200	1,090	Eccentric (RHS) widening	Widening of existing road in left Side	1.090
8	457+200	458+000	800	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	-
9	458+000	458+400	400	Eccentric (LHS) widening	Widening of existing road in Right Side	0.400
10	458+400	458+985	585	Eccentric (RHS) widening	Widening of existing road in left Side	0.585
11	458+985	459+385	400	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	-
12	459+385	461+400	2,015	Eccentric (RHS) widening	Widening of existing road in left Side	2.015
13	461+400	462+140	740	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	-
14	462+140	462+250	110	Realignment with SR and covered drain	Realignment (New 4 Lane)	-
15	462+250	462+750	500	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	-
16	462+750	463+750	1,000	Left side widening with service road	Widening of existing road in Right Side	1.000
17	463+750	464+300	550	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	-
18	464+300	466+130	1,830	Eccentric (RHS) widening	Widening of existing road in left Side	1.830
19	466+130	466+670	540	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	-
20	466+670	467+320	650	Right side widening with service road	Widening of existing road in left Side	0.650
21	467+320	469+800	2,480	Eccentric (RHS) widening	Widening of existing road in left Side	2.480
22	469+800	470+000	200	Eccentric (LHS) widening	Widening of existing road in Right Side	0.200
23	470+000	470+220	220	Left side widening with service road	Widening of existing road in Right Side	0.220
24	470+220	470+800	580	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	-
25	470+800	471+200	400	Left side widening with service road	Widening of existing road in Right Side	0.400
26	471+200	472+700	1,500	Eccentric (LHS) widening	Widening of existing road in Right Side	1.500
27	472+700	472+910	210	Right side widening with service road	Widening of existing road in left Side	0.210
28	472+910	473+450	540	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	-
29	473+450	473+900	450	Right side widening with service road	Widening of existing road in left Side	0.450

30	473+900	474+150	250	Left side widening with service road	Widening of existing road in Right Side	0.250
31	474+150	474+500	350	Eccentric (LHS) widening	Widening of existing road in Right Side	0.350
32	474+500	474+850	350	Left side widening with service road	Widening of existing road in Right Side	0.350
33	474+850	475+150	300	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	-
34	475+150	475+350	200	Right side widening with service road	Widening of existing road in left Side	0.200
35	475+350	476+400	1,050	Eccentric (RHS) widening	Widening of existing road in left Side	1.050
36	476+400	479+200	2,800	Eccentric (LHS) widening	Widening of existing road in Right Side	2.800
37	479+200	479+600	400	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	-
38	479+600	479+950	350	Eccentric (RHS) widening	Widening of existing road in left Side	0.350
39	479+950	480+400	450	Right side widening with service road	Widening of existing road in left Side	0.450
40	480+400	480+700	300	VUPs/PUPs Approaches with RE wall and s	New 4 lane (Raised portion)	-
41	480+700	480+800	100	Right side widening with service road	Widening of existing road in left Side	0.100
42	480+800	481+200	400	Concentric widening with service road	New 4 lane	-
43	481+200	482+270	1,070	Left side widening with service road	Widening of existing road in Right Side	1.070
44	482+270	482+570	300	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	-
45	482+570	482+700	130	Left side widening with service road	Widening of existing road in Right Side	0.130
46	482+700	483+100	400	Right side widening with service road	Widening of existing road in left Side	0.400
47	483+100	484+100	1,000	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	-
48	484+100	486+400	2,300	Eccentric (LHS) widening	Widening of existing road in Right Side	2.300
49	486+400	487+200	800	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	-
50	487+200	488+575	1,375	Eccentric (LHS) widening	Widening of existing road in Right Side	1.375
51	488+575	489+050	475	2-lane Flyover Approaches with RE wall and service road	New 4 lane (Raised portion)	-
52	489+050	489+700	650	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	
53	489+700	490+800	1,100	Eccentric (LHS) widening	Widening of existing road in Right Side	1.100
	Total Design Length		**37,800**			**26.935**

Sl. No.	**Design Km**		**Length of 4 Lane in (m)**	**Widening Side / Scheme (As per original)**	**Widening Side / Scheme (As per amendment)**	**2 Lane realignment/ bypass (in Km)**
	From	**To**				
1	453+000	453+140	140	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	0.280
2	453+140	453+200	60	Concentric widening with service road	New 4 lane	0.120
3	453+200	453+800	600	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	1.200
4	453+800	454+080	280	Right side widening with service road	New 2 lane in Right Side	0.280
5	454+080	455+430	1,350	Eccentric (RHS) widening	New 2 lane in Right Side	1.350
6	455+430	456+110	680	VUPs/PUPs Approaches with RE Wall	New 4 lane (Raised portion)	1.360
7	456+110	457+200	1,090	Eccentric (RHS) widening	New 2 lane in Right Side	1.090
8	457+200	458+000	800	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	1.600
9	458+000	458+400	400	Eccentric (LHS) widening	New 2 lane in Left Side	0.400
10	458+400	458+985	585	Eccentric (RHS) widening	New 2 lane in Right Side	0.585
11	458+985	459+385	400	VUPs/PUPs Approaches with RE wall and	New 4 lane (Raised portion)	0.800

