NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport & Highways)
Government of India

NAME OF WORK: Six laning from start of Valanchery bypass to Kappirikkad section of NH – 66 (old NH-17) from Design Ch. 298+500 (Ex. km 304.250) to Design Chainage 335+850 (Ex. km 349.260) in the state of Kerala on Hybrid Annuity Mode under Bharatmala Pariyojana

TECHNICAL SCHEDULES

(A, B, C & D)

Ocotober 2020

G-5 & 6, Sector – 10, Dwarka, New Delhi – 110 075

SCHEDULE-A

(See Clause 10.1)

SITE OF THE PROJECT

1 The Site

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

1.2 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 Concessionaire, and such inventory shall form part of the memorandum referred to in Clause 10.3.1 of the Agreement.

1.3 Additional land required for construction of works specified in the Change of Scope Order issued under Clause 16.2.3 of this Agreement shall be acquired in accordance with the provisions of Clause 10.3.6 of this Agreement. Upon acquisition, such land shall form part of the site and vest in the Authority.

Annex - I
(Schedule-A)
Site for Six Laning

1 The Site

The site of project highway is a section of National Highway No.66 (commencing from km 304.250 to km 318.450), existing NH-PWD Ponnani Bypass (commencing from km 0.000 to km 14.800) and National Highway No.66 (commencing from km 340.300 to km 349.260) in the State of Kerala. The land, carriageway and structures comprising the Site are described below

2 Land

The Site of the Project Highway comprises the land described in **Table A-1 (a)** and **Table A-1 (b).**

Table A-1 (a): Site of Project

Sl. No.	Existing Chainage (km)		Existing ROW width, m	Remarks
	From	To		
1	304.250	304.400	14.30	Through NH -17
2	304.400	304.600	15.40	
3	304.600	304.800	17.20	
4	304.800	305.000	14.90	
5	305.000	305.200	16.20	
6	305.200	305.400	16.80	
7	305.400	305.600	21.00	
8	305.600	305.800	30.10	
9	305.800	306.000	25.20	
10	306.000	306.200	21.25	
11	306.200	306.400	22.80	
12	306.400	306.600	22.00	
13	306.600	306.800	17.50	
14	306.800	307.000	18.00	
15	307.000	307.200	25.20	
16	307.200	307.400	20.60	
17	307.400	307.600	38.70	
18	307.600	307.800	36.00	
19	307.800	308.000	20.90	
20	308.000	308.200	35.40	
21	308.200	308.400	18.30	
22	308.400	308.600	17.30	
23	308.600	308.800	21.50	
24	308.800	309.000	17.70	
25	309.000	309.200	16.90	
26	309.200	309.400	20.20	
27	309.400	309.600	16.20	
28	309.600	309.800	20.50	
29	309.800	310.000	23.90	
30	310.000	310.200	26.45	
31	310.200	310.400	23.00	

Sl. No.	Existing Chainage (km)		Existing ROW width, m	Remarks
	From	To		
32	310.400	310.600	12.00	
33	310.600	310.800	14.20	
34	310.800	311.000	14.35	
35	311.000	311.200	27.30	
36	311.200	311.400	29.40	
37	311.400	311.600	20.30	
38	311.600	311.800	13.50	
39	311.800	312.000	15.80	
40	312.000	312.200	18.10	
41	312.200	312.400	19.30	
42	312.400	312.600	17.30	
43	312.600	312.800	14.60	
44	312.800	313.000	16.85	
45	313.000	313.200	14.10	
46	313.200	313.400	14.50	
47	313.400	313.600	16.70	
48	313.600	313.800	20.00	
49	313.800	314.000	17.65	
50	314.000	314.200	17.00	
51	314.200	314.400	14.50	
52	314.400	314.600	19.65	
53	314.600	314.800	16.90	
54	314.800	315.000	20.10	
55	315.000	315.200	19.70	
56	315.200	315.400	23.60	
57	315.400	315.800	17.90	
58	315.800	316.000	25.50	
59	316.000	316.200	26.40	
60	316.200	316.400	22.70	
61	316.400	316.600	17.30	
62	316.600	316.800	21.80	
63	316.800	317.000	25.40	
64	317.000	317.200	18.40	
65	317.200	317.400	28.70	
66	317.400	317.600	68.90	
67	317.600	317.800	72.70	
68	317.800	317.970	74.30	
69	317.970	318.450	45.00	
70	0.000 (318.450 of NH 17)	1.000	30.00	Through Existing Ponnani Bypass
71	1.000	2.000	30.00	
72	2.000	3.000	30.00	
73	3.000	4.000	30.00	
74	4.000	5.000	30.00	
75	5.000	6.000	30.00	

Sl. No.	Existing Chainage (km)		Existing ROW width, m	Remarks
	From	To		
76	6.000	7.000	30.00	
77	7.000	8.000	30.00	
78	8.000	9.000	30.00	
79	9.000	10.000	30.00	
80	10.000	11.000	30.00	
81	11.000	12.000	30.00	
82	12.000	13.000	30.00	
83	13.000	14.800 (340.300 of NH 17)	30.00	
84	340.300	341.000	29.90	Through NH -17
85	341.000	342.000	37.90	
86	342.000	343.000	19.00	
87	343.000	344.000	16.50	
88	344.000	345.000	26.00	
89	345.000	346.000	16.50	
90	346.000	347.000	17.30	
91	347.000	348.000	18.00	
92	348.000	349.000	19.00	
93	349.000	349.260	17.00	

Table A-1 (b): Site of Project (Bypass/New alignment)

Sl. No.	Existing Chainage		Name of Bypass/New alignment	Proposed ROW in m	
	From	To		LHS of proposed centerline	RHS of proposed centerline
1	306.150	311.330	Valanchery	22.5	22.5

3 Carriageway

3.1 Carriageway of Highway

The present width of main carriageway and paved shoulders of the Project Highway are given in **Table A-2.**

Table A-2: Width of Main Carriageway

Sl. No.	Existing Chainage (km)		Existing length, km	Width of Carriageway (m)		Width of Paved Shoulders (m)		Remarks
	From	To		LHS	RHS	Left	Right	
1	304.250	304.970	0.720	3.5	3.5	-	-	Through NH 17
2	304.970	308.050	3.080	3.5	3.5	-	-	
3	308.050	309.610	1.560	3.5	3.5	-	-	
4	309.610	310.000	0.390	3.5	3.5	1.5	1.5	
5	310.000	310.260	0.260	7.0	7.0	1.0	1.0	
6	310.260	311.690	1.430	3.5	3.5	-	-	

Sl. No.	Existing Chainage (km)		Existing length, km	Width of Carriageway (m)		Width of Paved Shoulders (m)		Remarks
	From	To		LHS	RHS	Left	Right	
7	311.690	315.950	4.260	3.5	3.5	-	-	
8	315.950	316.880	0.930	3.5	3.5	1.5	1.5	
9	316.880	317.160	0.280	3.5	3.5	-	-	
10	317.160	317.380	0.220	3.5	3.5	1.0.	10	
11	317.380	317.670	0.290	3.5	3.5			
12	317.670	317.970	0.300	3.5	3.5	1.0	1.0	
13	317.970	318.000	0.030	3.5	3.5	1.0	1.0	
14	318.000	318.450	0.450	3.5	3.5	-	-	
15	0.000 (318.450 of NH-17)	0.240	0.240	7.0	7.0	1.5	1.5	
16	0.240	3.100	2.860	3.5	3.5	-	-	
17	3.100	3.400	0.300	3.5	3.5	1.5	1.5	
18	3.400	11.200	7.800	3.5	3.5	-	-	
19	11.200	11.500	0.300	7.0	7.0	3.0	3.0	Through Ponnani Bypass
20	11.500	13.600	2.100	3.5	3.5	-	-	
21	13.600	13.860	0.260	3.5	3.5	1.5	1.5	
22	13.860	13.990	0.130	3.5	3.5	1.5	1.5	
23	13.990	14.260	0.270	3.5	3.5	1.5	1.5	
24	14.260	14.800 (340.300 of NH-17)	0.540	3.5	3.5	-	-	
25	340.300	341.900	1.600	3.0	3.0.	-	-	
26	341.900	342.050	0.150	3.5	3.5	-	-	
27	342.050	342.190	0.140	7.0	7.0	-	-	
28	342.190	342.360	0.170	3.5	3.5	1.0	1.0	Through NH 17
29	342.360	342.560	0.200	3.5	3.5	-	-	
30	342.560	343.430	0.870	3.5	3.5	1.5	1.5	
31	343.430	343.585	0.155	7.0	7.0	1.0	1.0	
32	343.585	349.260	5.675	3.5	3.5	1.5	1.5	

3.2 Carriageway of Service Road

The present width of carriageway of the service road is given in **Table A-3**:

Table A-3: Width of Service Road

Sl. No.	Existing Chainage (km)		Side (LHS/RHS/ BOTH)	Length, m	Width of Carriageway	Remarks
	From	To				
1	13.600	13.860	LHS	260	5.5	Existing VUP
2	13.600	13.860	RHS	260	3.5	
3	13.860	13.990	LHS	130	7.0	

4 Major Bridges

The Major Bridges in the Site are given in **Table A-4**.

Table A-4: List of Major Bridges

Sl. No.	Existing Chainage (km)	Name of River / Bridge	Skew Angle (Deg.)	Span Arrangement (No. x L in m)	Overall Width in m
1	318.188	Bharathapuzha River	-	1x32.15 + 2x32.20 + 2x32.15 + 2x32.20 + 1x32.15 + 1x32.20 + 1x32.15 + 1x32.20	8.00
2	14.143 of Ponnani Bypass	Canoli Canal	-	3x32.00 + 1x48.80 + 3x32.00	12.00
3	342.462	Kanjiramukku River - Puduponnani Bridge	-	1x16.60 + 7x24.30 + 1x16.60	8.20

5 Railway Crossing

5.1 Railway Level Crossings

The Railway level crossings in the Site are given in **Table A-5**.

Table A-5: List of Railway Level Crossings

Sl. No.	Existing Chainage (km)	L.C Number/ Railway km	Width of Railway Land
Nil			

5.2 Road Over / Under Bridges

A. The details of Road Over Bridges in the Site are given in **Table A-6**.

Table A-6: List of ROB's

Sl. No.	Existing Chainage (km)	Skew Angle (Deg.)	Span Arrangement (No. x L in m)	Carriageway Width (m)	Total Width (m)	Clear height available (m)	Type of structures		
							Foundation	Sub structure	Super Structure
1	317.425	15°	4x22.50 + (2x22.50) + 6x22.50	7.50	11.00	6.50	Well	RCC Wall type Abutment & Portal Type Piers	PSC I-Girder + RCC Deck Slab (for Railway Span) RCC T Girder+ RCC Deck slab (for Approach Spans)

B. The details of Road under Bridges in the Site are given in **Table A-7**.

Table A-7: List of RUB's

Sl. No.	Existing Chainage (km)	Span Arrangement (No. x L in m)	Vertical clearance (m)	Clear Width (m)	Type of Super Structure	Type of Sub Structure	Type of Foundation
Nil							

6 Grade Separators Structures

The Site includes the following Grade Separated Structures:

6.1 Interchanges

The details of interchanges are given **Table A-8**:

Table A-8: List of Interchanges

Sl. No.	Existing Chainage (km)	Type of Inter Change	Type of Super Structure	Type of Sub Structure	Type of Foundation	Span Arrangement (No. x L in m)	Vertical Clearance (m)	Overall Width
Nil								

6.2 Vehicular / Light Vehicular Underpasses

The details of Vehicular Underpasses/Light Vehicular underpasses are given in **Table A-9.**

Table A-9: List of Vehicular/Light Vehicular underpasses

Sl. No.	Existing Chainage (km)	Skew Angle (Deg.)	Span Arrangement (No. x L in m)	Vertical Clearance (m)	Overall Width (m)	Type of Super structure	Type of Sub Structure	Type Foundation
1	13.866 of Ponnani Bypass	30°	1x11.00* (SQ, 12.70* (SK)	5.50	12.00	RCC Box		

*Clear Span; SQ-Square Span; SK-Skew Span.

6.3 Pedestrian/Cattle Underpasses

The details of Pedestrian/Cattle Underpasses are given **Table A-10**:

Table A-10: List of Pedestrian/Cattle Underpasses

Sl. No.	Existing Chainage (km)	Skew Angle (Deg.)	Span Arrangement (No. x L in m)	Vertical Clearance (m)	Overall Width (m)	Type of structure
Nil						

6.4 Vehicular Overpasses

The details of Vehicular Overpasses are given in **Table A-11**:

Table A-11: List of Vehicular Overpasses

Sl. No.	Existing Chainage (km)	Skew Angle (Deg.)	Span Arrangement (No. x L in m)	Available Clearance (m)		Overall Width including Crash barrier/ Railing/ Parapet (m)	Type of Super structure	Type of Sub Structure	Type of Foundation
				Horizontal	Vertical				
Nil									

7 Minor Bridges

The Minor Bridges in the Site are given in **Table A-12.**

Table A-12: List of Minor Bridges on Main Carriageway

Sl. No.	Existing Chainage (km)	Skew Angle (Deg.)	Carriageway Width (m)	Span Arrangement (No. x L in m)	Total Width (m)	Type of structure	Remarks
1	307.495	-	6.40	1x12.10	8.20	RCC-T-Girder + Deck Slab	Nala-Kavumpuram Bridge
2	311.005	-	6.10	1x9.70	8.50	RCC-T-Girder + Deck Slab	Nala-Valanchery-I
3	311.075	-	6.20	1x9.50	8.30	RCC-T-Girder + Deck Slab	Nala-Valanchery-II

The details of Minor Bridges on Service Road are given in **Table A-13.**

Table A-13: List of Minor Bridges on Service road

Sl. No.	Existing Chainage (km)	Skew Angle (Deg.)	Carriageway Width (m)	Span Arrangement (No. x L in m)	Total Width (m)	Type of structure	Remarks
Nil							

8 Culverts

The details of Culverts in the Site are given in **Table A-14.**

Table A-14: List of Culverts on Main Carriageway

Sl. No.	Existing Chainage (km)	Type of Culvert	Skew Angle (Deg.)	Span Arrangement (No. x length x ht.) m	Overall Width (m)
1	304.650	RCC Slab Culvert	-	1x4.00x0.70	9.80
2	304.920	RCC Slab Culvert	-	1x1.30x0.40	9.80
3	305.150	RCC Slab Culvert	-	1x0.90x0.50	9.80
4	308.225	RCC Slab Culvert	-	1x1.20x1.00	15.50
5	308.325	RCC Slab Culvert	-	1x1.50x1.20	15.50
6	308.475	RCC Slab Culvert	-	1x1.80x0.40	9.80
7	308.625	RCC Slab Culvert	-	1x1.20x1.50	9.80
8	309.250	RCC Slab Culvert	-	1x3.00x0.35	9.80
9	309.675	RCC Slab Culvert	-	1x1.00x1.00	8.40
10	310.175	RCC Slab Culvert	24°	1x1.00x0.60	10.50
11	310.400	RCC Slab Culvert	-	1x0.90x1.00	10.50
12	310.500	RCC Slab Culvert	-	1x2.40x0.30	9.50
13	310.675	RCC Slab Culvert	-	1x1.70x0.50	10.50
14	311.100	RCC Slab Culvert	-	1x4.00x4.00	8.50
15	311.225	RCC Slab Culvert	-	1x1.20x0.70	15.00
16	311.825	RCC Slab Culvert	-	1x1.80x1.20	12.60

Sl. No.	Existing Chainage (km)	Type of Culvert	Skew Angle (Deg.)	Span Arrangement (No. x length x ht.) m	Overall Width (m)
17	312.025	RCC Slab Culvert	-	1x2.00x1.20	13.80
18	312.325	RCC Slab Culvert	-	1x2.40x0.20	10.60
19	312.975	RCC Slab Culvert	-	1x4.00x2.00	10.60
20	313.275	RCC Slab Culvert	-	1x0.90x0.60	10.60
21	313.430	RCC Slab Culvert	-	1x0.90x1.50	15.00
22	313.600	RCC Slab Culvert	-	1x1.80x2.50	19.00
23	313.725	RCC Slab Culvert	-	1x0.90x1.40/2.80	12.60
24	314.050	RCC Slab Culvert	-	1x0.90x0.80	13.10
25	314.175	RCC Slab Culvert	-	1x0.70x0.60	12.70
26	315.100	RCC Slab Culvert	-	1x0.90x0.70	12.60
27	315.400	RCC Slab Culvert	-	1x1.20x0.50	12.60
28	316.425	RCC Slab Culvert	18°.	1x1.20x0.50	12.20
29	317.715	Box Culvert	-	1x1.50x1.50	45.00
30	317.810	Box Culvert	-	1x1.50x1.50	30.00
31	0.017	Box Culvert	-	1x2.00x1.80	25.00
32	0.400	Box Culvert	-	1x2.00x1.50	11.80
33	0.440	Box Culvert	-	1x2.00x1.50	11.80
34	0.753	Box Culvert	-	1x2.00x1.60	11.80
35	0.961	Box Culvert	-	1x1.90x1.90	11.80
36	1.844	Box Culvert	-	1x2.00x2.10	11.80
37	2.541	Box Culvert	-	1x2.40x0.80	11.80
38	2.966	Box Culvert	-	1x2.00x1.50	11.80
39	3.285	Box Culvert	-	1x2.00x1.80	25.30
40	3.552	Box Culvert	-	1x2.00x1.70	11.80
41	3.8742	Box Culvert	-	1x2.00x1.80	11.80
42	4.177	Box Culvert	-	1x2.40x1.80	11.80
43	4.474	Box Culvert	-	1x2.00x1.80	11.80
44	4.848	Box Culvert	-	1x4.00x2.50	11.80
45	5.301	Box Culvert	-	1x4.00x2.50	11.80
46	5.648	Box Culvert	-	1x5.00x2.00	11.80
47	5.979	Box Culvert	-	1x5.00x2.00	11.80
48	6.320	Box Culvert	-	1x2.20x1.50	11.80
49	6.664	Box Culvert	-	1x2.00x1.50	11.80
50	6.964	Box Culvert	-	1x2.00x1.80	11.80
51	7.249	Box Culvert	-	1x2.70x1.10	11.80
52	7.724	Box Culvert	-	1x3.00x1.10	11.80
53	8.082	Box Culvert	-	1x2.00x1.60	11.80
54	8.430	Box Culvert	-	1x3.00x1.00	11.80
55	8.975	Box Culvert	-	1x2.00x1.20	11.80
56	9.411	Box Culvert	-	1x2.00x0.90	11.80
57	9.917	Box Culvert	-	1x2.00x0.90	11.80
58	10.432	Box Culvert	-	1x2.00x1.20	11.80
59	11.222	Box Culvert	-	1x2.00x1.20	11.80
60	11.507	RCC Slab Culvert	-	1x2.00x0.80	11.80
61	11.746	RCC Slab Culvert	-	1x2.00x1.40	11.80
62	12.105	RCC Slab Culvert	-	1x0.90x1.20	11.80
63	12.650	RCC Slab Culvert	-	1x1.00x1.20	11.80
64	13.188	RCC Slab Culvert	-	1x1.00x1.20	11.80

Sl. No.	Existing Chainage (km)	Type of Culvert	Skew Angle (Deg.)	Span Arrangement (No. x length x ht.) m	Overall Width (m)
65	13.374	RCC Slab Culvert	-	1x1.00x2.20	11.80
66	14.478	Box Culvert	-	1x2.00x2.00	12.00
67	340.417	RCC Slab Culvert	-	1x0.80x1.00	13.20
68	340.564	RCC Slab Culvert	-	1x0.40x0.30	8.20
69	343.000	RCC Slab Culvert	-	1x1.50x1.50	Under construction
70	347.850	RCC Slab Culvert	-	1x1.50x1.50	Under construction

The details of Culverts on Service Road are given in **Table A-15.**

Table A-15: List of Culverts on Service Road

Sl. No.	Existing Chainage (km)	Type of Culvert	Skew Angle (Deg.)	Span Arrangement (No. x length x ht.) m	Overall Width (m)
Nil					

9 Bus bays, Truck Lay byes and Bus Shelters

The total number of bus bays, bus shelters and truck lay byes on the project Highway is given below:

(a) Number of Bus bays on LHS - Nil

(b) Number of Bus bays on RHS - Nil

(c) Number of Truck lay-byes on LHS - Nil

(d) Number of Truck lay-byes on RHS - Nil

(e) Number of Bus shelters on LHS - 10

(f) Number of Bus shelters on RHS - 14

10 Intersections

The details of Major intersections are given in **Table A-16(a),** details of minor intersection are given in **Table A-16(b).**

Table A-16(a): List of Intersections (Major)

Sl. No.	Existing Chainage (km)	Side	Junction Type [Cross (X)/T or Y]	Category of Cross Road (NH/SH/MDR/ODR/VR)
1	305.110	RHS	T	MDR/ODR
2	310.100	LHS	T	SH-73
3	311.727	LHS	T	MDR/ODR
4	315.555	RHS	T	MDR/ODR
5	317.800	LHS	Y	MDR/ODR
6	318.450 (0.000 of Ponnani Bypass)	LHS	T	SH-69
7	11.350 of Ponnani Bypass	Both	+	Old NH/SH-62
8	13.865 of Ponnani Bypass	Both	+	Old-NH
9	340.300 (14.800 of Ponnani Bypass)	RHS	Y	Old NH

Table A-16(b): List of Intersections (Minor)

Sl. No.	Existing Chainage (km)	Side	Junction Type (+/T/ Y)	Category of Cross Road (NH/SH/MDR/ODR/VR)
1	306.695	RHS	T	VR
2	307.890	Both	+	VR
3	308.510	LHS	T	VR
4	310.595	Both	+	VR
5	311.275	LHS	T	VR
6	311.535	LHS	T	VR
7	313.045	RHS	T	VR
8	316.030	RHS	T	VR
9	316.585	LHS	T	VR
10	316.725	Both	+	VR
11	317.645	Both	+	VR
12	0.250	RHS	Y	VR
13	3.250	Both	+	VR
14	3.465	LHS	T	VR
15	6.200	Both	+	VR
16	7.050	Both	+	VR
17	8.880	Both	+	VR
18	10.070	Both	+	VR
19	10.530	Both	+	VR
20	12.220	Both	+	VR
21	12.590	Both	+	VR
22	12.690	RHS	Y	VR
23	12.735	LHS	Y	VR
24	13.360	Both	+	VR
25	340.680	LHS	T	VR
26	340.960	RHS	T	VR
27	342.150	RHS	Y	VR
28	343.310	RHS	T	VR
29	343.410	LHS	Y	VR
30	344.480	Both	+	VR
31	344.810	LHS	T	VR
32	345.315	LHS	T	VR
33	346.150	LHS	T	VR
34	346.225	RHS	T	VR
35	346.525	RHS	T	VR
36	347.040	Both	+	VR
37	347.750	RHS	T	VR
38	348.245	RHS	T	VR
39	348.290	LHS	T	VR
40	349.090	RHS	T	VR

11 Stretches Passing Through/Abutting Forest Area

The stretches of project highway given in **Table A-17** are passing through / abutting forest area.

