TECHNICAL SCHEDULE

SCHEDULE – A

SCHEDULE - A

(See Clause 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

1.1 Site of the 6 lane Project Expressway 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 Expressway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Expressway 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 Expressway as indicated in the Annexure-III shall be followed by the contractor with minimum FRL as indicated in the alignment plan. Based on the site /design requirement, the contractor may , however, improve / upgrade upon the alignment plans and profiles as indicated in Annexure-III and raised the finished roadway level (FRL) with approval from the authorities engineer with in the available right of way.

1.5 The Alignment plan of project Expressway are specified in Annex III

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

Annex - I

(Schedule-A)

Site

1. Site

The site of six lane Project Expressway is new alignment**.** The land, Carriageway and structures comprising the site are described below:

2. Land

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

S.No	Exiting Chainage (Km)		Total Proposed ROW (m)
	From	To	
1	Km 27.740 of NH-24	Km 51.975 of NH-58	90

3. Carriageway

The project Expressway runs mostly along the new alignment throughout.

4. Major Bridges

The Site includes the following Major Bridges:

S. No.	Existing 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)

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

S. No.	Existing Chainage (km)	Type of Structure		No. of spans with span length (m)	Overall Width (m)	ROB /RUB
		Foundation	Superstructure			
Nil						

6 Grade separators

The Site includes the following grade separators:

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

7 Minor bridges

The Site includes the following minor bridges:

S. No.	Existing Chainage (km)	Type of Structure		Overall length (m)	Span Arrangement (m)	Overall Width (m)
		Super-structure	Sub-structure			
1	51+850 of NH-58	RCC Slab	Brick Masonry Wall Type	16	2x6.7	20

8 Railway level crossings

The Site includes the following railway level crossings:

S. No.	Existing Location (km)	Remarks

1	Ghaziabad – Hapur Railway Line	Crossing the proposed alignment
2	Ghaziabad – Meerut Railway Line	Crossing the proposed alignment

9 Underpasses (Vehicular, Non Vehicular)

The Site includes the following underpasses:

S.No.	Existing 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)	Type of Culvert	Span / Opening with span length (m)	Width (m)
1	27.795	Pipe	1m dia	--

11 Bus bays

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

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

12 Truck Lay Byes

The details of truck lay byes are as follows:

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

13 Road Side Drains

The details of the roadside drains are as follows:

S. No.	Existing Location (Km)		Side	Type	
	From	To		Masonry/cc (Pucca)	Earthen (Kutcha)
Nil					

14 Major junctions

The details of major junctions are as follows:

S. No.	Existing Location (Km)		At grade	Grade Seperated	Category of cross road			
	From	To			NH	SH	MDR	Others
1.	*51.975 of NH-58 at Grade Junction*		*yes*	*--*	*NH-58*			

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

15 Minor junctions

The details of the Minor junctions are as follows:

S. No.	Existing Location	Type		Side
	Chainage	T-Junction	Cross Road	
NiL				

16 Bypasses

The details of the existing road section proposed to be followed are as follows:

S.No	Name of Bypass to town	Existing Chainage	Design Chainage	Design Length (Km)
NIL				

17 Referencing

S. No.	Existing Chainage (Km)	Design Chainage
1	KM 28 of NH-24	28.260
2	KM 51.975 of NH-58	59.777

18 (Other structures)

NIL

Annex - II

(Schedule-A)

Dates for providing Right of Way

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

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Existing Length (km)	Design Length (km)	Width (m)	Date of providing ROW*
	From	To	From	To				
1	2				3		4	5
(i) Full Right of Way	NIL							
(ii) Part Right of Way	NIL							
(iii) Balance Right of Way	27.740 of NH-24	51.975 of NH-58	28.000	59.777	--	31.777	90	Within 150 days of Appointed date

Annex - III

(Schedule-A)

Alignment Plans

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

Annex - IV

(Schedule-A)

Environment Clearances

Environment clearances has been obtained as per latest MOEF guidelines.

SCHEDULE – B

SCHEDULE - B

(See Clause 2.1)

Development of the Project Expressway

1 Development of the Project Expressway

Development of the Project Expressway shall include design and construction of the Project Expressway as described in this Schedule-B and in Schedule-C. The alignment plans of the Project Expressway are specified in Annex-III of Schedule-A .The proposed profile of the project Expressway as indicated in the Annexure-III of Schedule-A shall be followed by the contractor with minimum FRL as indicated in the alignment plan. Based on the site /design requirement, The contractor may , however, improve / upgrade upon the alignment plans and profiles as indicated in Annexure-III and raised the finished roadway level (FRL) with approval from the authorities engineer with in the available right of way .

2 Construction of Project – Expressway

The Project Expressway shall be developed & designed as per details given below:

(Km 27.740 of NH-24 – Km 51.975 of NH-58) of DME (6-lane Expressway) (Design Chainage: 28.000 to 59.777, Design Length:-31.777 Km)

2.1 Project Expressway shall be developed to new six-lane Expressway as described in Annex – I of Schedule ‘B‘ & Annexure – II of Schedule ‘C’.

3 Specifications and Standards

The Project Expressway 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 Delhi – Meerut Expressway

1 Construction of Project Expressway from existing Km. 27+740 of NH-24 to existing Km. 51+975 of NH-58 (Design Length : 31.777 kms).

1.1 The alignment plans of the Project Expressway are specified in Annex-III of Schedule-A .The proposed profile of the project Expressway as indicated in the Annexure-III of Schedule-A shall be followed by the contractor with minimum FRL as indicated in the alignment plan. Based on the site /design requirement, the contractor may, however, improve / upgrade upon the alignment plans and profiles as indicated in Annexure-III and raised the finished roadway level (FRL) with approval from the authorities engineer with in the available right of way .

1.2 WIDTH OF CARRIAGEWAY

1.2.1 Construction of 6-Lane expressway with paved shoulders shall be undertaken. The each paved carriageway shall be 11.25m and 3m wide paved shoulder for 6-Lane Expressway excluding the median as per schedule D.

Note:- All the cross sectional elements to be accommodated in the available/proposed ROW. If required, suitable retaining structures to be provided and no change of scope of work will be given.

1.2.2 Except as otherwise provided in this agreement, the width of the paved carriageway and cross sectional features shall conform to paragraph 1.2.1 above

2 GEOMETRIC DESIGN AND GENERAL FEATURES

2.1 General

The Project Expressway shall be constructed in conformity with the Specifications and Standards specified in Annex-I of **Schedule-D**. Geometric design and general features of expressway shall be in accordance with section-2 of the manual of specification and standards of the expressways (IRC SP-99-2013).

2.2 Design speed

The design speed shall be 120 km/hr for plain terrain as per para 2.2 of the above manual of specifications and Standards of the expressways (IRC SP-99-2013).

2.3 Improvement of the existing road geometrics

New Alignment

2.4 Right of Way

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

2.5 Type of shoulders

The shoulder on the outer side (left side carrageway shall be 3 m wide paved plus 2 m wide earthen. The shoulder composition shall be as below:

i) The composition and specification of the paved shoulder and edge Strip shall be same as that of the main carriageway.

ii) The earthen shoulder shall be provided with 200 mm thick layer of non-erodible/granular material for protection against erosion.

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 Manual.

2.6.2 Lateral clearance and Vertical clearances: The width of the opening at the Vehicular underpasses shall be as follows:

Vehicular underpasses

S.No	Design Chainage(km)	Clear Span (m)	Skew Angle	Vertical Clearance (m)
1	29.300	1x12	26°	5.5
2	29.632	1x12	19°	5.5
3	30.815	1x12	-	5.5
4	32.730	1x12	3°	5.5
5	36.235	1x12	-	5.5
6	36.958	1x12	-	5.5
7	47.642	1x12	-	5.5
8	50.744	1x12	18°	5.5
9	52.134	1x12	-	5.5
10	54.569	1x12	-	5.5
11	55.839	1x12	-	5.5
12	58.739	1x12	31°	5.5

Proposed Locations of Light Vehicular Underpasses (LVUP)/Cattle Underpass

S.No.	Design Chainage (Km)	Clear Span (m)	Vertical Clearance (m)	Skew Angle °	Total Width (m) Approx.
1	30.130	12	4	-	6 lane expressway
2	31.650	12	4		6 lane expressway
3	33.286	12	4	-	6 lane expressway
4	34.140	12	4	-	6 lane expressway
5	34.360	12	4	-	6 lane expressway
6	34.670	12	4	-	6 lane expressway
7	34.937	12	4	-	6 lane expressway
8	35.197	12	4	-	6 lane expressway
9	36.062	12	4	-	6 lane expressway
10	36.582	12	4	-	6 lane expressway
11	36.854	12	4	-	6 lane expressway
12	37.210	12	4	-	6 lane expressway
13	38.015	12	4	-	6 lane expressway
14	38.290	12	4	-	6 lane expressway
15	38.860	12	4	-	6 lane expressway
16	39.330	12	4	-	6 lane expressway
17	39.765	12	4	-	6 lane expressway
18	40.970	12	4	-	6 lane expressway
19	41.252	12	4	-	6 lane expressway
20	41.991	12	4	-	6 lane expressway
21	42.370	12	4	-	6 lane expressway
22	42.540	12	4	-	6 lane expressway
23	42.930	12	4	-	6 lane expressway
24	43.110	12	4	-	6 lane expressway
25	43.442	12	4	-	6 lane expressway
26	43.643	12	4	-	6 lane expressway

27	44.160	12	4	-	6 lane expressway
28	44.365	12	4	-	6 lane expressway
29	44.760	12	4	-	6 lane expressway
30	45.354	12	4	-	6 lane expressway
31	46.350	12	4		6 lane expressway
32	47.300	12	4	-	6 lane expressway
33	48.015	12	4	-	6 lane expressway
34	48.915	12	3		6 lane expressway
35	50.278	12	3		6 lane expressway
36	51.780	12	4	-	6 lane expressway
37	52.520	12	4	-	6 lane expressway
38	53.501	12	4	-	6 lane expressway
39	54.274	12	4	-	6 lane expressway
40	54.921	12	4	-	6 lane expressway
41	57.391	12	4	-	6 lane expressway
42	58.049	12	4	-	6 lane expressway
43	58.449	12	4	-	6 lane expressway
44	59.117	12	4	31°	6 lane expressway

2.7 Lateral and vertical clearances at overpasses

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

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

S. No.	Location	Design Chainage	Span/opening (m)	Remarks
NIL				

2.8 Slip Roads

Slip roads shall be constructed at the locations and for the lengths indicated below as per Manual:

Slip Roads

S. No	Design Chainage		Length (m)	Width (m)	Side
	From	To			
1	35.684	36.374	690	7	Both
		Total	**1380 (LHS + RHS)**		

2.9 Flyovers/ Grade separated structures

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

Grade Separators/ Flyovers

S.No.	Design Chainage (km)	Name of Village/ Town	Structural Configuration	Viaduct Length (m)	Clear Span(m)	Overall Width(m)	Remark
1	45.697	Bhaipur Village	6 lane Expressway Structure	1x30	30	2x17.5	Modinagar-Hapur

Elevated Structure

S. No.	Design Chainage (Km)		Name of Village /Town	Structural Configuration	Span Arrangement(m) at Centerline of the median	Viaduct length (m)	Overall Width (m)
	Start of Viaduct	End of Viaduct					
1	28.110	28.9995	Dasna	New 3+3-lane Expressway	5x30+26+30+30+30+30+11+20+40+20+22.5+18x30	649.50	2x17.50

Note: Flyover at Chainage 28.420 and ROB at Chainage 28.578 (Span =20+40+20) are already included in the above Proposed Elevated structure at from 28.220 to 28.870. For Skew angle ° Refer GAD

Interchanges

S.No.	Design Chainage (km)	Name of Village/ Town	Structural Configuration	Clear Span (m)	Overall Width (m)	Remark
1	31.330	At EPE Junction	6 lane Expressway Structure	2x45 (Skew angle 9°	2x17.5	Flyover ,Loops ,Ramps etc complete in all respect to be

						provided as per indicative drawings
2	59.777	Junction with NH-58	6 lane Expressway Structure	1x50.00	2x17.5	Flyovers ,Loops ,Ramps widening of NH-58 from..km 51.600 to km 53.450.and Slip roads etc complete in all respect to be provided as per indicative drawings

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

S. No.	Location	Type of Structure	Cross Road at			Remarks
			Existing Level	Raised Level	Lowered Level	
1	59.509	ROB	Yes			
2	59.777	Interchange	Yes			
3	31+330	Interchange	Yes			
4	45.697	Flyover	Yes			
5	29.300	VUP	Yes			
6	29.632	VUP	Yes			
7	30.815	VUP	Yes			
8	32.730	VUP	Yes			
9	36.235	VUP	YES			
10	36.958	VUP	Yes			
11	47.642	VUP	Yes			
12	50.744	VUP	Yes			
13	52.134	VUP	Yes			
14	54.569	VUP	Yes			
15	55.839	VUP	Yes			
16	58.739	VUP	Yes			
17	28.555	Elevated Structure	Yes			
18	30.130	LVUP	Yes			
19	31.650	LVUP	Yes			
20	33.286	LVUP	Yes			
21	34.140	LVUP	Yes			
22	34.360	LVUP	Yes			
23	34.670	LVUP	Yes			
24	34.937	LVUP	Yes			
25	35.197	LVUP	Yes			
26	36.062	LVUP	Yes			
27	36.582	LVUP	Yes			
28	36.854	LVUP	Yes			

S. No.	Location	Type of Structure	Cross Road at			Remarks
			Existing Level	Raised Level	Lowered Level	
29	37.210	LVUP	Yes			
30	38.015	LVUP	Yes			
31	38.290	LVUP	Yes			
32	38.860	LVUP	Yes			
33	39.330	LVUP	Yes			
34	39.765	LVUP	Yes			
35	40.970	LVUP	Yes			
36	41.252	LVUP	Yes			
37	41.991	LVUP	Yes			
38	42.370	LVUP	Yes			
39	42.540	LVUP	Yes			
40	42.930	LVUP	Yes			
41	43.110	LVUP	Yes			
42	43.442	LVUP	Yes			
43	43.643	LVUP	Yes			
44	44.160	LVUP	Yes			
45	44.365	LVUP	Yes			
46	44.760	LVUP	Yes			
47	45.354	LVUP	Yes			
48	46.350	LVUP	Yes			
49	47.300	LVUP	Yes			
50	48.015	LVUP	Yes			
51	48.915	LVUP	Yes			
52	50.278	LVUP	Yes			
53	51.780	LVUP	Yes			
54	52.520	LVUP	Yes			
55	53.501	LVUP	Yes			
56	54.274	LVUP	Yes			
57	54.921	LVUP	Yes			
58	57.391	LVUP	Yes			
59	58.049	LVUP	Yes			
60	58.449	LVUP	Yes			
61	59.117	LVUP	Yes			

2.10 Typical cross-sections of the Project Expressway

Typical cross section schedule for project Expressway is as follows:

S. No	Design Chainage		Length (m)	TCS	Remarks
	From	To			
1	28.000	28.230	0.230	1	
2	28.230	28.300	0.070	2	
3	28.300	28.880	0.580	3	
4	28.880	29.294	0.414	4	
5	29.294	29.306	0.012	VUP	
6	29.306	29.626	0.320	4	
7	29.626	29.638	0.012	VUP	
8	29.638	30.124	0.486	4	

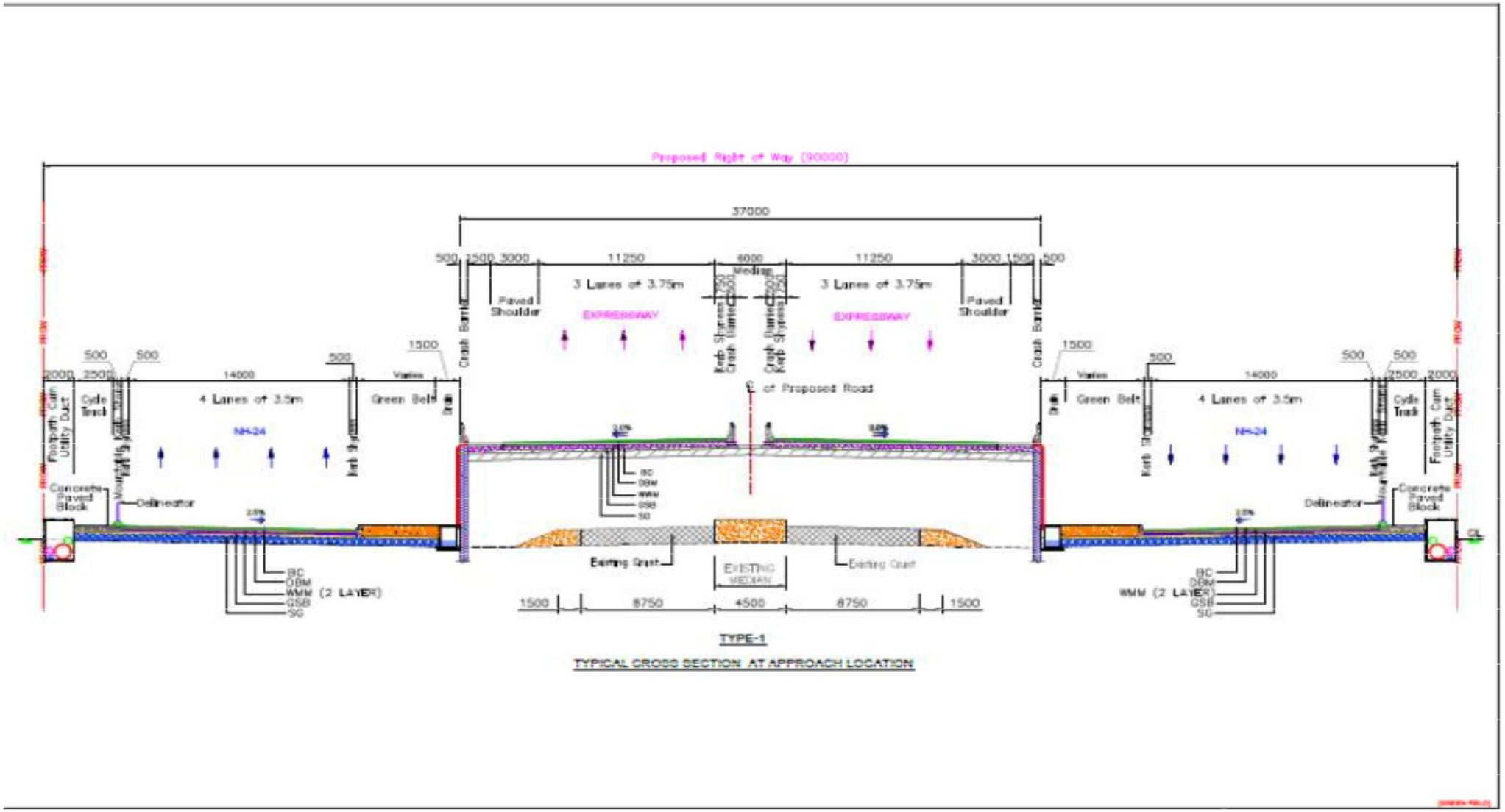
S. No	Design Chainage		Length (m)	TCS	Remarks
9	30.124	30.136	0.012	LVUP	
10	30.136	30.809	0.673	4	
11	30.809	30.821	0.012	VUP	
12	30.821	31.285	0.464	4	
13	31.285	31.375	0.090	Interchange	
14	31.375	31.644	0.269	4	
15	31.644	31.656	0.012	LVUP	
16	31.656	31.968	0.312	4	
17	31.968	31.993	0.025	Minor Bridge cum VUP	
18	31.993	32.425	0.432	4	
19	32.425	32.435	0.010	Minor Bridge	
20	32.435	32.724	0.289	4	
21	32.724	32.736	0.012	VUP	
22	32.736	33.280	0.544	4	
23	33.280	33.292	0.012	LVUP	
24	33.292	33.627	0.335	4	
25	33.627	33.717	0.090	Major Bridge	
26	33.717	34.134	0.417	4	
27	34.134	34.146	0.012	LVUP	
28	34.146	34.354	0.208	4	
29	34.354	34.366	0.012	LVUP	
30	34.366	34.664	0.298	4	
31	34.664	34.676	0.012	LVUP	
32	34.676	34.931	0.255	4	
33	34.931	34.943	0.012	LVUP	
34	34.943	35.191	0.248	4	
35	35.191	35.203	0.012	LVUP	
36	35.203	35.565	0.362	4	
37	35.565	35.590	0.025	Minor Bridge	
38	35.590	35.730	0.140	4	
39	35.730	35.742	0.012	Minor Bridge cum VUP	
40	35.742	35.892	0.150	4	
41	35.892	36.056	0.164	5	
42	36.056	36.068	0.012	LVUP	
43	36.068	36.229	0.161	5	
44	36.229	36.241	0.012	VUP	
45	36.241	36.576	0.335	5	
46	36.576	36.588	0.012	LVUP	
47	36.588	36.848	0.260	4	
48	36.848	36.860	0.012	LVUP	
49	36.860	36.952	0.092	4	
50	36.952	36.964	0.012	VUP	
51	36.964	37.204	0.240	4	
52	37.204	37.216	0.012	LVUP	
53	37.216	37.722	0.506	4	
54	37.722	37.742	0.020	Minor Bridge	

S. No	Design Chainage		Length (m)	TCS	Remarks
55	37.742	38.009	0.267	4	
56	38.009	38.021	0.012	LVUP	
57	38.021	38.284	0.263	4	
58	38.284	38.296	0.012	LVUP	
59	38.296	38.854	0.558	4	
60	38.854	38.866	0.012	LVUP	
61	38.866	39.224	0.358	4	
62	39.224	39.236	0.012	LVUP	
63	39.236	39.759	0.523	4	
64	39.759	39.771	0.012	LVUP	
65	39.771	39.950	0.179	4	
66	39.950	39.975	0.025	Minor Bridge cum VUP	
67	39.975	40.663	0.688	4	
68	40.663	40.688	0.025	Minor Bridge cum VUP	
69	40.688	40.964	0.276	4	
70	40.964	40.976	0.012	LVUP	
71	40.976	41.246	0.270	4	
72	41.246	41.258	0.012	LVUP	
73	41.258	41.635	0.377	4	
74	41.635	41.660	0.025	Minor Bridge cum VUP	
75	41.660	41.985	0.325	4	
76	41.985	41.997	0.012	LVUP	
77	41.997	42.364	0.367	4	
78	42.364	42.376	0.012	LVUP	
79	42.376	42.534	0.158	4	
80	42.534	42.546	0.012	LVUP	
81	42.546	42.727	0.181	4	
82	42.727	42.752	0.025	Minor Bridge cum VUP	
83	42.752	42.924	0.172	4	
84	42.924	42.936	0.012	LVUP	
85	42.936	43.104	0.168	4	
86	43.104	43.116	0.012	LVUP	
87	43.116	43.264	0.148	4	
88	43.264	43.276	0.012	Minor Bridge cum PUP	
89	43.276	43.534	0.258	4	
90	43.534	43.546	0.012	LVUP	
91	43.546	43.637	0.091	4	
92	43.637	43.649	0.012	LVUP	
93	43.649	43.767	0.118	4	
94	43.767	43.792	0.025	Minor Bridge cum VUP	
95	43.792	44.154	0.362	4	
96	44.154	44.166	0.012	LVUP	
97	44.166	44.359	0.193	4	
98	44.359	44.371	0.012	LVUP	
99	44.371	44.754	0.383	4	
100	44.754	44.766	0.012	LVUP	

S. No	Design Chainage		Length (m)	TCS	Remarks
101	44.766	45.348	0.582	4	
102	45.348	45.186	-0.162	LVUP	
103	45.186	45.348	0.162	4	
104	45.348	45.360	0.012	LVUP	
105	45.360	45.672	0.312	4	
106	45.672	45.722	0.050	Flyover	
107	45.722	46.344	0.622	4	
108	46.344	46.356	0.012	LVUP	
109	46.356	47.294	0.938	4	
110	47.294	47.306	0.012	LVUP	
111	47.306	47.636	0.330	4	
112	47.636	47.648	0.012	VUP	
113	47.648	48.009	0.361	4	
114	48.009	48.021	0.012	LVUP	
115	48.021	48.252	0.231	4	
116	48.252	48.292	0.040	Minor Bridge	
117	48.292	48.909	0.617	4	
118	48.909	48.921	0.012	LVUP	
119	48.921	49.619	0.698	4	
120	49.619	49.644	0.025	Minor Bridge cum VUP	
121	49.644	50.072	0.428	4	
122	50.072	50.084	0.012	LVUP	
123	50.084	50.738	0.654	4	
124	50.738	50.750	0.012	VUP	
125	50.750	51.774	1.024	4	
126	51.774	51.786	0.012	LVUP	
127	51.786	52.128	0.342	4	
128	52.128	52.140	0.012	VUP	
129	52.140	52.514	0.374	4	
130	52.514	52.526	0.012	LVUP	
131	52.526	53.495	0.969	4	
132	53.495	53.507	0.012	LVUP	
133	53.507	54.053	0.546	4	
134	54.053	54.065	0.012	Minor Bridge	
135	54.065	54.268	0.203	4	
136	54.268	54.280	0.012	LVUP	
137	54.280	54.563	0.283	4	
138	54.563	54.575	0.012	VUP	
139	54.575	54.915	0.340	4	
140	54.915	54.924	0.009	LVUP	
141	54.924	55.833	0.909	4	
142	55.833	55.845	0.012	VUP	
143	55.845	57.385	1.540	4	
144	57.385	57.397	0.012	LVUP	
145	57.397	57.969	0.572	4	
146	57.969	58.043	0.074	Toll plaza	