				service road		
12	459+385	461+400	2,015	Eccentric (RHS) widening	New 2 lane in Right Side	2.015
13	461+400	462+140	740	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	1.480
14	462+140	462+250	110	Realignment with SR and covered drain	Realignment (New 4 Lane)	0.220
15	462+250	462+750	500	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	1.000
16	462+750	463+750	1,000	Left side widening with service road	New 2 lane in Left Side	1.000
17	463+750	464+300	550	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	1.100
18	464+300	466+130	1,830	Eccentric (RHS) widening	New 2 lane in Right Side	1.830
19	466+130	466+670	540	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	1.080
20	466+670	467+320	650	Right side widening with service road	New 2 lane in Right Side	0.650
21	467+320	469+800	2,480	Eccentric (RHS) widening	New 2 lane in Right Side	2.480
22	469+800	470+000	200	Eccentric (LHS) widening	New 2 lane in Left Side	0.200
23	470+000	470+220	220	Left side widening with service road	New 2 lane in Left Side	0.220
24	470+220	470+800	580	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	1.160
25	470+800	471+200	400	Left side widening with service road	New 2 lane in Left Side	0.400
26	471+200	472+700	1,500	Eccentric (LHS) widening	New 2 lane in Left Side	1.500
27	472+700	472+910	210	Right side widening with service road	New 2 lane in Right Side	0.210
28	472+910	473+450	540	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	1.080
29	473+450	473+900	450	Right side widening with service road	New 2 lane in Right Side	0.450
30	473+900	474+150	250	Left side widening with service road	New 2 lane in Left Side	0.250
31	474+150	474+500	350	Eccentric (LHS) widening	New 2 lane in Left Side	0.350
32	474+500	474+850	350	Left side widening with service road	New 2 lane in Left Side	0.350
33	474+850	475+150	300	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	0.600
34	475+150	475+350	200	Right side widening with service road	New 2 lane in Right Side	0.200
35	475+350	476+400	1,050	Eccentric (RHS) widening	New 2 lane in Right Side	1.050
36	476+400	479+200	2,800	Eccentric (LHS) widening	New 2 lane in Left Side	2.800
37	479+200	479+600	400	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	0.800
38	479+600	479+950	350	Eccentric (RHS) widening	New 2 lane in Right Side	0.350
39	479+950	480+400	450	Right side widening with service road	New 2 lane in Right Side	0.450
40	480+400	480+700	300	VUPs/PUPs Approaches with RE wall and s	New 4 lane (Raised portion)	0.600
41	480+700	480+800	100	Right side widening with service road	New 2 lane in Right Side	0.100
42	480+800	481+200	400	Concentric widening with service road	New 4 lane	0.800
43	481+200	482+270	1,070	Left side widening with service road	New 2 lane in Left Side	1.070
44	482+270	482+570	300	VUPs/PUPs Approaches with RE wall and service road	New 4 lane (Raised portion)	0.600
45	482+570	482+700	130	Left side widening with service road	New 2 lane in Left Side	0.130
46	482+700	483+100	400	Right side widening with service road	New 2 lane in Right Side	0.400
47	483+100	484+100	1,000	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	2.000
48	484+100	486+400	2,300	Eccentric (LHS) widening	New 2 lane in Left Side	2.300
49	486+400	487+200	800	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	1.600
50	487+200	488+575	1,375	Eccentric (LHS) widening	New 2 lane in Left Side	1.375
51	488+575	489+050	475	2-lane Flyover Approaches with RE wall and service road	New 4 lane (Raised portion)	0.950
52	489+050	489+700	650	Realignment/Reconstruction Concentric Widening	Realignment (New 4 Lane)	1.300
53	489+700	490+800	1,100	Eccentric (LHS) widening	New 2 lane in Left Side	1.100
	Total Design Length		**37,800**			**48.665**

Note: (i) TCS-1 (2-Lane flyover at Jhanji) is indicated below.

3.0 Intersections and grade separators

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

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

(a) At-grade intersections

i) Major Junction

Sl.no	Existing Chainage	Design Chainage	Category of Road	Type of Junction	Remarks
1	457+200	457+250	-	4-legged	Baligaon Charali
2	461+600	461+500	-	4-legged	Nimatighat
3	479+950	479+950	ODR	3-Legged	Baloma Junction
4	486+700	486+800	Village Road	4-legged (Shrugged)	Hanschara Village

ii) Minor Junctions

Sl. No.	Design Chainage	Side (Left/Right)	Carriageway Width in m	
			Left	Right
1	455+772	Both side	4.00	4.00
2	456+067	Right	-	7.00
3	458+200	Both side	4.00	4.00
4	459+000	Left	3.50	-
5	459+160	Both side	3.50	3.50
6	460+000	Right	-	3.50
7	460+600	Left	3.50	-
8	460+610	Right	-	3.50
9	460+810	Left	4.00	-
10	464+000	Left	3.50	-
11	465+300	Right	-	3.50
12	466+610	Right		3.50
13	466+876	Right		3.50
14	468+270	Left	3.50	-
15	468+800	Left	3.50	-
16	470+000	Right	-	3.50
17	471+636	Right	-	3.50
18	472+210	Left	3.50	-
19	472+720	Both side	3.50	3.50
20	473+520	Left	4.00	-
21	474+920	Left	4.00	-
22	477+800	Left	4.50	-
23	480+700	Left	5.00	-
24	481+020	Left	4.50	-
25	481+500	Left	4.00	-
26	484+580	Right	-	3.50
27	489+920	Right	-	5.00

(b) Grade separated intersection without ramps

Sl. No.	Location	Salient features	Minimum length of viaduct to be provided	Road to carried over/under the structure
Nil				

4. Road embankment and cut section

4.1 Widening and improvement of the existing road embankment/cuttings and constructions 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. Deficlencies in the in the plan and profile of the existing road shall be corrected.

4.2 Raising of existing road. The existing road shall be raised in the following section :

Design Chainage in Km		Length in m	Remarks
From	To		
453+200	453+800	600	VUP
455+430	456+110	680	VUP
458+985	459+385	400	VUP
462+250	462+750	500	VUP
463+750	464+300	550	PUP
466+130	466+670	540	PUP
470+220	470+800	580	VUP
472+910	473+450	540	VUP
474+850	475+150	300	PUP
480+400	480+700	300	PUP
482+270	482+570	300	PUP
488+575	489+050	475	Flyover

5.0 Pavement design

5.1 Pavement design shall be carried out in accordance with Section-5 of Manual.

5.2 Type of pavement

Flexible pavement, expect in following locations where it is Rigid type pavement.

Sl. No.	Design Chainage (km)		Length (m)	Location
	From	To		
1	468.525	468.925	400	Proposed Toll Plaza with taper approach

5.3 Design requirements

5.3.1 Design Period and Strategy

Flexible pavement for new pavement and for widening and strengthening of the existing pavement shall be designed for a minimum design period of 15 years. Stage constructions shall not be permitted.

5.3.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement of the Manual, the contractor shall design the pavement for design traffic of not less than 46 million standard axles (msa) from km 453.000 to km 491.050.