Table A-17: Sections Abutting/Passing through Forest

Sl. No.	Name of the Forest Area	Existing Chainage		Side (Left / Right / both)	Length
		From	To		
Nil					

12 Stretches Passing Through/Abutting Wildlife Area

The stretches of project highway given in **Table A-18** are passing through / abutting wildlife area.

Table A-18: Sections/Abutting Wildlife Area

Sl. No.	Name of the Wildlife area	Existing Chainage		Side (Left/ Right /Both)	Length
		From	To		
Nil					

13 Stretches Passing Through/Abutting CRZ Area

The stretches of project highway given in **Table A-19** are passing through/abutting CRZ area.

Table A-19: Sections Passing through CRZ area

Sl. No.	River falling under CRZ	Existing Chainage as per CRZ Report (km)		Total Existing Length (m)	Type of CRZ I / II / III	Remarks
		From	To			
1	Canoli Canal	14.100	14.190	90	CRZ II, CRZ IVB	Through Ponnani Bypass
2	Project road close to sea shore	14.610	14.800	190	CRZ II	
3	Project road close to seashore	340.300	342.300	2000	CRZ II	Through NH -17
4	Kanjiramukku river	342.300	342.820	520	CRZ IA, CRZ IB, CRZ II, CRZ III, CRZ IVB	

14 Built-Up Area

The sections of Project Highway passing through built-up areas are given in **Table A-20.**

Table A-20 Sections Passing Through Built-up Areas

Sl. No	Existing km		Length in km	Town/Village Name
	From	To		
1	304.275	305.475	1.200	Kanchippura
2	306.975	307.825	0.850	Katipparuthi
3	307.825	309.050	1.225	Kavumpuram
4	309.050	310.960	1.910	Valanchery
5	310.960	311.760	0.800	Painkanur
6	311.760	313.250	1.490	Padikasala
7	315.000	316.010	1.010	Athavanad

Sl. No	Existing km		Length in km	Town/Village Name
	From	To		
8	316.400	317.970	1.570	Kuttippuram
9	3.150	3.500	0.350	Ayankalam
10	11.000	12.250	1.250	Chamravattam Junction
11	340.300	342.200	1.900	Keezhilam
12	343.000	344.000	1.000	Thuvvakulam
13	344.000	345.000	1.000	Veliancode
14	345.000	345.500	0.500	Kinar
15	345.500	346.000	0.500	Kummilavalapu
16	346.000	346.600	0.600	Ayyotichira
17	346.600	347.500	0.900	Puthiyuruthi
18	347.500	349.260	1.760	Kappirikkad

15 Other Structures

Details of other structures, such as Foot over Bridges (FOB), Subways, Toll Plazas, Canal crossings etc. if any.

Nil

16 Type of Terrain

The types of terrain through which project highway passes are given in **Table A-21**.

Table A-21: Type of Terrain

Sl. No.	Existing Chainage (km)		Length (km)	Type of Terrain	Remarks
	From	To			
1	304.250	318.450	14.20	Rolling/Mountainous	
2	318.450	349.200	23.76*	Plain	*Through Ponnani Bypass

17 Reference System

The relationship between the "Existing Chainage" and "Design Chainage" for the Project Highway is given in **Table A-22.**

Table A-22: Chainage Referencing System

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Remarks
1	304.250	298+500	Through NH-17
2	305 (Missing)	299+240	
3	306	300+260	
4	306.150	300+400	
5	307 (Missing)	Valanchery Bypass	
6	308 (Missing)		
7	309 (Missing)		
8	310		
9	311		

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Remarks
10	311.330	304+080	
11	312	305+255	
12	313	306+255	
13	314 (Missing)	307+120	
14	315	308+120	
15	316 (Missing)	309+120	
16	317	310+130	
17	318	311+730	
19	0 (318.450 of NH-66)	312+170	Through Ponnani Existing Bypass
20	1	313+160	
21	2	314+140	
22	3	315+130	
23	4	316+130	
24	5	317+180	
25	6	318+130	
26	7	319+130	
27	8	320+130	
28	9	321+130	
29	10	322+130	
30	11	323+130	
31	12	324+130	
32	13	325+130	
33	14	326+130	
34	14.8 (340.300 of NH-66)	326+920	
35	341	327+600	Through NH-17
36	342 (Missing)	328+600	
37	343	329+590	
38	344	330+590	
39	345	331+580	
40	346 (Missing)	332+590	
41	347	333+590	
42	348	334+580	
43	349	335+580	
44	349.260	335+850	

18 Detailed Project Report

The Detailed Project report of Authority provided in soft copy is for the purpose of reference only. The Authority makes no representation whatsoever, express, implicit or otherwise, regarding the accuracy, adequacy, correctness, reliability and/or completeness of any assessment, assumptions, statement or information provided by it and the Concessionaire confirms that it shall have no claim whatsoever against the Authority in this regard.

19 Existing Utility

Detail of Existing Utilities are given below: -

(i) Electrical utilities

The Site Includes the following electrical utilities: -

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

Sl No.	Chainage		Length (in Km)			Crossings			Transformer	
	From	To	400 KV	220 KV	110KV & 66KV	400 KV	220 KV	110KV	No	Capacity
1	Design Ch. 300+540		-	-	-	-	1	-	-	-

(b) High Tension / Low Tension Lines (HT / LT Lines)

Sl No.	Chainage		Length (in Km)			Crossings			Transformer	
	From	To	33 KV	11 KV	LT	33 KV	11 KV	LT	No	Capacity
1	D.Ch. 298+500 to D.Ch. 335+850 Existing Km 304.250 to Km 349.260)		0	2.30	3.41		5		5	100 kva

(ii) Public Health Utilities (Water / Sewage Pipelines)

The Site includes following public Health utilities

Sl.No.	Chainage		Length (in Km)				Crossings			
	From	To	Water Supply Line		Sewage Line		Water Supply Line Sewage Line		Sewage Line	
			With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow
1	D.Ch. 298+500 to D.Ch. 335+850 Existing Km 304.250 to Km 349.260)		31.833 km		-		1.575 km		-	

SCHEDULE - B
(See Clause 2.1)

DEVELOPMENT OF THE PROJECT HIGHWAY

1 Development of the Project Highway

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

2 Six-Laning

2.1 Six-Laning shall include construction of the Six Lane Project Highway as described in **Annex-I** of this **Schedule-B** and **Annex-I** of **Schedule-C**.

Development of project highway "Six laning from start of Valanchery bypass to Kappirikkad section of NH – 66 (old NH-17) from Design Chainage 298+500 (Ex. km 304.250)" to Design Chainage 335+850 (Ex. km 349.260)" is taken, as described in Annex-I of this Schedule-B and Annex-I of Schedule-C.

2.2 Six Laning shall be completed by the Concessionaire in conformity with the Specifications and Standards set forth in **Annex-I** of **Schedule-D**.

Annex - I
(Schedule -B)
Description of Six Laning

1. Width of Carriageway

1.1 The width of carriageway, paved shoulders, earthen shoulders, median and other cross sectional elements shall be as per Manual specified in Annex-I of Schedule-D, unless specified otherwise in Schedule 'D'.

The width of carriageway, paved shoulders, earthen shoulders, median and other cross sectional elements shall be as per the TCS drawings presented in clause 4.1, below.

1.2 Except as otherwise provided in this Agreement, but subject to the provisions of Annex-I of this Schedule B, the width of the paved carriageway shall conform to Clause 1.1 above.

2. Project Facilities

Project facilities shall be constructed in conformity with **Annex-I** of **Schedule-C.**

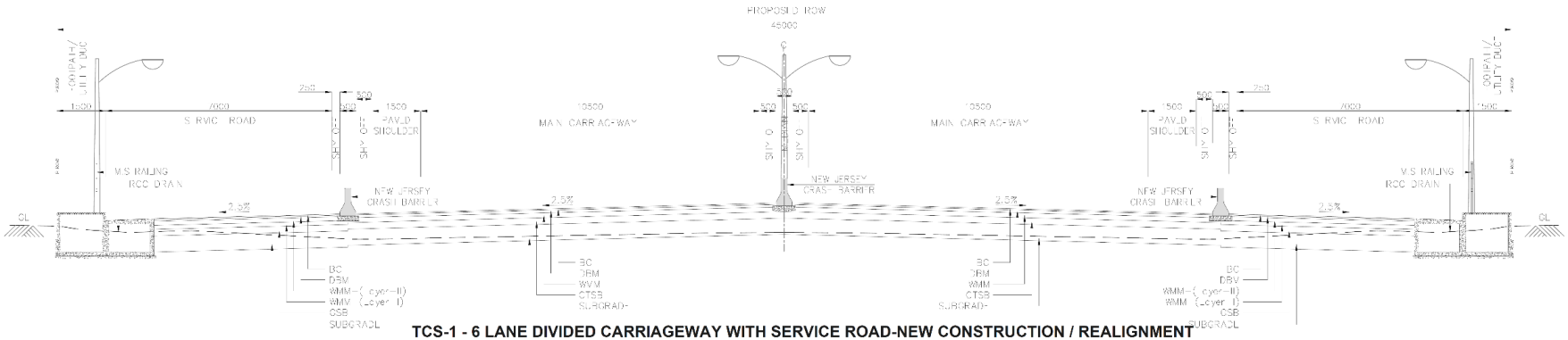
3. Specifications and Standards

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

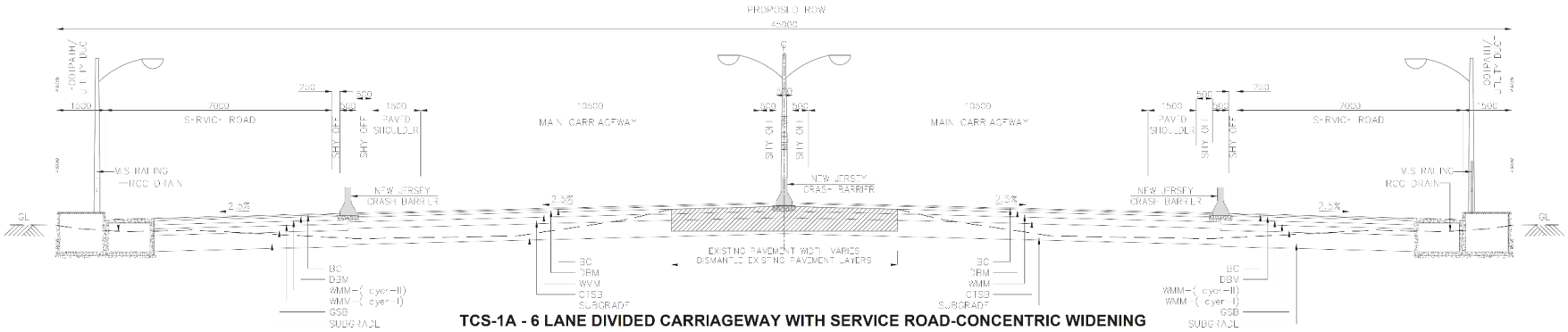
4. Other Features of Six laning

4.1 Cross Section Type along the Project Corridor

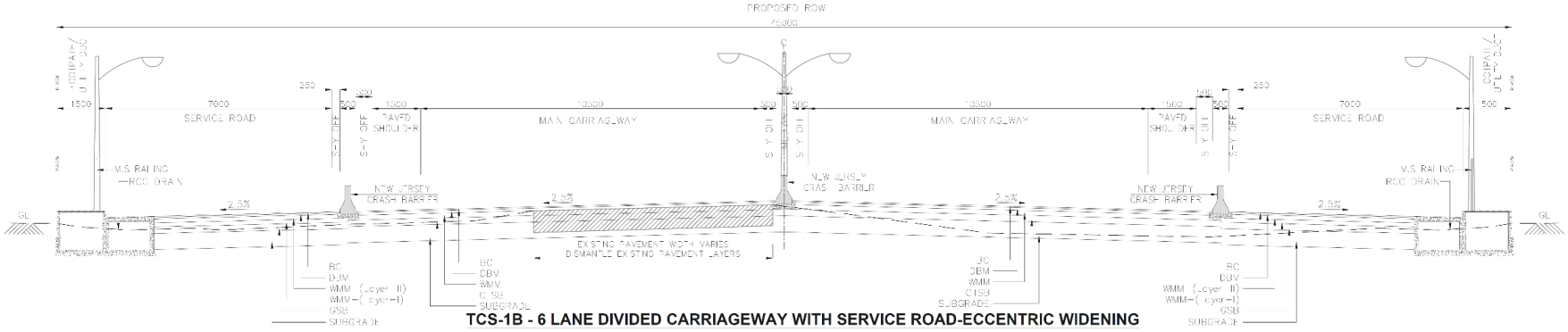
Different type of cross sections for different segments of Six Lane stretch shall be developed as per TCS presented below:



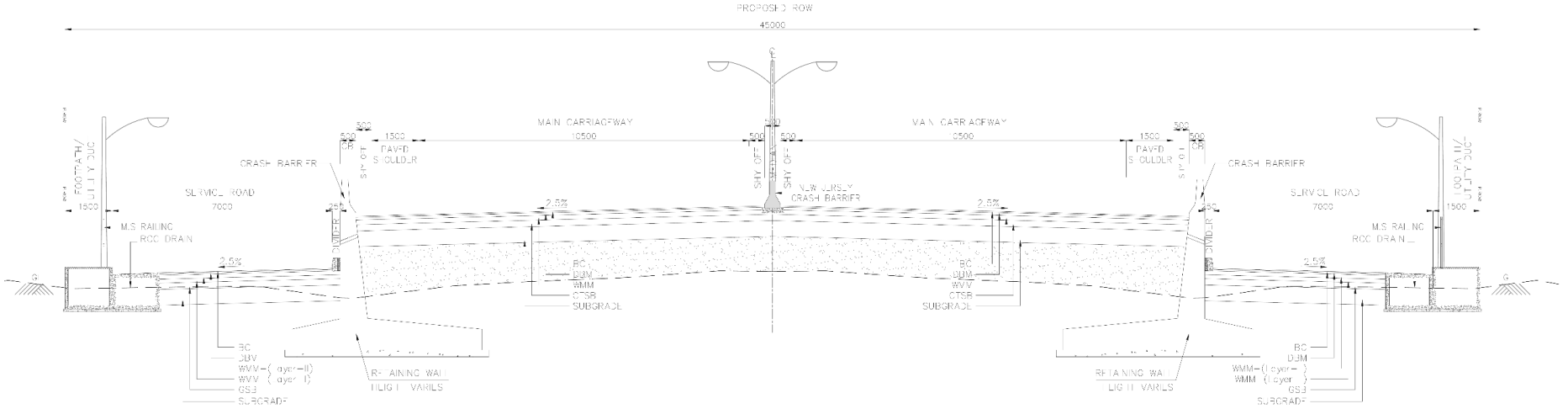
TCS-1 - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD-NEW CONSTRUCTION / REALIGNMENT



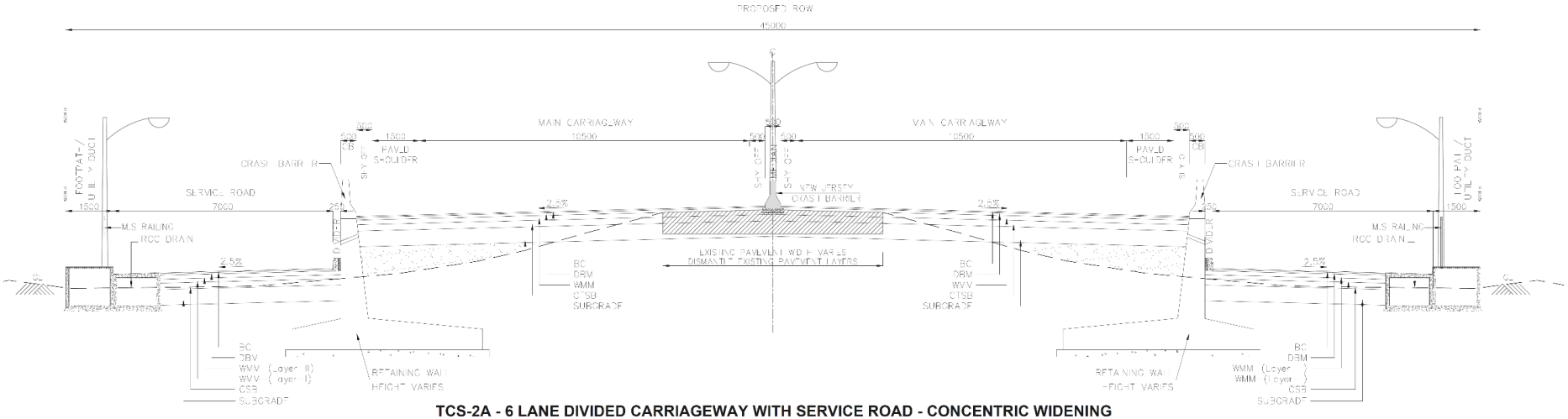
TCS-1A - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD-CONCENTRIC WIDENING