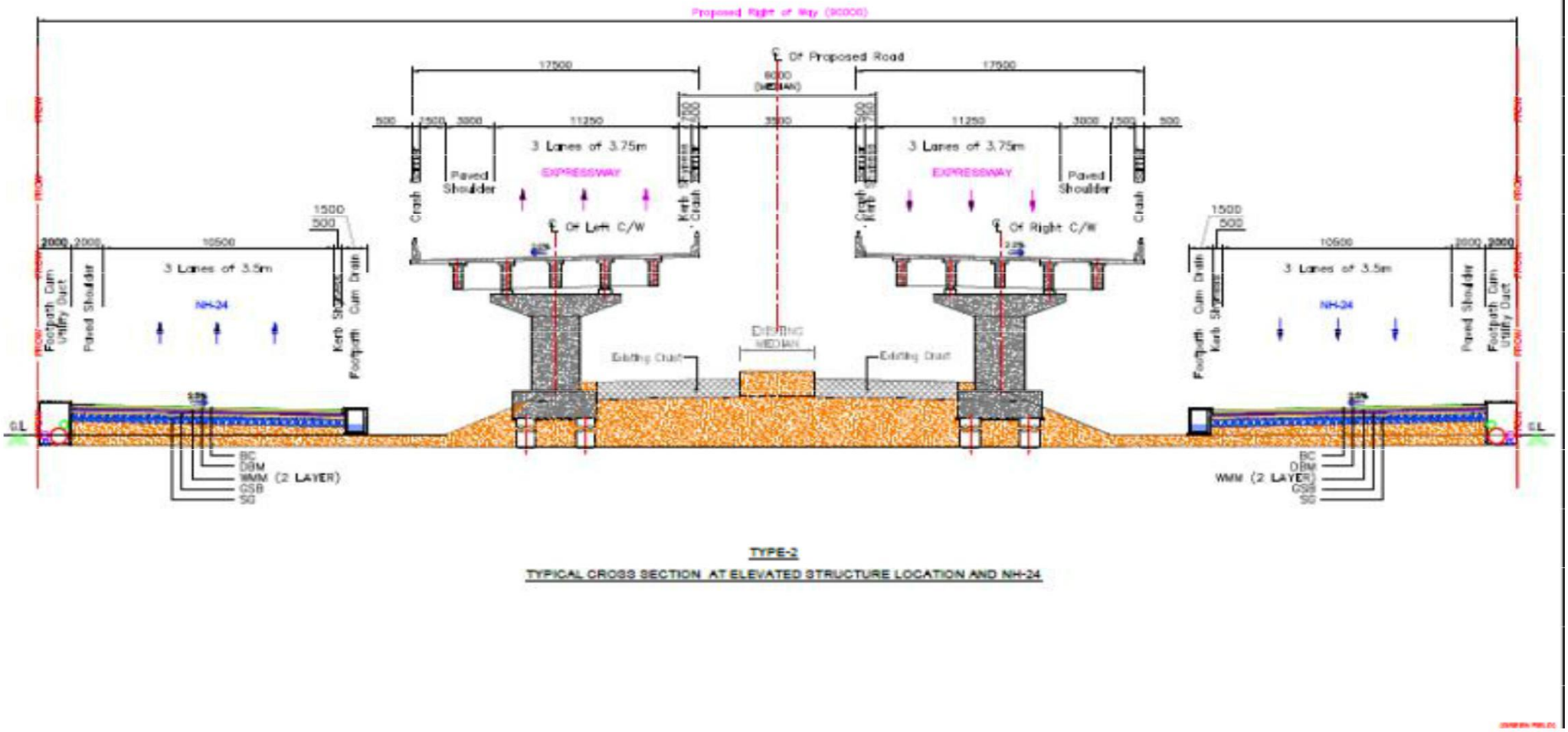
S. No	Design Chainage		Length (m)	TCS	Remarks
147	58.043	58.055	0.012	LVUP	
148	58.055	58.443	0.388	Toll plaza	
149	58.443	58.455	0.012	LVUP	
150	58.455	58.569	0.114	Toll plaza	
151	58.569	58.733	0.164	4	
152	58.733	58.745	0.012	VUP	
153	58.745	59.111	0.366	4	
154	59.111	59.123	0.012	LVUP	
155	59.123	59.494	0.371	4	
156	59.494	59.524	0.030	ROB	
157	59.524	59.777	0.253	4	
158	59.777	59.777	0.000	Interchange	

Typical Cross Sections



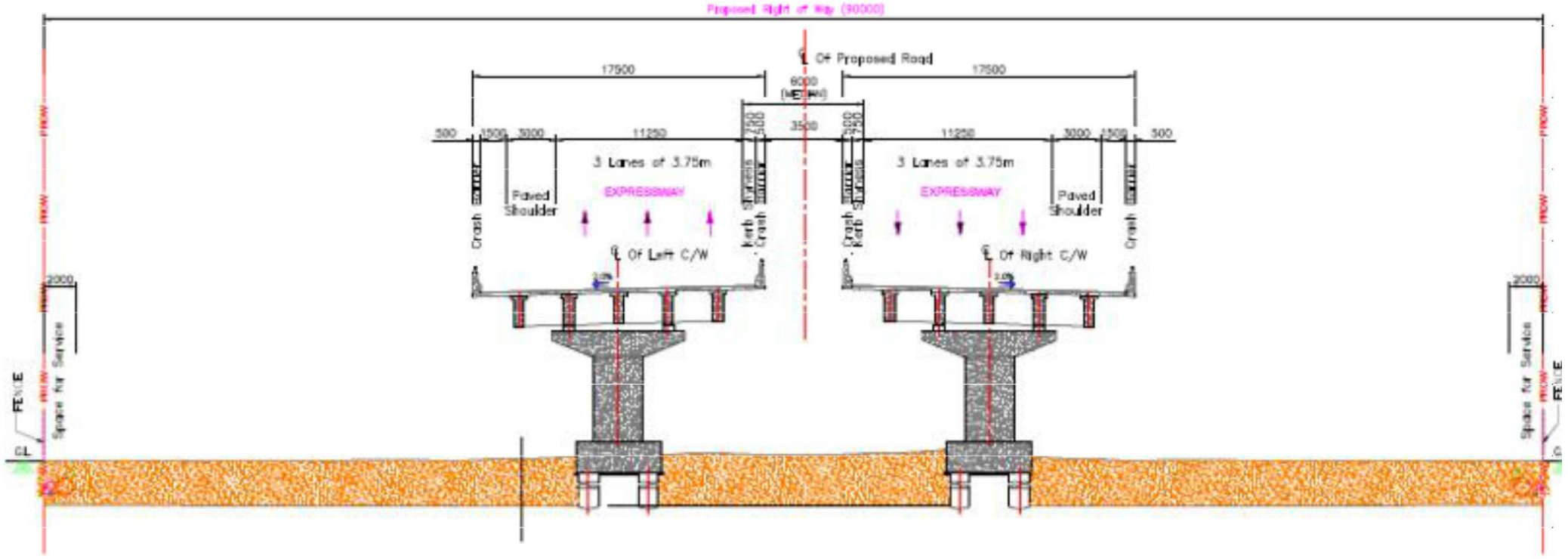
TYPE-1

TYPICAL CROSS SECTION AT APPROACH LOCATION



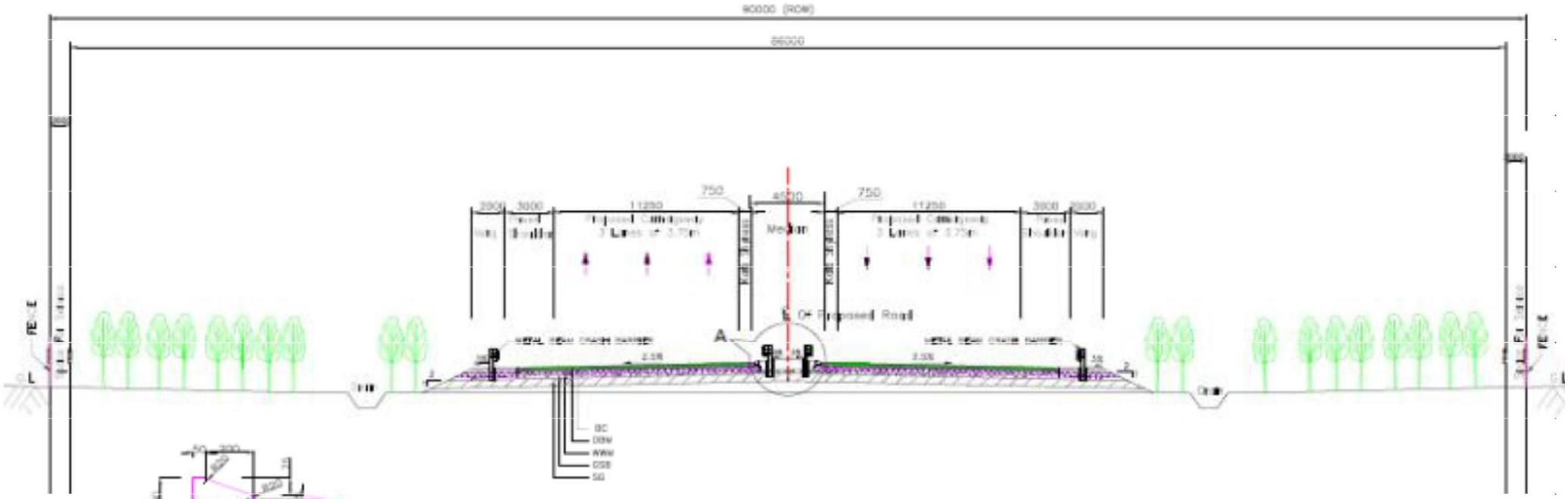
TYPE-2

TYPICAL CROSS SECTION AT ELEVATED STRUCTURE LOCATION AND NH-24

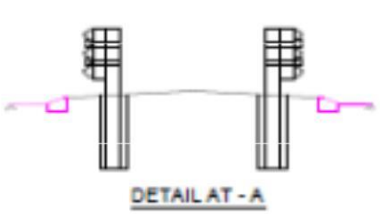


TYPE-3

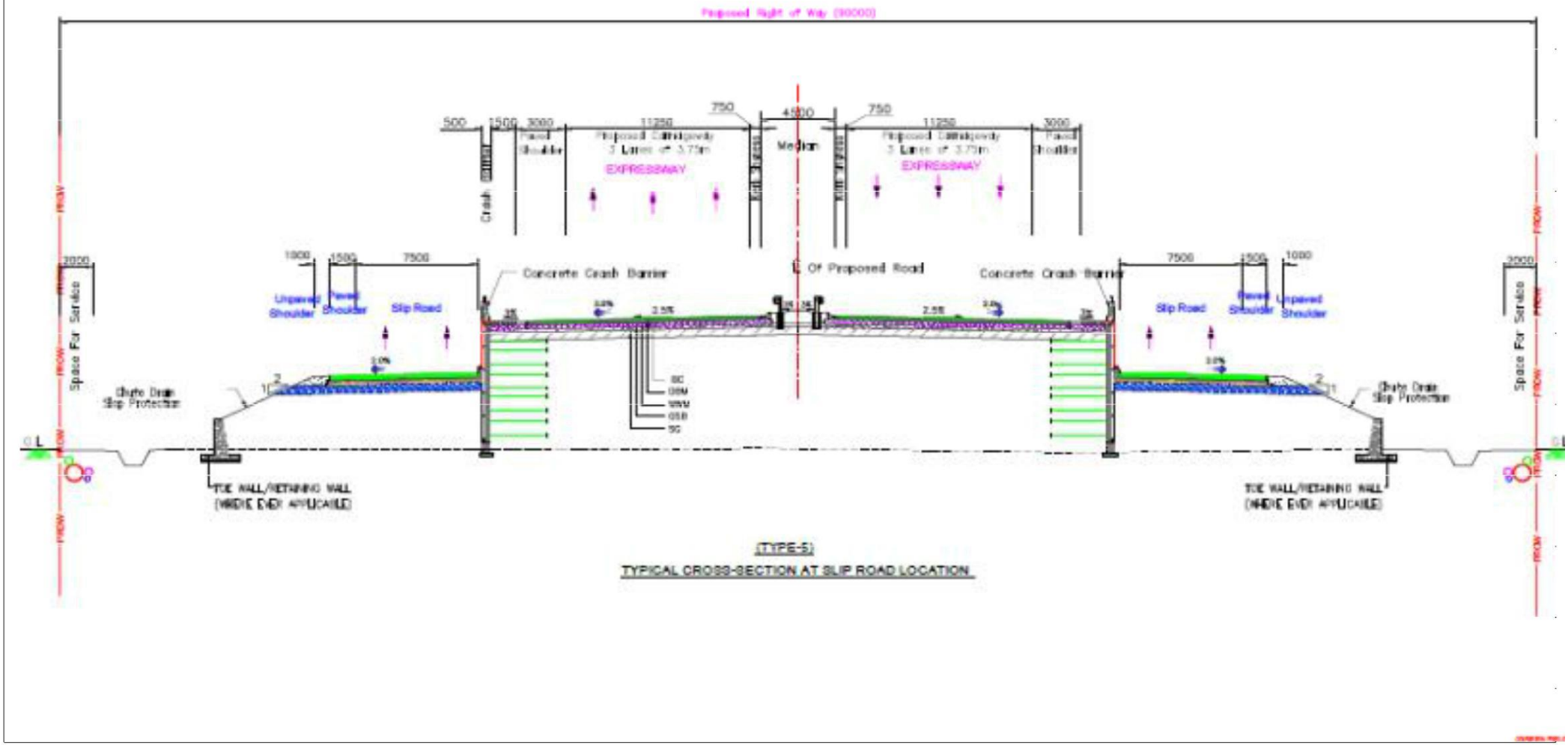
TYPICAL CROSS SECTION AT ELEVATED STRUCTURE LOCATION



TYPICAL CROSS-SECTION - (TYPE-4)



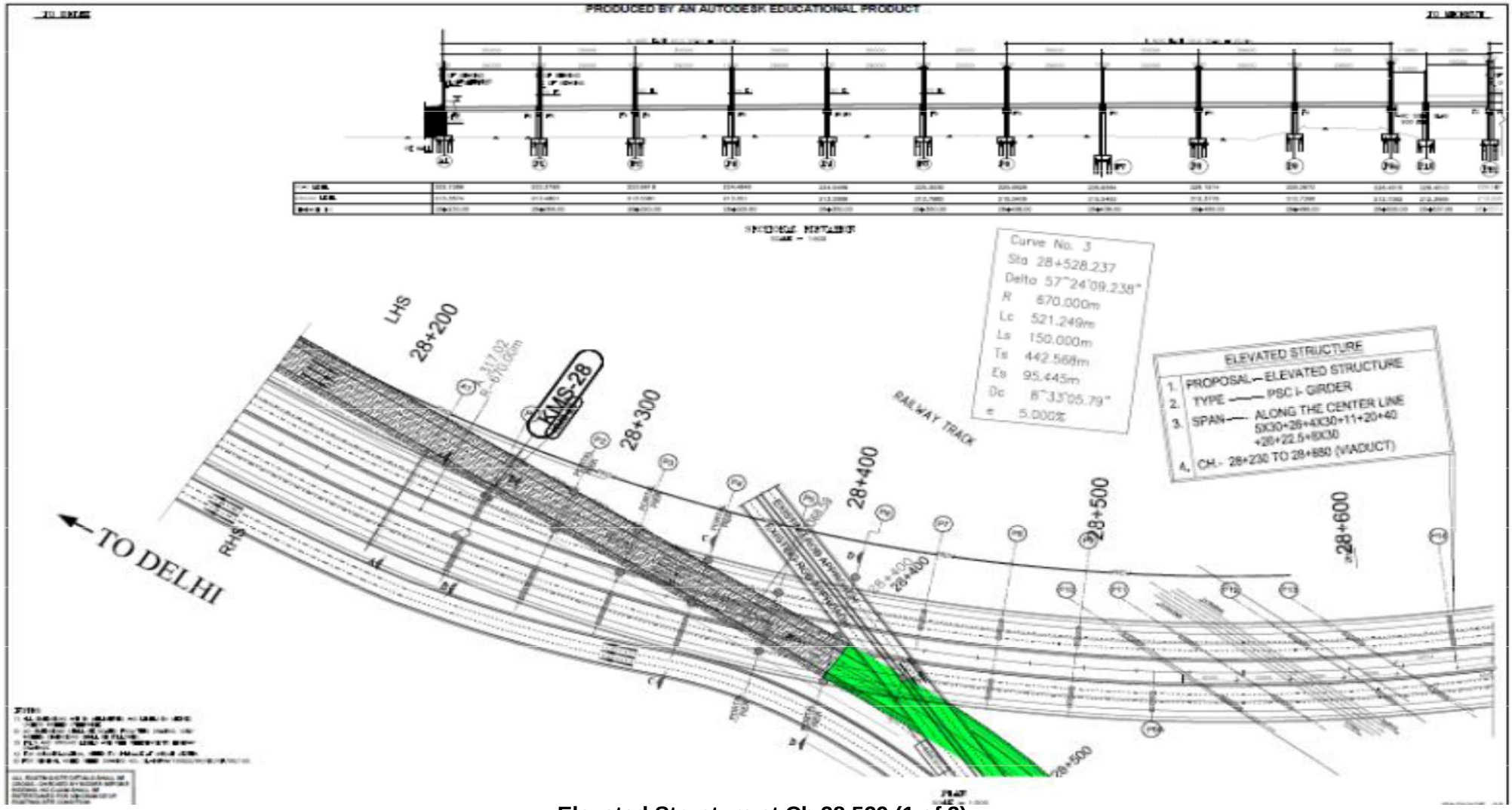
DETAIL AT - A



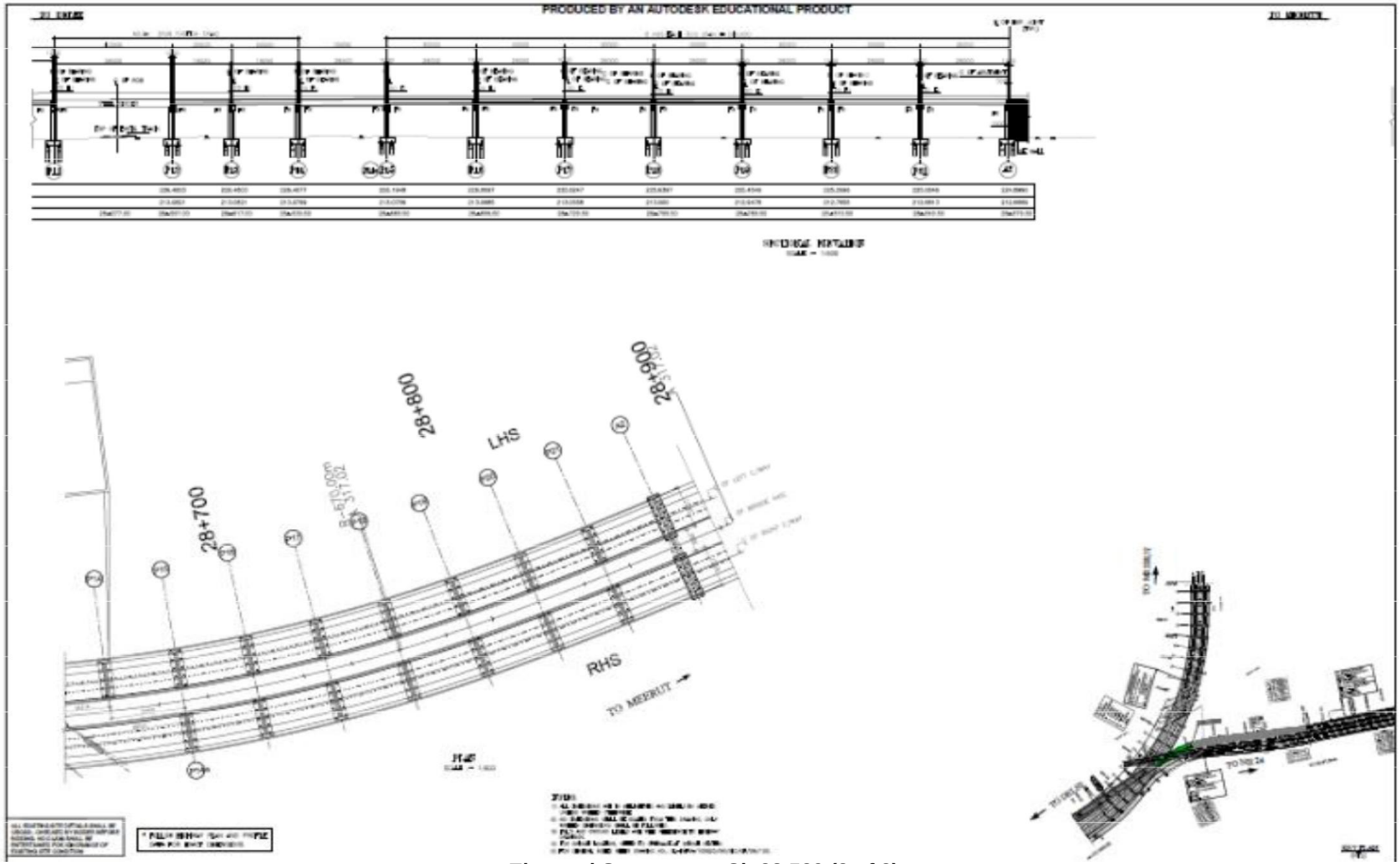
(TYPE-5)

TYPICAL CROSS-SECTION AT SLIP ROAD LOCATION

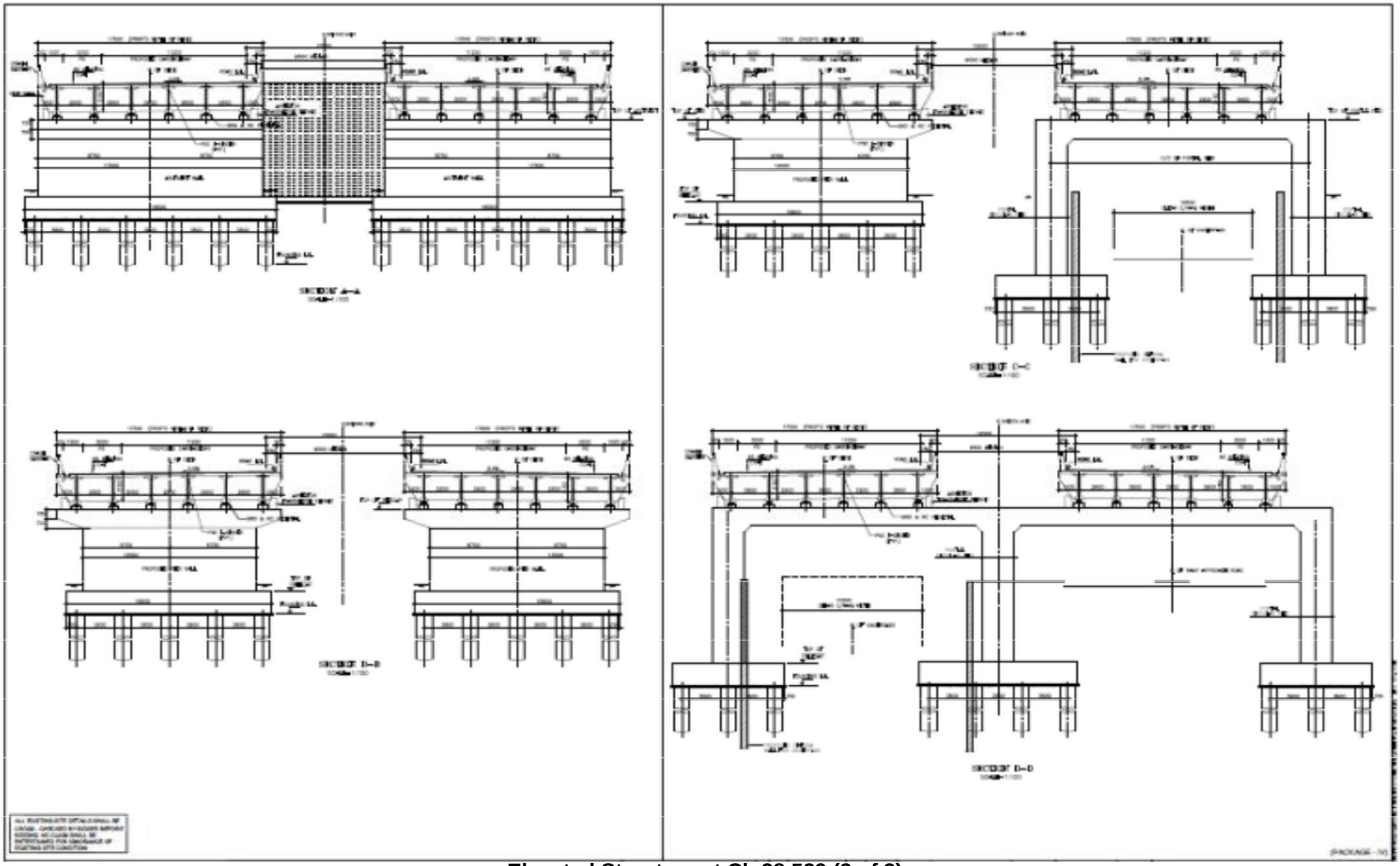
GADs



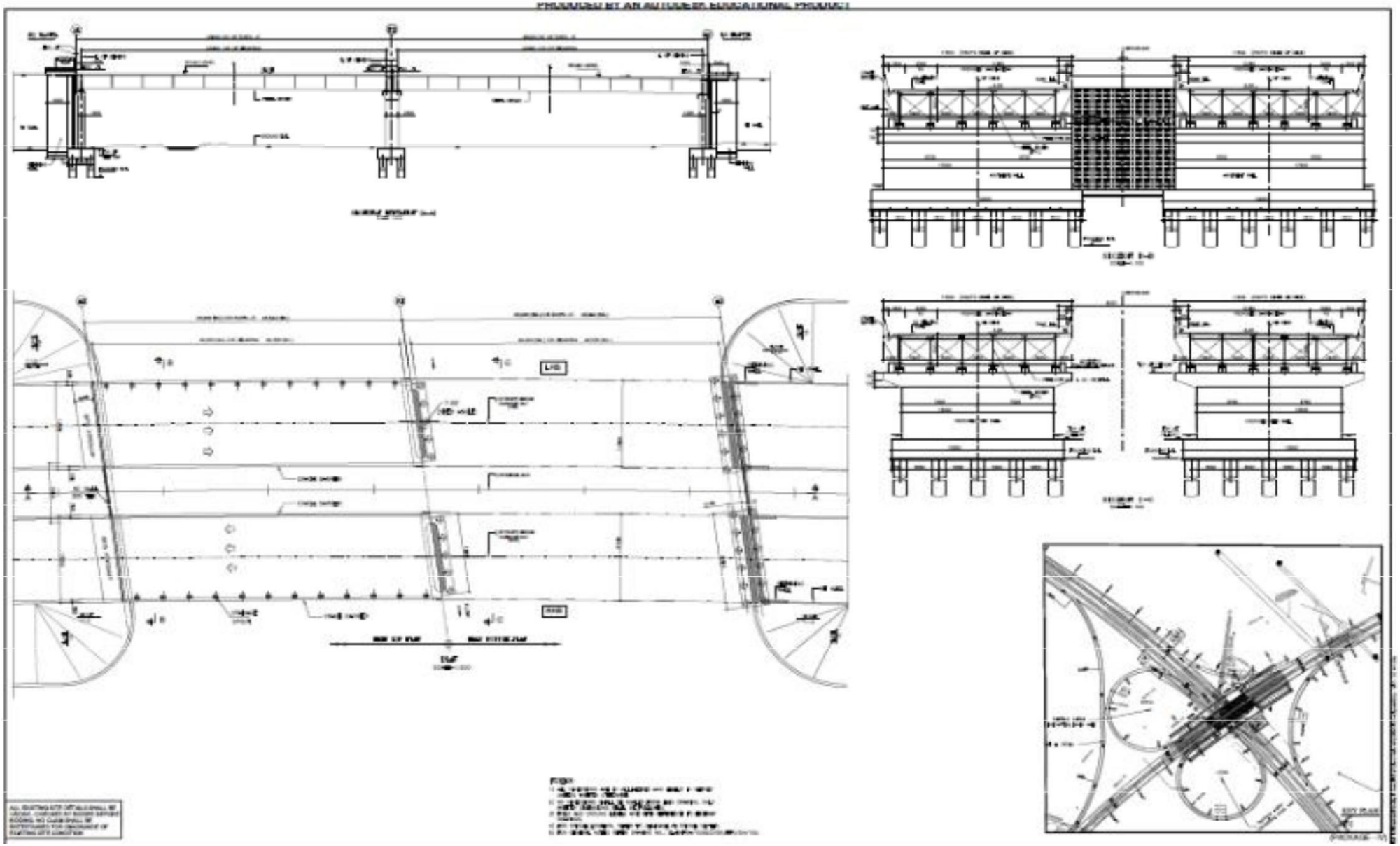
Elevated Structure at Ch 28.529 (1 of 3)