5.4 Reconstruction of stretches

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

Design Chainage in km		Length in m	Remarks
From	To		
453+200	453+800	600	VUP
455+430	456+110	680	VUP
458+985	459+385	400	VUP
462+250	462+750	500	VUP
463+750	464+300	550	PUP
466+130	466+670	540	PUP
470+220	470+800	580	VUP
472+910	473+450	540	VUP
474+850	475+150	300	PUP
480+400	480+700	300	PUP
482+270	482+570	300	PUP
488+575	489+050	475	Flyover

6. Roadside drainage

Drainage system including surface drains for the Project Highway shall be provided as per section 6 of the Manual. Covered Drains and lined drain shall be provided in the following stretches.

Location of Covered Drain

Design Chainage in km		Length in m	Side
From	To		
453+140	453+200	60	Both Side
453+800	454+080	280	Both Side
462+750	463+750	1000	Both Side
466+670	467+320	650	Both Side
470+000	470+220	220	Both Side
470+800	471+200	400	Both Side
472+700	472+910	210	Both Side
473+450	473+900	450	Both Side
473+900	474+150	250	Both Side
474+500	474+850	350	Both Side
475+150	475+350	200	Both Side
479+950	480+400	450	Both Side
480+700	480+800	100	Both Side
480+800	481+200	400	Both Side
481+200	482+270	1070	Both Side
482+570	482+700	130	Both Side
482+700	483+100	400	Both Side
	Total length	**6620**	

Location of Line Drain

Design Chainage in km		Length in m	Side
From	To		
453+200	453+800	600	Both Side
455+430	456+110	680	Both Side
458+985	459+385	400	Both Side
462+250	462+750	500	Both Side
463+750	464+300	550	Both Side
466+130	466+670	540	Both Side
470+220	470+800	580	Both Side
472+910	473+450	540	Both Side
474+850	475+150	300	Both Side
480+400	480+700	300	Both Side
482+270	482+570	300	Both Side
488+575	489+050	475	Both Side
	Total length	**5765**	

A precast drain has been proposed at RE wall locations. Locations are as given below.

Design Chainage		Length in m	Remarks
From	To		
488+575	489+050	475	New 2-lane Flyover

RCC drain (Covered/Line) partially complete in the following stretches.

Drain Status RHS					
Sl.No.	Chainage		Length (Km)	Description	Remarks
	From	To			
1	480.450	480.500	0.050	Wall Completed	
2	480.500	480.700	0.200	Slab Completed	
3	480.700	480.760	0.060	Wall Completed	
4	480.790	480.840	0.050	Wall Completed	
5	480.880	480.960	0.080	PCC Completed	
6	480.96	481.040	0.080	Slab Completed	
7	481.04	481.060	0.020	Wall Completed	
8	481.060	481.120	0.060	Slab Completed	
9	481.12	481.170	0.050	Wall Completed	
10	481.400	481.500	0.100	Wall Completed	
11	481.500	481.610	0.110	Slab Completed	
12	481.610	481.830	0.220	Wall Completed	
13	481.850	482.210	0.360	Wall Completed	
14	482.210	482.250	0.040	Raft Completed	

15	482.250	482.300	0.050	PCC Completed	
16	482.390	482.460	0.070	Wall Completed	
17	482.460	482.490	0.030	Raft Completed	
18	482.520	482.550	0.030	Raft Completed	
19	482.550	482.600	0.050	PCC Completed	
20	482.750	482.780	0.030	Raft Completed	
21	482.780	482.850	0.070	Wall Completed	
22	483.060	483.100	0.040	Raft Completed	

Drain Status LHS					
Sl.No.	**Chainage**		**Length (Km)**	**Description**	**Remarks**
	From	**To**			
1	480.520	480.570	0.050	Slab Completed	
2	480.570	480.680	0.110	Wall Completed	
3	480.900	481.030	0.130	Slab Completed	
4	481.030	481.090	0.060	Wall Completed	
5	481.090	481.110	0.020	PCC Completed	
6	481.270	481.320	0.050	Raft Completed	
7	481.400	481.490	0.090	Wall Completed	
8	481.520	482.220	0.700	Wall Completed	
9	482.240	482.270	0.030	Wall Completed	
10	482.270	482.320	0.050	Raft Completed	
11	482.370	482.390	0.020	Wall Completed	
12	482.450	482.500	0.050	Raft Completed	
13	483.090	483.100	0.010	Wall Completed	

Note:- The partially constructed RCC Drain will be dismantled due to modification of drawing from Ch. 481+048 to 481+093 LHS**.**

7. Design of structures

7.1 General

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

7.1.2 Width of the carriageway of new bridges and structures shall be as follows:-
All new structures shall be minimum carriageway as per Manual Fig. 7.2 and fig. 7.3

7.1.3 The following structures shall be provided with footpaths:

Sl. No	Bridge at Km	Utility service to be carried	Remarks
All New Bridges in built-up area shall have provisions for footpath			

7.1.4 All bridges shall be high-level bridges

7.1.5 Utility services to be carried over the structures

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

Sl. No	Bridge at Km	Utility service to be carried	Remarks
All New Bridges shall have provisions for utility services to be carried over			