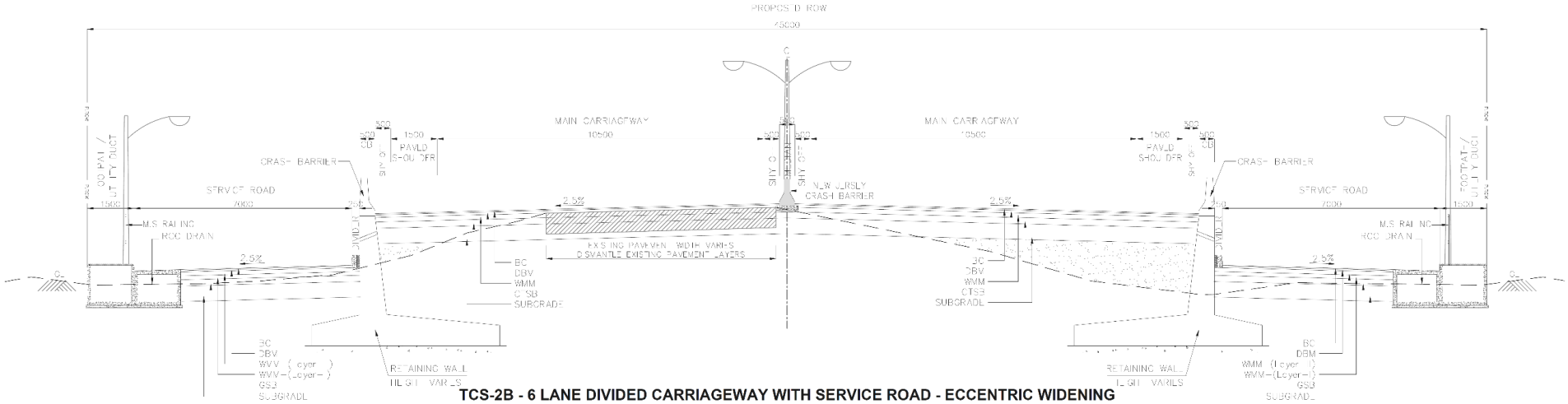
TCS-1B - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD-ECCENTRIC WIDENING



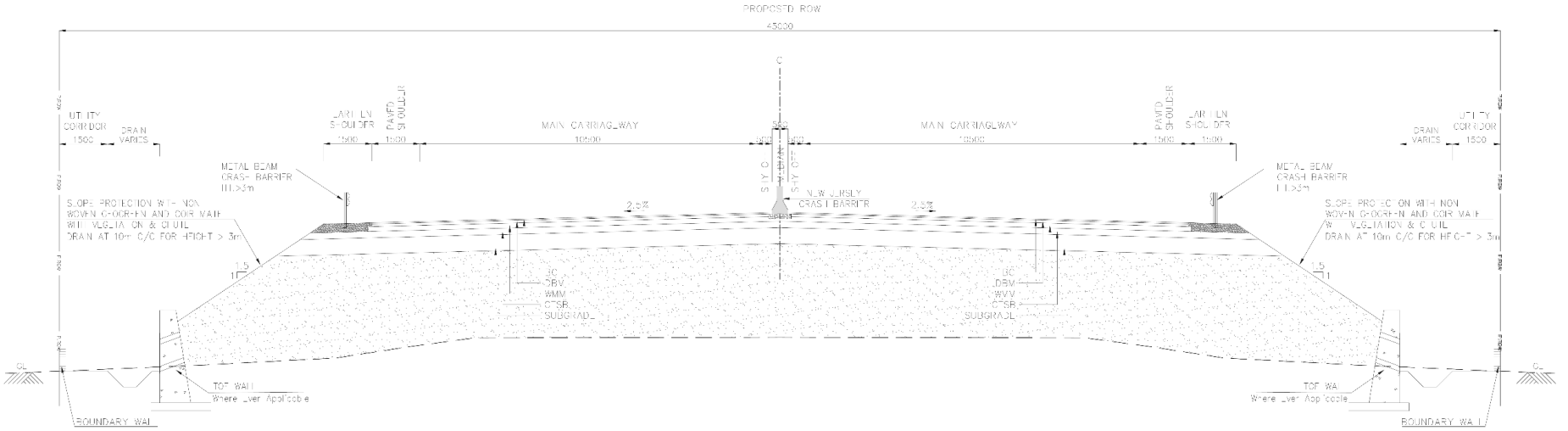
TCS-2 - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD - NEW CONSTRUCTION / REALIGNMENT
(EARTH FILL PORTION)



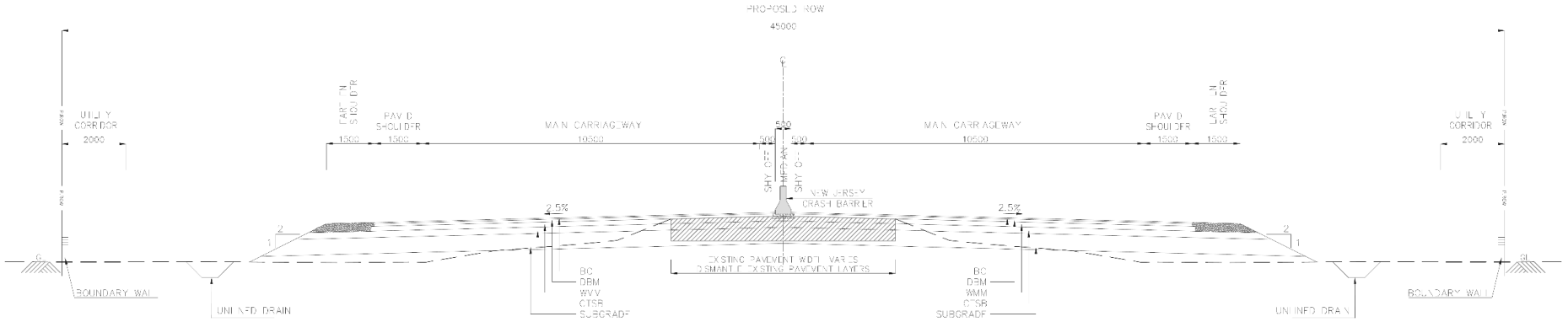
TCS-2A - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD - CONCENTRIC WIDENING
(EARTH FILL PORTION)



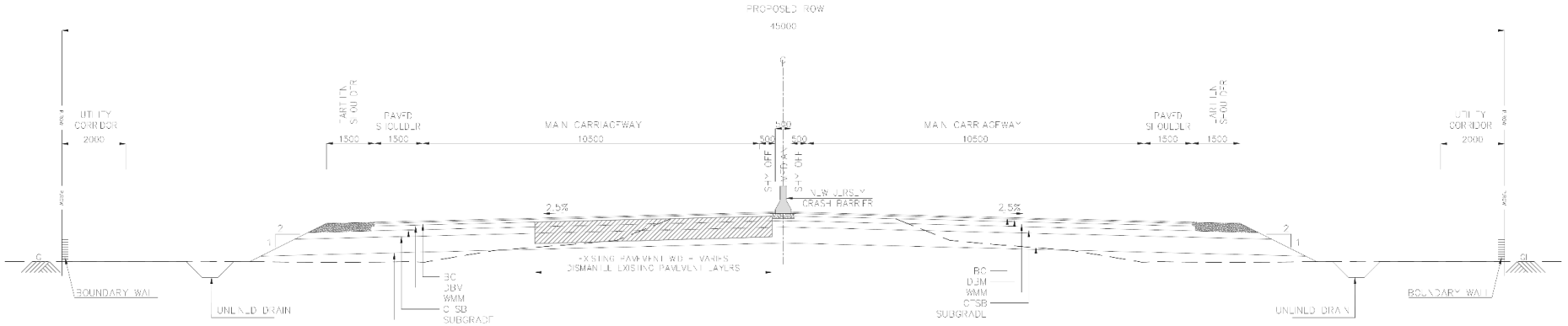
TCS-2B - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD - ECCENTRIC WIDENING
(EARTH FILL PORTION)



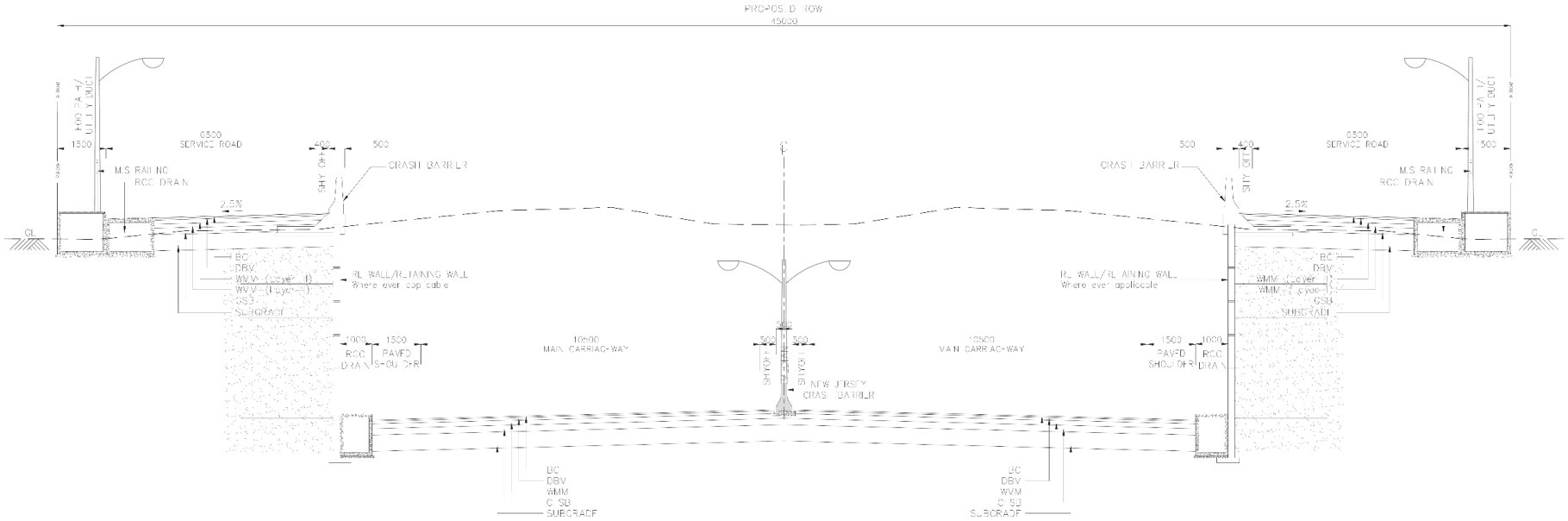
TCS-2C - 6 LANE DIVIDED CARRIAGEWAY WITHOUT SERVICE ROAD - NEW CONSTRUCTION / REALIGNMENT
(EARTH FILL PORTION)



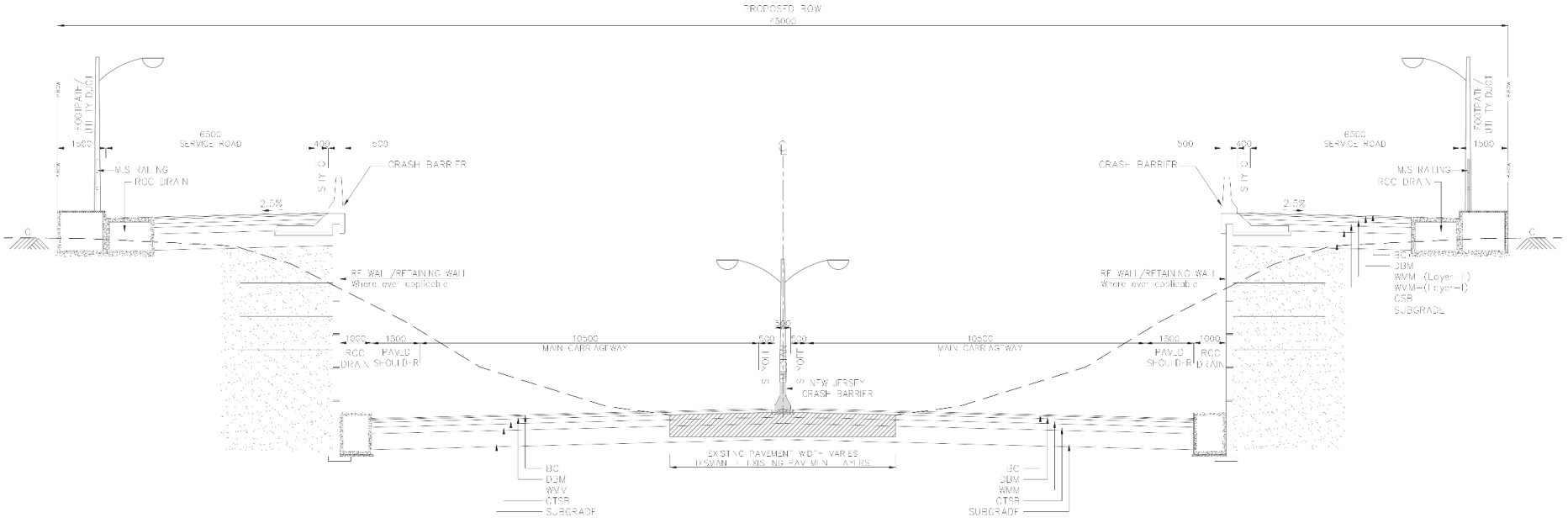
TCS-2D - 6 LANE DIVIDED CARRIAGEWAY WITHOUT SERVICE ROAD - CONCENTRIC WIDENING



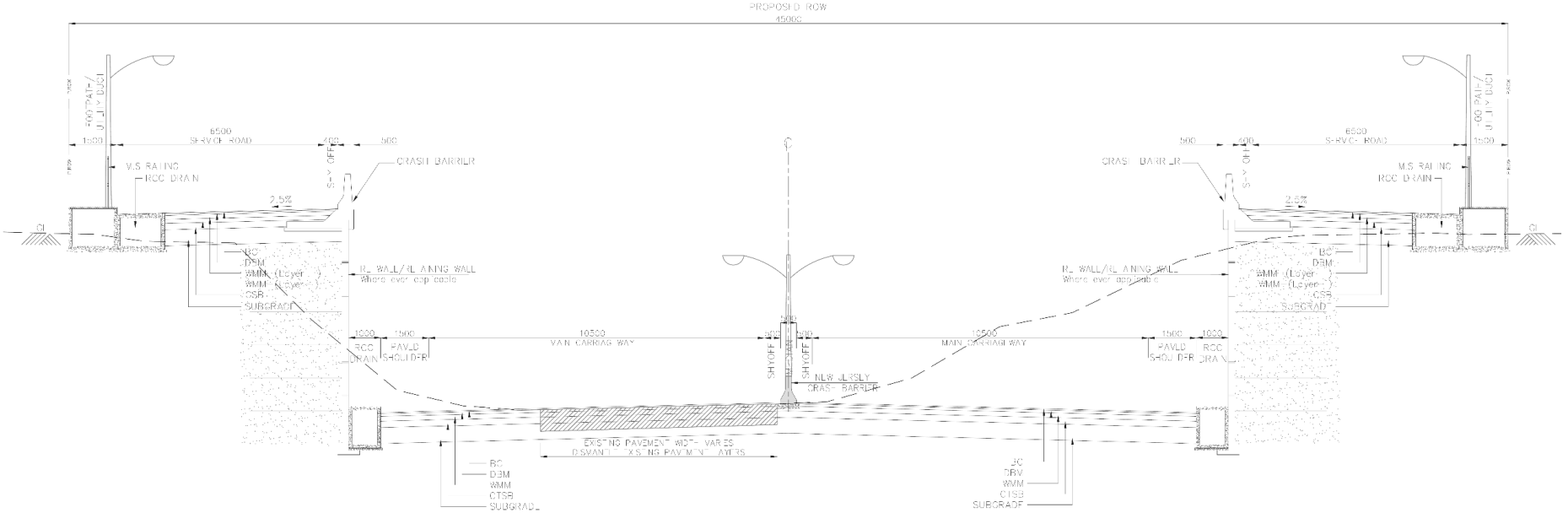
TCS-2E - 6 LANE DIVIDED CARRIAGEWAY WITHOUT SERVICE ROAD - ECCENTRIC WIDENING



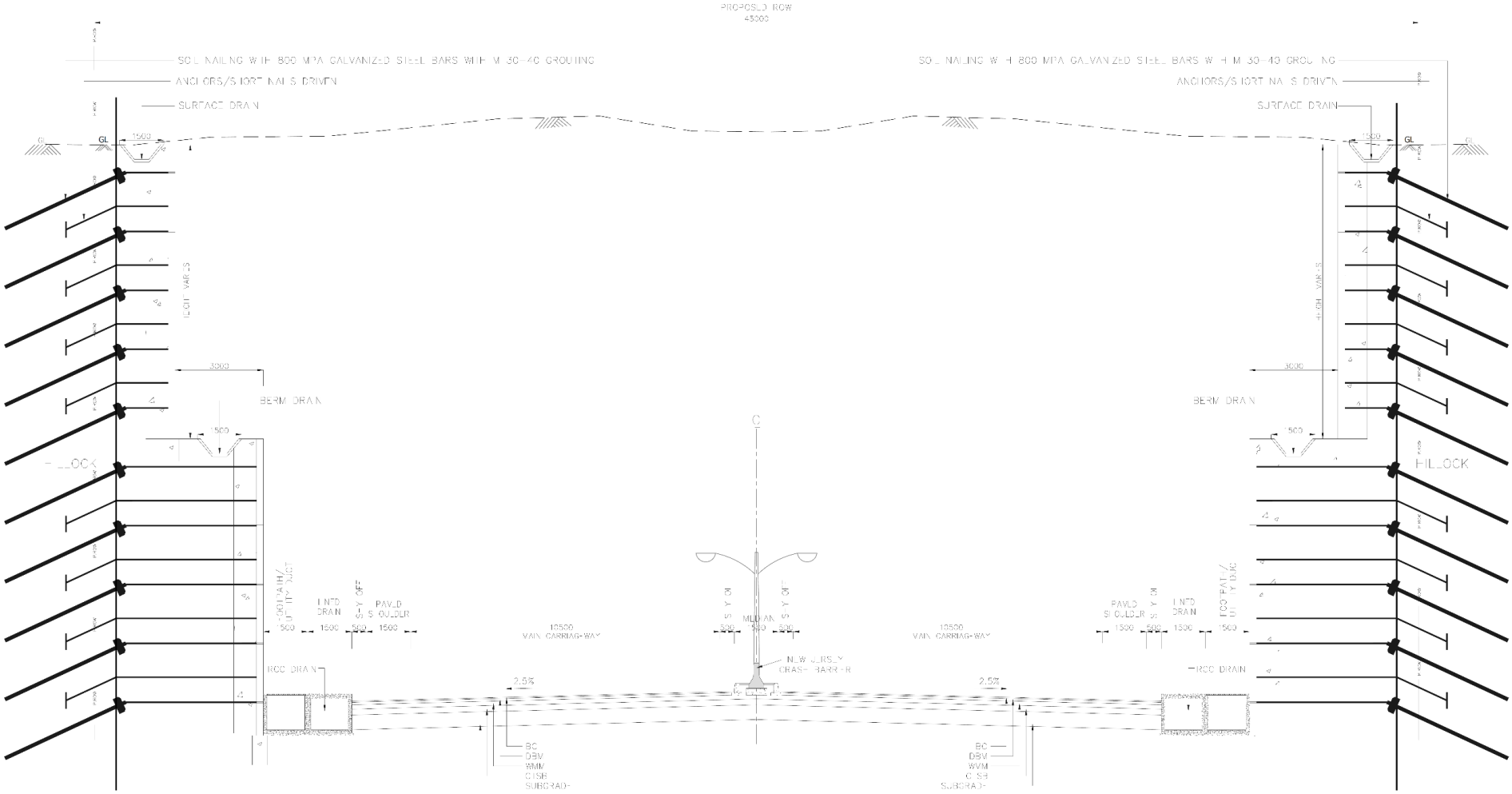
TCS-3 6-LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD - NEW CONSTRUCTION / REALIGNMENT
(CUT SECTION)