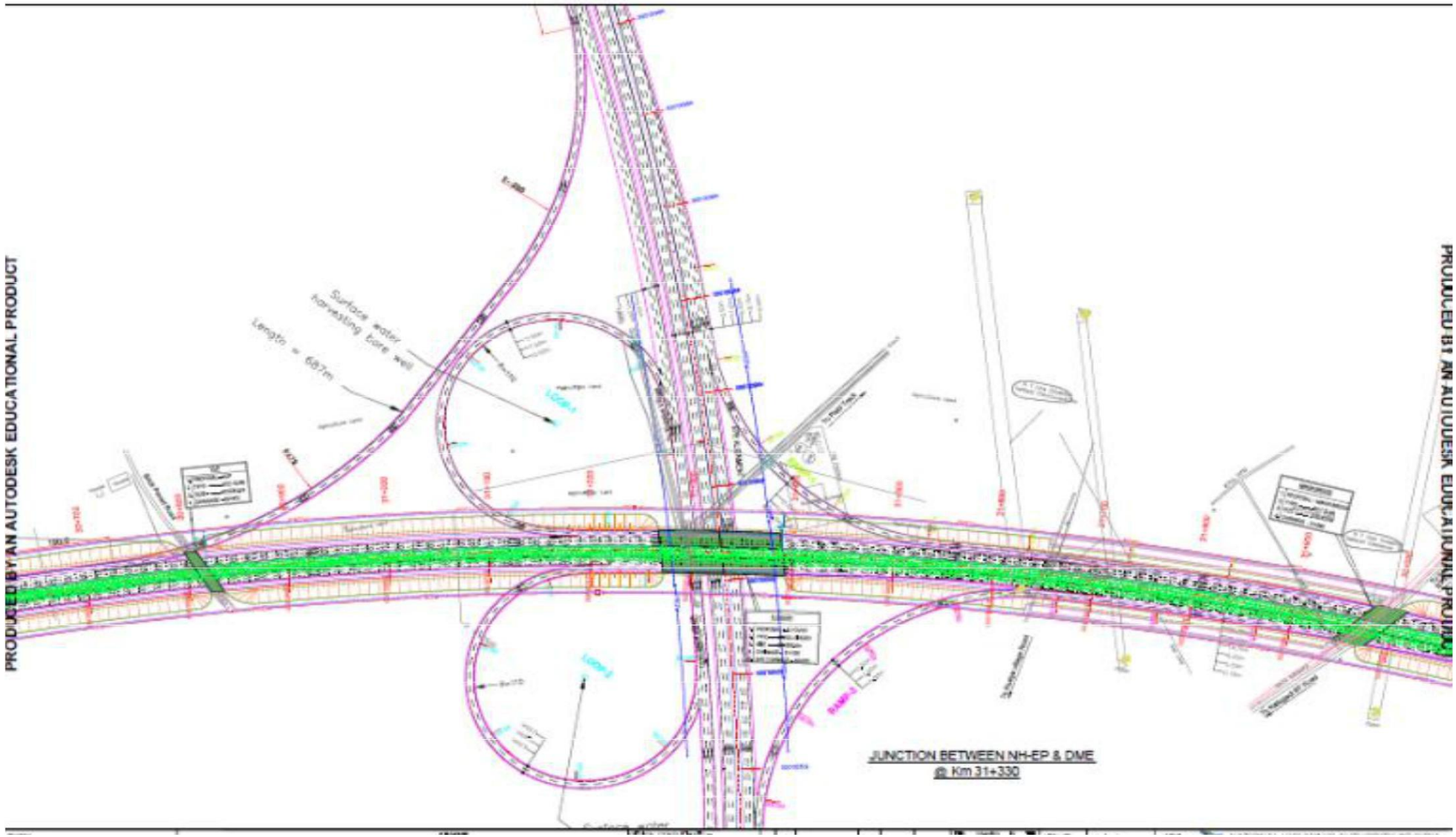
Elevated Structure at Ch 28.529 (2 of 3)



Elevated Structure at Ch 28.529 (3 of 3)

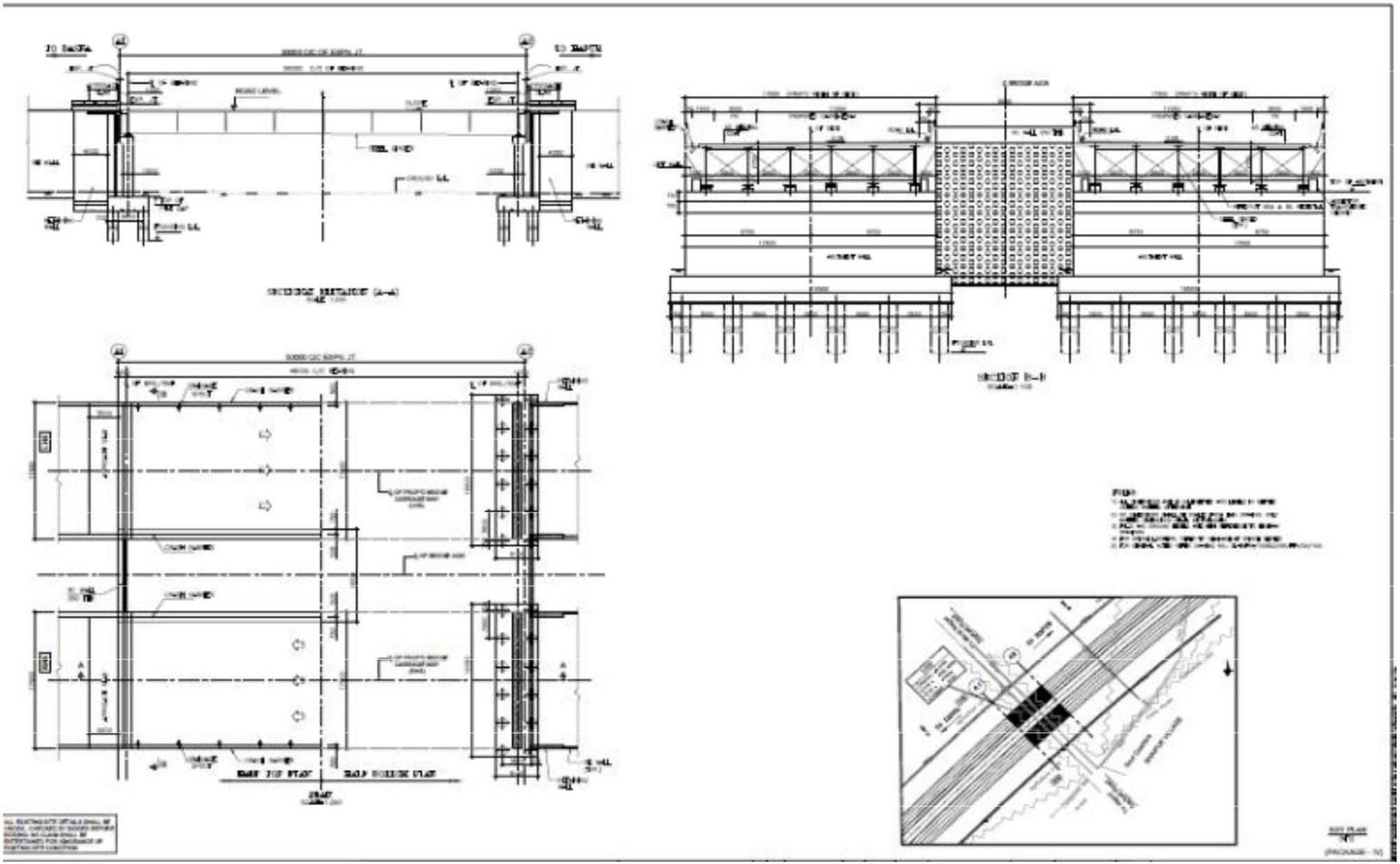


Flyover at Ch. 31.330

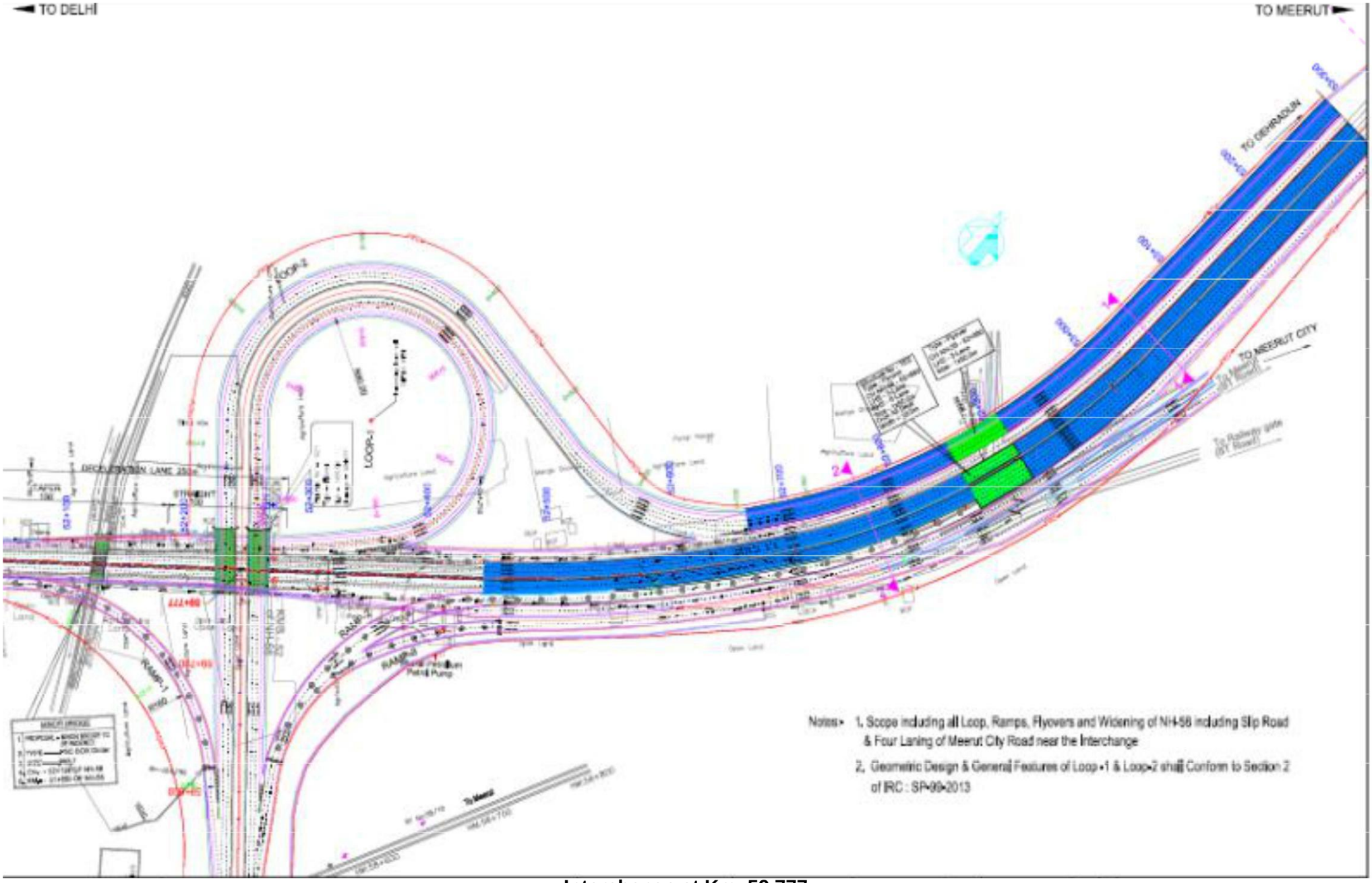


Interchange at Ch. 31.330

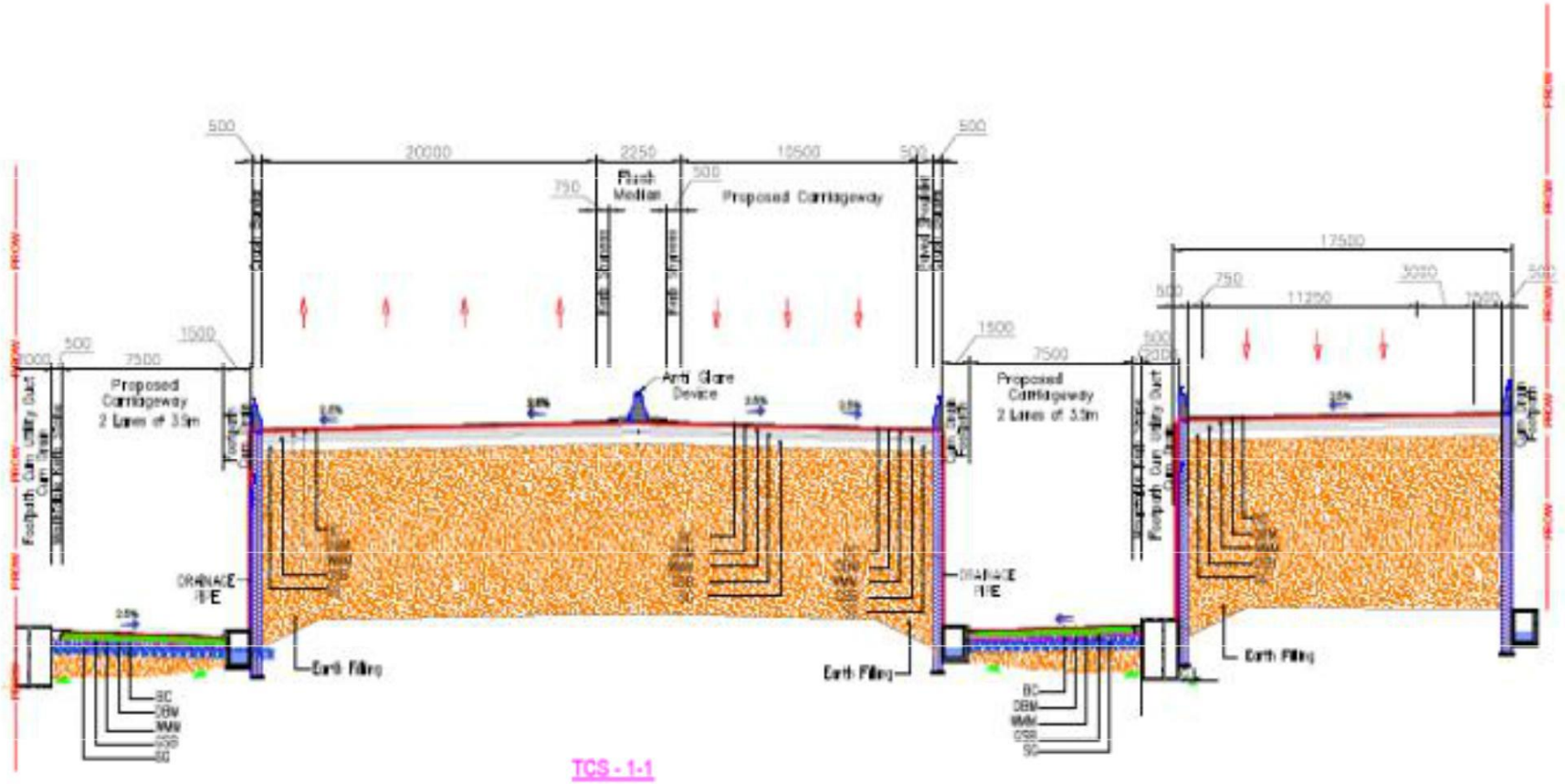
Note: Flyover ,Loops ,Ramps etc complete in all respect to be provided as per above drawings



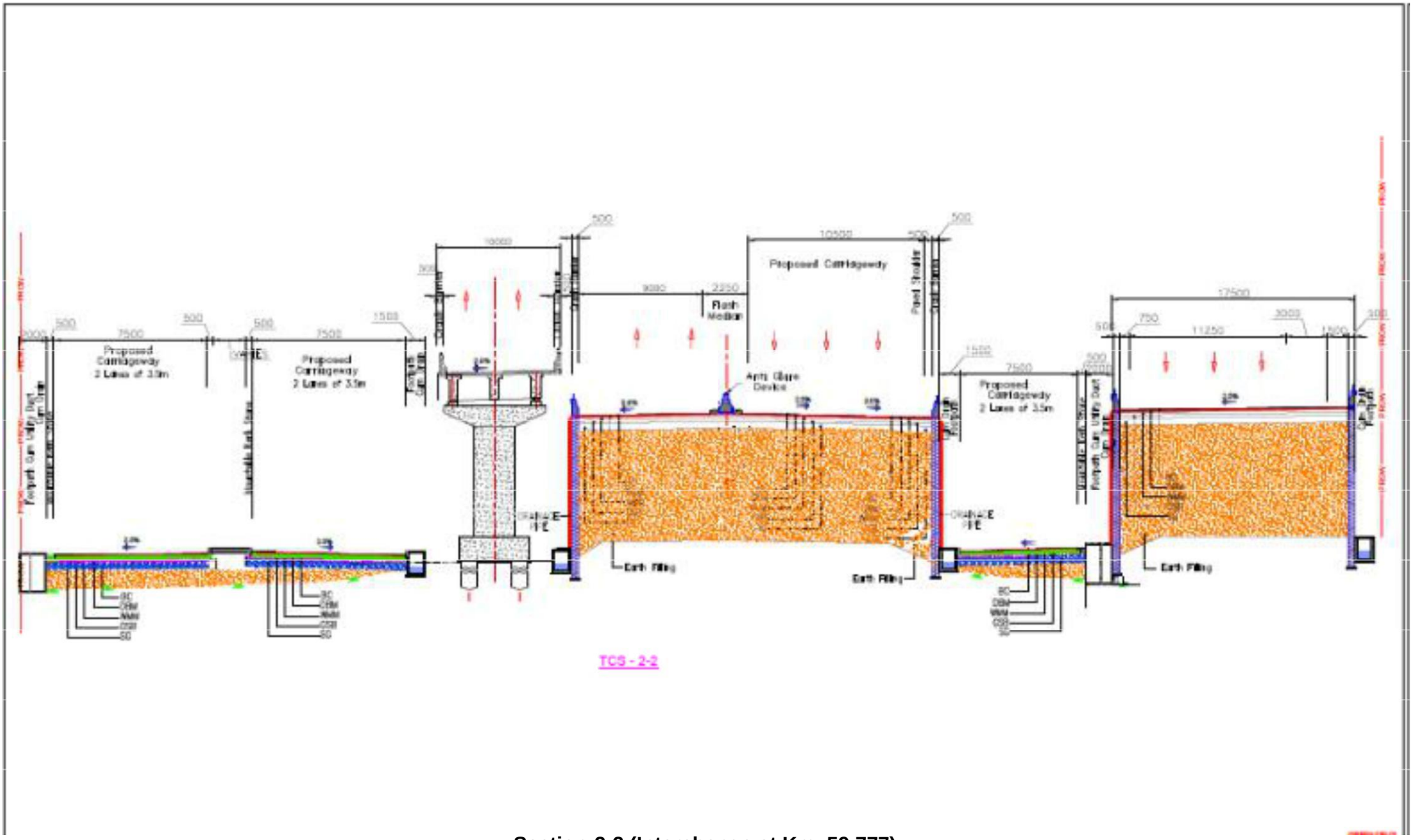
Flyover at Ch. 45.697



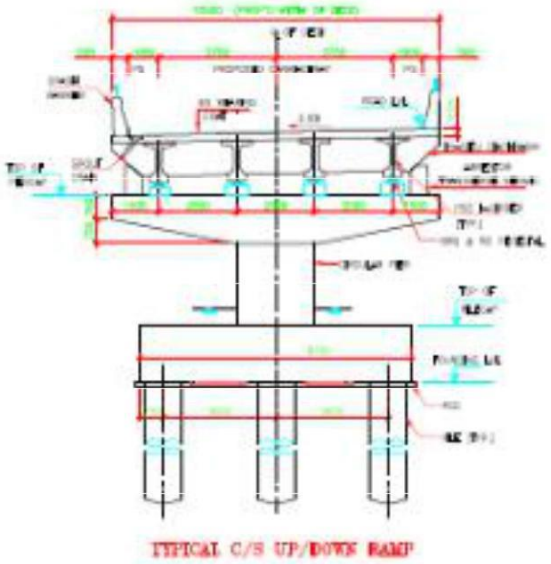
Interchange at Km. 59.777



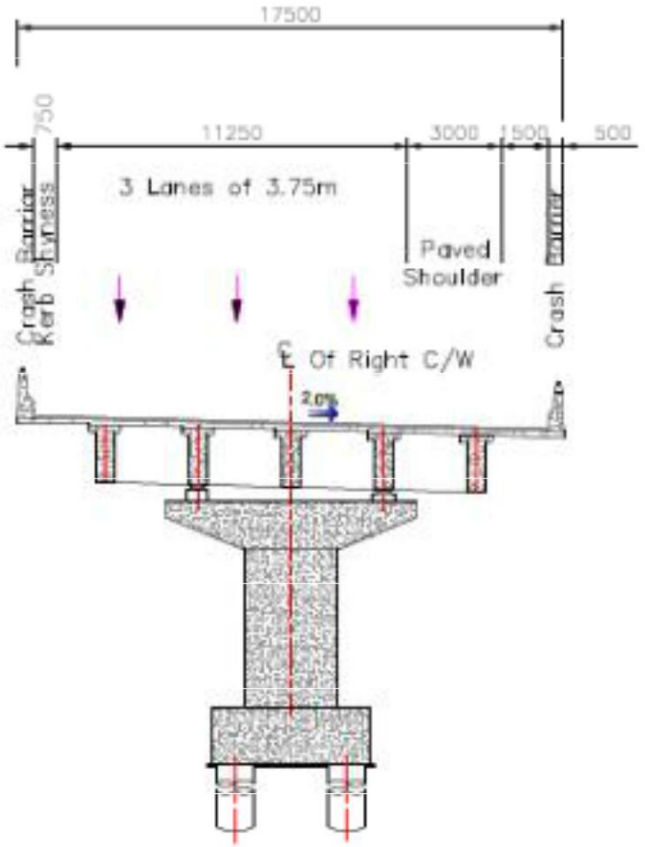
Section-1-1 (Interchange at Km. 59.777)



Section-2-2 (Interchange at Km. 59.777)