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

7.2 Culverts

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

7.2.2 Reconstruction of existing culverts.

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

Sr. No.	Existing Chainage	Design Chainage	Proposed Type of Structure	Recommendation	Proposed span Arrangement (m)	Over all Width in (m)
1	453+900	453+895	HP	Reconstruction	1x 1.2 m dia	4 - lane
2	454+100	454+096	HP	Reconstruction	1x 1.2 m dia	4 - lane
3	454+856	454+856	HP	Reconstruction	1x1.2 m dia	4 - lane
4	455+043	455+039	HP	Reconstruction	1x 1.2 m dia	4 - lane
5	455+757	455+756	HP	Reconstruction	1x 1.2 m dia	4 - lane
6	455+788	455+786	HP	Reconstruction	1x 1.2 m dia	4 - lane
7	456+133	456+133	HP	Reconstruction	1x 1.2 m dia	4 - lane
8	456+496	456+496	HP	Reconstruction	1x 1.2 m dia	4 - lane
9	456+809	456+809	HP	Reconstruction	1x 1.2 m dia	4 - lane
10	456+841	456+841	HP	Reconstruction	1x 1.2 m dia	4 - lane
11	457+260	457+254	HP	Reconstruction	1x 1.2 m dia	4 - lane
12	458+735	458+700	HP	Reconstruction	1x 1.2 m dia	4 - lane
13	459+190	459+147	HP	Reconstruction	1x 1.2 m dia	4 - lane
14	459+260	459+217	HP	Reconstruction	1x 1.2 m dia	4 - lane
15	459+768	459+725	HP	Reconstruction	1x 1.2 m dia	4 - lane
16	460+007	459+956	HP	Reconstruction	1x 1.2 m dia	4 - lane
17	460+157	460+107	HP	Reconstruction	1x 1.2 m dia	4 - lane
18	460+327	460+277	HP	Reconstruction	1x 1.2 m dia	4 - lane
19	460+455	460+405	HP	Reconstruction	1x 1.2 m dia	4 - lane
20	460+596	460+546	HP	Reconstruction	1x 1.2 m dia	4 - lane
21	460+718	460+667	HP	Reconstruction	1x 1.2 m dia	4 - lane
22	460+887	460+836	HP	Reconstruction	1x 1.2 m dia	4 - lane
23	461+305	461+251	HP	Reconstruction	1x 1.2 m dia	4 - lane
24	461+577	461+525	HP	Reconstruction	1x 1.2 m dia	4 - lane
25	461+811	461+757	HP	Reconstruction	1x 1.2 m dia	4 - lane
26	461+926	461+872	HP	Reconstruction	1x 1.2 m dia	4 - lane
27	462+090	462+032	HP	Reconstruction	1x 1.2 m dia	4 - lane
28	462+285	462+228	HP	Reconstruction	1x 1.2 m dia	4 - lane
29	462+610	462+550	HP	Reconstruction	1x 1.2 m dia	4 - lane
30	470+472	470+460	Box	Reconstruction	1x 1.2 x 1.2	4 - lane

Sr. No.	Existing Chainage	Design Chainage	Proposed Type of Structure	Recommendation	Proposed span Arrangement (m)	Over all Width in (m)
31	472+953	472+953	Box	Reconstruction	1 x 1.5 x 1.5	4 - lane
32	480+701	480+732	Box	Reconstruction	1 x 1.5 x 1.0	4 - lane

Culvert (Reconstruction) Work under Construction Stage (partially complete)

Sr. No.	Existing Chainage	Design Chainage	Site Chainage	Proposed Type of Structure	Recommendation	Proposed span Arrangement (m)	Over all Width in (m)	Status
1	454+100	454+096	454+097	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
2	454+856	454+856	454+856	HP	Reconstruction	1x1.2 m dia	4 - lane	Completed in R/S except Protection work
3	455+043	455+039	455+041	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
4	455+757	455+756	455+756	HP	Reconstruction	1x 1.2 m dia	4 - lane	Up to cradle Concrete Completed in R/S except Head Wall & Protection Work
5	455+788	455+786	455+786	HP	Reconstruction	1x 1.2 m dia	4 - lane	Up to cradle Concrete Completed in R/S except Head Wall & Protection Work
6	456+133	456+133	456+131	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
7	456+496	456+496	456+496	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
8	456+809	456+809	456+808	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
9	456+841	456+841	456+840	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
10	457+260	457+254	457+254	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
11	459+190	459+147	459+147	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
12	459+260	459+217	459+208	HP	Reconstruction	1x 1.2 m dia	4 - lane	Up to cradle Concrete Completed in R/S except Head Wall & Protection Work
13	459+768	459+725	459+725	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
14	460+007	459+956	459+956	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
15	460+157	460+107	460+109	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
16	460+718	460+667	460+669	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
17	460+887	460+836	460+839	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
18	461+305	461+251	461+251	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed in R/S except Protection work
19	461+811	461+757	461+757	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed upto PCC R/S & Head Wall Ist Lift R/S completed.
20	461+926	461+872	461+872	HP	Reconstruction	1x 1.2 m dia	4 - lane	Completed upto PCC R/S & Head Wall Ist Lift R/S completed.

7.2.3 Widening of Existing Culverts

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

Sr. No.	Existing Chainage	Design Chainage	Proposed Type of Structure	Recommendation	Proposed (m) span Arrangement	Overall Width in m
1	453+171	453+171	Slab	Retained & Widened	1x1.9x1.6	4- lane
2	463+597	463+536	Slab	Retained & Widened	1x1.5x2.0	4- lane
3	464+649	464+586	Slab	Retained & Widened	1x1x1.5	4- lane
4	465+570	465+507	Box	Retained & Widened	1x1.5x1.5	4- lane
5	465+965	465+902	Box	Retained & Widened	1x1.5x1.5	4- lane
6	467+234	467+206	Box	Retained & Widened	1x1.5x1.5	4- lane
7	469+018	469+002	Box	Retained & Widened	1x1.5x1.5	4- lane
8	469+684	469+667	Slab	Retained & Widened	1x3.0x1.5	4- lane
9	470+827	470+815	Slab	Retained & Widened	1x3.0x2	4- lane
10	471+116	471+100	Box	Retained & Widened	1x1.5x1.5	4- lane
11	472+351	472+351	Slab	Retained & Widened	1x6.0x3.0	4- lane
12	473+543	473+543	Box	Retained & Widened	1x1.5x1.5	4- lane
13	473+934	473+934	Box	Retained & Widened	1x3.0x5.0	4- lane
14	474+604	474+614	Slab	Retained & Widened	1x3.0x2.5	4- lane
15	475+328	475+338	Slab	Retained & Widened	1x3.0x4.0	4- lane
16	476+515	476+530	HP	Retained & Widened	2 x 1.2 m dia	4 - lane
17	476+900	476+916	Slab	Retained & Widened	1x3.0x2.5	4- lane
18	477+175	477+193	HP	Retained & Widened	2 x 1.2 m dia	4 - lane
19	477+276	477+295	HP	Retained & Widened	2 x 1.2 m dia	4 - lane
20	477+543	477+563	HP	Retained & Widened	2 x 1.2 m dia	4 - lane
21	478+562	478+590	HP	Retained & Widened	2 x 1.2 m dia	4 - lane

Sr. No.	Existing Chainage	Design Chainage	Proposed Type of Structure	Recommend ation	Proposed (m) span Arrangement	Overall Width in m
22	478+953	478+980	Slab	Retained & Widened	1x3.0x3.0	4- lane
23	479+110	479+136	HP	Retained & Widened	2 x 1.2 m dia	4 - lane
24	481+693	481+821	Box	Retained & Widened	1x1.5x2.0	4- lane
25	483+775	483+866	Box	Retained & Widened	1x3.0x2.0	4- lane
26	484+856	484+931	Slab	Retained & Widened	1x0.9x3.0	4- lane
27	485+571	485+646	Slab	Retained & Widened	1x6.0x4.0	4- lane
28	487+871	487+920	Box	Retained & Widened	1x1.5x1.5	4- lane