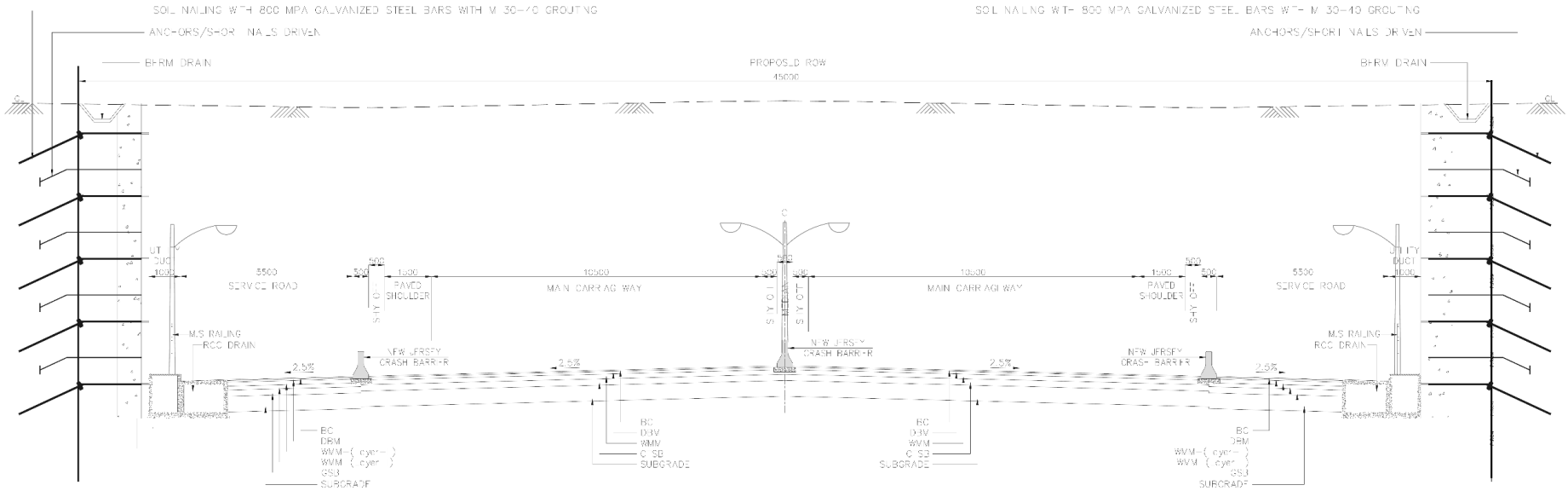
TCS-3A 6-LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD - CONCENTRIC WIDENING (CUT SECTION)



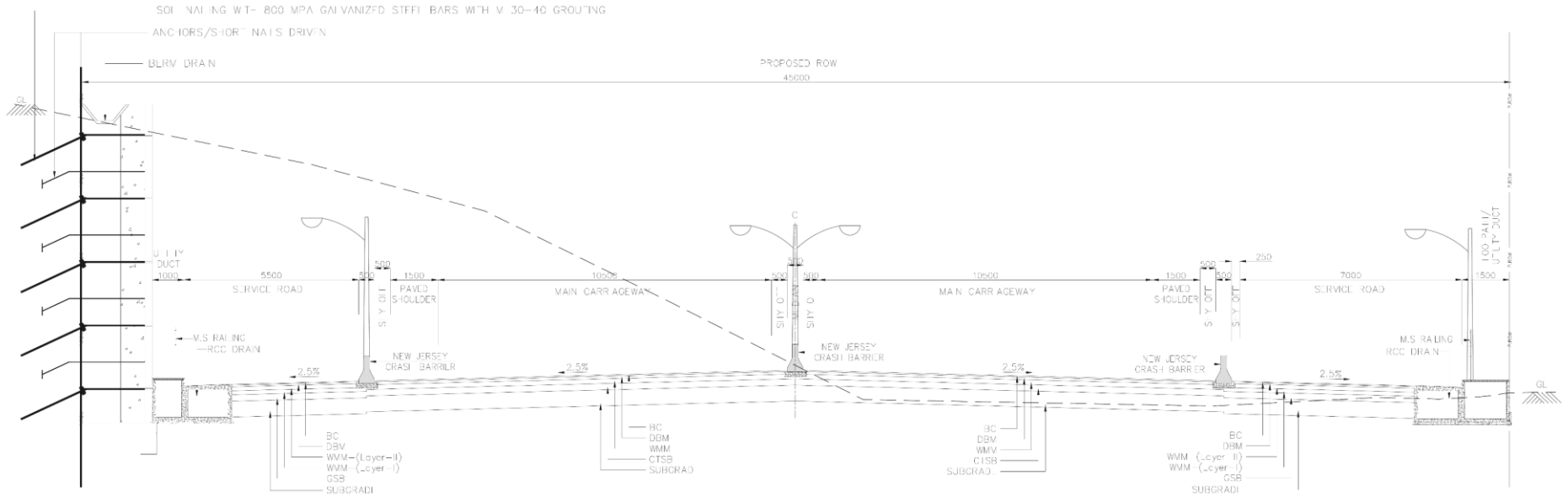
TCS-3B 6-LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD - ECCENTRIC WIDENING
(CUT SECTION)



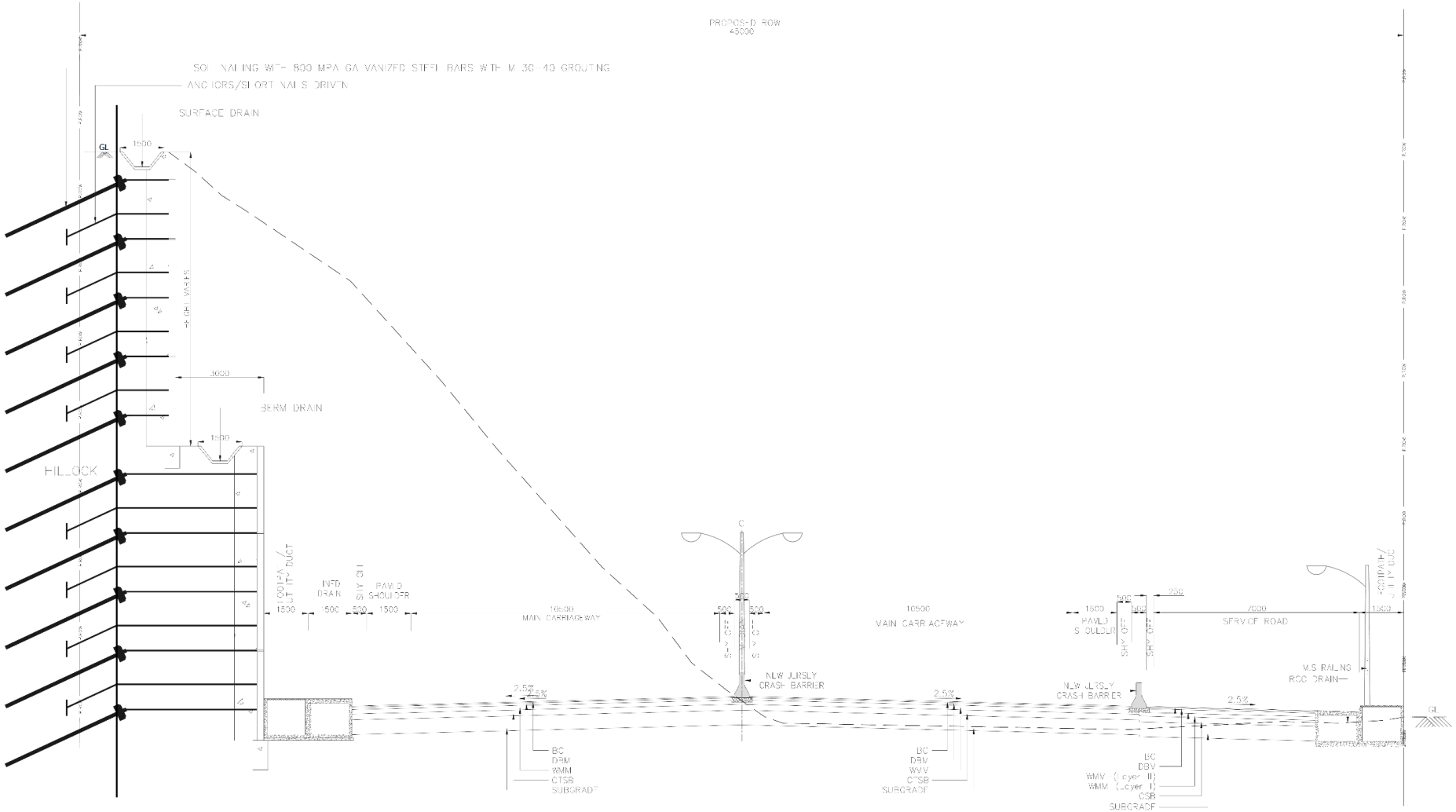
TCS-3C 6-LANE DIVIDED CARRIAGEWAY WITHOUT SERVICE ROAD
(CUT SECTION - VALENCHERY BYPASS)



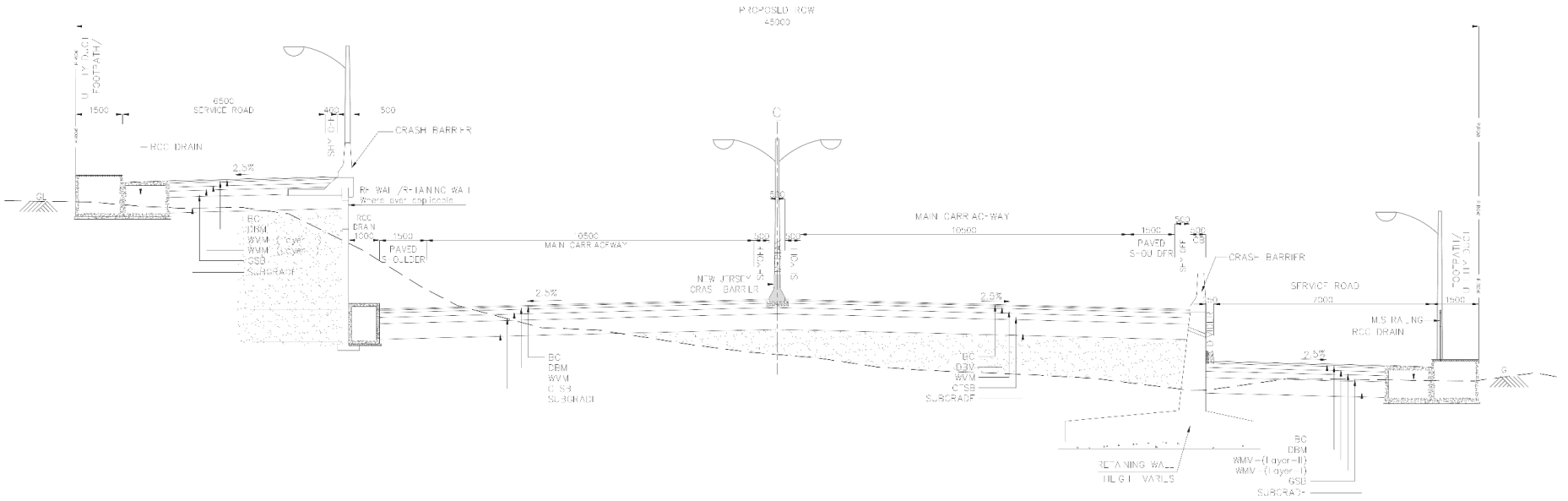
TCS-3D - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD-CUTTING SECTION



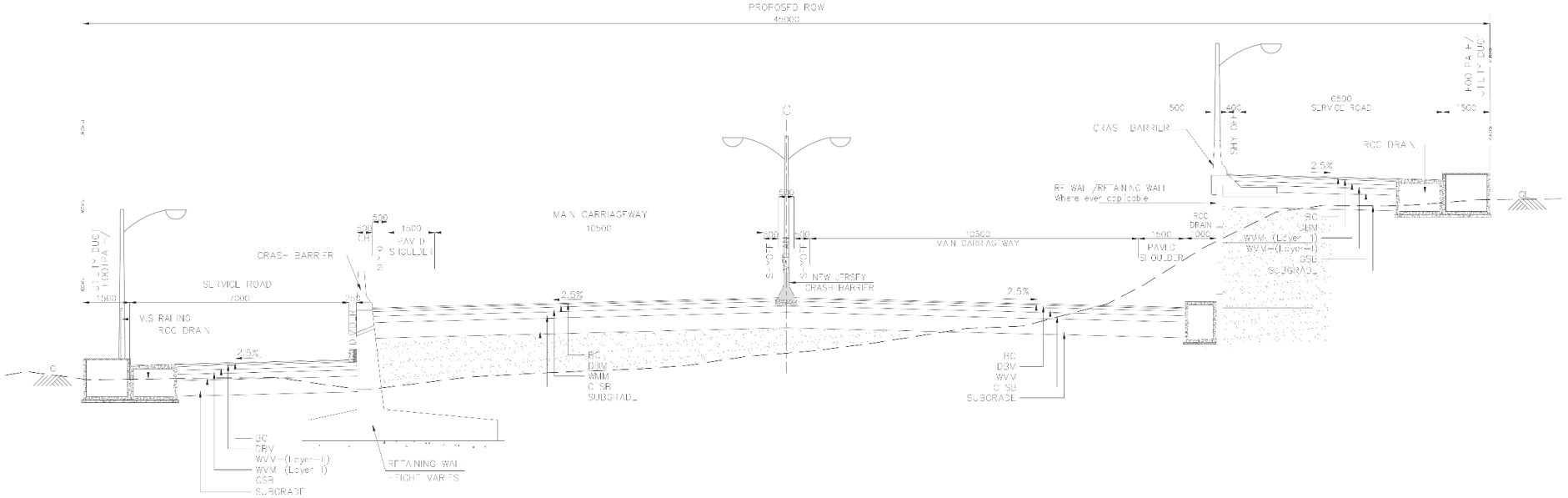
TCS-3E - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD- LHS CUTTING SECTION



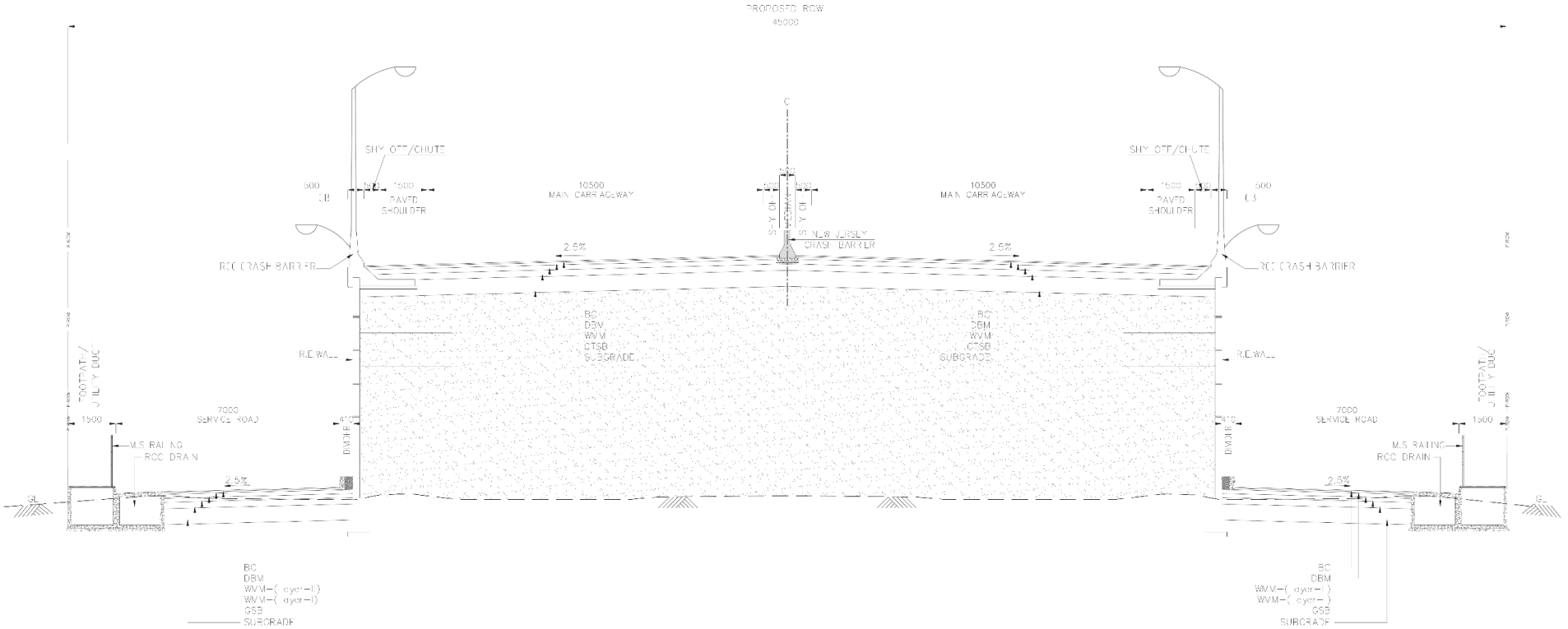
TCS-3G - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD- LHS CUTTING SECTION



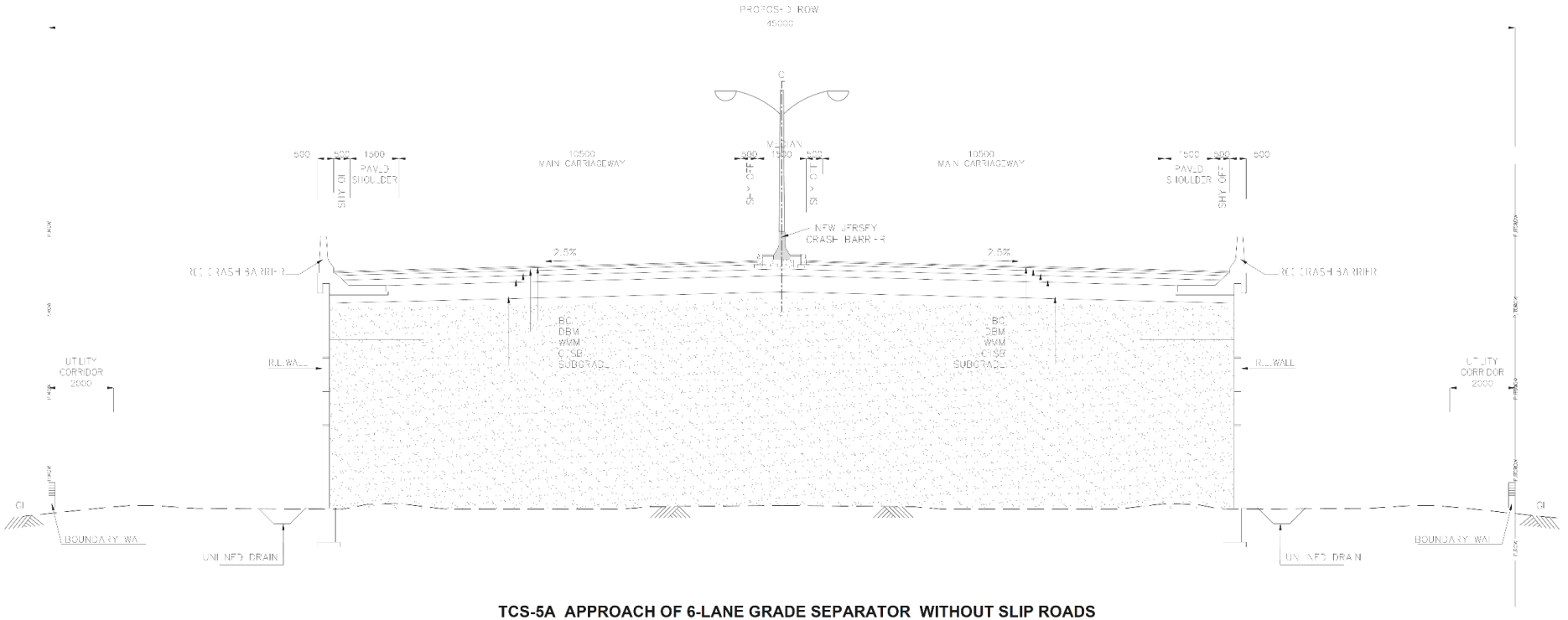
TCS-4A - 6 LANE DIVIDED CARRIAGEWAY WITH LEFT SERVICE ROAD @ HIGHER LEVEL WITH MAIN CARRIAGEWAY