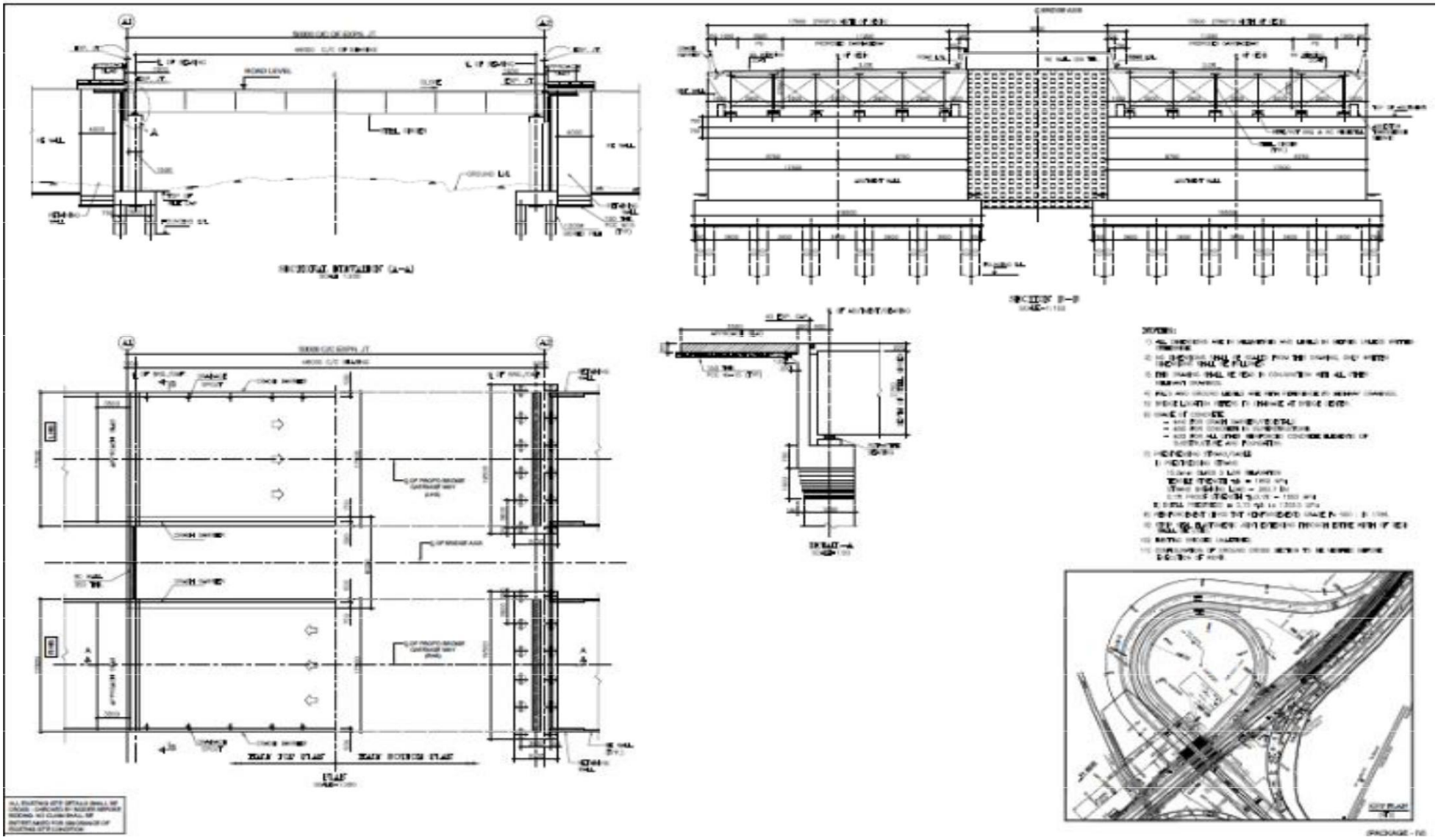


TCS RAMP 1 & RAMP 3

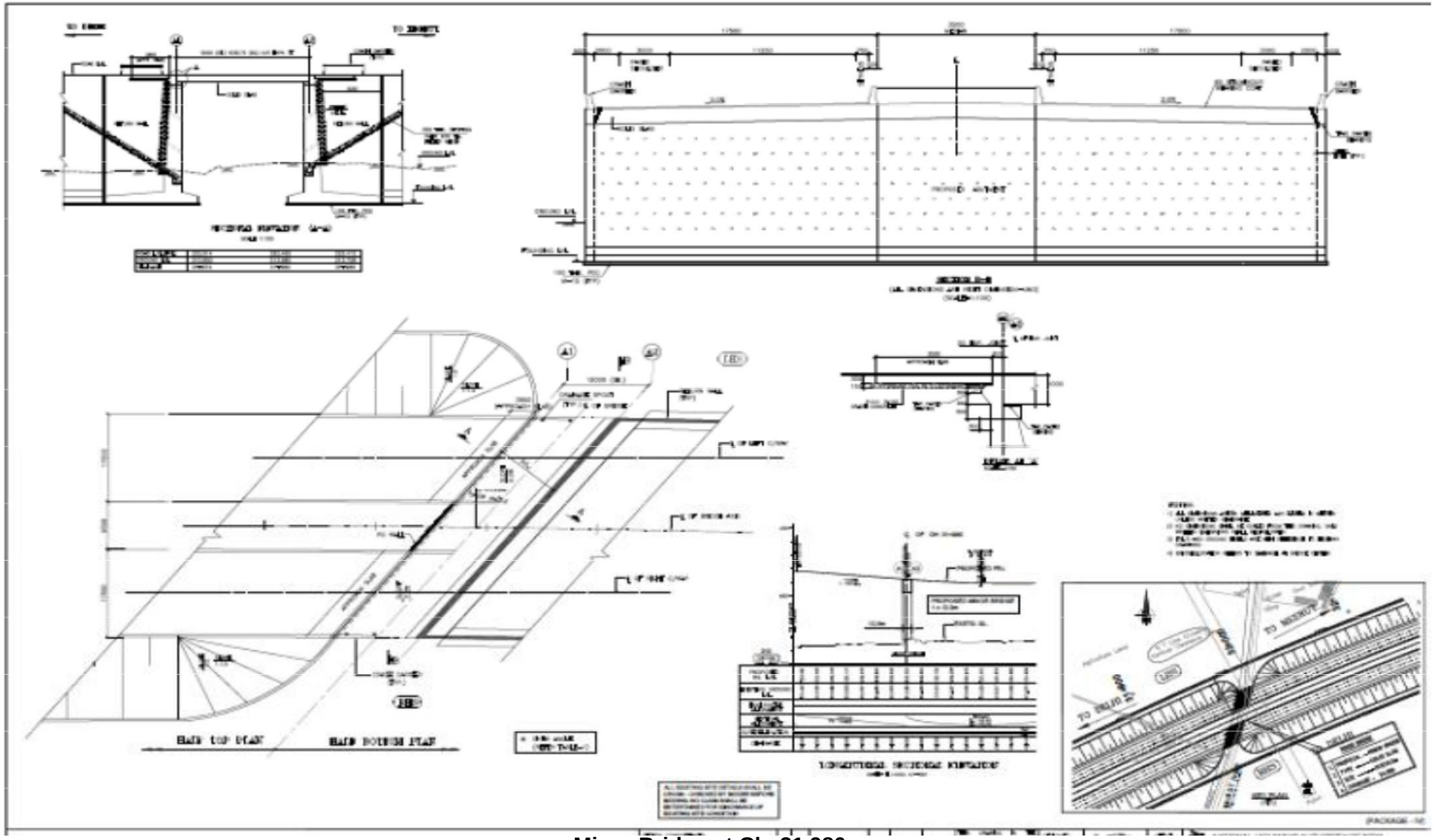


TCS RAMP - 2 (3 LANES)

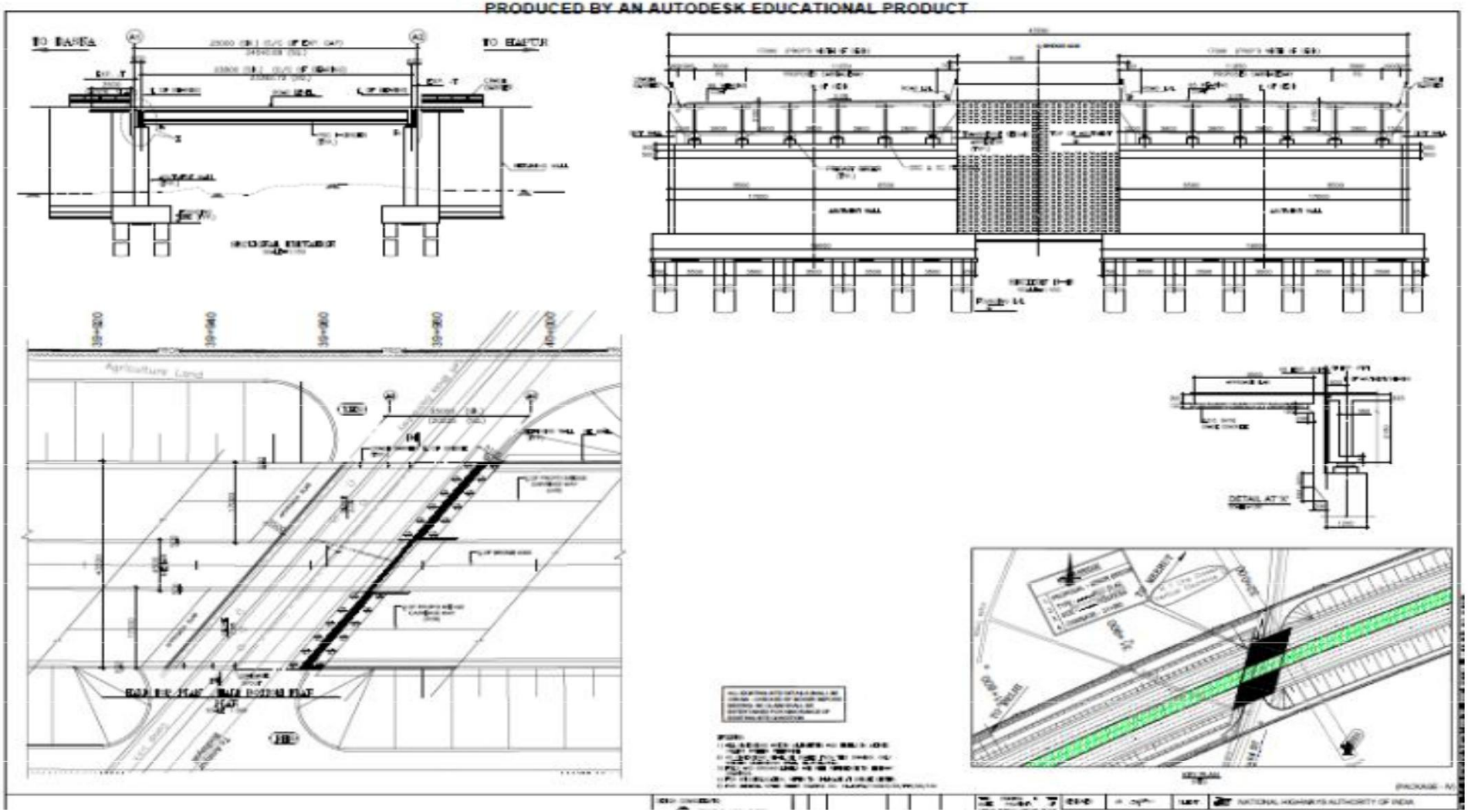
TCS RAMP (Interchange at Km. 59.777)