Culvert (Retained & Widened) Work Under Construction Stage (partially complete)

Sr. No.	Existing Chainage	Design Chainage	Site Chainage	Proposed Type of Structure	Recomm endation	Proposed (m) span Arrangement	Overall Width in m	Status
1	465+570	465+507	465+513	Box	Retained & Widened	1x1.5x1.5	4- lane	12.500 m completed up to PCC out of scope 14.300 m
2	465+965	465+902	465+908	Box	Retained & Widened	1x1.5x1.5	4- lane	14.930 m completed up to PCC out of scope 18.567 m
3	469+018	469+002	469+009	Box	Retained & Widened	1x1.5x1.5	4- lane	11.800 m completed up to PCC out of scope 14.800 m
4	469+684	469+667	469+665	Slab	Retained & Widened	1x3.0x1.5	4- lane	12.400 m completed up to PCC out of scope 14.400 m
5	470+827	470+815	470+822	Slab	Retained & Widened	1x3.0x2	4- lane	31.218 m completed up to PCC out of scope 31.218 m
6	472+351	472+351	472+358	Slab	Retained & Widened	1x6.0x3.0	4- lane	12.000 m completed up to PCC out of scope 14.100 m
7	476+515	476+530	476+536	HP	Retained & Widened	2 x 1.2 m dia	4 - lane	Exv. & PCC B/S Completed, Head Wall Ist Lift B/S completed
8	476+900	476+916	476+924	Slab	Retained & Widened	1x3.0x2.5	4- lane	14.579 m completed up to Slab out of scope 14.579 m & parapet wall not completed
9	477+543	477+563	477+570	HP	Retained & Widened	2 x 1.2 m dia	4 - lane	Upto Head Wall B/S Completed only protection work balance
10	478+562	478+590	478+596	HP	Retained & Widened	2 x 1.2 m dia	4 - lane	Upto Head Wall B/S Completed only protection work balance
11	478+953	478+980	478+987	Slab	Retained & Widened	1x3.0x3.0	4- lane	14.700 m completed up to Slab out of scope 14.700 m & parapet wall not completed

Sr. No.	Existing Chainage	Design Chainage	Site Chainage	Proposed Type of Structure	Recommendation	Proposed (m) span Arrangement	Overall Width in m	Status
12	479+110	479+136	479+145	HP	Retained & Widened	2 x 1.2 m dia	4 - lane	Upto Head Wall B/S Completed only protection work balance
13	481+693	481+821	481+829	Box	Retained & Widened	1x1.5x2.0	4- lane	31.165 m completed up to Slab out of scope 31.165 m & parapet wall not completed
14	483+775	483+866	483+882	Box	Retained & Widened	1x3.0x2.0	4- lane	21 m completed up to Slab out of scope 21 m & parapet wall not completed
15	484+856	484+931	484+944	Slab	Retained & Widened	1x0.9x3.0	4- lane	14.270 m completed up to Slab out of scope 14.270 m & Return Wall & Parapet Wall L/S Completed
16	485+571	485+646	485+659	Slab	Retained & Widened	1x6.0x4.0	4- lane	14.600 m completed up to Slab out of scope 14.600 m
17	487+871	487+920	487+940	Box	Retained & Widened	1x1.5x1.5	4- lane	15.545 m completed up to Slab out of scope 15.545 m & parapet wall not completed

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

Sl. No.	Design Chainage (km)	Proposed Type of culvert	Span Arrangement No. x Length /No. x Dia(m)
Nil			

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

As per site condition,

Repairs/replacement of railing/parapets and any other defects noticed at the time of construction shall be undertaken by the contractor for all the retained culverts along with repair/construction of flooring and protection works.

7.2.6 Floor protection works shall be as specified in the relevant IRC Codes and Specification

7.3 Bridges

7.3.1 Existing bridges to be re-construction/widened/Repairs

i) The existing bridges at the following locations shall be re-constructed as new structures.

a) Major Bridges

Nil

b) Minor Bridges

Sl. No.	Existing Chainage	Design Chainage	Proposed Structure configuration	Proposed span arrangement (No. x L)
1	457+375	457+375	New 4-Lane Bridges	1x18.01m
2	480+320	480+360	New 4-Lane Bridges+ New 2-lane Bridges on service road on both side	1x14.21m

iii) The following narrow bridges shall be widened/Repairs and Strengthen:

a) Major Bridges

Sl. No.	Chainage (km)	Width (m)	Span Arrangement	Type of structure			Details of Repair
				Foundation	Sub structure	Super structure	
1	458+150	11.40	21.6+29.8+21.6 =73.0m	Well	RCC walls type	RCC box girder	Wearing coat, Bearings, Railings Drainage spout and expansion gap need repair
2	488+450	11.40	33.5+38.55+33.5 =105.55m	Well	RCC walls type	RCC box girder	Wearing coat, Bearings, Railings Drainage spout and expansion gap need repair

Note: Widening of major bridges is not applicable due to RCC Box Girder type superstructure. However and strengthening of existing major bridges.

b) Minor Bridges

Sl. No.	Design Chainages	Width (m)	Span Arrange--ment	Type of structure			Details of widening	Remarks
				Found-ation	Sub structure	Super Structure		
1	455+150	7.9	2 x 8.0 = 16.00 m	Open	RCC Wall	Solid Slab	Widened to the required overall Width (12m)	
2	455+370	7.9	1 x 6.1 = 6.1m	Open	RCC Wall	Solid Slab	Widened to the required overall Width (12m)	
3	459+525	7.9	1 x 8.7 = 8.7 m	Open	PCC Wall	Solid Slab	Widened to the required overall Width (12m)	
4	468+155	7.9	2 x 7.2 = 14.4 m	Open	PCC Wall	Solid Slab	Widened to the required overall Width (12m)	
5	471+480	7.9	1 x 10.62 = 10.62m	Open	PCC Wall	Solid Slab	Widened to the required overall Width (12m)	