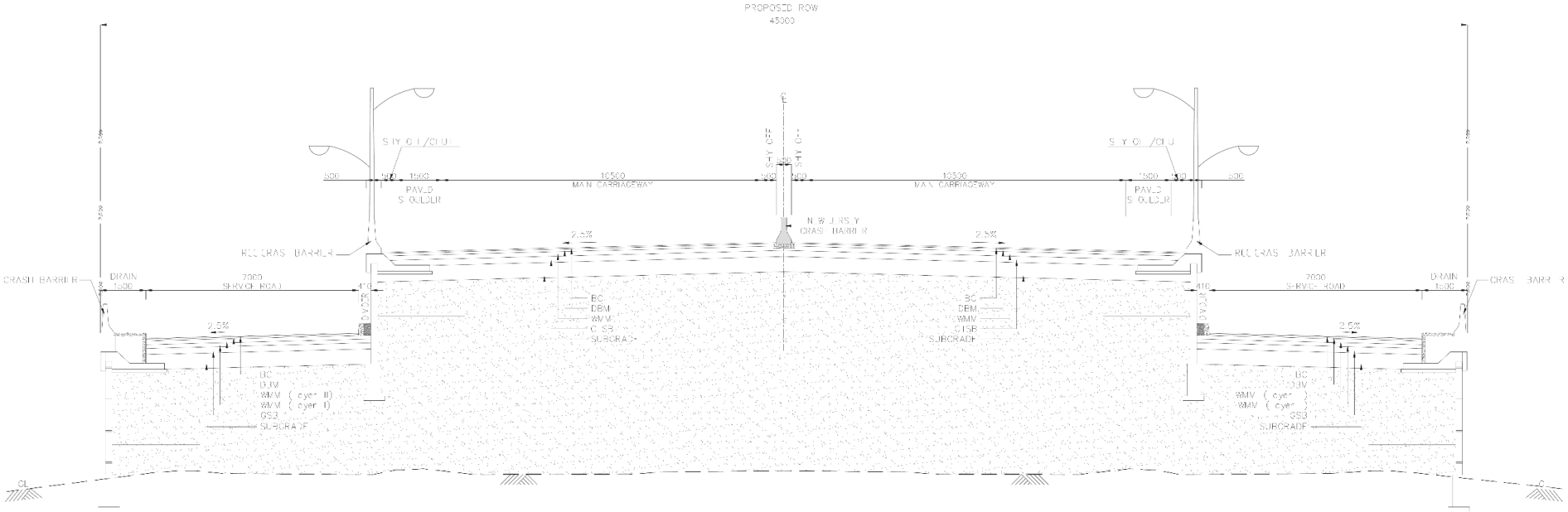
TCS-4B - 6 LANE DIVIDED CARRIAGEWAY WITH RIGHT SERVICE ROAD @ HIGHER LEVEL WITH MAIN CARRIAGEWAY