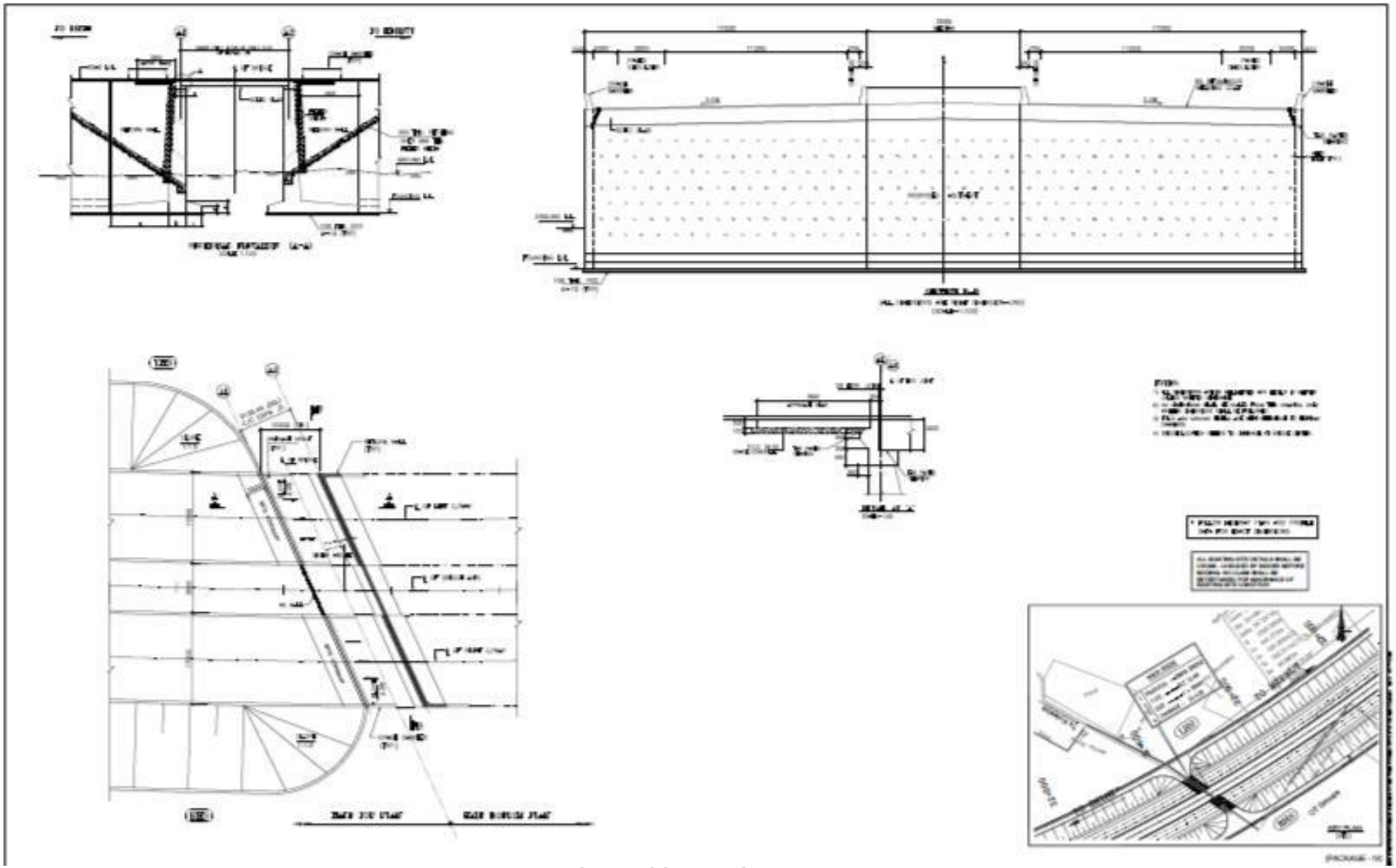
Flyover at Ch. 59.777



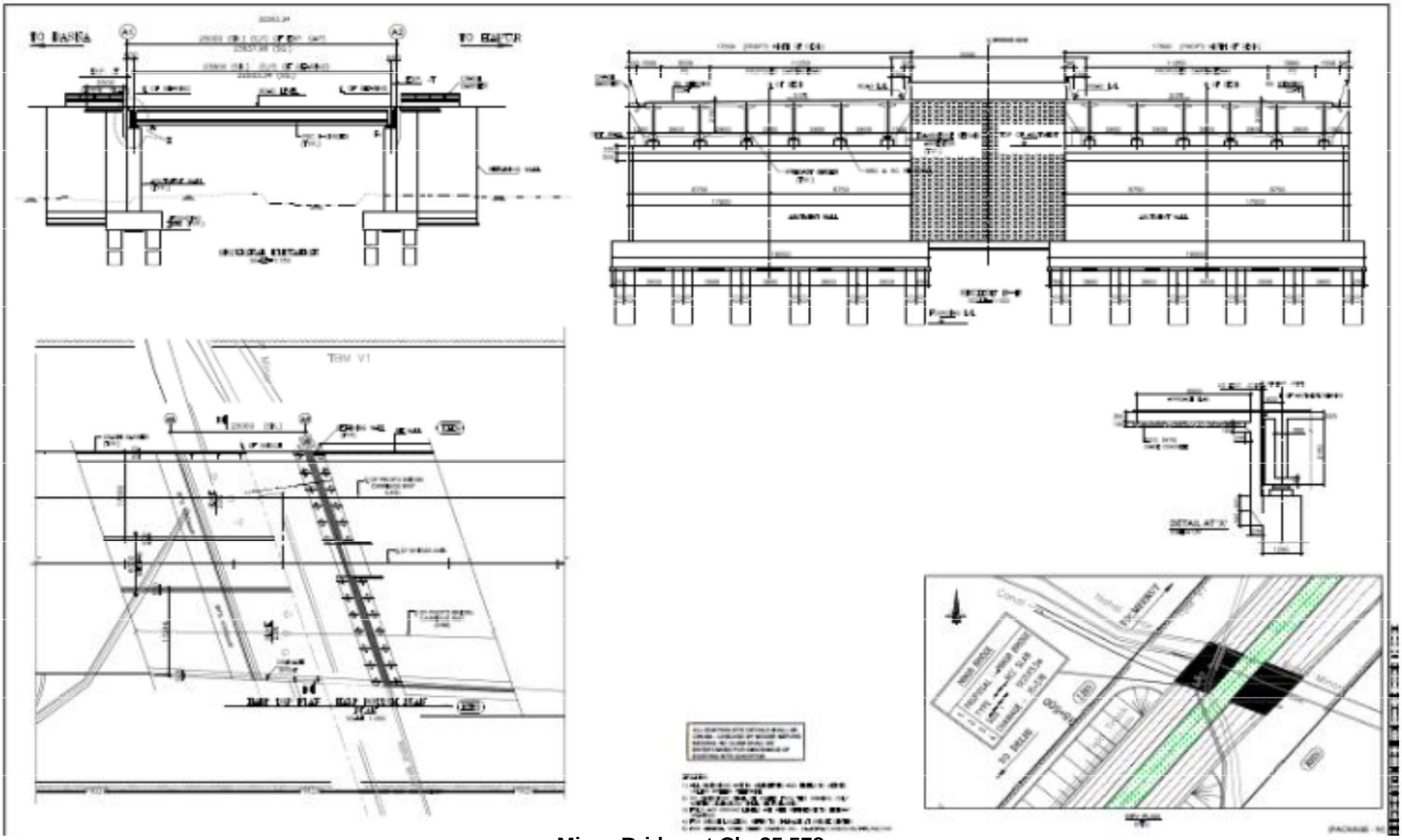
Minor Bridge at Ch. 31.980



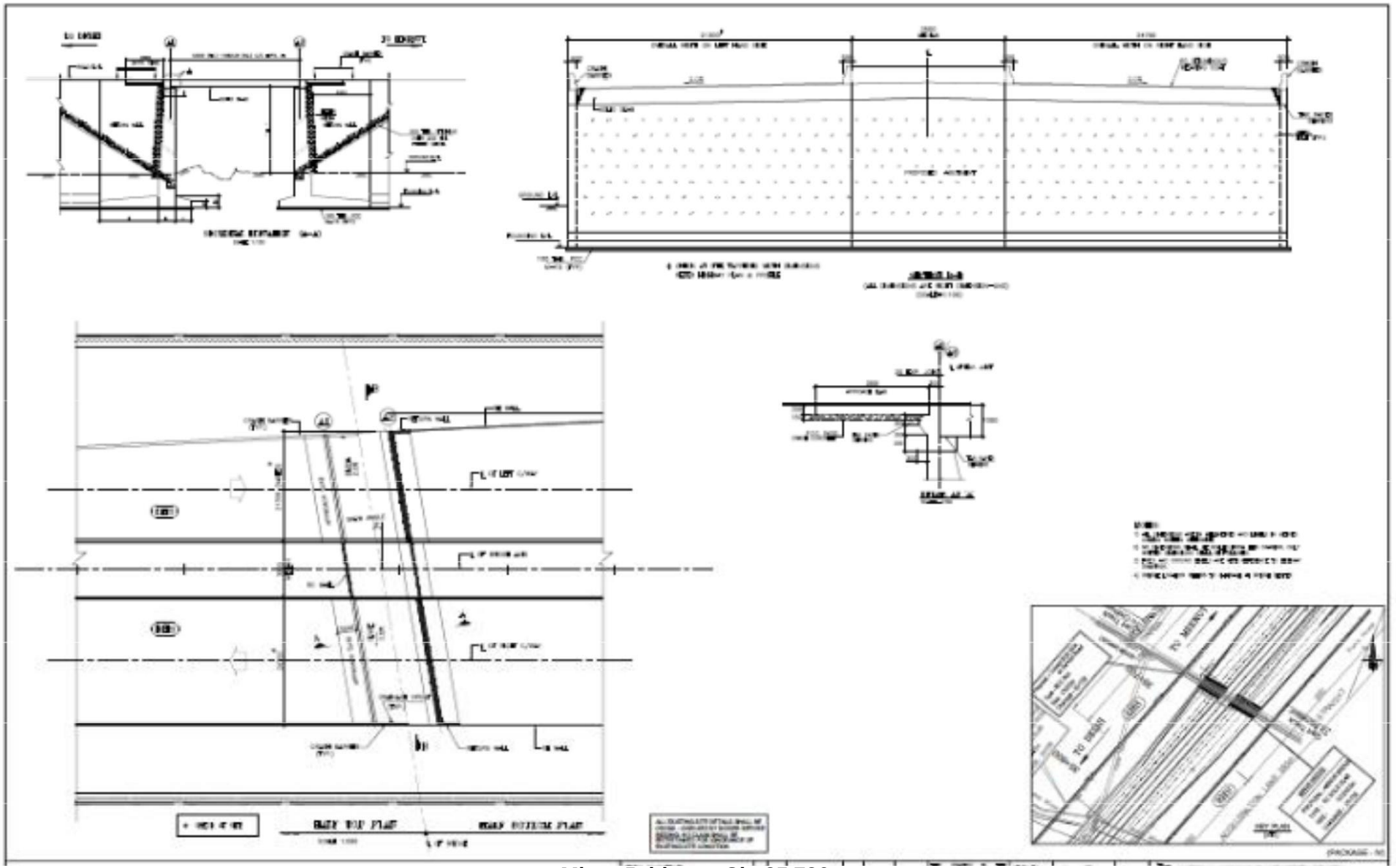
Minor Bridge at Ch. 31.980



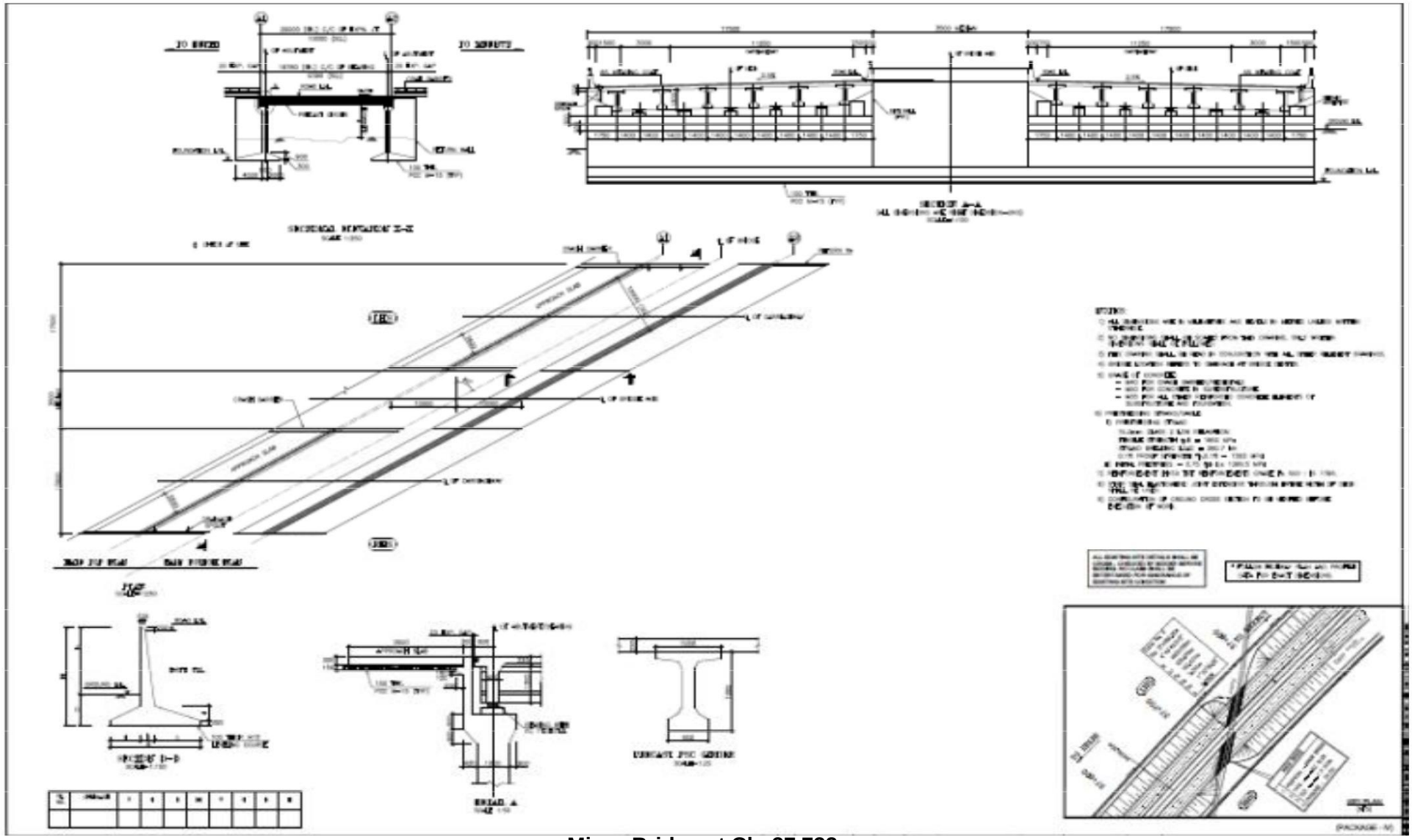
Minor Bridge at Ch. 32.430



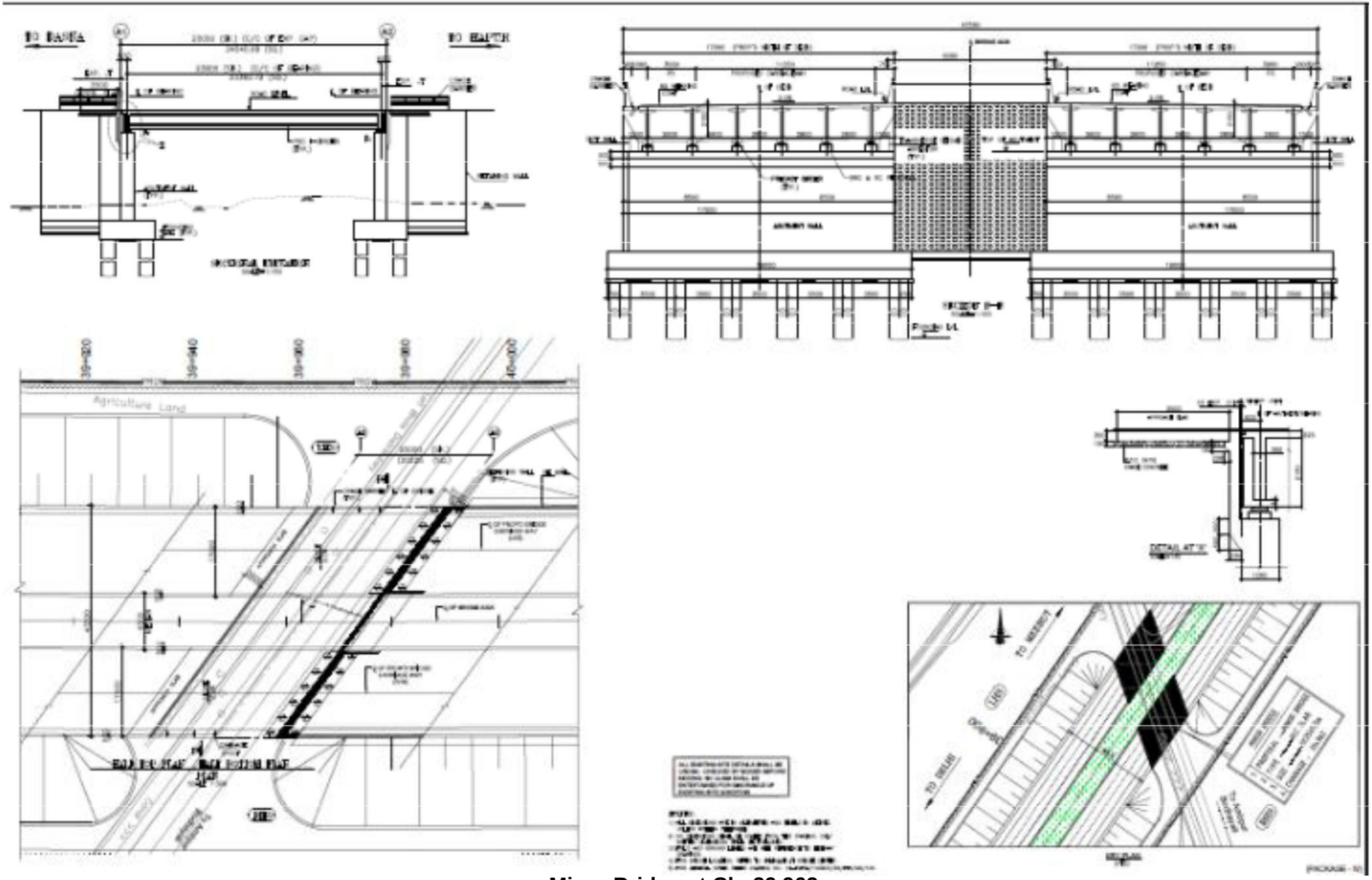
Minor Bridge at Ch. 35.578



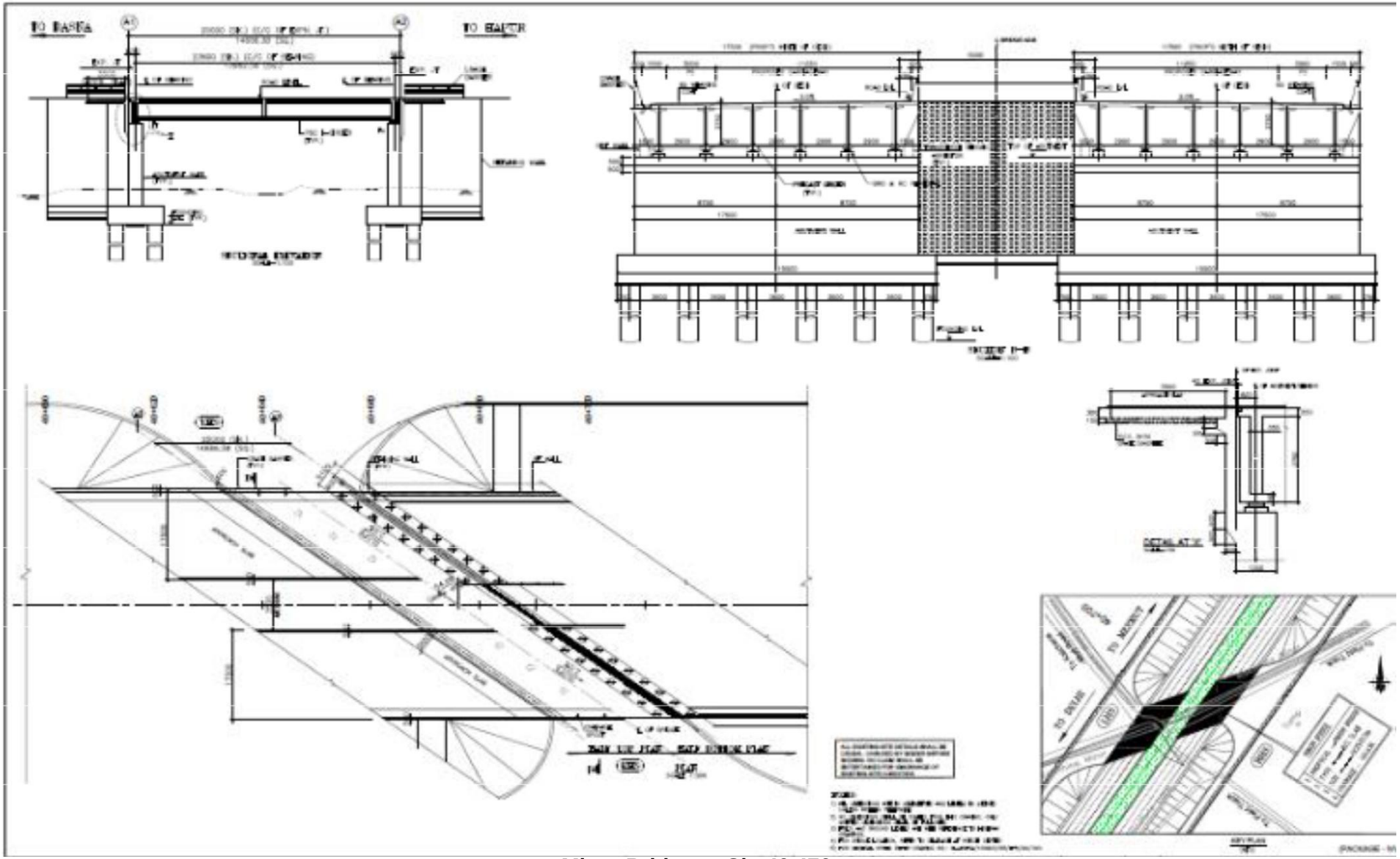
Minor Bridge at Ch. 35.736



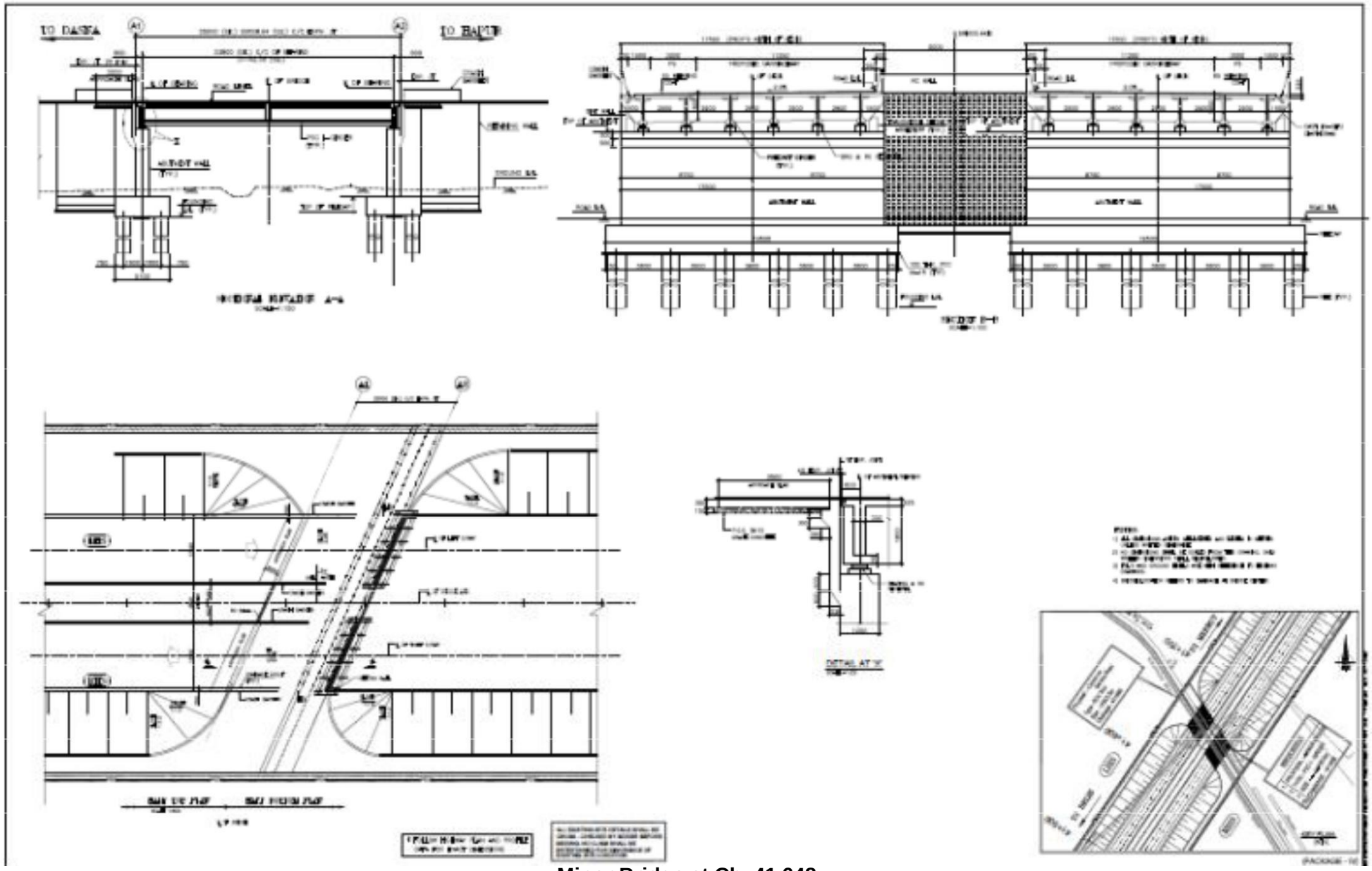
Minor Bridge at Ch. 37.732



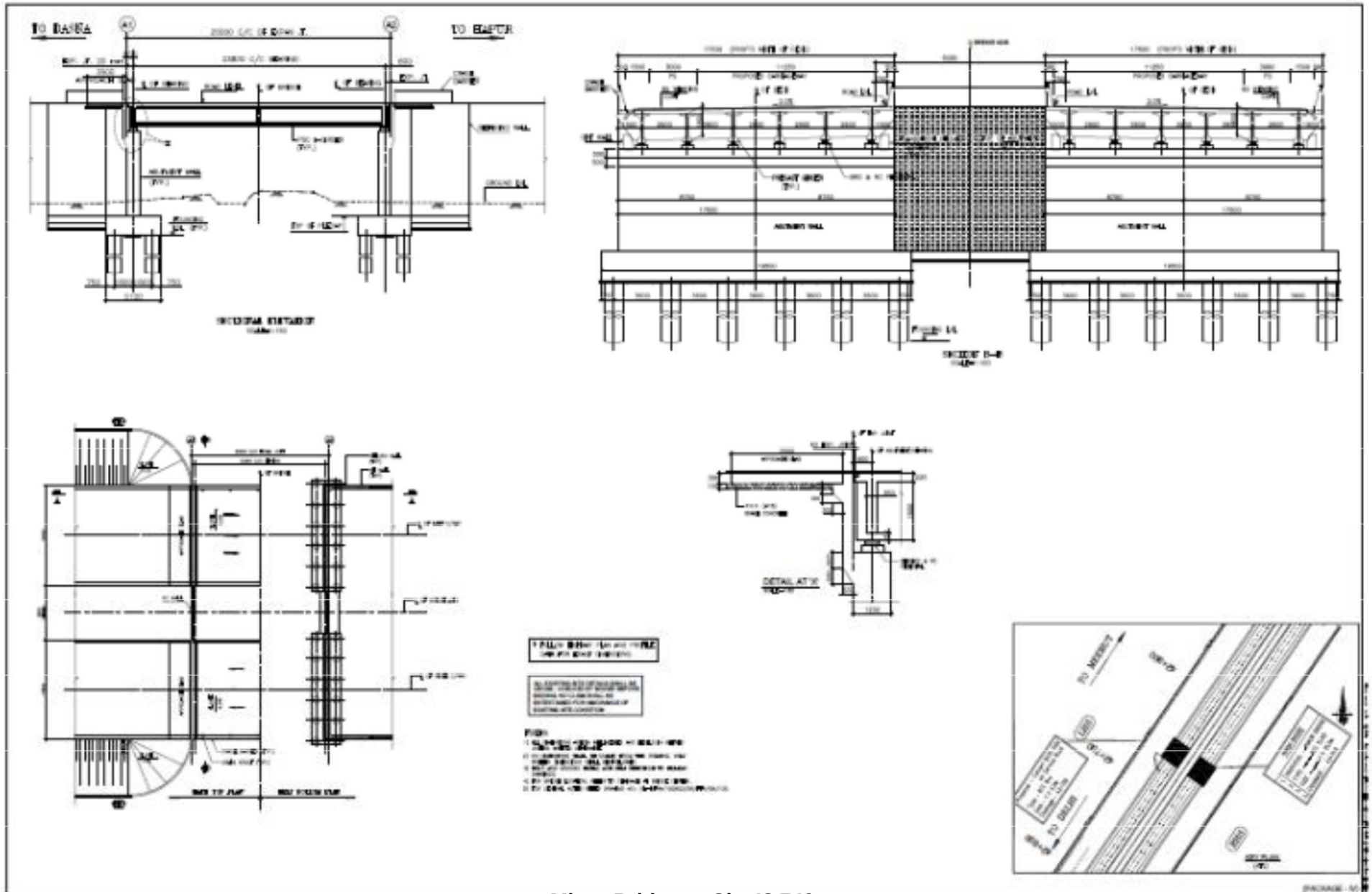
Minor Bridge at Ch. 39.962



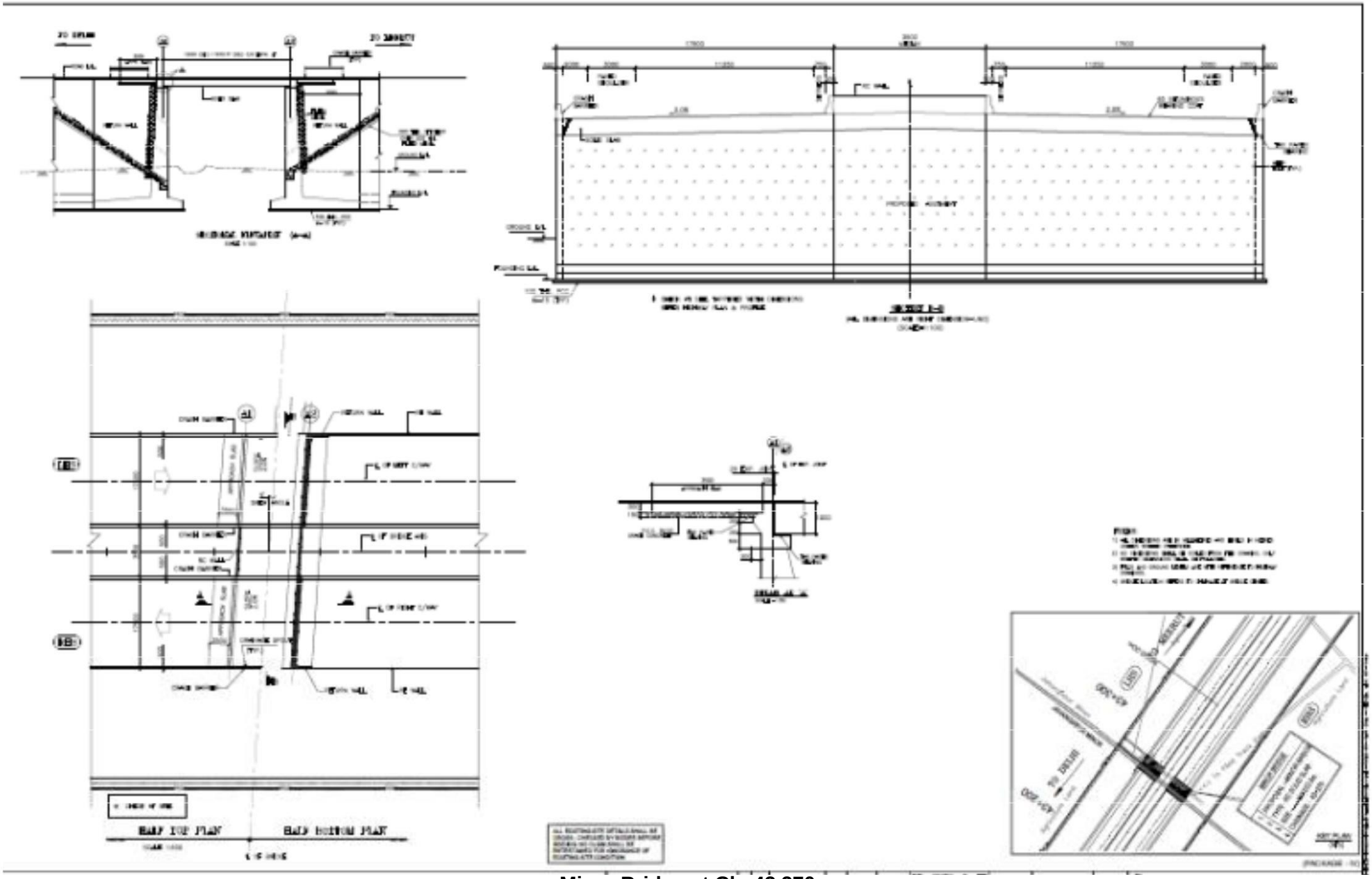
Minor Bridge at Ch. 40.476



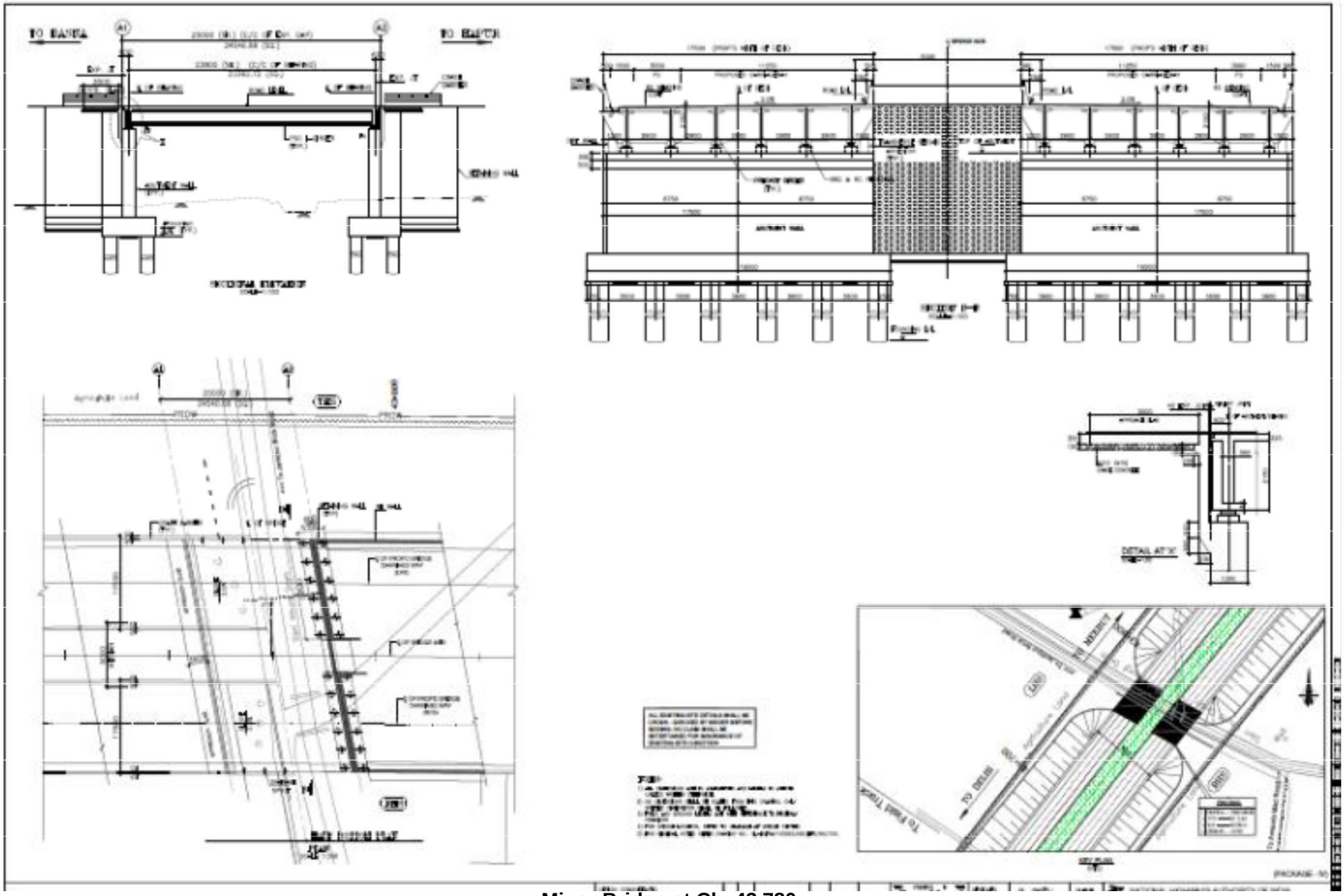
Minor Bridge at Ch. 41.648



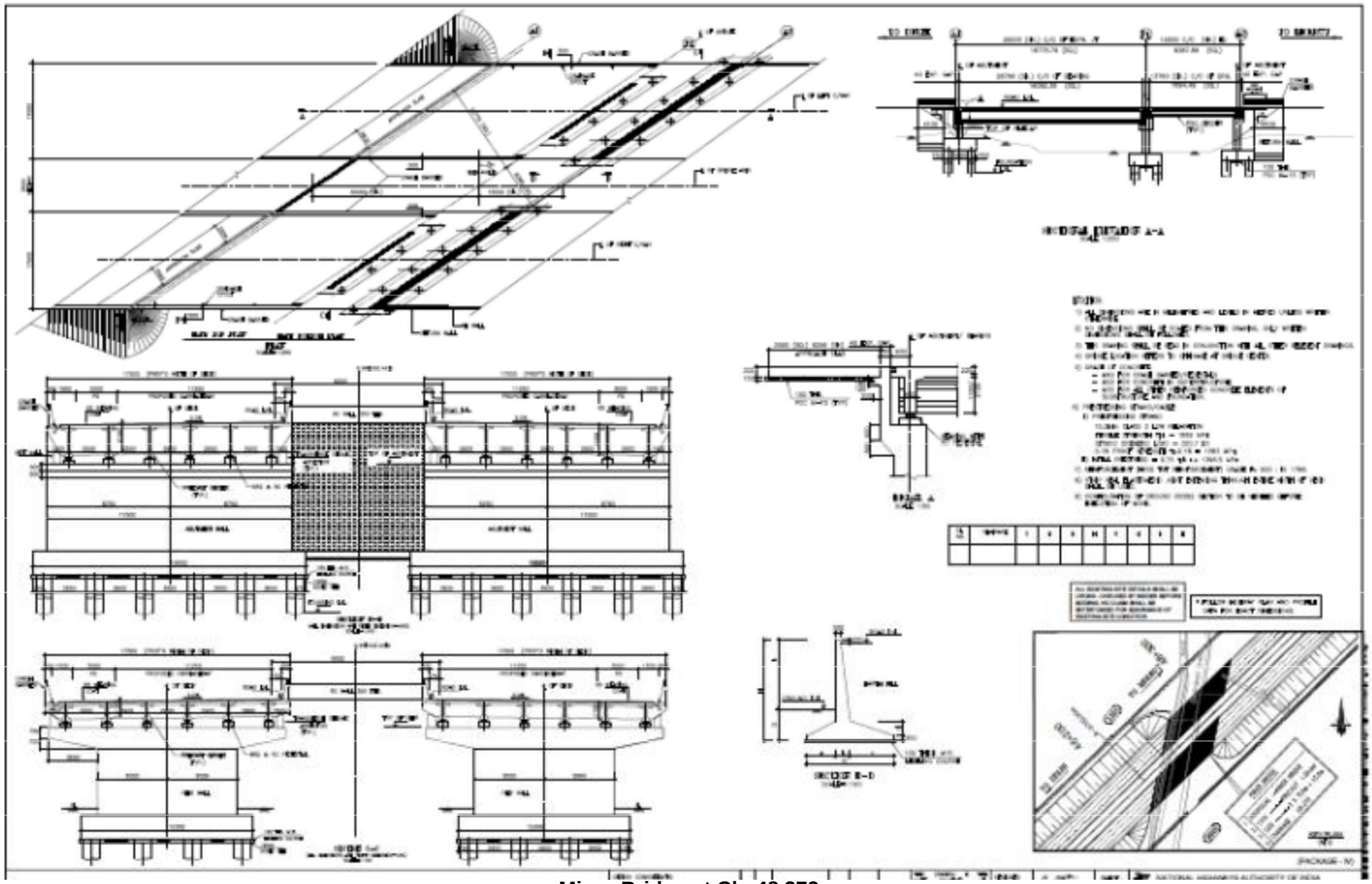
Minor Bridge at Ch. 42.740



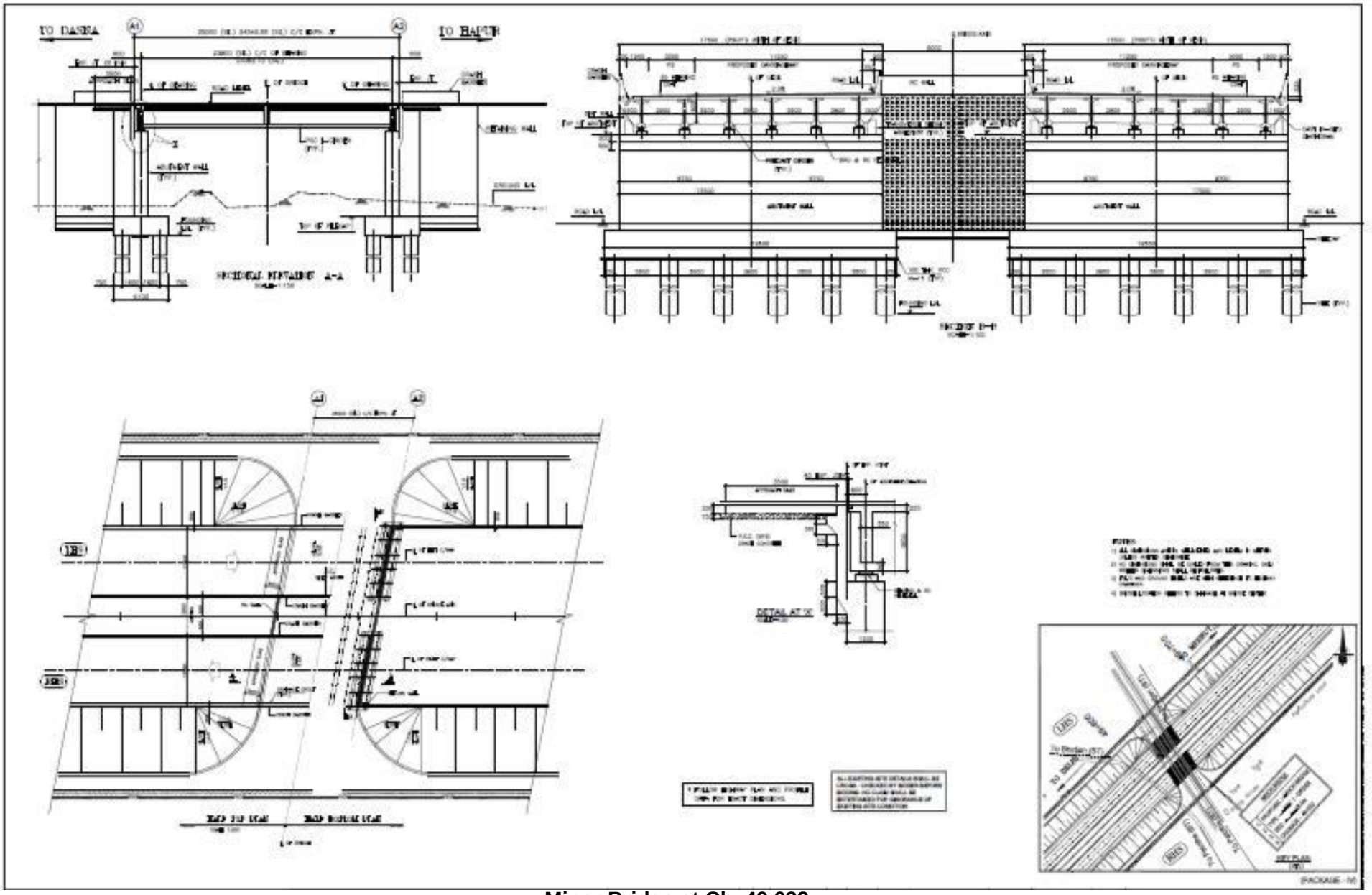
Minor Bridge at Ch. 43.270



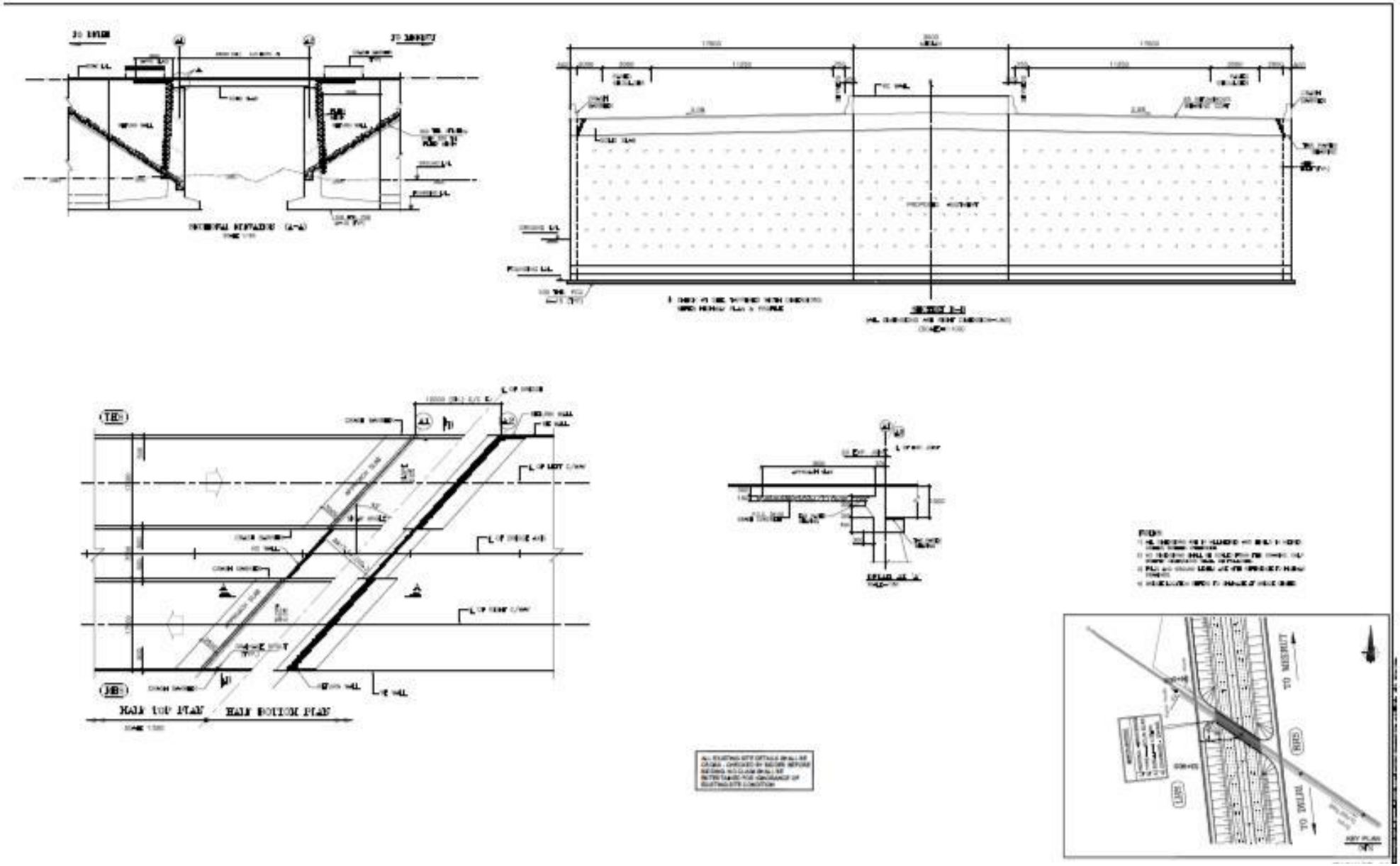
Minor Bridge at Ch. 43.780



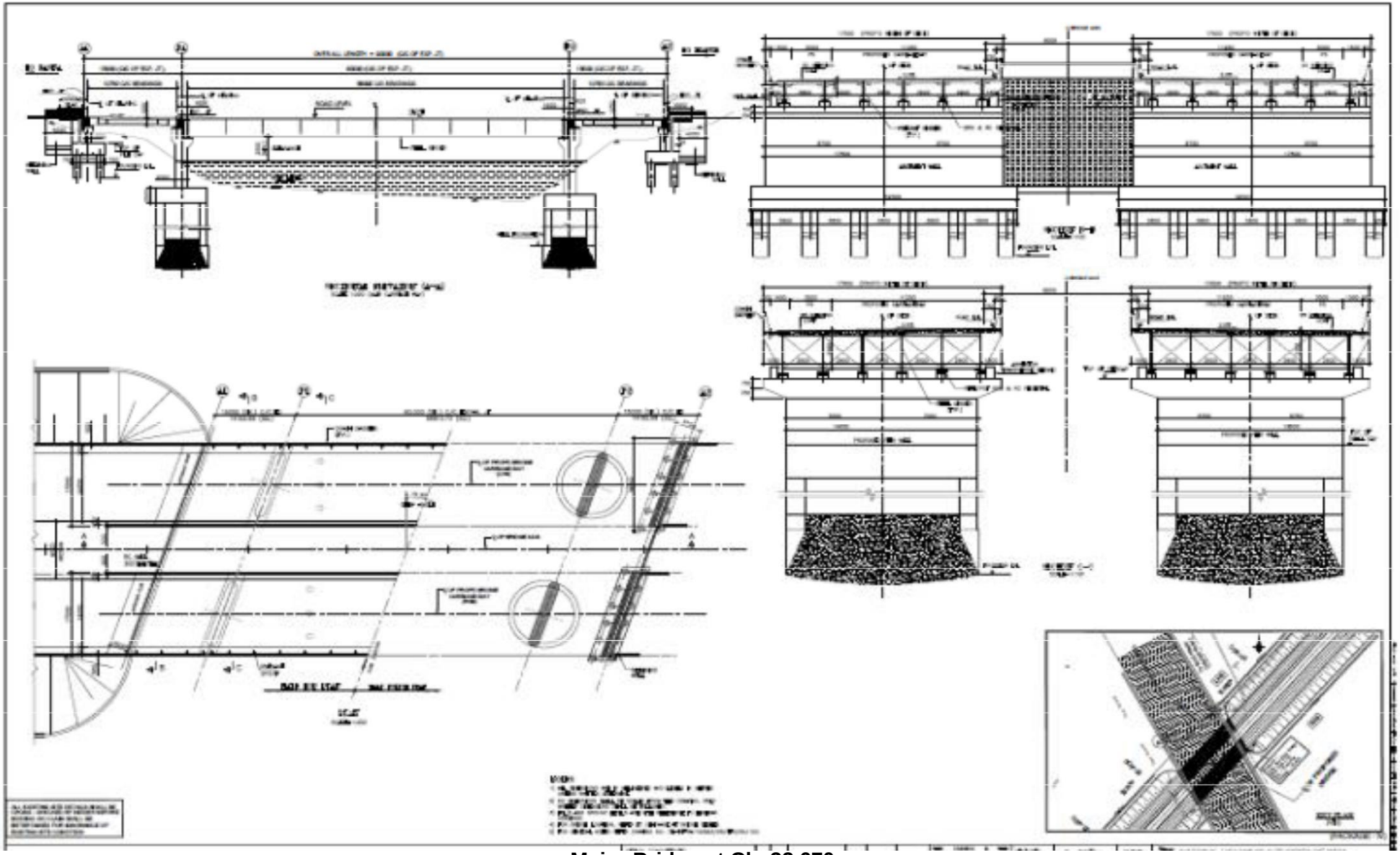
Minor Bridge at Ch. 48.272



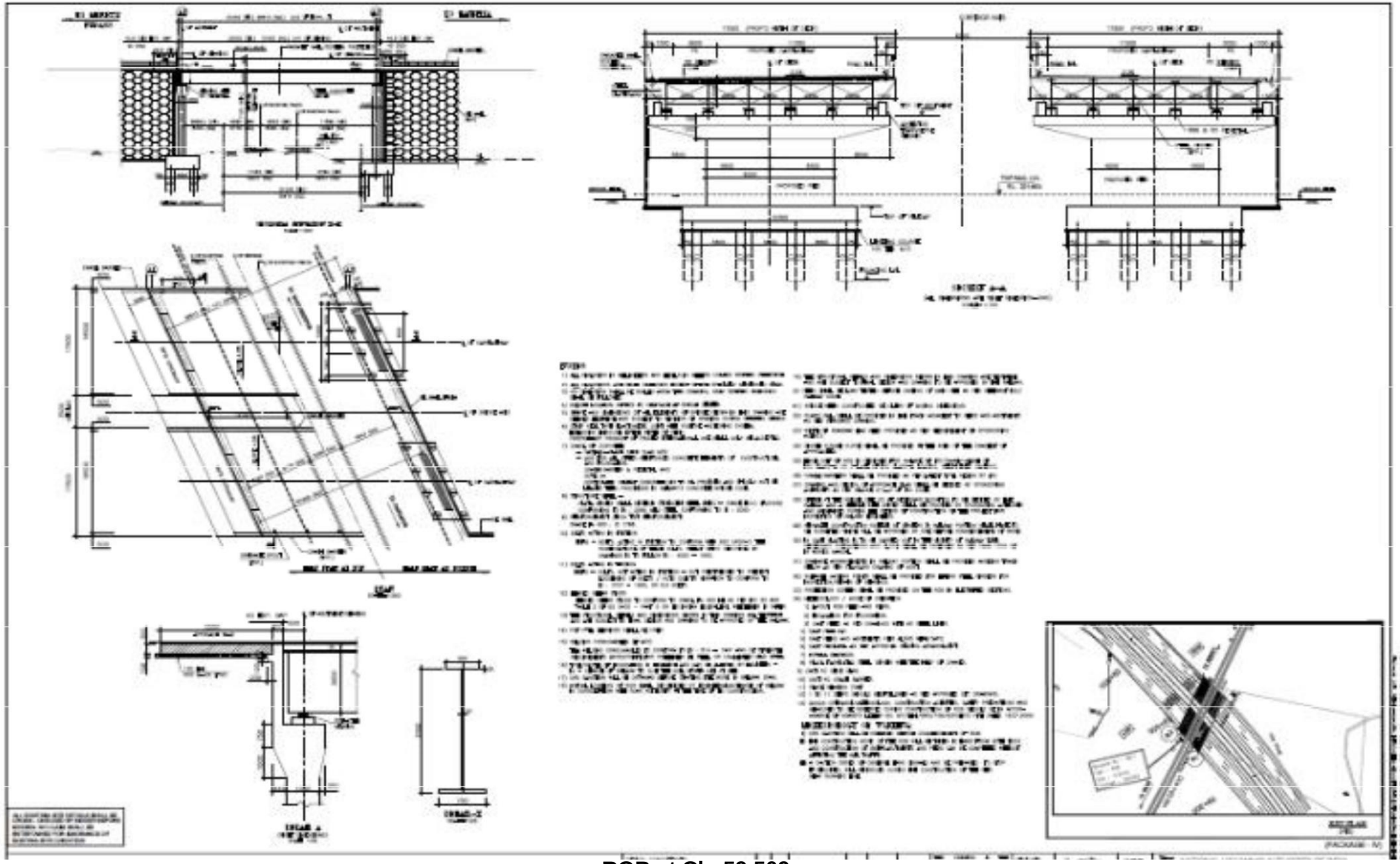
Minor Bridge at Ch. 49.632



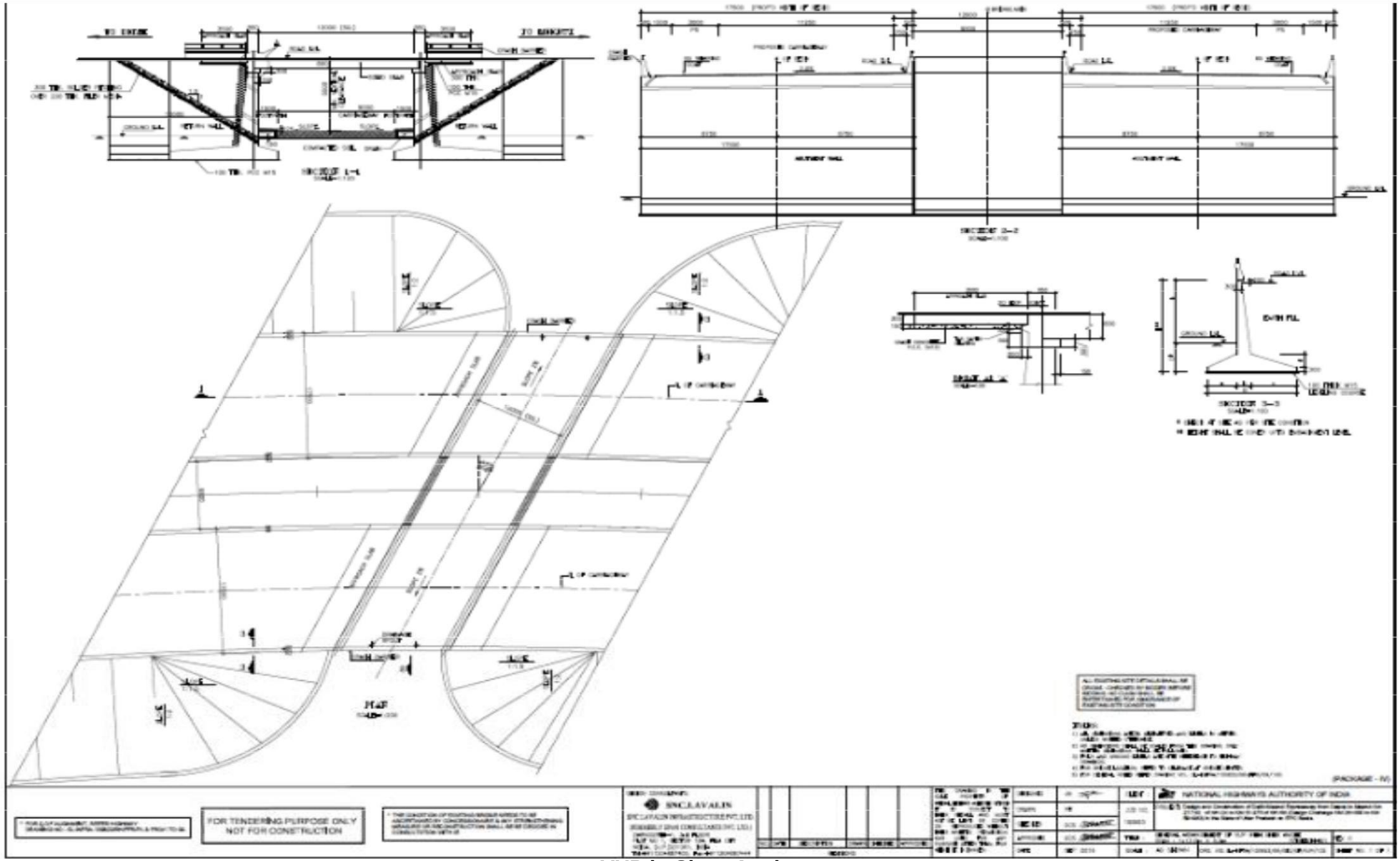
Minor Bridge at Ch. 54.059



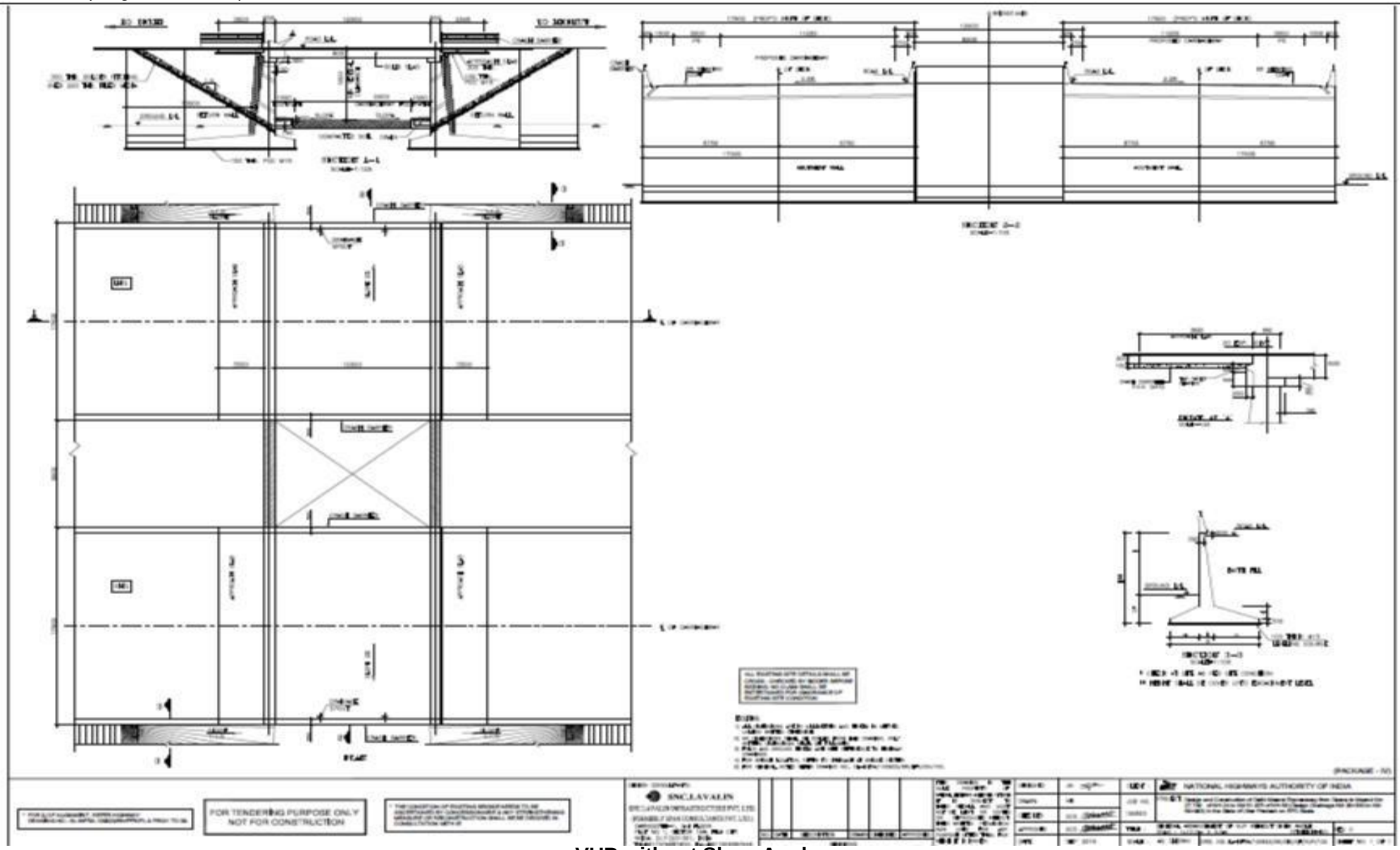
Major Bridge at Ch. 33.670



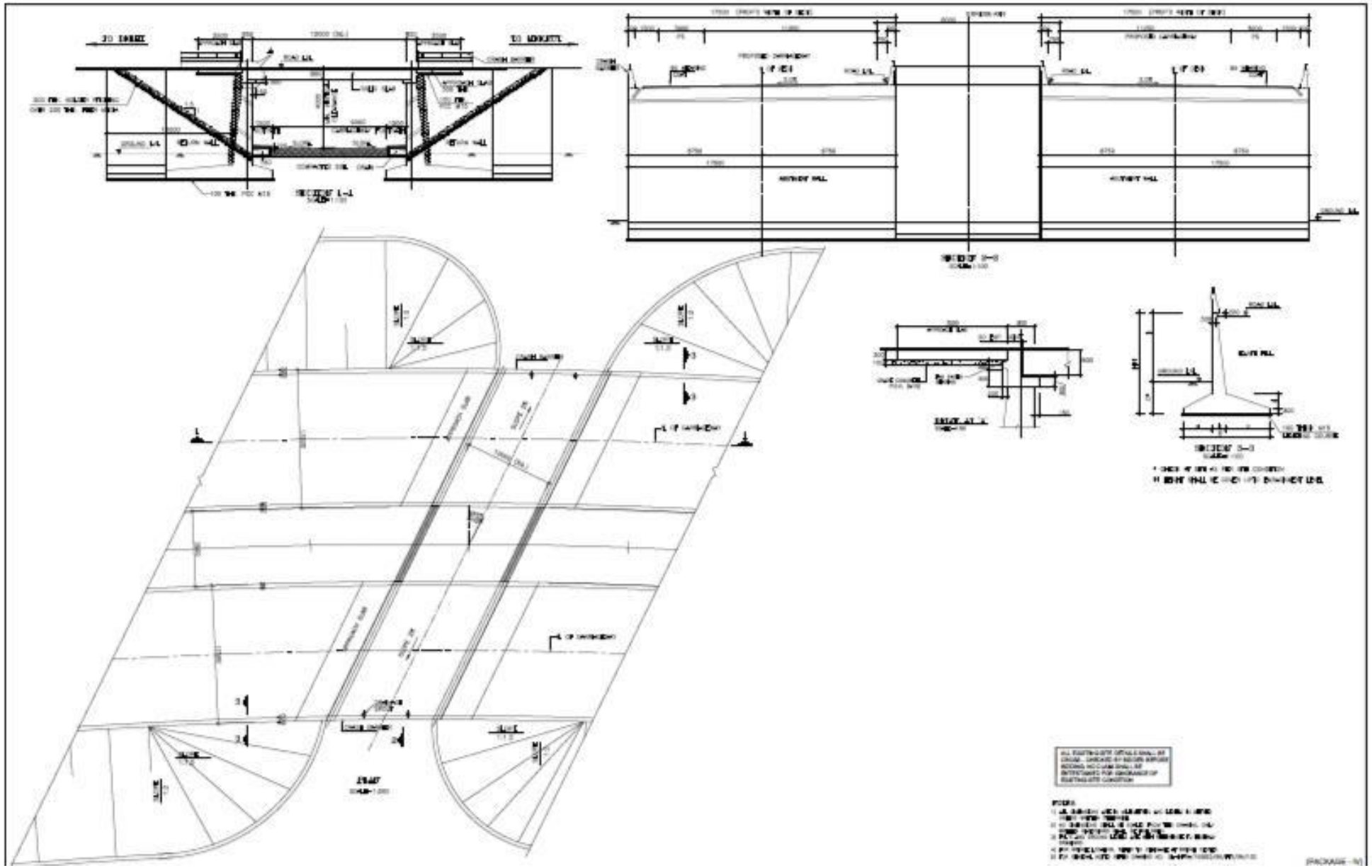
ROB at Ch. 59.509



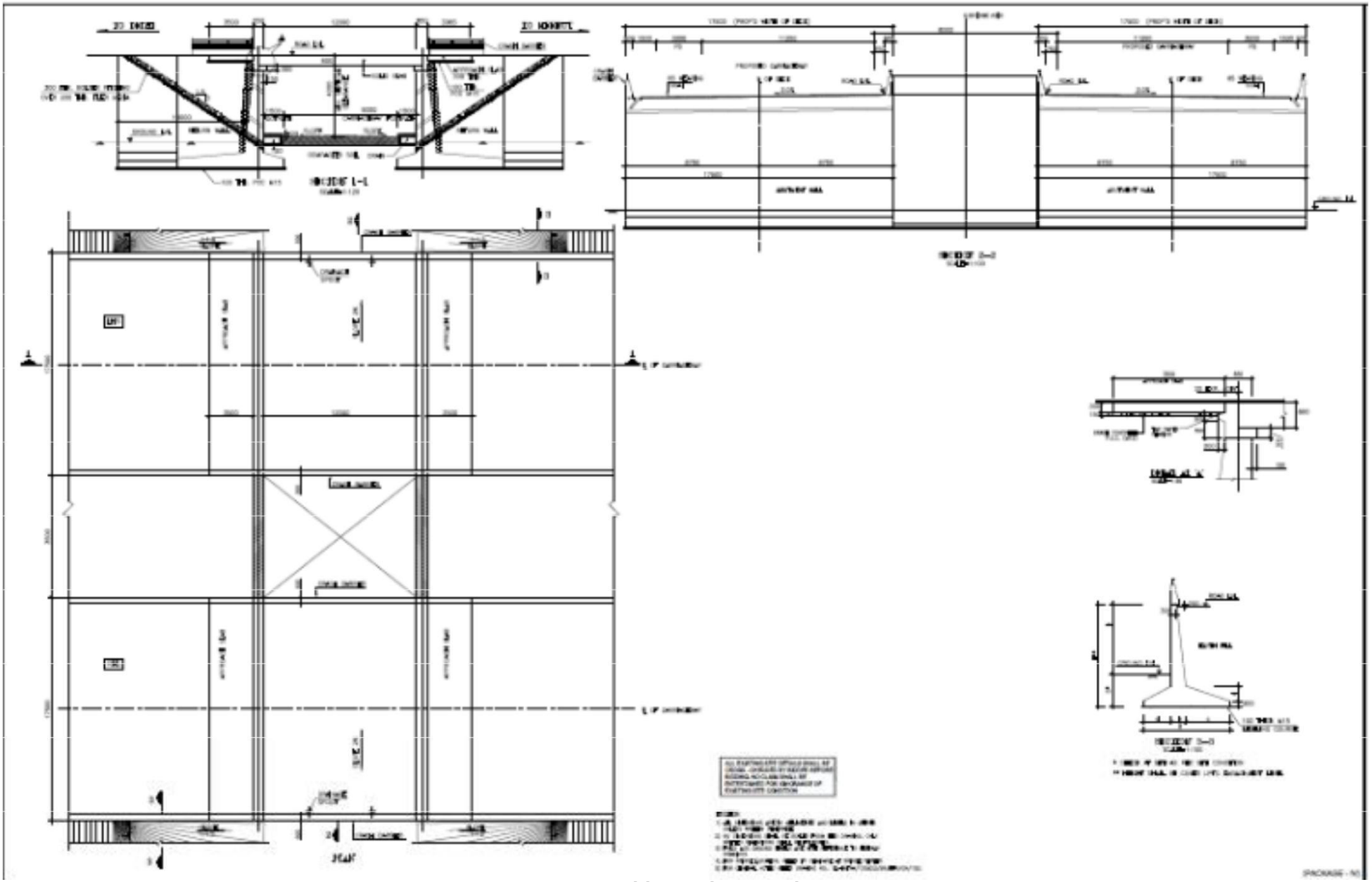
VUP in Skew Angle



VUP without Skew Angle



LVUP in Skew Angle



LVUP without Skew Angle

3 INTERSECTIONS AND GRADE SEPARATORS

All intersections and grade separators shall be as per the Manual.

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

(a) At-grade intersections

To be constructed as per standard designs for intersections.

S. No.	Design Chainage	Type of Intersection	Side	Villages	
				Left	Right
NIL					

(b) Grade separated intersection with/without ramps

S. No.	Location	Type of Structure	Cross Road at			Remarks
			Existing Level	Raised Level	Lowered Level	
1	59.509	ROB	Yes			
2	59.777	Interchange	Yes			
3	31+330	Interchange	Yes			
4	45.697	Flyover	Yes			
5	29.300	VUP	Yes			
6	29.632	VUP	Yes			
7	30.815	VUP	Yes			
8	32.730	VUP	Yes			
9	36.235	VUP	YES			
10	36.958	VUP	Yes			
11	47.642	VUP	Yes			
12	50.744	VUP	Yes			
13	52.134	VUP	Yes			
14	54.569	VUP	Yes			
15	55.839	VUP	Yes			
16	58.739	VUP	Yes			
17	28.555	Elevated Structure	Yes			
18	30.130	LVUP	Yes			
19	31.650	LVUP	Yes			
20	33.286	LVUP	Yes			
21	34.140	LVUP	Yes			
22	34.360	LVUP	Yes			
23	34.670	LVUP	Yes			
24	34.937	LVUP	Yes			
25	35.197	LVUP	Yes			
26	36.062	LVUP	Yes			
27	36.582	LVUP	Yes			
28	36.854	LVUP	Yes			
29	37.210	LVUP	Yes			
30	38.015	LVUP	Yes			
31	38.290	LVUP	Yes			
32	38.860	LVUP	Yes			
33	39.330	LVUP	Yes			
34	39.765	LVUP	Yes			
35	40.970	LVUP	Yes			
36	41.252	LVUP	Yes			
37	41.991	LVUP	Yes			

S. No.	Location	Type of Structure	Cross Road at			Remarks
			Existing Level	Raised Level	Lowered Level	
38	42.370	LVUP	Yes			
39	42.540	LVUP	Yes			
40	42.930	LVUP	Yes			
41	43.110	LVUP	Yes			
42	43.442	LVUP	Yes			
43	43.643	LVUP	Yes			
44	44.160	LVUP	Yes			
45	44.365	LVUP	Yes			
46	44.760	LVUP	Yes			
47	45.354	LVUP	Yes			
48	46.350	LVUP	Yes			
48	47.300	LVUP	Yes			
49	48.015	LVUP	Yes			
50	48.915	LVUP	Yes			
51	50.278	LVUP	Yes			
52	51.780	LVUP	Yes			
53	52.520	LVUP	Yes			
54	53.501	LVUP	Yes			
55	54.274	LVUP	Yes			
56	54.921	LVUP	Yes			
57	57.391	LVUP	Yes			
58	58.049	LVUP	Yes			
59	58.449	LVUP	Yes			
60	59.117	LVUP	Yes			

4 ROAD EMBANKMENT

Construction of new road embankment shall conform to the Specifications and Standards given in the Manual and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected. .The proposed profile of the project Expressway as indicated in the Annexure-III of Schedule-A are deemed to be part of Schedule-B and shall be followed by the contractor with minimum FRL as indicated in the alignment plan. Based on the site /design requirement, The contractor may , however, improve / upgrade upon the alignment plans and profiles as indicated in Annexure-III and raised the finished roadway level (FRL) with approval from the authorities engineer with in the available right of way The contractor shall use minimum 30% fly ash of total embankment earth work.

5 PAVEMENT DESIGN

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

5.2 Type of pavement

Type of pavement shall be rigid pavement in Toll Plaza and Flexible pavement shall be for main carriageway/Service roads/Slip Roads

5.3 Design requirements

As per clause 5.4.1 of expressway Manual.

5.3.1 Design Period and strategy

The design of Flexible Pavement shall be carried out as per provisions of section 5 of the manual .The Flexible pavement for new pavement / reconstruction of the existing pavement (for main carriageway) shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

5.3.2 Design Traffic

(i) Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the flexible pavement for minimum design traffic of 110 CMSA.

5.4 Reconstruction / Realignment Sections

The following sections of the existing road shall be reconstructed / realigned. These shall be designed as new pavement.

Sl. No.	Stretch (from Km to Km)	Remarks
NIL		

6 ROADSIDE DRAINAGE

Drainage system including surface and subsurface drains for the Project Expressway shall be provided as per the Manual and drains shall be constructed throughout the length.

7 DESIGN OF STRUCTURES

7.1 General

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

7.1.2 Deleted.

7.1.3 Deleted

7.1.4 All bridges shall be high-level bridges and will be provided with footpaths.

No Exception. All are high level bridges

7.1.5 Deleted.

7.1.6 Cross-section of the new culverts and bridges at deck level for the Project Expressway shall conform to the typical cross-sections given in 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:

At the following locations culverts shall be re-constructed after dismantling if existing culverts:

Table 24 :Details of Reconstruction Culverts

S.No	Design Chainage (km)	Type of Culvert	Span Arrangement (m)	Remarks
1	28.055	Box	1x5.0	Reconstruction

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 Expressway 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.

S. No.	Design Chainage	Culvert Location (Proposed) Km	Repairs to be carried out [specify]
Nil			

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

S.No	Design Chainage (km)	Type of Culvert	Span Arrangement (m)	Remarks

S.No	Design Chainage (km)	Type of Culvert	Span Arrangement (m)	Remarks
1	37.442	Box	1x4	New 6-lane Expressway
2	38.174	Box	1x4	New 6-lane Expressway
3	40.252	Box	1x4	New 6-lane Expressway
4	45.786	Box	1x4	New 6-lane Expressway
5	52.301	Box	1x4	New 6-lane Expressway
6	53.094	Box	1x4	New 6-lane Expressway
7	53.811	Box	1x4	New 6-lane Expressway
8	55.234	Box	1x4	New 6-lane Expressway
9	55.665	Box	1x4	New 6-lane Expressway
10	55.760	Box	1x4	New 6-lane Expressway
11	56.294	Box	1x4	New 6-lane Expressway
12	56.859	Box	1x4	Toll plaza location

Note: - Location and sizes of the above culverts are indicative. The same shall be finalized in consultation with Authority Engineer.

7.2.5 Deleted.

7.2.6 Deleted.

7.3 Bridges

7.3.1 Existing bridges to be repaired / reconstructed / widened

(i) The existing bridges at the following locations shall be rehabilitate and Widened. GADs are annexed at Annexure – "A" to this schedule.

S. No	Design Chainage (Km)	Side	Carriageway Width (m)	Overall width (m)	Span Arrangement (m)	Type of Structure		Remarks
						Super Structure	Sub-structure	
1	Km 51+850 of NH-58	-	1x45.0	1x46.0	2x6.7 (Skew Angle-13°)	RCC Slab	RCC	Widening of existing bridge on NH-58 & (Ramp 1) of Interchange at NH-58

7.3.2 Additional New Bridges

New bridges at the following locations on the Project Expressway shall be constructed. GADs are annexed at Annexure – "A" to this schedule.

Major Bridge

Design Chainage (Km)	Side	Carriageway Width (m)	Overall width (m)	Span Arrangement (m)	Type of Structure		Remarks
					Super Structure	Sub-Structure	
33.670	Both	2x16.50	2x17.5	15+60+15 (Skew Angle-20.06°)	PSC Girder	RCC Abutment & Pier	Upper Ganga Canal

2. Minor Bridges

A.Details of New Proposed Minor Bridges for Main Carriageway

S.No	Design Chainage (Km)	Side	Carriageway Width (m)	Overall width (m)	Span Arrangement (m)	Type of Structure		Remarks
						Super Structure	Sub-structure	
1	31.980	Both	2x16.50	2x17.5	1x25 (Skew Angle-39°)	RCC T-Beam	RCC	
2	32.430	Both	2x16.50	2x17.5	1x10 (Skew Angle-24°)	RCC Slab	RCC	
3	35.578	Both	2x16.50	2x17.5	1x25 (Skew Angle-19°)	RCC T-Beam	RCC	
4	35.736	Both	2x16.50	2x17.5	1x12 (Skew Angle-9°)	RCC Slab	RCC	
5	37.732	Both	2x16.50	2x17.5	1x20 (Skew Angle-60°)	RCC T-Beam	RCC	
6	39.963	Both	2x16.50	2x17.5	1x25 (Skew Angle-36°)	RCC T-Beam	RCC	
7	40.676	Both	2x16.50	2x17.5	1x25 (Skew Angle-54°)	RCC T-Beam	RCC	
8	41.648	Both	2x16.50	2x17.5	1x25 (Skew Angle-24°)	RCC T-Beam	RCC	
9	42.740	Both	2x16.50	2x17.5	1x25	RCC T-Beam	RCC	
10	43.270	Both	2x16.50	2x17.5	1x12 (Skew Angle-4°)	RCC Slab	RCC	
11	43.780	Both	2x16.50	2x17.5	1x25 (Skew Angle-11°)	RCC T-Beam	RCC	
12	48.272	Both	2x16.50	2x17.5	1 x 40 (Skew Angle-56°)	PSC I-Girder	RCC	
13	49.632	Both	2x16.50	2x17.5	1 x 25 (Skew Angle-11°)	RCC T-Beam	RCC	
14	54.059	Both	2x16.50	2x17.5	1x25- (Skew Angle-42°)	RCC T Beam	RCC	

7.3.3 Deleted.

7.3.4 Deleted

7.3.5 Drainage system for bridge decks

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

7.3.6 Structures in marine environment

Not Applicable

7.4. Rail-road bridges

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

7.4.2 Road over-bridges

S. No	Design Chainage (Km)	Side	Carriageway Width (m)	Overall width (m)	Span Arrangement (m)	Type of Structure		Remarks
						Super Structure	Sub-Structure	
1	59.509	Both	2x16.50	2x17.5	1x30 (Skew Span & Skew Angle 24.03^{O})	Composite Steel Structure	RCC Abutment	New 6-Lane Expressway

Note: - The proposed span arrangement is tentative and subject to change upon requirements of Railway Authority. Any increase in span arrangement shall not be treated as change in scope of work.

7.4.3 Road under-bridges

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

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

7.5 Grade separated structures

The grade separated structures shall be provided at the locations and of the type and length specified in paragraph 2.9 of Annexure I is as under:.

S. No.	Location	Type of Structure	Span/opening (m)	Width
1	59.509	ROB	1x30 (Skew Span & Skew Angle 24.03^0)	As per Mannual
2	59.777	Interchange	i)1x50.00 ii)1x50.00	As per Mannual As per Mannual
3	31+330	Interchange	2x60 (Skew Angle-9°)	As per Mannual As per
4	45.697	Flyover	1x50	Mannual As per
5	29.300	VUP	12 m	Mannual As per
6	29.632	VUP	12 m	Mannual As per
7	30.815	VUP	12 m	Mannual As per
8	32.730	VUP	12 m	Mannual As per
9	36.235	VUP	12 m	Mannual As per
10	36.958	VUP	12 m	Mannual As per
11	47.642	VUP	12 m	Mannual As per
12	50.744	VUP	12 m	Mannual As per
13	52.134	VUP	12 m	Mannual As per
14	54.569	VUP	12 m	Mannual As per
15	55.839	VUP	12 m	Mannual As per
16	58.739	VUP	12 m	Mannual
17	28.555	Elevated Structure	5x30+26+30+30+30+30 +11+20+40+20+22.5 +18x30	As per Mannual As per
18	30.130	LVUP	12m	Mannual As per
19	31.650	LVUP	12m	Mannual As per
20	33.286	LVUP	12m	
21	34.140	LVUP	12m	

S. No.	Location	Type of Structure	Span/opening (m)	Width
				Mannual

S. No.	Location	Type of Structure	Span/opening (m)	Width
22	34.360	LVUP	12m	As per Mannual
23	34.670	LVUP	12m	As per Mannual
24	34.937	LVUP	12m	As per Mannual
25	35.197	LVUP	12m	As per Mannual
26	36.062	LVUP	12m	As per Mannual
27	36.582	LVUP	12m	As per Mannual
28	36.854	LVUP	12m	As per Mannual
29	37.210	LVUP	12m	As per Mannual