Sl. No.	Design Chainages	Width (m)	Span Arrange--ment	Type of structure			Details of widening	Remarks
				Found-ation	Sub structure	Super Structure		
6	474+275	7.9	2 x 10.0 = 20.00 m	Open	PCC Wall	Solid Slab	Widened to the required overall Width (12)	
7	476+280	7.9	1 x 6.3 = 6.3 m	Open	PCC Wall	Solid Slab	Widened to the required overall Width (12m)	
8	478+012	7.9	2 x 7.3 = 14.6 m	Open	PCC Wall	Solid Slab	Widened to the required overall Width (12m)	
9	481+280	7.9	2 x 7.5 = 15.0 m	Open	PCC Wall	Solid Slab	Widened to the required overall Width (12m)	
10	482+950	7.9	2 x 7.5 = 15.0 m	Open	PCC Wall	Solid Slab	Widened to the required overall Width (12m)	Sub-structure completed except abutment cap RHS Service Road

Note: Deck slab, approach slab, substructure and foundation are required to be widened to the required overall width (12m) for all above minor bridges.

7.3.2 Additional new bridges

New bridges at the following location on the Project Highway shall be constructed.

Major bridges:

Sl. No.	Name of Bridges	Existing Chainage	Design Chainage	Proposed span arrangement(No.x1)	Remarks
1	Bhogdoi River	458+200	458+150	20.81+27.648+20.81	New 2-lane Bridges
2	Jhanji River	488+400	488+450	31.348+36.398+31.348	New 2-lane Bridges

Minor Bridges:

Sl. No.	ExistingChainage	Design Chainage	Span arrangement	Remarks
1	455+150	455+150	1 x 15.21 m	New 2 lane Bridge
2	455+370	455+370	1 x 6.0m	New 2 lane Bridge
3	459+570	459+525	1 x 8.28m	New 2 lane Bridge
4	468+175	468+155	1 x 13.61m	New 2 lane Bridge
5	471+495	471+480	1 x 10.2m	New 2 lane Bridge
6	474+270	474+275	1 x 19.21m	New 2 lane Bridge
7	476+260	476+280	1 x 6.0m	New 2 lane Bridge
8	478+000	478+012	1x 13.81m	New 2 lane Bridge
9	481+150	481+280	1 x 14.21m	New 2-lane Bridge on MCW + New 2-lane Bridge on Service Road on Both side
10	482+850	482+950	1 x 14.21m	New 2-lane Bridge on MCW + New 2-lane Bridge on Service Road on Both side

Minor Bridge Work Under Construction Stage (partially complete)

Sl. No.	Existing Chainage (km)	Type of Structures			No. of Spans with span length in m	Width (m)	Status
1	482.850	Shallow	RCC Wall	Solid Slab	1x 14.2 = 14.2 m	12	New 2-lane bridge partially complete for RHS Service Road

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

Sl. No.	Location at km	Remarks
"As per site condition and where ever technically feasible"		

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

Sl. No.	Location at km	Remarks
In all the retained bridges which are proposed for widened, railing/parapets shall be replaced.		

7.3.5 Drainage system for bridges decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.21 of the Manual.

7.3.6 Structure in marine environment

Nil

7.4 Rail-road bridges

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

7.4.2 Road over bridges(road over rail) shall be provided at the following crossing, as per GAD drawing attached:

Sl. No.	Design Chainage(km)	Span arrangement/length of span in m	Remarks
		Nil	

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

Road under bridges

Sl. No.	Location of level crossing	Number and length of span
Nil		

7.5 Grade separated structure

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

Nil

7.6 Repairs and strengthening of structures

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

A-Bridges

i) Major Bridges

Sl. No.	Location of Bridge(km)		Nature and extent of repairs/ strengthening to carried out
	Existing Chainage	Design Chainage	
1	457+375	457+375	Repairing replacement are required for damaged bearings, railings, expansion joints, drainage spouts and wearing coat.
2	480+320	480+360	Repairing replacement are required for damaged bearings, railings, expansion joints, drainage spouts and wearing coat.

ii) Minor Bridges

Sl. No	Existing Chainage	Design chainage	Details of widening
1	455+150	455+150	Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width (12m)
2	455+370	455+370	Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width (12m)
3	459+570	459+525	Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width (12m))
4	468+175	468+155	Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width (12m)
5	471+495	471+480	Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width (12m)
6	474+270	474+275	Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width (12m)
7	476+260	476+280	Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width (12m)
8	478+000	478+012	Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width (12m)
9	481+150	481+280	Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width (12m)
10	482+850	482+950	Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width (12m)

B-ROB/RUB

Sl. No.	Location of structure (km)	Nature and extent of repair/strengthening to be carried out
Nil		

C- Overpasses/ Underpasses and other structures

Sl. No.	Location of structure (km)	Nature and extent of repair/strengthening to be carried out
Nil		

7.7 List of Major Bridges and Structures

The following is the list of existing Major Bridges and Structures

Sl. No.	Name of Bridge	Existing Chainage	Design Chainage	Proposed span arrangement (No. x 1)	Remarks
1	Bhogdoi River	458+200	458+150	20.81+27.648+20.81	New 2-lane bridge
2	Jhanji River	488+400	488+450	31.348+36.398+31.348	New 2-lane bridge

The following is the list of the New Major Bridges and structures:-

Sl. No	Location		Remarks
	Existing Chainage (km)	Design chainage (km)	
Nil			

8. Traffic control devices and road safety works

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

8.2 Specifications of the reflecting sheeting: As per the clause 9.3 of the Manual of specifications and standards.

9. Roadside furniture

Roadside Furniture shall be provided in accordance with the provision of section 11 of the Manual.

9.1 Overhead traffic signs: locations and size

5 No's overhead shall be provided excluding toll-Plaza locations.

10. Compulsory Afforestation

Total of 120 nos. trees are identified to be affected in the processed ROW.

11. Hazardous locations

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

Sl No.	Location stretch from (km) to (km)	LHS/RHS
This shall be provided at high embankment and at sharp curve locations.		

12.Special requirements for hill roads

Nil

13. Change of Scope

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

14. Utility Shifting

Electrical Utility shifting partially completed & balances yet to be shifted.
PHE line yet to be shifted.
DNPL/ Oil India Pipe/ONGC pipe line yet to be shifted.