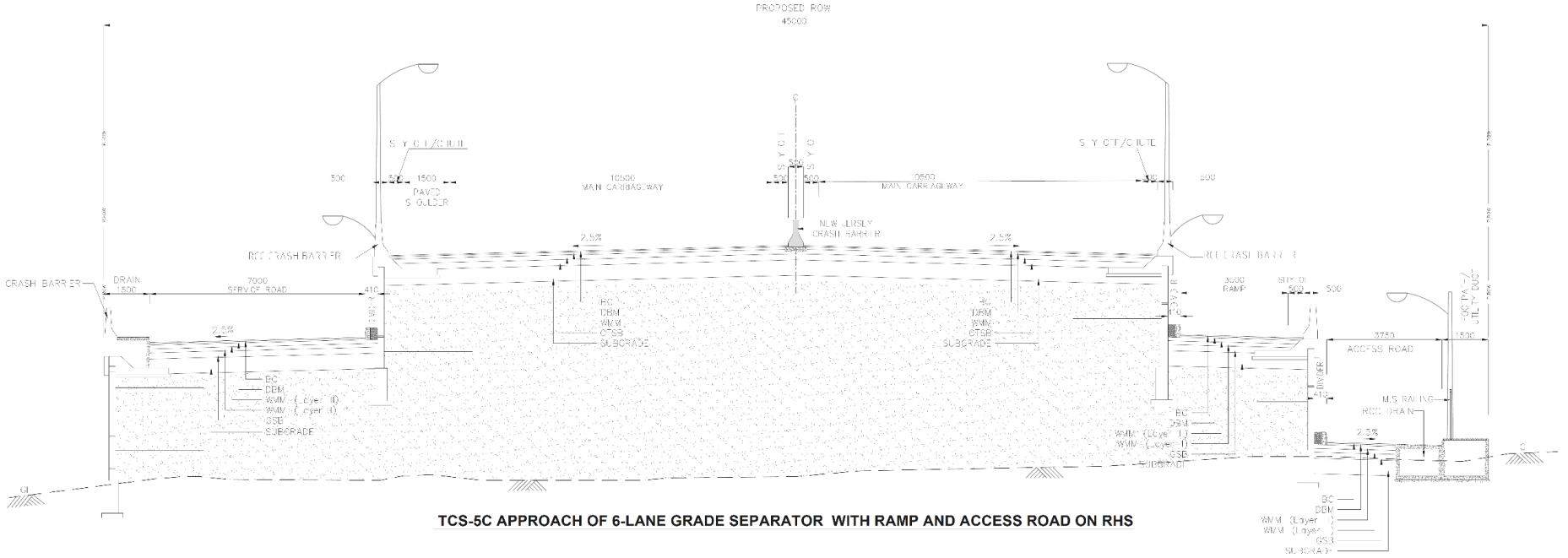
TCS-5 APPROACH OF 6-LANE GRADE SEPARATOR WITH SERVICE ROAD



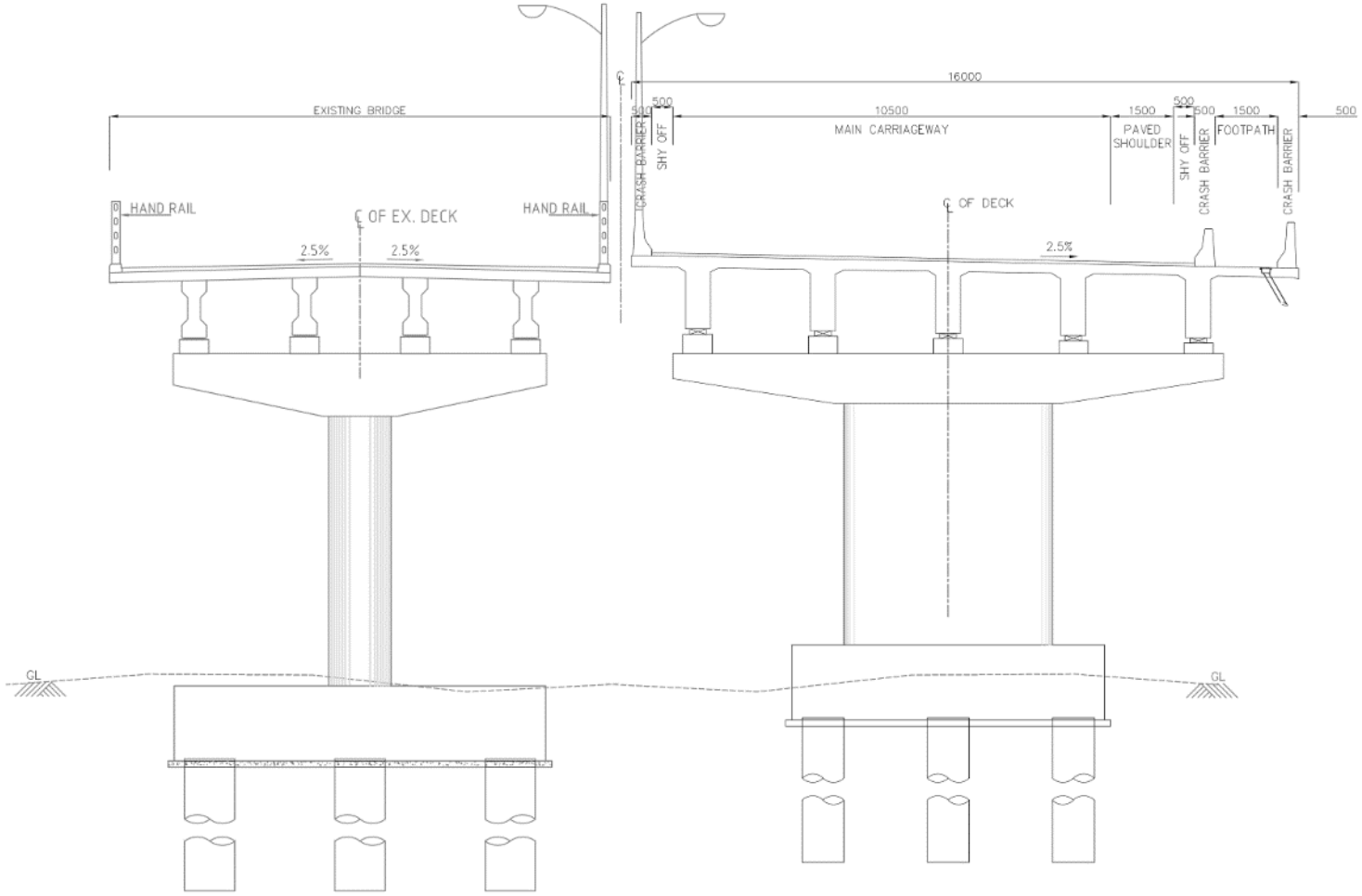
TCS-5A APPROACH OF 6-LANE GRADE SEPARATOR WITHOUT SLIP ROADS



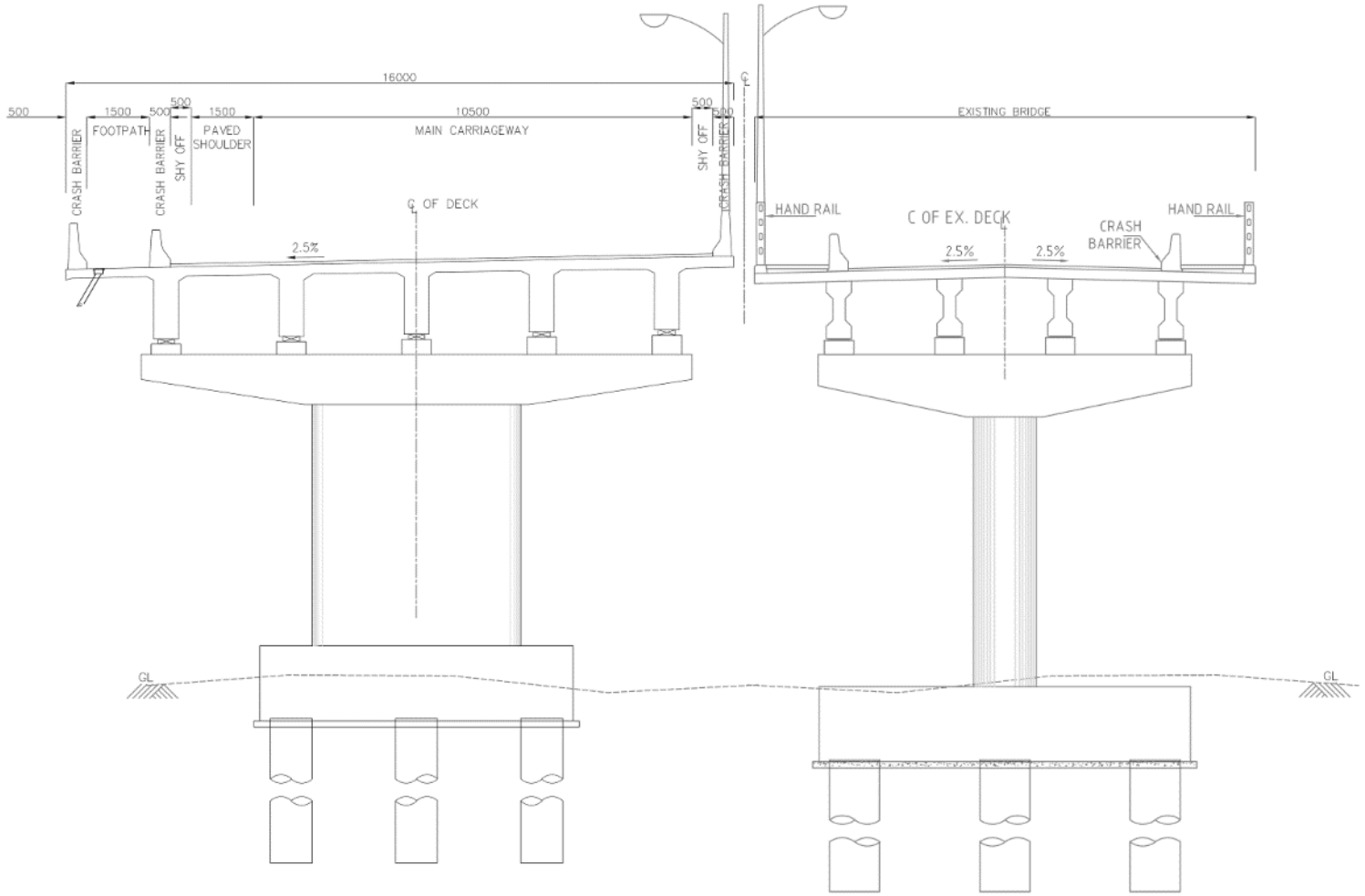
TCS-5B APPROACH OF 6-LANE GRADE SEPARATOR WITH SERVICE ROAD



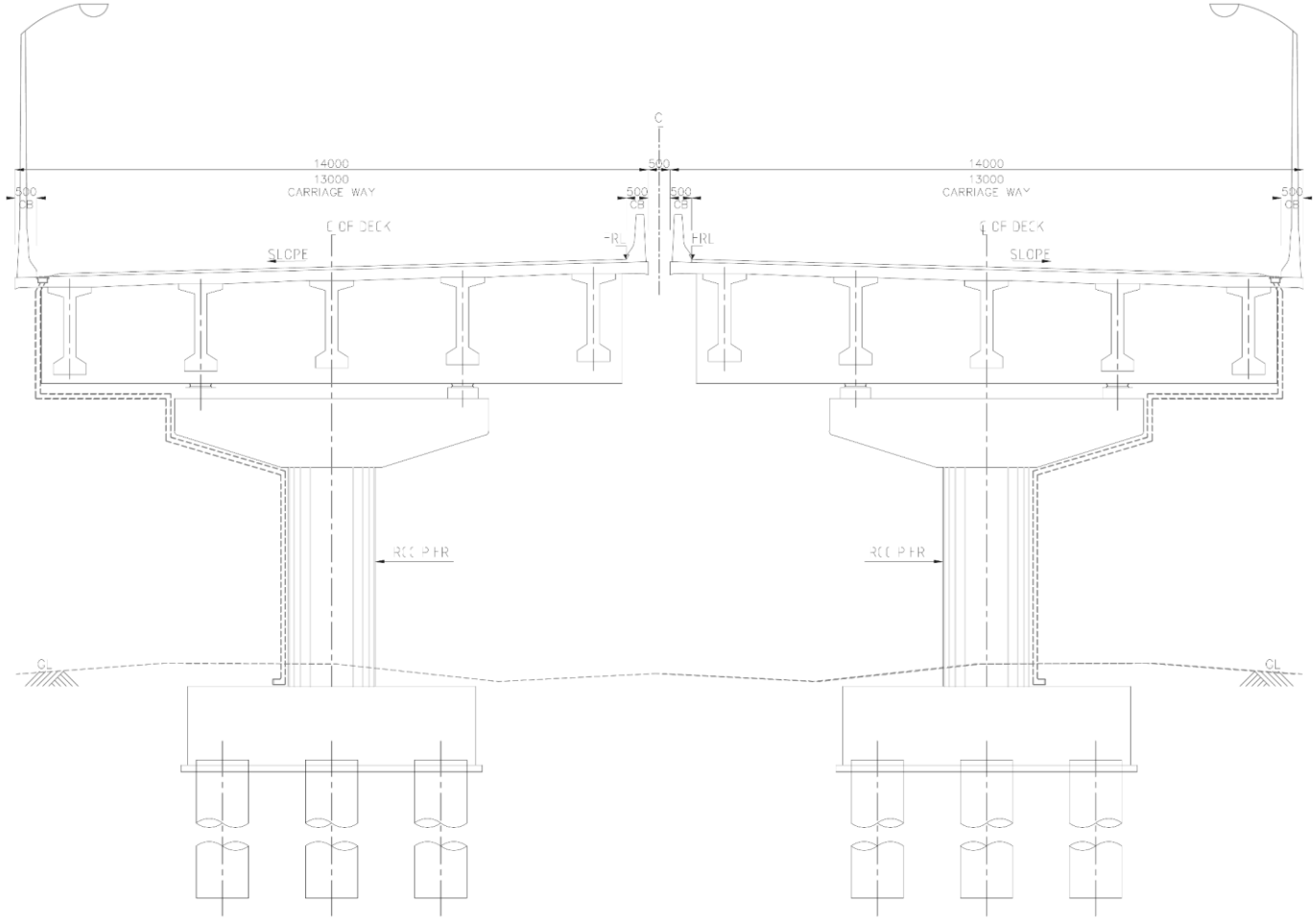
TCS-5C APPROACH OF 6-LANE GRADE SEPARATOR WITH RAMP AND ACCESS ROAD ON RHS



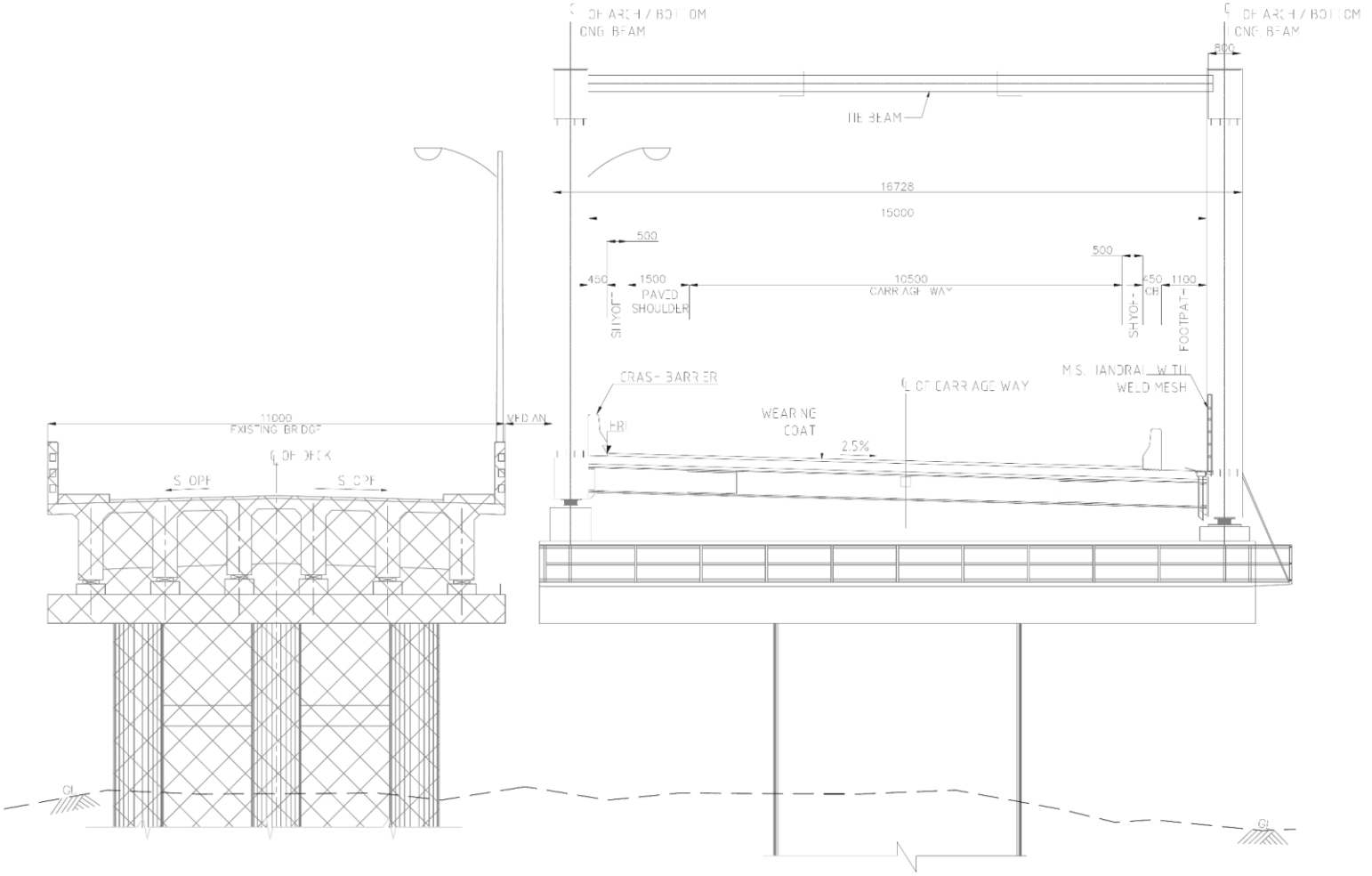
TCS-6A EXISTING BRIDGE ON LHS AND NEW 3-LANE BRIDGE ON RHS



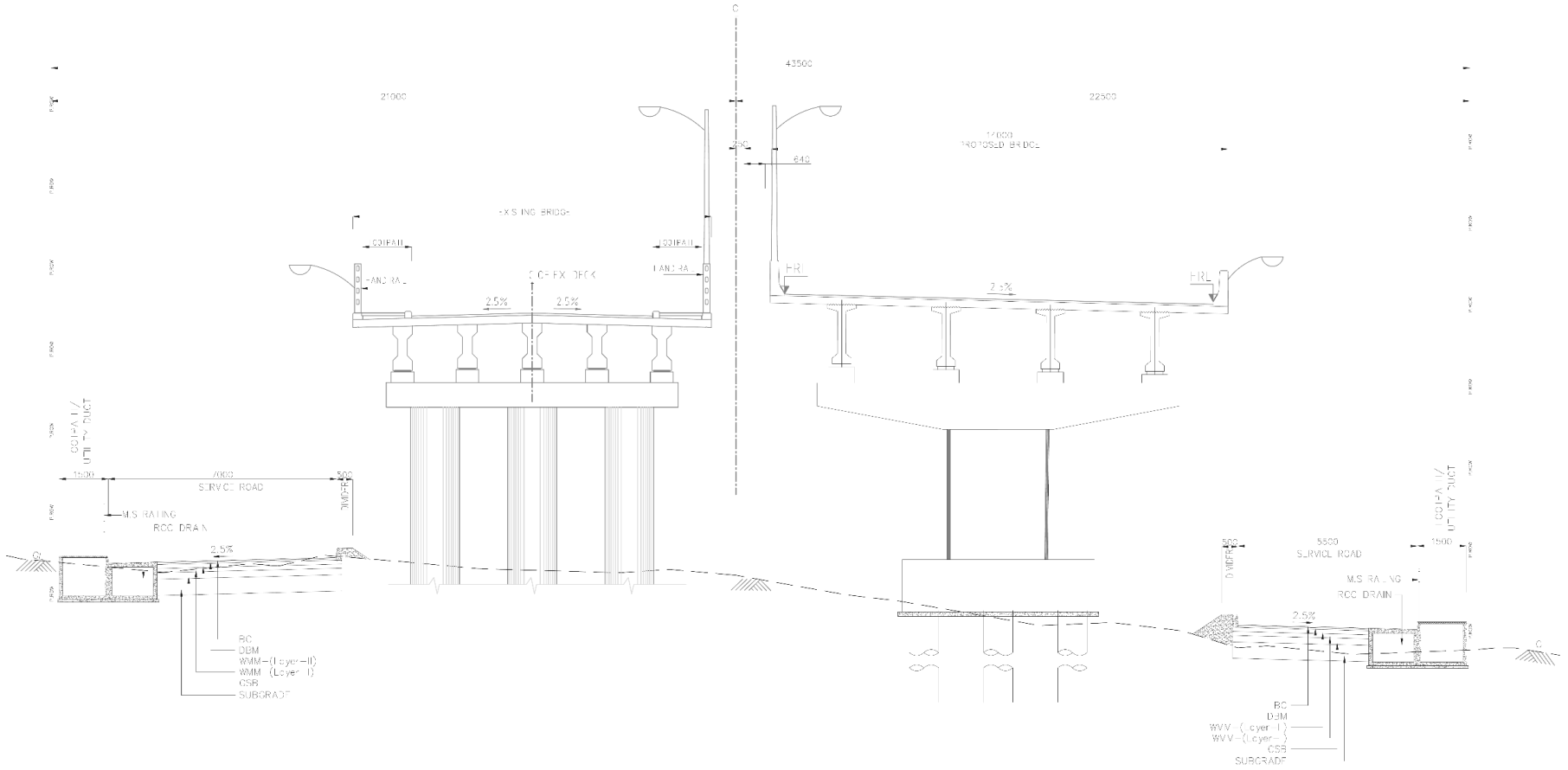
TCS-6B EXISTING BRIDGE ON RHS AND NEW 3-LANE BRIDGE ON LHS



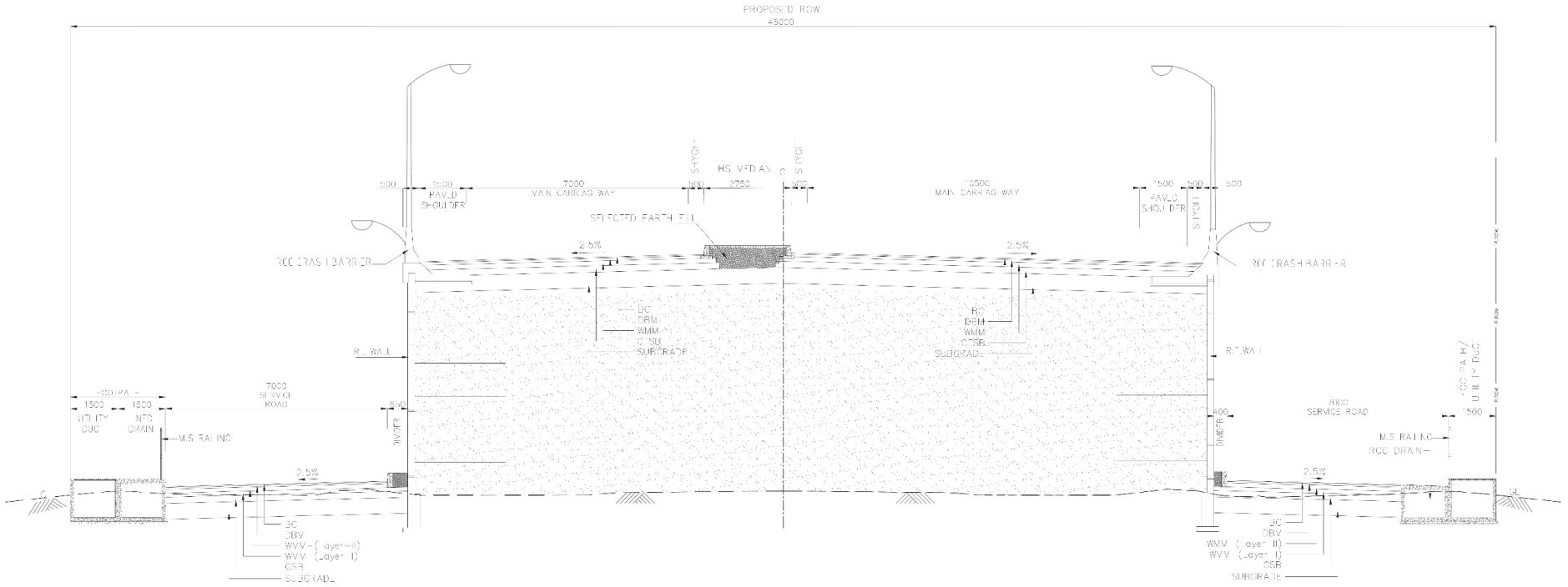
TCS-7 NEW 6-LANE VIADUCT IN BYPASS



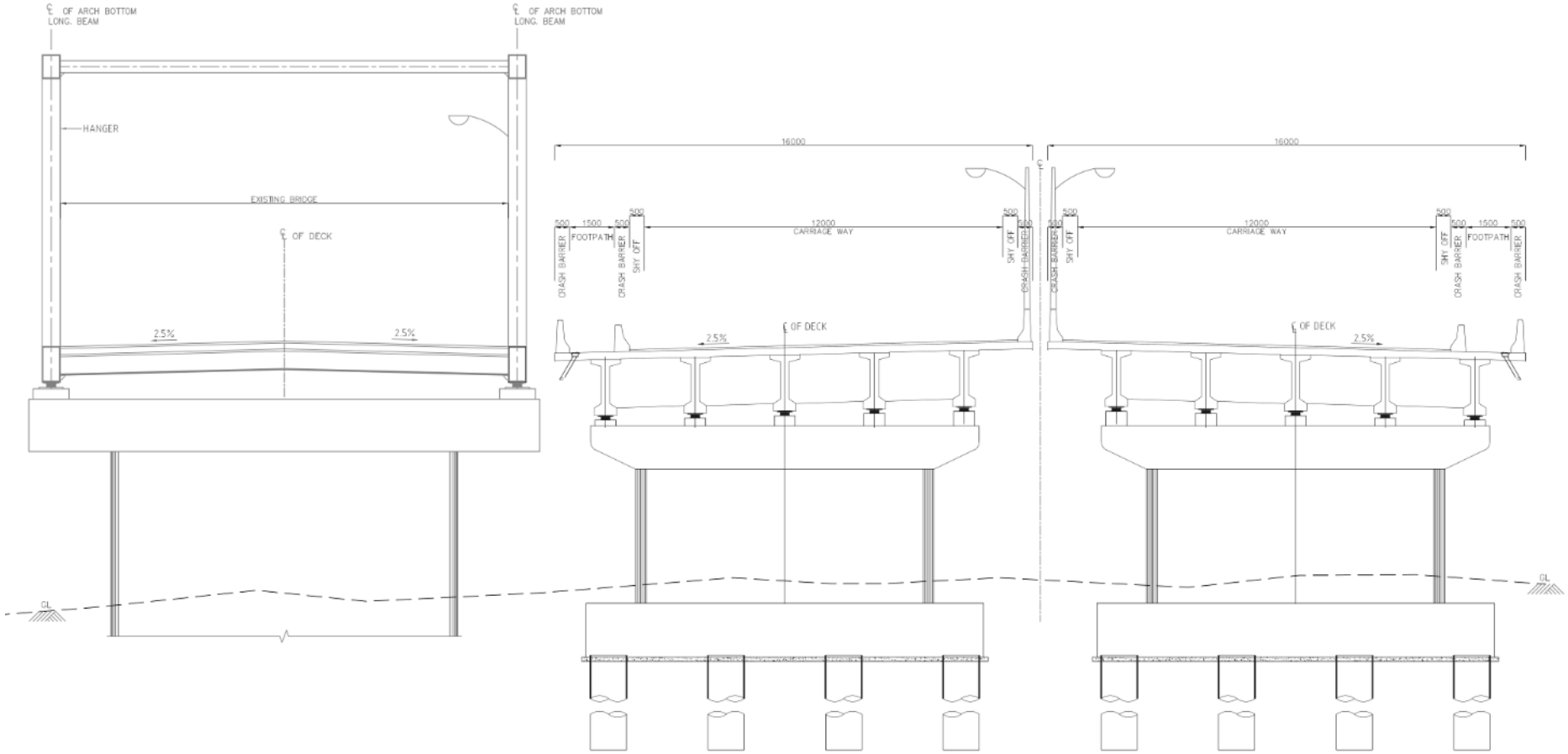
TCS-8 EXISTING 2-LANE ROB ON LHS AND NEW 3-LANE ROB ON RHS @ RAILWAY SPAN (KUTTIPURAM ROB)



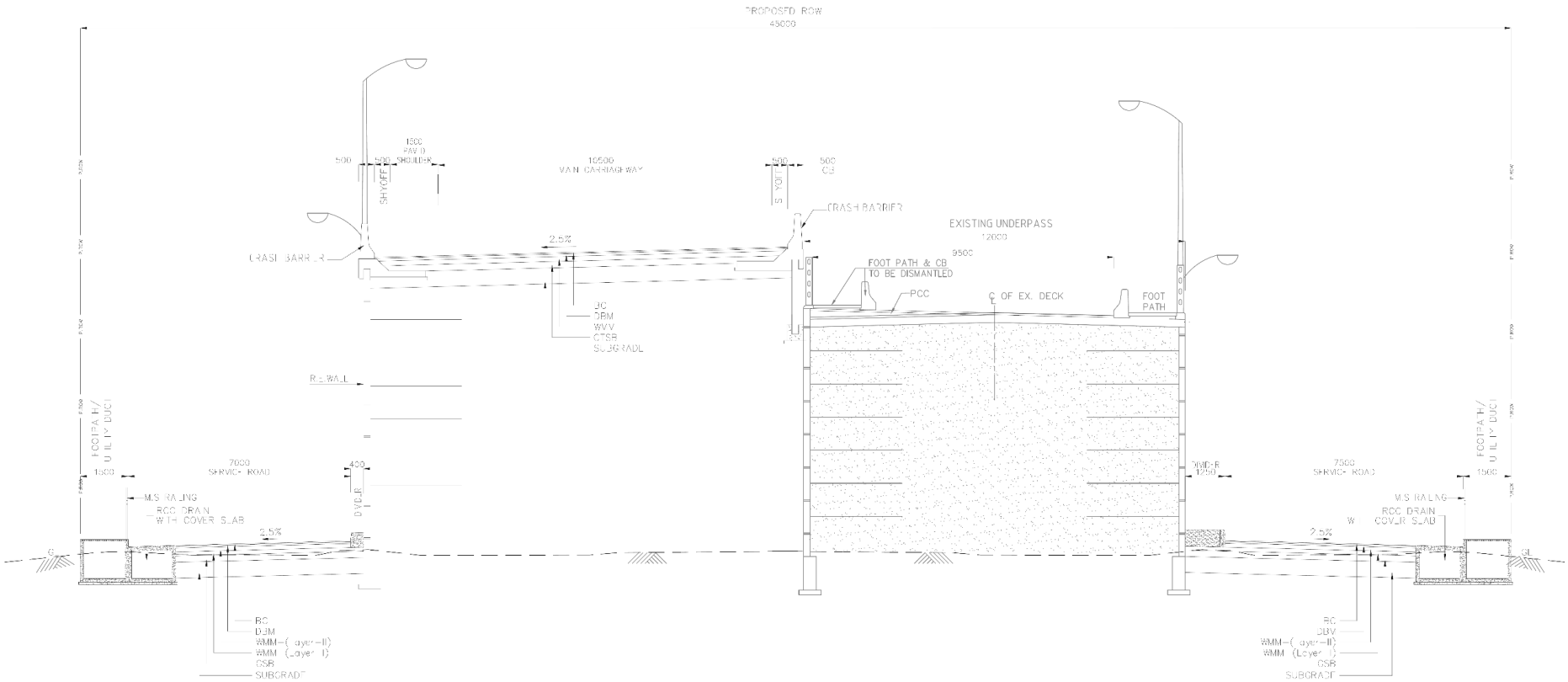
TCS-8A EXISTING 2-LANE ROB ON LHS AND NEW 3-LANE ROB ON RHS @ APPROACH PORTION (VIADUCT)
(KUTTIPURAM ROB)



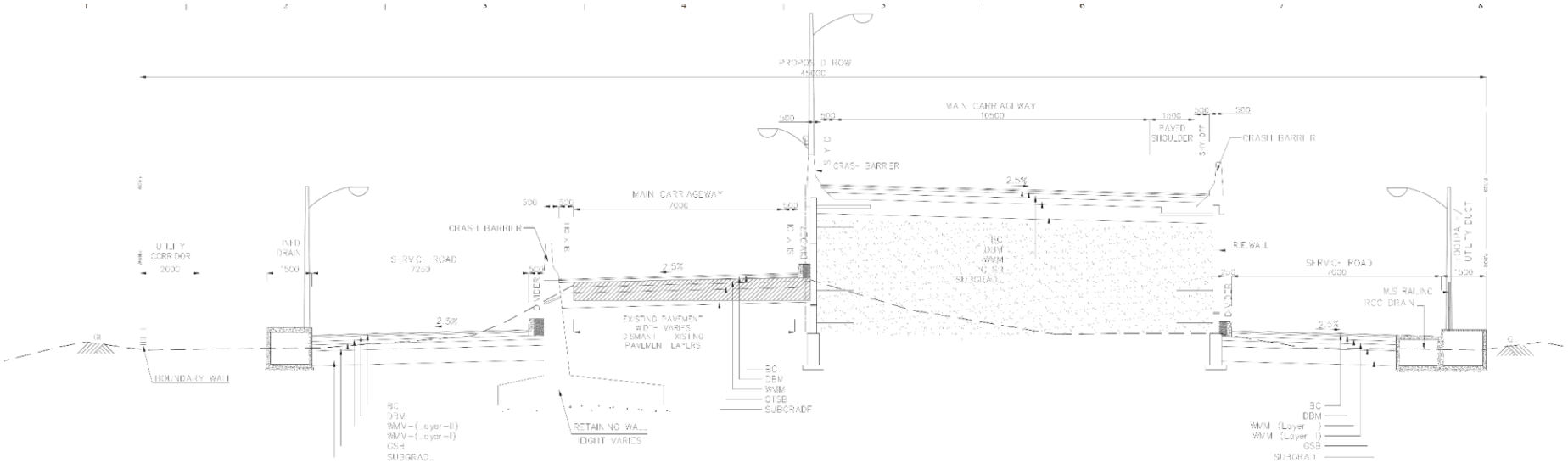
TCS-8B EXISTING 2-LANE ROB ON LHS AND NEW 3-LANE ROB ON RHS @ APPROACH PORTION (RE WALL)
(KUTTIPURAM ROB)



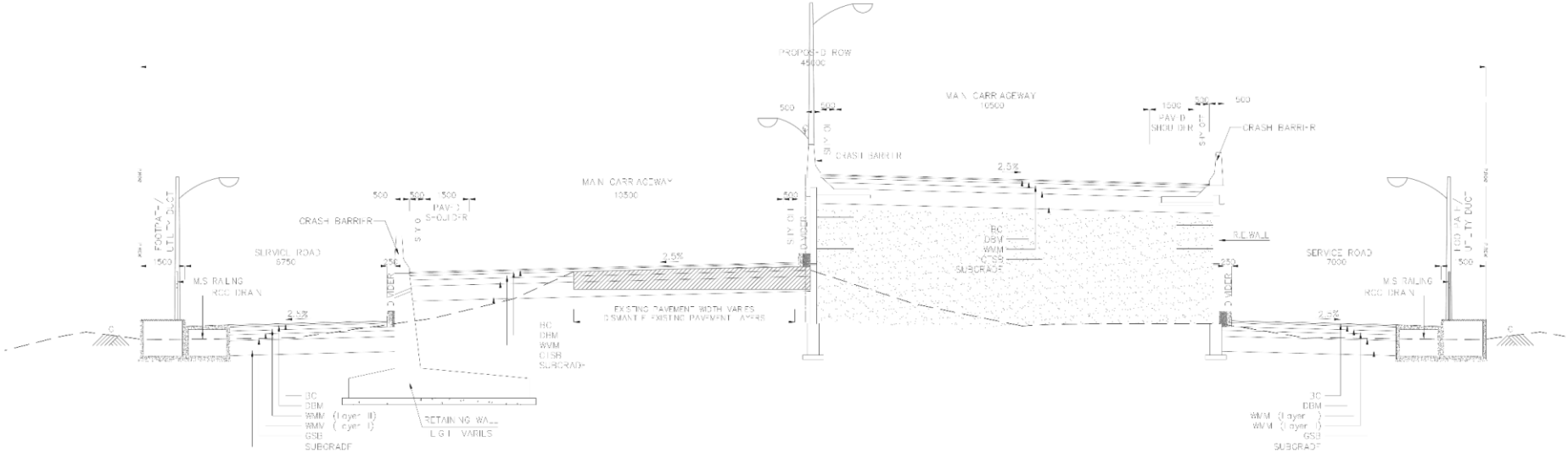
TCS-9 EXISTING 2-LANE BRIDGE WITH NEW 6-LANE BRIDGE AT KUTTIPURAM



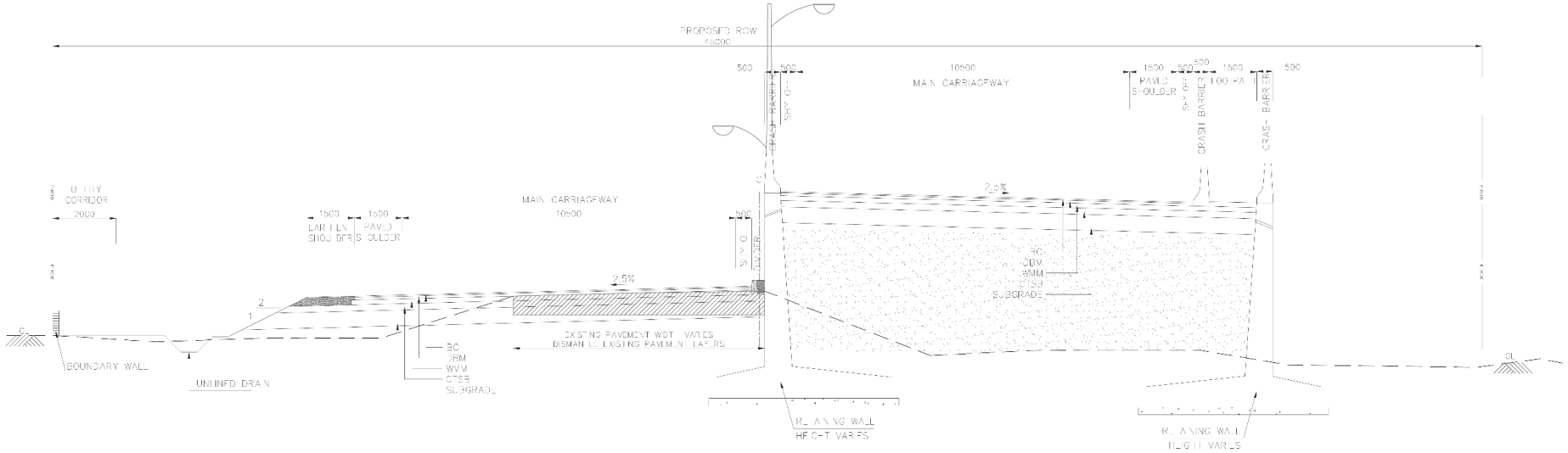
TCS-10A NEW 3-LANE VUP APPROACH ON LHS AND WIDENING OF EXISTING VUP APPROACH ON RHS WITH SLIP ROAD (PONNANI BYPASS - CANOLI CANAL BRIDGE)