30	38.015	LVUP	12m	As per Mannual
31	38.290	LVUP	12m	As per Mannual
32	38.860	LVUP	12m	As per Mannual
33	39.330	LVUP	12m	As per Mannual
34	39.765	LVUP	12m	As per Mannual
35	40.970	LVUP	12m	As per Mannual
36	41.252	LVUP	12m	As per Mannual
37	41.991	LVUP	12m	As per Mannual
38	42.370	LVUP	12m	As per Mannual
39	42.540	LVUP	12m	As per Mannual
40	42.930	LVUP	12m	As per Mannual
41	43.110	LVUP	12m	As per Mannual
42	43.442	LVUP	12m	As per Mannual
43	43.643	LVUP	12m	As per Mannual
44	44.160	LVUP	12m	As per Mannual
45	44.365	LVUP	12m	As per Mannual
46	44.760	LVUP	12m	As per Mannual
47	45.354	LVUP	12m	

S. No.	Location	Type of Structure	Span/opening (m)	Width
48	46.350	LVUP	12m	
49	47.300	LVUP	12m	
50	48.015	LVUP	12m	
51	48.915	LVUP	12m	
52	50.278	LVUP	12m	
53	51.780	LVUP	12m	
54	52.520	LVUP	12m	
55	53.501	LVUP	12m	
56	54.274	LVUP	12m	
57	54.921	LVUP	12m	
58	57.391	LVUP	12m	
59	58.049	LVUP	12m	
60	58.449	LVUP	12m	
61	59.117	LVUP	12m	

7.6 Repairs and strengthening of bridges and structures

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

A. Bridges

Sl. No.	Design location of bridge at km	Nature and extent of repairs/ strengthening to be carried out
NIL		

B. ROB / RUB

Sl. No.	Design location of ROB/RUB at km	Nature and extent of repairs/ strengthening to be carried out
NIL		

C. Overpasses/Underpasses and other structures

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

7.7 List of Major Bridges and Structures

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

S. No.	Location	Type of Structure	Span/opening (m)	Width
1	59.509	ROB	1x30 (Skew Span & Skew Angle 24.03^{O})	As per Mannual
2	59.777	Interchange	i)1x50.00 ii)1x50.00	As per Mannual
3	31+330	Interchange	2x60 (Skew Angle-9°)	As per Mannual
4	45.697	Flyover	1x50	As per Mannual
5	29.300	VUP	12 m	As per Mannual
6	29.632	VUP	12 m	As per Mannual
7	30.815	VUP	12 m	As per Mannual
8	32.730	VUP	12 m	As per Mannual
9	36.235	VUP	12 m	As per Mannual
10	36.958	VUP	12 m	As per Mannual
11	47.642	VUP	12 m	As per Mannual
12	50.744	VUP	12 m	As per Mannual
13	52.134	VUP	12 m	As per Mannual
14	54.569	VUP	12 m	As per Mannual
15	55.839	VUP	12 m	As per Mannual
16	58.739	VUP	12 m	As per Mannual
17	28.555	Elevated Structure	5x30+26+30+30+30+30 +11+20+40+20+22.5 +18x30	As per Mannual
18	30.130	LVUP	12m	As per Mannual
19	31.650	LVUP	12m	As per Mannual
20	33.286	LVUP	12m	As per Mannual
21	34.140	LVUP	12m	As per Mannual
22	34.360	LVUP	12m	As per Mannual
23	34.670	LVUP	12m	As per Mannual
24	34.937	LVUP	12m	As per Mannual
25	35.197	LVUP	12m	As per Mannual
26	36.062	LVUP	12m	As per

S. No.	Location	Type of Structure	Span/opening (m)	Width
				Mannual

S. No.	Location	Type of Structure	Span/opening (m)	Width
27	36.582	LVUP	12m	As per Mannual
28	36.854	LVUP	12m	As per Mannual
29	37.210	LVUP	12m	As per Mannual
30	38.015	LVUP	12m	As per Mannual
31	38.290	LVUP	12m	As per Mannual
32	38.860	LVUP	12m	As per Mannual
33	39.330	LVUP	12m	As per Mannual
34	39.765	LVUP	12m	As per Mannual
35	40.970	LVUP	12m	As per Mannual
36	41.252	LVUP	12m	As per Mannual
37	41.991	LVUP	12m	As per Mannual
38	42.370	LVUP	12m	As per Mannual
39	42.540	LVUP	12m	As per Mannual
40	42.930	LVUP	12m	As per Mannual
41	43.110	LVUP	12m	As per Mannual
42	43.442	LVUP	12m	As per Mannual
43	43.643	LVUP	12m	As per Mannual
44	44.160	LVUP	12m	As per Mannual
45	44.365	LVUP	12m	As per Mannual
46	44.760	LVUP	12m	As per Mannual
47	45.354	LVUP	12m	As per Mannual
48	46.350	LVUP	12m	As per Mannual
49	47.300	LVUP	12m	As per Mannual
50	48.015	LVUP	12m	As per Mannual
51	48.915	LVUP	12m	As per Mannual
52	50.278	LVUP	12m	As per

S. No.	Location	Type of Structure	Span/opening (m)	Width
				Mannual
53	51.780	LVUP	12m	As per Mannual
54	52.520	LVUP	12m	As per Mannual
55	53.501	LVUP	12m	As per Mannual
56	54.274	LVUP	12m	As per Mannual
57	54.921	LVUP	12m	As per Mannual
58	57.391	LVUP	12m	As per Mannual
59	58.049	LVUP	12m	As per Mannual
60	58.449	LVUP	12m	As per Mannual
61	59.117	LVUP	12m	As per Mannual
62	33.670	Major Bridge	15+60+15 (Skew Angle =20.06°	As per mannual

8. TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

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

(a) Traffic Signs:

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

(b) Pavement Marking:

Pavement marking shall cover road marking for the entire Project Expressway.

(c) Safety Barrier:

Provision of W-beam crash barrier along the project Expressway shall be provided at the high embankment locations and details to be prepared as per site requirement in consultation with the Independent Engineer.

8.2 Specifications of the reflective sheeting

Retro reflective sheeting should be of high intensity grade with encapsulated lens or with micro prismatic retro-reflective element in accordance with ASTM standard D4956-04.

8.3 **Advanced Traffic Management Systems (ATMS)**

S.No	Item	Interval	(No's)
1	Emergency Call Boxes	2 Km	16
2	Mobile communication Systems	For a section	1
3	Variable Message Sign Systems	2 Km	16
4	Meteorological Data System	10 km	4
5	Automatic Traffic Counter and Vehicle classification	Toll plaza	1
6	Video surveillance system	2 Km	16
7	Video incident detection system	125m	260

Note: Above mentioned numbers are tentative, exact locations and numbers to be as per schedule D.

9 ROADSIDE FURNITURE

9.1 Roadside furniture shall be provided in accordance with the provisions of Section 10 of the Manual.

(a) Road Boundary Stone: for the entire Project Expressway.

(b) Overhead Traffic Sings: Location and Size

- Full width Overhead signs: 8 nos. (Locations to be finalized in consultation with Authority's Engineer)
- Cantilever Overhead signs: 4 nos. (Locations to be finalized in consultation with Authority's Engineer)

(c) Delineators: Delineators for the entire Project Expressway at the locations as suggested in Schedule-D.