Schedule-C

(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

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

a) Toll plaza[s];
b) Roadside facilities;
c) Pedestrian facilities;
d) Tree plantation;
e) Truck lay-byes;
f) Bus-boys and bus shelters;
g) Rest areas; and
h) Other to be specified

2 Description of Project Facilities

Each of the Project Facilities is described below showing:

a) Toll Plaza:

1 No. of toll plaza shall be provided at design chainage Km 468.725 (existing chainage Km 468+750)

Specifications and other requirements of the toll plazas shall be strictly as per schedule "D". Rigid pavement shall be constructed for the Toll Plaza area including the transition portion.

Road side Furniture

(i) Traffic Signs and Pavement Markings
Traffic signs and pavement marking shall include road side, overhead signs, curve mounted signs and road marking along the project highway. The locations for these provisions shall be finalised as per manual.

(ii) Concrete Crash Barrier, Metal beam crash barrier, Separators (MS railings) wherever required as per manual.

(iii) Traffic Safety Devices wherever required

(iv) Boundary Stones

(v) Hectometre/ Kilometre Stones

(vi) Traffic Blinker Signal (L.E.D) shall be provided at all At-grade junctions, median opening, schools, hospitals, police station, places of worship and institutional buildings etc.

(vii) Overhead signs: 5 Nos.(Excluding overhead signs at Toll Plaza location which are as given in Schedule D) shall be provided.

(viii) Delineators and Studs(100mmx 100mm) with reflective panels of dual prismatic cube capable of providing total reflection of light entering the lens face for lane marking and delineators for night time visibility shall be provided for the entire project Highway.

b) Pedestrian Facilities

The additional pedestrians facilities in the form of guard rails, footpath, lighting etc. Shall be provided wherever required.

c) Landscaping and Tree Plantation

Landscaping of the highway shall be done on, but not limited to the following:
Median
Grade Separated intersections
Entry and Exit ramp
At grade islands of intersection locations
Toll Plaza Area

(e) **Truck Lay-byes:**Truck Lay-byes shall be provided at following locations:

Sl. No.	Design Chainage	Side
1	458.850	Left
2	490.100	Right

(f) Bus-bays and Bus Shelter:Bus-bays shall be provided locations:

Locations of Bus bays

Sl. No.	Design Chainage	Side	Name/Location
1	455.450	Both	Jorhat
2	468.400	Both	Hatigarh/Chenijan
3	480.100	Both	Teok
4	487.750	Both	Jhanji

(g) Others

1 Highway Lighting shall be provided as per schedule D(Manual of Specifications and Standard for 4-Laning of Highway) IRC:SP:84-2009). However, the lighting in built up areas shall be provided in consultation with IE/Employer.

2. Highway Patrol
The Concessionaire shall provided Highway Patrol vehicles in adequate number as per manual and this agreement.

3. Medical Aid Post: As per Article 21.

4. Cranes
The Concessionaire shall provided one mobile Cranes having the capacity to left a truck with a gross vehicle weight of 30,000(thirty thousand) kilogram and such posts shall be located at the toll plaza location in consultation with the IC/Authority.

5. Traffic Aid Post

6. ECB (Emergency Call Boxes)
ECBs (Emergency Call Boxes) with loud speaker, micro phone, activation button with LED indicating conversation, shall be housed in a vandal proof casing and operate in full to play mode in noise level of upto 95 decibels within built diagnostic features for automatic detection in case of damage by any object. Mobile communication system shall comprise the mobile radio base stations and control equipment. It shall have provision for mounted

mobile set on ambulances, trains & patrolling vehicles. The system shall have the facility to connect mobile to mobile, mobile to controller, and controller to mobile along with the systems for waiting, holding and transfer of call. The system shall use pair frequencies to be allotted to the concessionaire with the approval of wireless planning & coordination (WPC), Deptt. Of Telecommunications and shall operate for full duplex mode.

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

Schedule-H (Annexure to schedule H and schedule J is attached separately)
(See Clause 19.3)

Contract Price Weightages

1.1 The Contract Price for this Agreement is **Rs 403.3 Cr**

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage Weightage
1	2	3	4
Road works including culverts, minor bridges, underpasses, overpasses, approaches to ROB/RUB/Major Bridges/ Structures (excluding service roads)	**69.02%**	**A-Widening and Strengthening of existing road**	
		(1) Earthwork up to top of the sub-grade	3.49%
		(2) Granular work (sub-base, base, shoulders)	4.62%
		(3) Bituminous work	15.53%
		(4) Widening and repair of culverts	1.78%
		(5)Widening and repair of Minor bridges	1.14%
		B-New 2-lane Realignment/ bypass	
		(1) Earthwork up to top of the sub-grade	8.70%
		(2) Granular work (sub-base, base, shoulders)	23.28%
		(3) Bituminous work	28.15%
		(4) CC Pavement	Nil
		C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:	
		(1) Culverts	1.08%
		(2) Minor bridges	6.45%
		(3) Cattle/ Pedestrian underpasses	1.44%
		(4) Pedestrian overpasses	Nil
		(5) Grade separated structures	1.01%
		a) Underpasses (VUPs)	3.33%
		b) Overpass	Nil
Major Bridge works and ROB/RUB	**3.70%**	**A- Widening and repairs of Major Bridges**	
		(1) Foundation	0.85%
		(2) Sub-structure	1.71%
		(3) Super-structure (including crash barriers etc. complete)	5.98%
		B- Widening and repair of	
		(a) ROB	Nil
		(b) RUB	Nil

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage Weightage
		C-New Major Bridges	
		(1) Foundation	36.58%
		(2) Sub-structure	13.72%
		(3) Super-structure (including crash barriers etc. complete)	41.16%
		D- New rail-road bridges	
		(a) ROB	Nil
		(b) RUB	Nil
Structures (elevated sections, reinforced earth)	**5.61%**	(1) Foundation	Nil
		(2) Sub-structure	Nil
		(3) Super-structure (including crash barriers etc. complete)	Nil
		(4) Reinforced Earth	100.00%
		(5) Fly Ash	Nil
Other Engineering Works	**21.67 %**	(i) Service roads	45.40 %
		(ii) Toll Plaza	9.62 %
		(iii) Road side drains	18.04 %
		(iv) Road signs, markings, km stones, safety devices.....	12.20 %
		(v) Project facilities	2.61 %
		(vi) Repairs to bridges/ structures	Nil
		a) Providing wearing coat	0.20%
		b) Replacement of bearings, joints	Nil
		c) Providing crash barriers	1.41 %
		d) Other items (Junctions)	7.71 %
		(vii) Road side plantation	0.81 %
		(viii) Repair of protection works	0.71 %
		(iX) Safety and traffic management during construction	1.28 %