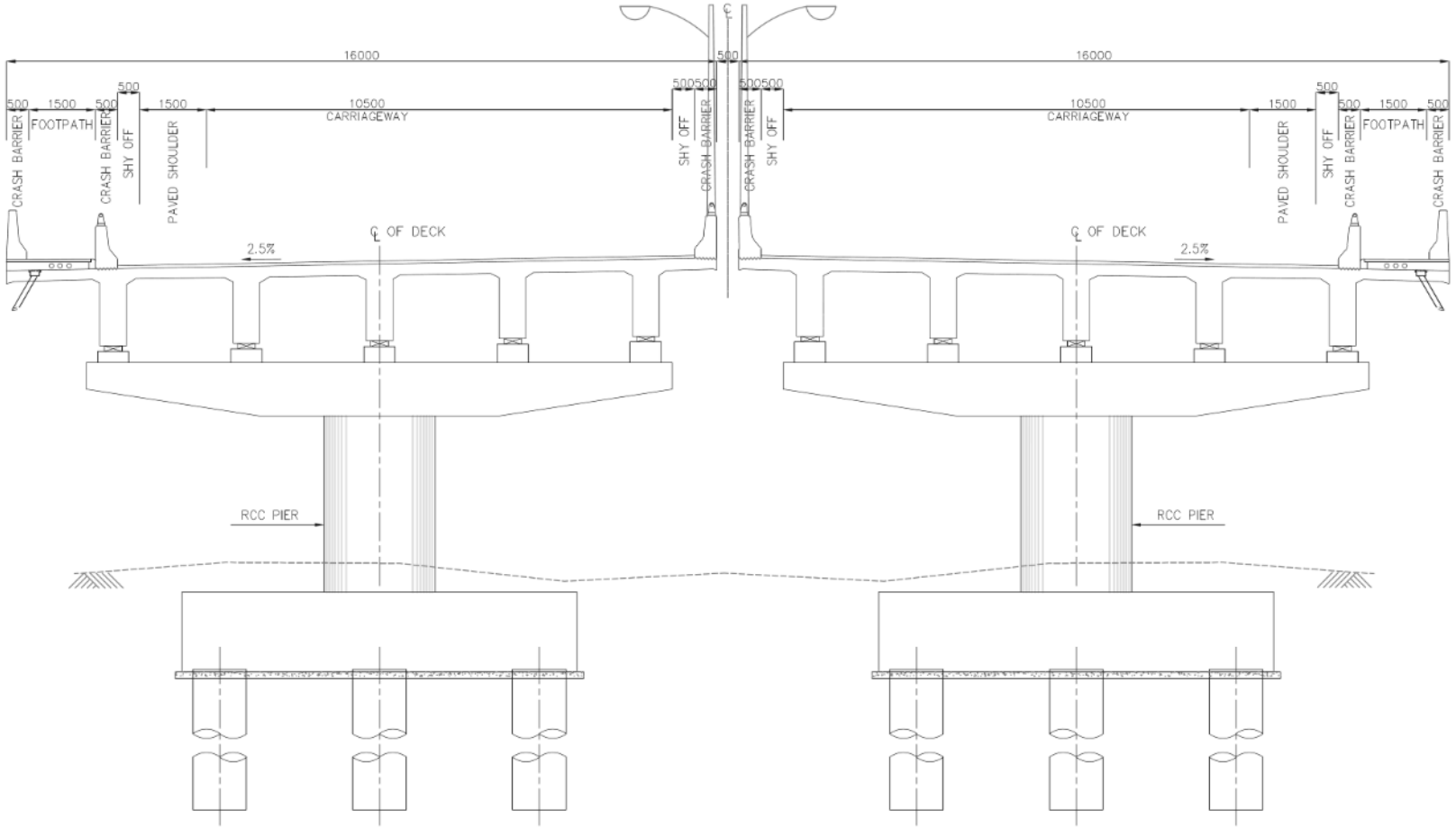
TCS-10B - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD - ECCENTRIC WIDENING
PUDHU PONNANI BRIDGE APPROACH



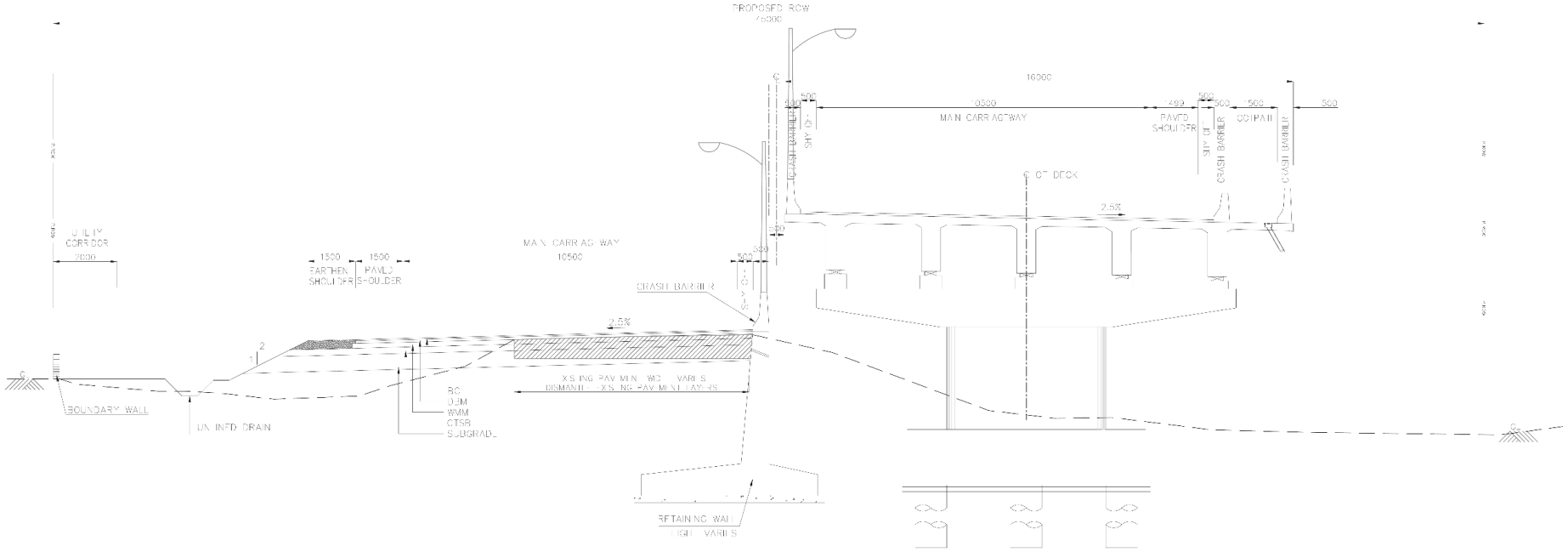
TCS-10C - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD - ECCENTRIC WIDENING



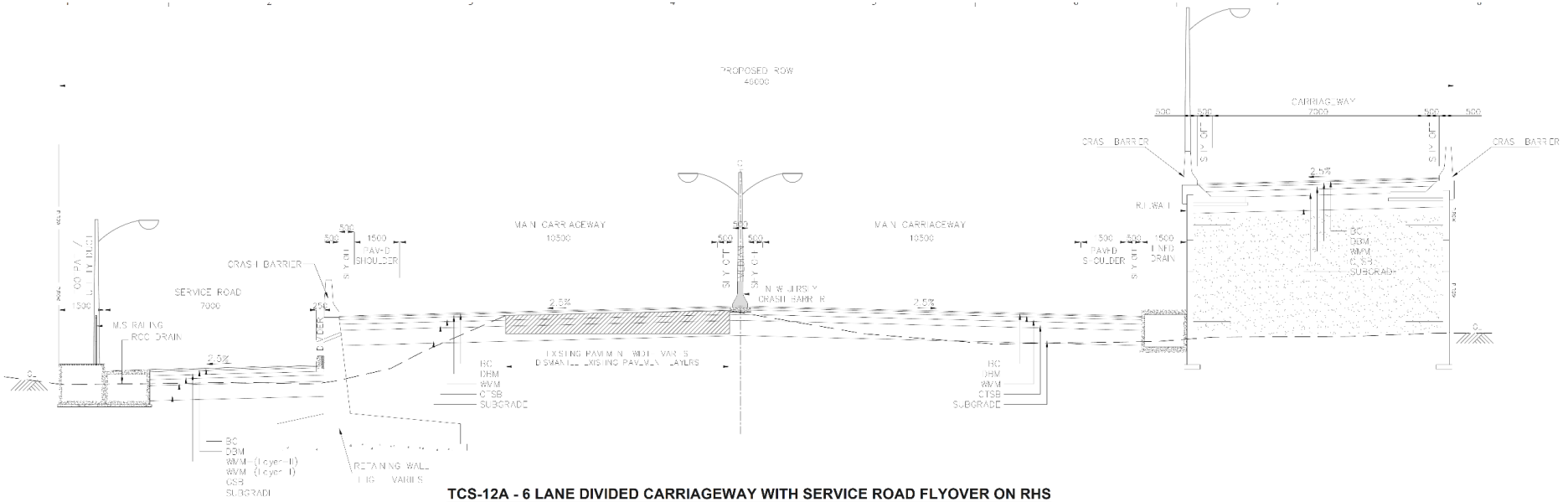
TCS-10D - 6 LANE DIVIDED CARRIAGEWAY WITHOUT SERVICE ROAD - ECCENTRIC WIDENING
PUDHU PONNANI BRIDGE APPROACH



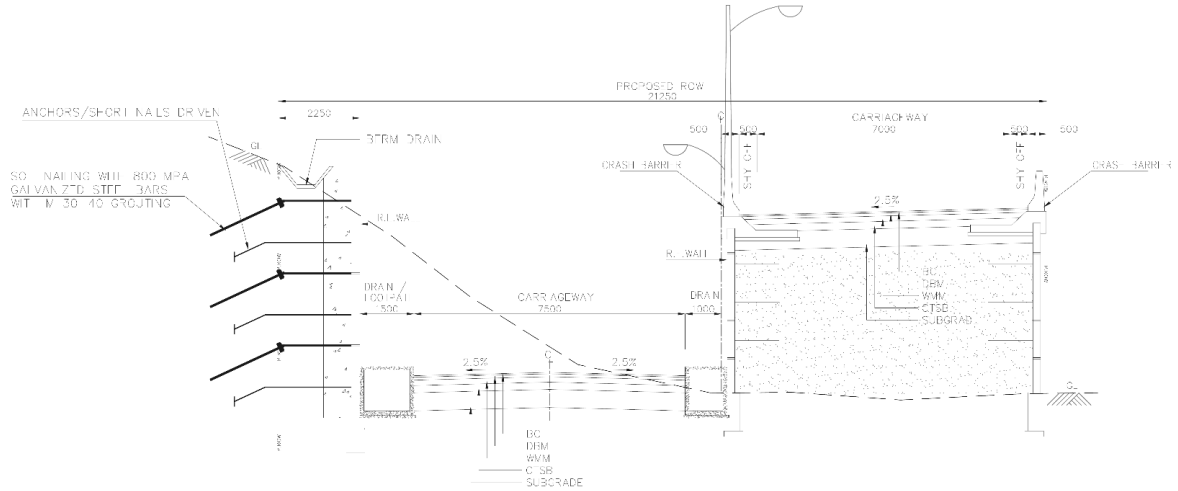
TCS-11 NEW 3 LANE + NEW 3 LANE BRIDGE AT BYPASS/REALIGNMENT LOCATIONS



TCS-11A NEW 3-LANE CARRIAGEWAY ON LHS - ECCENTRIC WIDENING & NEW 3-LANE BRIDGE ON RHS



TCS-12A - 6 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD FLYOVER ON RHS



TCS-12B -TYPICAL CROSS SECTION FOR SERVICE ROAD FLYOVER AT CROSS ROAD LOCATION

TCS Schedule*

Sl. No.	Design Chainage		Length in m	Type of TCS	Remarks
	From	To			
1	298+500	298+570	70	2A	
2	298+570	298+750	180	2B	
3	298+750	298+900	150	5	
4	298+900	299+080	180	5	
5	299+080	299+210	130	5	
6	299+210	299+500	290	5	VUP at 299+360
7	299+500	299+640	140	5	
8	299+640	299+780	140	5	
9	299+780	300+100	320	3B	
10	300+100	300+220	120	3A	
11	300+220	300+400	180	4A	
12	300+400	300+520	120	3	
13	300+520	300+740	220	3C	
14	300+740	300+777	37	5A	
15	300+777	302+737	1960	7	Viaduct at 301+757
16	302+737	302+970	233	5A	
17	302+970	304+000	1030	2C	SVUP at 303+815
18	304+000	304+210	210	5A	
19	304+210	304+460	250	5B	
20	304+460	304+580	120	5	VUP at 304+468
21	304+580	304+720	140	5	
22	304+720	305+100	380	3	VOP at 304+930
23	305+100	305+200	100	4B	
24	305+200	305+300	100	4B	
25	305+300	305+400	100	2B	
26	305+400	305+500	100	3B	
27	305+500	305+610	110	2B	
28	305+610	305+820	210	4A	
29	305+820	305+950	130	4A	
30	305+950	306+030	80	4A	
31	306+030	306+100	70	4A	
32	306+100	306+300	200	5	LVUP at 306+295
33	306+300	306+930	630	5	
34	306+930	306+980	50	3D	
35	306+980	307+080	100	3D	
36	307+080	307+220	140	3D	
37	307+220	307+380	160	4A	
38	307+380	308+000	620	3	VOP at 307+640
39	308+000	308+170	170	3	
40	308+170	308+480	310	2	
41	308+480	308+570	90	2B	
42	308+570	308+650	80	3A	

Sl. No.	Design Chainage		Length in m	Type of TCS	Remarks
	From	To			
43	308+650	308+700	50	3B	
44	308+700	309+000	300	3B	
45	309+000	309+300	300	3	
46	309+300	309+850	550	3B	VOP at 309+700
47	309+850	310+080	230	3B	
48	310+080	310+170	90	3A	
49	310+170	310+280	110	3B	
50	310+280	310+400	120	3A	
51	310+400	310+450	50	8B	
52	310+450	310+545	95	8B	
53	310+545	310+642	97	8A	
54	310+642	310+687	45	8	ROB cum Viaduct at 310+663
55	310+687	310+815	128	8A	
56	310+815	310+900	85	8B	
57	310+900	311+100	200	5C	
58	311+100	311+200	100	5	Flyover at 311+185
59	311+200	311+700	500	5	
60	311+700	311+735	35	5	
61	311+735	312+093	358	9	MJB at 311+914
62	312+093	312+200	107	2	Service Road Flyover at 312+180
63	312+200	312+230	30	12A	
64	312+230	312+310	80	12A	
65	312+310	312+400	90	12A	
66	312+400	312+540	140	3E	
67	312+540	312+630	90	3E	
68	312+630	312+750	120	3D	
69	312+750	312+820	70	3D	
70	312+820	312+950	130	3E	
71	312+950	312+980	30	3E	
72	312+980	313+090	110	2B	
73	313+090	313+390	300	2B	
74	313+390	313+410	20	3D	
75	313+410	313+460	50	3D	
76	313+460	313+590	130	3E	
77	313+590	313+720	130	3D	
78	313+720	313+820	100	1B	
79	313+820	314+080	260	1	
80	314+080	314+165	85	1B	
81	314+165	314+210	45	3D	
82	314+210	314+260	50	3D	
83	314+260	314+300	40	3G	
84	314+300	314+430	130	3G	
85	314+430	314+520	90	3D	

Sl. No.	Design Chainage		Length in m	Type of TCS	Remarks
	From	To			
86	314+520	314+850	330	1B	
87	314+850	315+300	450	5	VUP at 315+380
88	315+300	315+870	570	5	
89	315+870	316+350	480	2D	
90	316+350	316+570	220	2E	
91	316+570	317+960	1390	2D	
92	317+960	318+760	800	5	VUP at 318+345
93	318+760	319+610	850	5	VUP at 319+174
94	319+610	320+610	1000	2D	
95	320+610	321+400	790	5	LVUP at 321+005
96	321+400	322+120	720	2D	
97	322+120	322+290	170	2E	
98	322+290	322+460	170	2D	
99	322+460	322+680	220	2E	
100	322+680	322+980	300	2D	
101	322+980	323+950	970	5	Flyover cum Vaiduct at 323+472
102	323+950	324+210	260	2A	
103	324+210	324+430	220	1A	
104	324+430	325+080	650	2A	
105	325+080	325+330	250	1A	
106	325+330	325+470	140	2A	
107	325+470	325+650	180	1A	
108	325+650	326+150	500	10A	VUP at 325+985
109	326+150	326+390	240	6B	MJB at 326+270
110	326+390	326+470	80	10A	VUP at 326+800
111	326+470	327+000	530	5	
112	327+000	327+350	350	5	
113	327+350	328+540	1190	1B	
114	328+540	328+600	60	1B	
115	328+600	328+670	70	10C	
116	328+670	328+770	100	10C	
117	328+770	328+830	60	10C	
118	328+830	328+956	126	10B	
119	328+956	329+160	204	6A	MJB at 329+054
120	329+160	329+242	82	10D	
121	329+242	329+274	32	11A	MJB at 329+290
122	329+274	329+306	32	11	
123	329+306	329+338	32	11A	
124	329+338	329+550	212	10C	
125	329+550	329+590	40	1B	
126	329+590	329+990	400	1B	
127	329+990	330+260	270	1A	
128	330+260	330+600	340	1B	

Sl. No.	Design Chainage		Length in m	Type of TCS	Remarks
	From	To			
129	330+600	331+490	890	5	VUP at 331+075
130	331+490	331+580	90	5	
131	331+580	331+730	150	2B	
132	331+730	332+150	420	2A	
133	332+150	332+890	740	5	LVUP 332+535
134	332+890	333+100	210	1A	
135	333+100	333+210	110	2A	
136	333+210	333+340	130	2B	
137	333+340	334+000	660	2	
138	334+000	334+260	260	1	
139	334+260	334+375	115	1B	
140	334+375	334+450	75	5	VUP at 334+870
141	334+450	334+650	200	5	
142	334+650	335+300	650	5	
143	335+300	335+400	100	1B	
144	335+400	335+660	260	1A	
145	335+660	335+720	60	1B	
146	335+720	335+850	130	1B	
Total Length			**37350**		

Note:

1. TCS schedule shown is indicative. It shall be read in concurrence with other features of Schedule B & C. As per site condition applicable arrangement of service road, cut / fill on LHS/RHS/BHS to be decided during execution and shall got approved from Independent Engineer / NHAI.
2. Median & Carriageway width tapering shall be provided as per IRC-SP-87-2019.
3. Desirable minimum Sight distance shall be followed for vertical curves
4. Existing road is proposed for Reconstruction
5. Any variation in lengths specified in the above table shall not constitute a Change of Scope, save and except any variation in the length arising out of a change of scope expressly undertaken in accordance with the provisions of Article 16.