10 MEDIAN WIDTH

Median Width of 6 m shall be provided

11 COMPULSORY AFFORESTATION

Deleted

12 HAZARDOUS LOCATIONS

The safety barriers shall also be provided as per the manual, direction of Authority Engineer & Safety Consultant or as per good engineering practice.

13 SPECIAL REQUIREMENTS FOR HILL ROADS

Nil

14 Slope protection

The side slopes shall be protected by using suitable protection measures such as turfing including chutes and stone pitching /guide bunds etc .wherever required along the project expressway.

15 R.E. WALL

S. No	Design Chainage		Length (m)	Side	Remarks
	From	To			
1	35.892	36.058	166	2	
2	36.065	36.229	164	2	
3	36.241	36.578	337	2	
Total Length in meter			**2*667=1334**		

Note: Above locations are tentative and exact locations and length to be decided at Detailed Design stage as per Schedule D Any increase 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.

16 RETAINING WALL / TOE WALL

Minimum tentative length of Retaining wall/Toe wall shall be 57.328 Km (including LHS & RHS), however the exact requirement of Retaining wall /Toe wall shall be worked out and constructed as per actual site condition and manual of specification and standards as mention

in Schedule D in consultation with Authority Engineer, safety Consultant or Employer at the time of execution. Any increase 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.

17 RAIN WATER HARVESTING

As per Ministry of Environment and Forest notification, New Delhi dated 14.01.1997 (as amended on 13.01.1998, 05.01.1999 & 06.11.2000). the construction of Rain water, harvesting structure is mandatory in and around water crises area, notified by the Central Ground Water Board. for the project expressway ,ground water recharging/rain water harvesting structures shall be provided at every 500 m interval; on either side. Rainwater harvesting structures one each in every loop of clover leaf/dumble interchange as well as suitable number of such units on either side of the vehicular underpasses wherever the profile of the cross road has been lowered, shall also be provided to take care of drainage and prevent flooding.

18 UTILITY CORRIDOR

2.00 m wide utility corridor at the end of ROW has been provided on both sides along the project expressway. All utility items related to project expressway such as electric lines, telephone lines ,water pipe lines /office/networking of toll plaza shall be laid underground. The utilities on bridges shall be taken as per ministry guidelines vide letter no.RW/NH-34066/2/95-S&R dated on 25th Oct. 1999 . The public related utilities are to be shifted outside ROW and would only be provided with underground facility of crossings through pipes/culverts structures.

Utility duck in the form of 600mm dia meter NP-4 pipe across the project highway at spacing of 1 km shall be provided for crossing of underground utilities.

19 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 – C

SCHEDULE – C

(see clause 2.1)

PROJECT FACILITIES

1 Project Facilities

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

(a) Toll Plazas;
(b) Road Side furniture/ Road Safety Devices
(c) Lighting
(d) Landscaping and Tree Plantation
(e) Vehicle Rescue post
(f) Service Areas;

2. Project Facilities for Expressway

Project facilities forming part of expressway and to be completed on or before the project completion date have been described in Annexure-I of this Schedule-C

Annexure-I

(SCHEDULE – C)

PROJECT FACILITIES

1 Project Facilities

The Contractor shall construct the Project Facilities described in this Annexure-I to form part of Expressway. The Project Facilities shall include:

2 Description of Project Facilities

(a) Toll Plazas;
(b) Road Side furniture/ Road Safety Devices
(c) Lighting
(d) Landscaping and Tree Plantation
(e) Vehicle Rescue post
(f) Service Areas;

(a) Toll Plazas

Toll Plazas shall be developed as per Annexure-I of schedule-D.

Design Chainage (Km)	* Number of Lanes
58.229	12+12 + 1 oversized lane on both side

There will be Toll Plaza /Toll booths at entry/Exist Location of Designated Interchanges with required number of lanes. The number of lanes etc shall be as per specified in schedule-D.

(b) Road Side Furniture/ Road Safety Devices

Road side furniture shall be provided as per Annexure-I of Schedule-D.

(i) Traffic Signs: Traffic Signs include roadside signs, chevron signs, overhead signs and kerb mounted signs along the entire Project Expressway. These shall be provided as per guidelines given in IRC: 67 and Section 800 of MORTH specifications.

(ii) Overhead Traffic Sings: Location and Size

Full width Overhead signs: 8 nos. (Locations to be finalized in consultation with Authority's Engineer)

Cantilever Overhead signs: 4 nos. (Locations to be finalized in consultation with Authority's Engineer)

However location of these sign board shall be decided actual site requirement and in consultation with Authority engineer.

(iii) Pavement Markings: Pavement markings shall cover the entire Project Expressway and will be provided as per guidelines given in IRC: 35 and section 800 of MORTH specifications.

(iv) Boundary (ROW) Stones : These shall be provided for the entire Project Expressway . These shall be spaced at 200 m and shall be provided as per Type Design given in IRC: 26

(v) Hectometer & Kilometer Stones: These shall be provided for the entire Project Expressway and will conform to IRC: 26.

vi) Crash Barriers: - Concrete/Metal Crash Barriers shall be provided throughout the length of the project expressway. There location will be as under:-

(a) Concrete Crash Barrier: New Jersey Type shall be provided at all interchanges including loops and ramps, major bridges, minor bridges, slab/box culverts, underpasses and ROBs and their approaches of embankment more than 4 m height (left side only) of both the carriageways. These barriers shall be provided as per section 811 of MORTH specification - 2013.

(b) Metallic Crash Barrier:- Throughout the balance length of expressway (except as specified in (a) above) on left side as well as both sides of median as per section 811 of MORTH Specifications - 2013.

(vii) Fencing: Fencing throughout the Project Expressway at the edge of ROW on both sides shall be provided as specified in Schedule-D. Fencing on either side of culverts, PUPs, VUPs, and minor bridges within ROW and linking the same with ROW fencing shall also be provided. Fencing shall be chain link type with size 1.8 * 1.8 meter and above it the 0.7m height will be Barbed bar wire fencing. The drawing of fencing shall be finalized in consultation with Authority engineer before installing at site.

(viii) Reflective Pavement Markers / Road Studs: These studs of prismatic retro reflective two-way markers shall be provided as specified in Schedule D.

(ix) Delineators shall be provided on median side of each carriageway at 50m interval throughout the length and at merging/diverging areas, service areas, ramps of interchanges, bridges and their approaches, the spacing shall be reduced to 30m. These shall conform to IRC: 79

(x) Blinker Lights: Yellow flashing lights using solar power with full alternative power back-up shall be provided to alert the drivers about oncoming interchange, major bridge, wayside amenity and toll plaza. These shall be provided as per International standards.

(c) Lighting

Lighting shall be provided at the locations of interchanges, Flyovers, major bridges, Toll Plazas, inside VUPs and inside PUPs, including high mast as shown in drawing and as per Expressway Manual / relevant IRC code using solar power including batteries with full alternative power back-up as specified in Schedule D. Power back generators shall be placed at the ground level only

(d) Landscaping and Tree Plantation

As per IRC SP-21 -landscaping and tree plantation 88000 trees local species in double row of trees at the end of ROW on either side will be provided .Landscape treatment with provision of fountains an lighting shall be provided in the entire open areas near major bridges, interchanges, Grade separators ,elevated sections,Viaducts,traffic islands ,toll plaza and service area. Shrubs and flooring plant shall be planted and maintained in medians..

The system for watering of median plantation and landscaping areas shall be through pipe water supply . any arrangement for pumping etc shall be at ground level. to ensure safety of traffic watering by tankers shall not be resorted too.

(e) Vehicle Rescue post

Their location to be decided by the Contractor in consultation with Authority Engineer. Drawing for Vehicle Rescue Post is to be developed in Consultation with Authority Engineer.

(f) Service Areas

Service Areas shall be provided as per Annexure-I of Schedule-D. Service area shall be provided at locations given below : -

Sl No.	Design Chainage (Km)	Remarks
1	36.250	225 m x 100 m wide on both side of Expressway

Note: Number and location of the project facilities mentioned in this **Annexure – I** are tentative. The Independent Engineer shall finalize the number/ location of these facilities as per site requirements.

SCHEDULE – D

SCHEDULE - D

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 Expressway.

2 Design Standards

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

- Manual of Standards and Specifications for Expressway (IRC:SP:99-2013).
- Ministry of Road Transport & Highways Specifications for Road and Bridge works 2013.

Annex - I

(Schedule-D)

Specifications and Standards for Construction

1 Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications & Standards for Expressways (IRC:SP:99-2013) referred to as the Manual, and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2 Deviations from the Specifications and Standards

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

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

Deviations from the Specifications and Standards

Sl No	Clause	Items	Provisions as per IRC:SP:99-2013	Design Chainage	Deviations from the Expressway Guidelines with Remarks
1	2.17	Clear Zone	" A clear zone width of 9-11 m for design speed of 100 – 120 Km/hour for the errant vehicle…….crash barrier should be part of the clear zone distance"		No provision of clear zone width. Crash barrier to be provided at the end of the earthen shoulders. Embankment slope of 1V:2H to be provided.
2	Section 12	Toll Plaza			Equipments for toll collection systems stands deleted. Section 12 is modified to that extent.
3	Section 2	Median			Instead of 12m wide depressed median, 6m wide raised median is proposed to be provided.

SCHEDULE – E

SCHEDULE –E
(See Clause 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

1.1 The Contractor shall, at all times maintain the Project Expressway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

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

1.3 All Materials, works and construction operations shall conform to the MORTH Specifications for Road and Bridge Works (2013), 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 Expressway 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 Expressway 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 Expressway on account of a Force Majeure Event or default or neglect of the Authority shall be undertaken by the Authority at its own cost. The Authority may instruct the Contractor to undertake the repairs at the rates agreed between the Parties.

Annex – I

(Schedule E)

Repair/Rectification of Defects and Deficiencies

(For Expressway stretch)

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

Nature of defect or deficiency	Time limit for repair/ rectification
Expressway and Service Road	
(a) Carriageway and paved shoulders	
(i) Surface cleaning	Daily
(ii) Breach or blockade	Temporary / restoration of traffic withi hours, Permanent restoration wi 2 days
(ii) Roughness value exceeding 1800 mm in a stretch of 1 km (as measured by a calibrated Bump Integrator)	- 30 days
(iii) Pot holes	- Pot Less
(iv) Cracking in more than 5% of road surface in a stretch of 1 km	- 2 days
(v) Rutting more than 2% of road surface in a stretch of 1 km (measured with 3 m straight edge)	- 5 days
(vi) Bleeding/skidding	- 7 days
(vii) Ravelling/Stripping of bitumen surface exceeding 10 sq m	- 10 days
(viii) Damage to pavement edges exceeding 10 cm	- 10 days
(ix) Removal of debris	- 3 hours
(x) Spalling of joints – concrete pavement - 15 days	
(xi) Joints sealant - concrete pavement 15 days	-
(xii) Sunken concrete – pavement slab - 15 days	
(b) Hard/earth shoulders, side slopes, drains and culverts	
(i) Variation by more than 2% in the prescribed slope of camber/cross fall	- 15 days
(ii) Edge drop at shoulders exceeding 40 mm	- 7 days
(iii) Variation by more than 15% in the prescribed side (embankment) slopes	- 15 days
(iv) Rain cuts/gullies in slope	- 7 days
(v) Damage to or silting of culverts and side drains during and immediately preceding the rainy season	- 7 days
(vi) Desilting of drains in urban/semi-urban areas	- 48 hours

(c)	**Road side furniture including road signs and pavement marking**		
(i)	Damage to shape or position; poor visibility or loss of retro-reflectivity	-	48 hours
(d)	**Trees and plantation**		
(i)	Obstruction in a minimum head-room of 5.0 m above carriageway or obstruction in visibility of road signs	-	24 hours
(ii)	Deterioration in health of trees and bushes	-	Timely watering and treatment
(iii)	Replacement of trees and bushes	-	30 days
(iv)	Removal of vegetation affecting sight line and road structures	-	24 hours
(e)	**Rest areas**		
(i)	Cleaning of toilets	-	8 hours
(ii)	Defects in electrical, water and sanitary installations	-	8 hours
(f	**Toll plaza[s]**		
(i)	Failure of toll collection equipment or lighting	-	4 hours
(ii)	Damage to toll plaza	-	7 days
(g)	**Other Project Facilities and Approach roads**		
(i)	Damage or deterioration in Approach Roads, Pedestrian facilities, truck lay-bys, wayside amenities, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works]	-	15 days
(i)	**Damages to Access control provisions and crash barrier**	-	1 day
Bridges/Underpasses/Overpasses/ROB's/RUB's/Grade Separator			
(a)	**Superstructure of bridges**		
(i)	Cracks		
	Temporary measures	-	within 48
	Permanent measures	-	hours within 45 days
(ii)	Spalling/scaling	-	15 days
(b)	**Foundations of bridges**		
(i)	Scouring and/or cavitation	-	15 days
(c)	**Piers, abutments, return walls and wing walls of bridges**		
(i)	Cracks and damages including settlement and tilting	-	30 days
(d)	**Bearings (metallic) of bridges**		
(i)	Deformation	-	15 days
(e)	**Joints in bridges**		
(i)	Loosening and malfunctioning of joints	-	15 days
(f)	**Other items relating to bridges**		
(i)	Deforming of pads in elastomeric bearings	-	7 days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	-	3 days

(iii)	Damage or deterioration in parapets and handrails	-	3 days
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	-	15 days
(v)	Damage to wearing coat	-	15 days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds Damage to wearing coat Rain-cuts or erosion of banks of the side slopes of approaches	-	30 days
(vi)	Growth of vegetation affecting the structure or obstructing the waterway	-	15 days
(viii)	Water logging (Pumping out of Water)	-	1 hour

Additional requirements for Rigid Pavement including Interchanges & Toll Plazas

Refer IRC: SP: 83

1	Crack Sealing and joint Resealing	7 days each
2	Crack Stitching (cross stitching)	7 days each
3	Partial depth Repair	7 days per joint /crack/rigid slab location or pot holes of one slab
4	Full depth Repair	30 days
5	Slab Stabilization	7 days per slab
6	Repair for Load transfer failure (Retrofit of dowel bars)	7 days per joint
7	Slab Lifting or Jacking	7 days per slab
8	Reinstate the Evenness and skid Resistance (Diamond grinding)	7 days per slab
9	Diamond Grooving	7 days per slab
10	Milling Procedure	7 days per slab
11	Concrete Overlays	30 days per scale
12	Rehabilitation of Soft-Earthen-Shoulders	10 days per km

SCHEDULE – H

SCHEDULE - H

(See Clauses10.1.4 and 19.3)

Contract Price Weightages

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

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road works including culverts, minor bridges, underpasses, overpasses, approaches to ROB/RUB/ Major Bridges/ Structures (but excluding service roads)	77.35%	A- Widening and strengthening of existing road	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Granular work (sub-base, base, shoulders)	0.00%
		(3) Dense Bituminous Macadam (DBM)	0.00%
		(4) Bituminous Concrete	0.00%
		(5) Widening and repair of culverts	0.00%
		(6) Widening and repair of minor bridges	0.00%
		B- New 2-lane realignment/bypass	
		(1) Earthwork up to top of the sub-grade	31.00%
		(2) Granular work (sub-base, base, shoulders)	21.40%
		(3) Dense Bituminous Macadam (DBM)	10.00%
		(4) Bituminous Concrete	3.97%
		(5) CC Pavement	0.00%
		C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:	
		(1) Culverts	1.53%
		(2) Minor bridges	7.7%
		(3)Cattle/Pedestrian underpasses	0.00%
		(4) Pedestrian overpasses	0.00%
		(5) Grade separated structures	24.40%
		(a) Underpasses	0.00%
		(b) Overpass	
Major Bridge works and ROB/RUB	2.16%	A- Widening and repairs of Major Bridges	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including crash barriers etc. complete)	0.00%

		(4) Approaches (excluding Retaining wall)	**0.00%**
		(5) Retaining Wall.	**0.00%**
		B- Widening and repair of	
		(a) ROB	
		(b) RUB	
		1) Foundation	**0.00%**
		(2) Sub-structure	**0.00%**
		(3) Super-structure (including crash barriers etc. complete)	**0.00%**
		(4) Approaches (excluding Reinforced Earth wall)	**0.00%**
		(5) Reinforced Earth wall.	**0.00%**
		C- New Major Bridges	
		(1) Foundation	**21.85%**
		(2) Sub-structure	**13.92%**
		(3) Super-structure (including crash barriers etc. complete)	**21.85%**
		(4) Approaches (excluding Retaining Wall)	**6%**
		(5) Retaining Wall	**6%**
		D- New rail-road bridges	
		(a)ROB	
		(b) RUB	
		(1) Foundation	**9.15%**
		(2) Sub-structure	**6.08%**
		(3) Super-structure (including crash barriers etc. complete)	**9.15%**
		(4) Approaches (excluding Reinforced Earth Wall)	**3%**
		(5) Reinforced Earth Wall	**3%**
Structures (elevated sections, reinforced earth)	**8.16%**	**(1) Foundation**	**36%**
		(2) Sub-structure	**22%]**
		(3) Super-structure (including crash barriers etc. complete)	**36%**
		(4) Approaches (excluding Reinforced Earth Wall)	**3%**
		(5) Reinforced Earth Wall	**3%**
Other works	**12.33%**	**(i) Slip roads**	**6.77%**
		(ii) Toll Plaza	**6.58%**
		(iii) Road side drains	**0.40%**
		(iv) Road signs, markings, km stones, safety devices, ….	**11.99%**
		(v) Project facilities	**5.92%**
		(vi) Repairs to bridges/structures	**0.00%**
		a) Providing wearing coat	**0.00%**
		b) Replacement of bearings, joints	**0.00%**
		c) Providing crash barriers	**0.00%**
		d) Other items	**0.00%**

		(vii) Road side plantation **(viii) protection works** **(ix) Safety and traffic management during construction**	**0.5%** **61.99%** **5.85%**

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 roads).

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

Table 1.3.1

Stage of Payment	Percentage - weightage	Payment Procedure
A-Widening and strengthening **(1) Earthwork up to top of the sub-grade**	**0.00%**	**Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length. @**
(2) Granular work (sub-base, base, shoulders)	**0.00%**	
(3) Dense Bituminous Macadam(DBM)	**0.00%**	
(4) Bituminous Concrete (BC)	**0.00%**	
(5) Widening and repair of culverts	**0.00%**	**Cost of ten completed culverts shall be determined pro rata with respect to the total number of culverts. Payment shall be made on the completion of ten culverts.**
(6) Widening and repair of minor bridges	**0.00%**	**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 minor bridge.**
B- New -Expressway		**Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length.**
(1)Earthwork up to top of the sub-grade	**31.00%**	
(2) Granular work (sub-base, base, shoulders)	**21.40%**	
(3) Dense Bituminous Macadam (DBM)	**10.00%**	
(4) Bituminous Concrete (BC)	**3.97%**	

Stage of Payment	Percentage - weightage	Payment Procedure
(5) CC Pavement	**0.00%**	
C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses: **(1) Culverts**	**1.53%**	**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 five culverts.**
(2) Minor bridges	**7.7%**	**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 minor bridge**
(3) Cattle/Pedestrian underpasses	**0.00%**	**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: (i)1 to 5 - on completion of all, (ii) 6 or more - on completion of five**
(4) Pedestrian Overpasses	**0.00%**	**Same as for (3) above**
(5) Grade separated structures		
(a) Underpasses	**24.40%**	**Same as for (3) above**
(b) Overpasses	**0.00%**	**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) and (4) above shall be worked out.

1.3.2 Major Bridge works and ROB/RUB.

Procedure for estimating the value of Major Bridge works and of ROB/RUB shall be as 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**	**0.00%**	**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, wing walls, return walls, guide bunds, if any.	**0.00%**	
Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, tests on completion etc., complete in all respects.	**0.00%**	
Approaches: On completion of approaches (excluding retaining wall if any), filter media etc. and complete in all respects & fit for use.	**0.00%**	
Retaining Wall: On completion of Retaining Wall if any in all respects.	**0.00%**	**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 each stage of ROB/RUB as per the weightage given in this table.**
B- Widening and repairs of **(a) ROB** **(b) RUB** **1. Foundation: On completion of the foundation work including foundations for wing and return walls**	**0.00%**	
2. Sub-structure: On completion of abutments, piers up to the abutment/pier cap, wing walls, return walls, guide bunds, if any.	**0.00%**	
3. Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, tests on completion etc., complete in all respects.	**0.00%**	**Cost of each Major Bridge 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 as per the weightage given in this table**
4. Approaches: On completion of approaches (excluding reinforced earth wall if any), filter media etc. and complete in all respects & fit for use.	**0.00%**	
5. Reinforced Earth Wall: On	**0.00%**	

Stage of Payment	Weightage	Payment Procedure
completion of Reinforced Earth Wall if any in all respects.		
6. New Major Bridges		
1. Foundation: On completion of the foundation work including foundations for wing and return walls	**21.85%**	**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 each stage of ROB/RUB as per the weightage given in this table..**
2. Sub-structure: On completion of abutments, piers up to the abutment/pier cap	**13.92%**	
3. Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, tests on completion etc., complete in all respects.	**21.85%**	
4. Approaches: On completion of approaches (excluding retaining wall if any), filter media etc. and complete in all respects & fit for use.	**6%**	
5. Retaining Wall: On completion of Retaining Wall if any in all respects.	**6%**	
3. New Rail-road bridges		
(a) ROB		
(b) RUB		
1. Foundation: On completion of the foundation work including foundations for wing and return walls	**9.15%**	
2. Sub-structure: On completion of abutments, piers up to the abutment/pier cap, wing walls, return walls, guide bunds, if any.	**6.08%**	
3. Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, tests on completion etc., complete in all respects.	**9.15%**	

Stage of Payment	Weightage	Payment Procedure
4. Approaches: On completion of approaches (excluding reinforced earth wall if any), filter media etc. and complete in all respects & fit for use.	**3%**	
5. Reinforced Earth Wall: On completion of Reinforced Earth Wall if any in all respects.	**3%**	

1.3.3 Structures

Procedure for estimating the value of structure work shall be as 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 foundations for wing and return walls	**36%**	**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 made on completion of each stage of a structure as per the weightage given in this table.**
(2) Sub-structure: On completion of abutments, piers up to the abutment/pier cap, wing walls, return walls if any.	**22%**	
(3) Super-structure: On completion of the Structure along with super structure, including hand rails/crash barriers, tests on completion etc., elevated structure complete in all respects and fit for use.	**36%**	
(4) Approaches: On completion of approaches (excluding Reinforced earth wall if any), filter media etc. and complete in all respects & fit for use.	**3%**	
(5) Reinforced earth work	**3%**	**Payment shall be made on pro rata basis on completion of 25 (twenty five) percent of total area.**

1.3.4 Other works.

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Slip roads	**6.77%**	**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	**6.58%**	**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	**0.40%**	**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, …	**11.99%**	
(v) Project Facilities	**5.92%**	**Payment shall be made on pro rata basis for completed facilities.**
a) Bus bays	**0.00%**	
b) Truck lay-byes	**0.00%**	
c) Rest areas	**0.00%**	
d) others	**0.00%**	
(vi) Repairs to existing bridges/structures	**0.00%**	**Payment shall be made for completed items.**
a) Providing wearing coat	**0.00%**	
b) Replacement of bearing, joints	**0.00%**	
c) Providing crash barriers	**0.00%**	
(d) Other items		

Stage of Payment	Weightage	Payment Procedure
	0.00%	
(vii) Roadside plantation	0.5%	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	61.99%	
(ix) Other Items and Safety and traffic management during construction	5.85%	Payment shall be made on pro-rata basis every six months.

2. Procedure for payment for Maintenance

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

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

SCHEDULE-I

Annex-I

(Schedule-I)

List of Drawings

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

(a) Working Drawings of all the components/elements of the Project Expressway as determined by Authority Engineer/NHAI, and

(b) As-built drawings for the Project Expressway components/elements as determined by Authority Engineer /NHAI. As-built drawings shall be duly certified by Authority Engineer.

1. A broad list of the drawings of the various components/elements of the Project Expressway and project facilities required to be submitted by the Contractor is given below:
   (a) Drawings of horizontal alignment, vertical profile and cross sections
   (b) Drawings of cross drainage works
   (c) Drawings of interchanges, major intersections, grade separators, underpasses, ROB's and Major Bridges.
   (d) Drawings of toll plaza layout, toll collection systems and roadway near toll plaza
   (e) Drawings of Control Centre
   (f) Drawings of drainage system
   (g) Drawing of a truck parking lay bye with furniture and drainage system
   (h) Drawings of road furniture items including traffic signage, markings, safety barriers, etc.
   (i) Drawings of traffic diversion 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 pedestrian crossings
   (n) Drawings of Highway lighting
   (o) Layout/Configuration of ATMS
   (p) General arrangement of Base camp and Administrative Block
   (q) Drawing of service area.

SCHEDULE-J

SCHEDULE - J

(See Clause 10.3.2)

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

2.1 Project Milestone-I shall occur on the date falling on the 110th (one hundred and Thirtieth) day from the Appointed Date (the "**Project Milestone-I**").

2.2 Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Expressway 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

3.1 Project Milestone-II shall occur on the date falling on the 260th (Three hundred and Tenth) day from the Appointed Date (the "**Project Milestone-II**").

3.2 Prior to the occurrence of Project Milestone -II, the Contractor shall have continued with construction of the Project Expressway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 40% (forty per cent) of the Contract Price.

4 Project Milestone-III

4.1 Project Milestone-III shall occur on the date falling on the [365th (Four Hundred and Thirtieth] day from the Appointed Date (the "**Project Milestone-III**").

4.2 Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Expressway 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.

5 Scheduled Completion Date

5.1 The Scheduled Completion Date shall occur on the [540th (Six Hundred and fortieth] day from the Appointed Date.

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

6 Extension of time

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