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

1.3 Procedure of estimating the value of work done

1.3.1 Road works including approaches to minor bridges, major bridges and Structures (excluding service road)

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

Table 1.3.1

Stage of payment	% Weightage	Payment procedure
A - Widening and strengthening		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than **10(ten) percent** of the total length. @
(1) Earthwork up to top of the sub-grade	3.49%	
(2) Granular work (sub-base, base, shoulders)	4.62%	
(3) Bituminous work	15.53%	
(4) Widening and repair of culverts	1.78%	Cost of ten completed culverts shall be determined pro rate with respect to the total number of culverts. Payment shall be made on the completion of **(10) ten culverts**.
(5) Widening and repair of minor bridges	1.14%	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 a two lane minor bridge.**
B - New 2-lane realignment, bypass		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full **2-lane length or 5 (five) km length**.
(1) Earthwork up to top of the sub-grade	8.70%	
(2) Granular work (sub-base, base, shoulders)	23.28%	
(3) Bituminous work	28.15%	
(4) CC pavement	Nil	
C - New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypass		
(1) Culverts	1.08%	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 **2-lane 5 (five) culverts.**
(2) Minor bridge	6.45%	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 a **2 lane minor bridge.**
(3) Cattle / pedestrian underpass	1.44%	Cost of each cattle / pedestrian underpass shall be determined on pro rata basis with respect to the total number of cattle/ pedestrian underpasses. Payment shall be made on the completion of the number of cattle /pedestrian underpasses specified below: Total no. Stage for payment- **Completion of one no. in all respect.**
(4) Pedestrian Overpasses	Nil	Same as for (3) above
(5) Grade separated structures	1.01%	
(a) underpasses (Vehicular)	3.33%	Same as for (3) above
(b) overpasses	Nil	Same as for (3) above

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

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

Where P = Contract Price

L= Total length in km

Similarly, the rates per km for stages (1), (2) & (4) above shall be work out.

1.3.2 Major Bridge Works and ROB/RUB

Procedure for estimating the value of Major Bridge works shall be stated in table 1.3.2:

Table 1.3.2

Stage of payment	% weightage	Payment Procedure
A- Widening and repairs of Major Bridges **Foundation:** On completion of the Foundation work including Foundations for wing and return walls	0.85%	Cost of each Major Bridge (widening and repairs) shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridges (widening and repairs). Payment shall be made **on completion** of each stage of a Major Bridge as per the weightage given in this table.
Sub-structure: On completion of abutments, piers up to the abutment/pier cap	1.71%	
Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, wing walls, return walls, guide bunds, if any, tests on completion etc., bridge complete in all respects and fir for use.	5.98%	
B- Widening and repairs of		
(a) ROB	Nil	Cost of each ROB/RUB (widening and repairs) shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB (widening and repairs). Payment shall be made on completion of a ROB/RUB.
(b) RUB	Nil	
E- New Major Bridges		
(1) **Foundation:** On completion of the foundation work including foundations for wing and return walls.	36.58%	Cost of each major bridges shall be determined on pro rata basis with respect to the total linear length (m) of the major bridges. Payment shall be made **on completion** of each stage of a major **bridge in 2-lanes** as per the weightage given in this table.
(2) **Sub-structure:** On completion of abutments, piers up to	13.72%	
(3) **Super-structure**: On completion of the super structure in all respects including hand rails/crash barriers, wing walls, return walls, guise bunds, if any, tests on completion etc., complete in all respects and fit for use	41.16%	
B- New Rail-road bridges (a) ROB (b) RUB	Nil Nil	Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB. Payment shall be made on completion of a ROB/RUB.

1.3.3 Structures

Procedure for estimating the value of Structure works shall be stated in table 1.3.3:

Table 1.3.3

Stage of payment	% weightage	Payment procedure
(1) **Foundation**: On completion of the foundation works including foundation for wing and return walls	Nil	Cost of each structure shall be determined on pro rata basis in respect to the total linear length (m) of all the structures. Payment shall be of a
(2) **Sub-structure**: On completion of abutments, piers up to the abutment/pier cap	Nil	

(3) **Super-stricture:** On completion of the Structure along with super structure, including hand rails/crash barriers, wing walls, tests on completion etc., elevated structure complete in all respects and fit for use.	Nil	structure as per the weightage given in this table.
(4) **Reinforced Earth work** excluding back fill	100%	Payment shall be made on pro rata basis on completion of 25 (twenty five) percent of total area.
(5) Fly Ash	Nil	Payment shall be made on pro rata basis on completion 25 (twenty five) percent of total area.

1.3.4 **Other engineering works**

Procedure for estimating the value of Other engineering works shall be stated in table 1.3.4:

Table 1.3.4

Stage of payment	**% weightage**	**Payment procedure**
(i) Service roads	45.40%	Unit of measurement is linear length in km. Cost per km shall be determined on pro rata basis with respect to the total length of the service roads. Payment shall be made for completed service road in a length of not less than 20(twenty) percent of the total length of service roads.
(ii) Toll plaza including CC pavement	9.62%	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.
(iii) Road side drains	18.04%	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.
(iv) Road signs, markings, km stones, safety devices.	12.20%	
(v) Project Facilities a) Bus bays b) Truck lay-bus c) Rest areas d) Others	 2.04% 0.57% Nil Nil	Payment shall be made on pro rata basis for completed facilities.
(vi) Repairs to existing bridges/structures	Nil	Payment shall be made for completed items.
a) Providing wearing coat	0.20%	
b) Replacement of bearing, joints	Nil	
c) Providing crash barriers	1.41%	
d) Other items (junctions)	7.71%	
(vii) Roadside plantation	0.81%	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.
(viii) Protection works	0.71%	
(ix)Traffic Diversion, Safety and traffic management during construction	1.28%	Payment shall be made on prorate basis every six month.

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 instalments in accordance with the provisions of Clause 19.7.