4.2 Alignment Plan and Longitudinal Section

Alignment Plan & Longitudinal Section (Plan & Profile) of the Project Highway is given at Appendix-BI in Soft copy for reference only. The Plan & Profile of the Project road shall be developed separately by Concessionaire within available ROW.

4.3 Reconstruction stretches

Details of reconstruction stretches for existing pavement are listed in **Appendix BII.**

4.4 Bypass and new Realignment

The details of bypass and new realignment to be provided are given in **Appendix-BIII.**

4.5 Service Road/Slip Road

Service Roads / Slip Roads shall be provided in stretches indicated in **Appendix B-IV.**

4.6 Proposed Right of Way and Additional Land Requirement

The details of the Proposed ROW and the additional land already/ being / to be acquired are given in are given in **Appendix-BV.**

4.7 Type of Pavement

Design of Flexible Pavement shall be carried out in accordance with section 5 of the manual for Minimum Design Traffic of 80 MSA from D. Ch. 298+500 to 312+200 and 35 MSA from D. Ch 312+200 to 335+850 respectively for Main Carriageway. Service road shall be designed for design traffic of 10 MSA for entire length.

However, Concessionaire shall ensure the pavement design for its adequacy based on the latest traffic counts and properties of available material w.r.t to IRC: 37-2018, traffic analysis shall be as per specifications and Standards mentioned in Schedule-D. If any additional MSA is required based on Concessionaire's analysis, the same shall be accommodated at Concessionaire's cost, in consultation with the Independent Engineer.

4.8 Intersection

The intersection shall be provided at locations specified in **Appendix-BVI** as per Schedule D.

4.9 Viaduct/Elevated Corridor/Flyover/Underpasses/FOB/Overpasses

Viaduct/Elevate corridor, Flyover, Vehicular underpasses, Light Vehicular underpasses, Small Vehicular underpasses, Foot over Bridge, Pedestrian/cattle underpasses shall be provided along the project highway at location given at **Appendix-B VII.**

Overpass shall be provided as per details given in **Appendix-B VIII.**

4.10 Median (Type, width and openings)

The median shall be provided as per TCS drawings given in clause 4.1

4.11 Major Bridges

The Major bridges as listed in **Appendix-B IX** shall be constructed, widened, reconstruction and rehabilitation or extended.

4.12 Minor Bridges

The Minor bridges as listed in **Appendix-B X** shall be constructed, widened, reconstruction and rehabilitation or extended.

4.13 Culverts

Culverts shall be constructed, new construction, reconstructed, rehabilitation or extended are as per **Appendix-B XI.**

4.14 ROBs/RUBs:

Details of ROBs/RUBs to be constructed, widened, reconstructed or rehabilitated are given in **Appendix-B XII.**

4.15 Tunnels

Details of tunnels to be provided are given at **Appendix-B XIII.**

4.16 Utilities crossing

Provision for accommodating utilities shall be made both overhead as well as underground wherever required as per site requirement.

Utility ducts in form of 600mm dia Hume Pipe shall be provided across the Project Highway at every 0.5km interval and along with inspection chamber for crossing of underground utilities. Location for such utility crossing shall be finalized in consultation with Authority Engineer.

4.17 Maintenance of Existing Structures

All the other structures mentioned in Schedule-A are also to be maintained apart from the maintenance requirements specified in the Concession Agreement.

4.18 Built-up sections

The Built-Up Sections in the Project Highway are given in Schedule A.

4.19 Slope Protection and Retaining Walls

Details of cut slope protective measures to be taken are given at **Appendix B-XIV,** the stretches where retaining walls are to be provided at the edge of service road are given at **Appendix B-XV** and the stretches where retaining walls (RE wall / RCC wall) are to be provided between service road and main carriageway are given at **Appendix B-XVI.**

4.20 RCC Covered Lined Drain

Lined drain to be provided is given in **Appendix B- XVII.**

4.21 Utility Shifting

Utilities to be shifted are provided in **Appendix B- XVIII.**

Appendix-BI

Alignment Plan, Longitudinal profile and Typical Cross section of Project highway are given in soft copy.

Appendix-BII

Details of Stretches Proposed for Reconstruction

Entire existing pavement along total project road stretch is proposed for reconstruction.

Appendix-BIII

Details of Bypasses and new Realignment

1 Bypasses

Sl. No.	Bypass Location	Existing Chainage (km)		Design Chainage (km)		Length (km)	Remarks
		From	To	From	To		
1	Valanchery	306.150	311.330	300+400	304+580	4.180	On RHS of existing road

2 Realignment

Sl. No.	Design Chainage		Length in, m	Remarks
	From	To		
1	300+220	300+400	180	Realignment
2	304+580	305+200	620	Realignment
3	305+610	305+820	210	Realignment
4	305+950	306+030	80	Realignment
5	306+300	306+980	680	Realignment
6	307+080	308+480	1400	Realignment
7	309+000	309+300	300	Realignment
8	311+200	311+700	500	Realignment
9	311+700	312+230	530	Realignment
10	312+400	312+540	140	Realignment
11	312+820	312+950	130	Realignment
12	313+820	314+080	260	Realignment
13	314+300	314+430	130	Realignment
14	333+340	334+000	660	Realignment
15	334+000	334+260	260	Realignment
16	334+650	335+300	650	Realignment
Total, m			**6730**	

Appendix-BIV

Details of Service Road/Slip Road

Service Road (Including Load bearing drain as shown in typical cross sections indicated and referred in section 4.1 of this Schedule B) shall be constructed at the following locations. Load bearing drain shall be designed to allow for movement of heavy vehicle.

Sl. No.	Design Chainage (km)		Length, m	Side	Service road Width, m	Total Length, m
	From	To				
1	298+500	299+780	1280	BHS	7.00	2560
2	299+780	300+220	440	BHS	6.90	880
3	300+220	300+420	200	LHS	6.90	200
4	300+220	300+420	200	RHS	7.25	200
5	300+420	300+520	100	BHS	6.90	200
6	304+210	304+720	510	BHS	7.00	1020
7	304+720	305+100	380	BHS	6.90	760
8	305+100	305+300	200	LHS	7.25	200
9	305+100	305+300	200	RHS	6.90	200
10	305+300	305+400	100	BHS	7.00	200
11	305+400	305+500	100	BHS	6.90	200
12	305+500	305+610	110	BHS	7.00	220
13	305+610	306+100	490	LHS	6.90	490
14	305+610	306+100	490	RHS	7.25	490
15	306+100	306+930	830	BHS	7.00	1660
16	306+930	307+220	290	BHS	5.75	580
17	307+220	307+380	160	LHS	6.90	160
18	307+220	307+380	160	RHS	7.25	160
19	307+380	308+170	790	BHS	6.90	1580
20	308+170	308+570	400	BHS	7.00	800
21	308+570	310+400	1830	BHS	6.90	3660
22	310+400	310+545	145	BHS	7.00	290
23	310+545	310+642	97	LHS	7.00	97
24	310+545	310+642	97	RHS	5.50	97
25	310+687	310+815	128	LHS	7.00	128
26	310+687	310+815	128	RHS	5.50	128
27	310+815	310+900	85	BHS	7.00	170
28	310+900	311+100	200	LHS	7.00	200
29	310+900	311+100	200	RHS	7.75	200
30	311+100	311+700	600	BHS	7.00	1200
31	311+700	311+735	35	BHS	7.00	70
32	312+093	312+400	307	BHS	7.00	614
33	312+400	312+630	230	LHS	6.90	230
34	312+400	312+630	230	RHS	7.00	230
35	312+630	312+820	190	BHS	5.50	380
36	312+820	312+980	160	LHS	5.50	160
37	312+820	312+980	160	RHS	7.25	160

Sl. No.	Design Chainage (km)		Length, m	Side	Service road Width, m	Total Length, m
	From	To				
38	312+980	313+390	410	BHS	7.00	820
39	313+390	313+460	70	BHS	5.50	140
40	313+460	313+590	130	LHS	5.50	130
41	313+460	313+590	130	RHS	7.25	130
42	313+590	313+720	130	BHS	5.50	260
43	313+720	314+165	445	BHS	7.25	890
44	314+165	314+260	95	BHS	5.50	190
45	314+260	314+430	170	RHS	7.25	170
45	314+430	314+520	90	BHS	5.50	180
46	314+520	314+850	330	BHS	7.25	660
47	314+850	315+870	1020	BHS	7.00	2040
48	317+960	319+610	1650	BHS	7.00	3300
49	320+610	321+400	790	BHS	7.00	1580
50	322+980	324+210	1230	BHS	7.00	2460
51	324+210	324+430	220	BHS	7.25	440
52	324+430	325+080	650	BHS	7.00	1300
53	325+080	325+330	250	BHS	7.25	500
54	325+330	325+470	140	BHS	7.00	280
55	325+470	325+650	180	BHS	7.25	360
56	325+650	326+150	500	LHS	7.00	500
57	325+650	326+150	500	RHS	7.50	500
58	326+390	326+470	80	LHS	7.00	80
59	326+390	326+470	80	RHS	7.50	80
60	326+470	327+350	880	BHS	7.00	1760
61	327+350	328+600	1250	BHS	7.25	2500
62	328+600	328+830	230	LHS	6.75	230
63	328+600	328+830	230	RHS	7.00	230
64	328+830	328+956	126	LHS	7.25	126
65	328+830	328+956	126	RHS	7.00	126
66	329+338	329+550	212	LHS	6.75	212
67	329+338	329+550	212	RHS	7.00	212
68	329+550	330+600	1050	BHS	7.25	2100
69	330+600	332+890	2290	BHS	7.00	4580
70	332+890	333+100	210	BHS	7.25	420
71	333+100	334+000	900	BHS	7.00	1800
72	334+000	334+375	375	BHS	7.25	750
73	334+375	335+300	925	BHS	7.00	1850
74	335+300	335+850	550	BHS	7.25	1100
Total						**55760**

Note:

1. Total length mentioned in above table is excluding the length of taper portion of entry/exist.

2. In some location RCC covered drain shall be part of service road as shown in TCS, thus making total width of service road 7.0m.

Entry/Exit locations

The entry/exit arrangement to Main Carriageway & service road shall be as per clause 2.12 of the Manual of Specification and Standards. Tentative locations of entry/exit to Main Carriageway & Service road are given below. The locations shall be finalized in consultation with Independent Engineer/Project Director, NHAI as per site requirement. Any increase in the number specified in below table shall not constitute a change of scope, save and except any variations arising out of a change of scope expressly undertaken in accordance with the provisions of Article 16.

Sl. No	Design Chainage (km)	Entry/Exit to MCW	Side
1	298+720	Entry/Exit to MCW	LHS
2	299+770	Entry/Exit to MCW	Both
3	304+210	Only Exit on LHS & Only Entry on RHS	Both
4	304+770	Entry/Exit to MCW	Both
5	307+200	Entry/Exit to MCW	Both
6	308+220	Entry/Exit to MCW	Both
7	310+800	Only Exit on LHS & Only Entry on RHS	Both
8	312+500	Entry & Exit	Both
9	314+250	Entry	LHS
10	314+430	Exit	LHS
11	314+750	Entry & Exit	Both
12	316+060	Entry on LHS & Exit on RHS	Both
13	317+750	Exit on LHS & Entry on RHS	Both
14	319+840	Entry on LHS & Exit on RHS	Both
15	320+400	Exit on LHS & Entry on RHS	Both
16	321+620	Entry on LHS & Exit on RHS	Both
17	322+760	Exit on LHS & Entry on RHS	Both
18	324+100	Entry & Exit	Both
19	325+600	Entry & Exit	Both
20	327+400	Entry & Exit	Both
21	328+500	Entry & Exit	Both
22	330+500	Entry & Exit	Both
23	331+950	Entry & Exit	Both
24	334+300	Entry & Exit	Both
25	335+400	Entry & Exit	Both

***MCW: Main Carriageway**

Appendix-BV

Details of Proposed ROW for the project highway are given below:

Sl. No.	Design Chainage (km)		Proposed Length (km)	Proposed ROW (m)
	From	To		
1	298+500	335+850	37.350	45*

***Note:** Additional land shall be acquired for Rest area, Truck lay bye and Canal/Nala locations. For complete details of Right of Way refer Plan & profile drawings given in Appendix- BI to Schedule B.

Appendix-BVI

Intersections

At Grade Intersections

At grade intersection shall be provided with the intersecting roads to Service roads along the project road at the following locations as given below, the cross roads shall be regraded and strengthened to have a crust as same of Service road for a length shown in the Ministry's typed designs for intersections along-with provision of adequate cross drainage structure on the cross roads.

Sl. No	Design Chainage (km)	Side	Type of Junction	Leads To	
				LHS	RHS
1	305+315	RHS	T	-	Painkannur
2	305+950	RHS	T	-	Painkannur
3	306+600	Both	+	Existing Road	Existing Road
4	307+500	RHS	Y	-	Existing Road
5	308+155	RHS	T	-	Athavanad
6	309+860	Both	+	Kuttippuram	Kuttippuram
7	312+420	RHS	Y	-	Thavanur
8	315+595	LHS	Y	Edappal	-
9	322+195	Both	+	Village Road	Village Road
10	322+650	Both	+	Village Road	Village Road
11	324+350	Both	+	Pulikka Kadavu Road	Keezhillam
12	324+720	Both	+	Village Road	Village Road
13	324+820	RHS	Y	-	Village Road
14	324+860	LHS	Y	Mukkilepeedika	-
15	325+490	Both	+	Kollanpadi	Village Road
16	327+300	LHS	T	Police station	
17	327+560	RHS	T	-	Ponnani
18	328+740	RHS	Y	-	Puthuponnani
19	329+892	RHS	T	-	Pamba Road
20	329+990	LHS	T	Vadakkepuram	-
21	331+390	LHS	T	Pathamuri	
22	331+890	LHS	T	Thannithura	
23	332+725	LHS	T	Village Road	-
24	332+800	RHS	T	-	Village Road
25	333+100	RHS	T	-	Village Road
26	333+620	Both	+	Village Road	Village Road
27	334+330	RHS	T	-	Palappetty
28	334+825	RHS	T	-	Palappetty
29	335+680	RHS	T	-	Kappirikkad

Note:

(i) Type of Junction to be improved as per manual and MOST type design for intersection on National Highways, 1995.

(ii) Any other junction not mentioned above but observed during the construction of the project shall be improved as per manual requirements. The same shall not constitute a Change of Scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 16.

(iii) The concessionaire shall take up 'Detailed Engineering study' to ascertain further details of all intersections and treatment of the intersections shall be designed in accordance with the latest guidelines mentioned out in section-3 of Manual. The same shall not constitute a Change of Scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 16.

Appendix-BVII

Details of Proposed Viaduct / Elevated Corridor

Sl. No.	Design Chainage (km)		Skew Angle (Deg.)	#Span Arrangement(m)	Proposed Deck Width (m)	Remarks
	From	To				
1	300+777	302+737	-	56x35.00	14.00 + M + 14.00	Viaduct in Valanchery Bypass
2	323+293	323+651	-	LHS-2x35.00 + 1x23.73 + (1x47.00) + 2x21.00 + 5x35.00; RHS-2x35.00 + 2x21.00 + (1x47.00) + 1x23.73 + 5x35.00	13.75 + 13.75	Flyover cum Viaduct

M=Median width.
# Span Arrangement mentioned is Centre to Centre of Expansion joint.

Details of Proposed New Flyover

Sl. No.	Design Chainage (km)	Name of Intersecting Roads	Skew Angle (Deg.)	# Clear Span arrangement No. x L in m	Overall width of structure along with its approaches
1	311+185	SH	-	1x20.00 + 1x25.00 + 1x20.00	27.50
2	*312+180	SH-69	-	2x45.00	9.00

Lateral clearance mentioned is minimum clear span between the inner faces of substructure normal to the existing crossroad.
* Proposal at 312+180 is Service road flyover near Kuttipuram.

Details of Proposed New Vehicular Underpasses

Sl. No.	Design Chainage (km)	Name of Intersecting Roads	Skew Angle (Deg.)	# Clear Span arrangement No. x L in m & Clear Minimum Height	Overall width of structure along with its approaches
1	299+360	MDR-242	-	1x25.00x5.50	27.50
2	304+468	Existing NH-17; serviceability to SH - 73	-	1x25.00x5.50	27.50
3	315+380	Old NH-17	39°	1x25.00x5.50	27.50
4	318+345	MDR	-	1x15.00x5.50	27.50
5	319+174	MDR-186	27°	1x15.00x5.50	27.50
6	325+985	Village Road	25°	1x11.00x5.50	LHS-14.00
7	326+800	Existing NH-17	-	1x25.00x5.50	27.50
8	331+075	Village Road	-	1x25.00x5.50	27.50
9	334+870	Village Road	-	1x15.00x5.50	27.50

Lateral clearance mentioned is minimum clear span between the inner faces of substructure normal to the existing crossroad.

Details of Proposed New LVUP

Sl. No.	Design Chainage (km)	Name of Intersecting Roads	Skew Angle (Deg.)	# Clear Span arrangement No. x L in m & Clear Minimum Height	Overall width of structure along with its approaches	Remarks
1	306+295	-	-	1 x 15.00 x 4.00	27.50	-
2	321+005	Village Road	23°	1 x 15.00 x 4.00	27.50	-
3	332+535	In Village	-	1 x 15.00 x 4.00	27.50	-

Lateral clearance mentioned is minimum clear span between the inner faces of substructure normal to the existing crossroad.

Details of Proposed New SVUP

Sl. No.	Design Chainage (km)	Name of Intersecting Roads	Skew Angle (Deg.)	# Clear Span arrangement No. x L in m & Clear Minimum Height	Overall width of structure along with its approaches	Remarks
1	303+815	Village Road	-	1x 7.00 x 4.00	27.50	-

Lateral clearance mentioned is minimum clear span between the inner faces of substructure normal to the existing crossroad.

Details of Foot Over Bridge (FOB)

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Skew Angle (Deg.)	# Span arrangement No. x L x H (m)	Remarks
Nil					

Lateral clearance mentioned is minimum clear span between the inner faces of substructure normal to the existing crossroad.

Rehabilitation and repairs of Existing Vehicular Underpasses

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Structure Dimension (m) No. x L x H	Name of Intersecting Roads	Remark
1	13.866 in Ponnani bypass	325+985	1 x 11.00 x 5.50	Village Road	Repair and Rehabilitation measures shall be carried out as mentioned in notes. Necessary measures / treatments for protecting structures in marine environment shall be carried out in accordance with relevant IRC codes and Guidelines.

Note: If the existing structure during detailed investigation is found structurally unsafe to cater the design loads as per the latest applicable codes, the same shall be reconstructed/ rehabilitated to make it safe for carrying the design loads. This does not constitute any change of scope.

Necessary repairs to existing structure shall be carried out in consultation with Concerned Authority/ Independent Engineer.

Details of Pedestrian/Cattle Underpasses

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Name of Intersecting Roads	Skew Angle (Deg.)	Proposed Span arrangement No. x L x H	Overall width of structure along with its approaches
Nil						

Details of Subway

Sl. No.	Design Chainage (km)	Name of intersecting Road	Skew Angle (Deg.)	Proposed Span arrangement No. x L x H	Overall width in m
Nil					

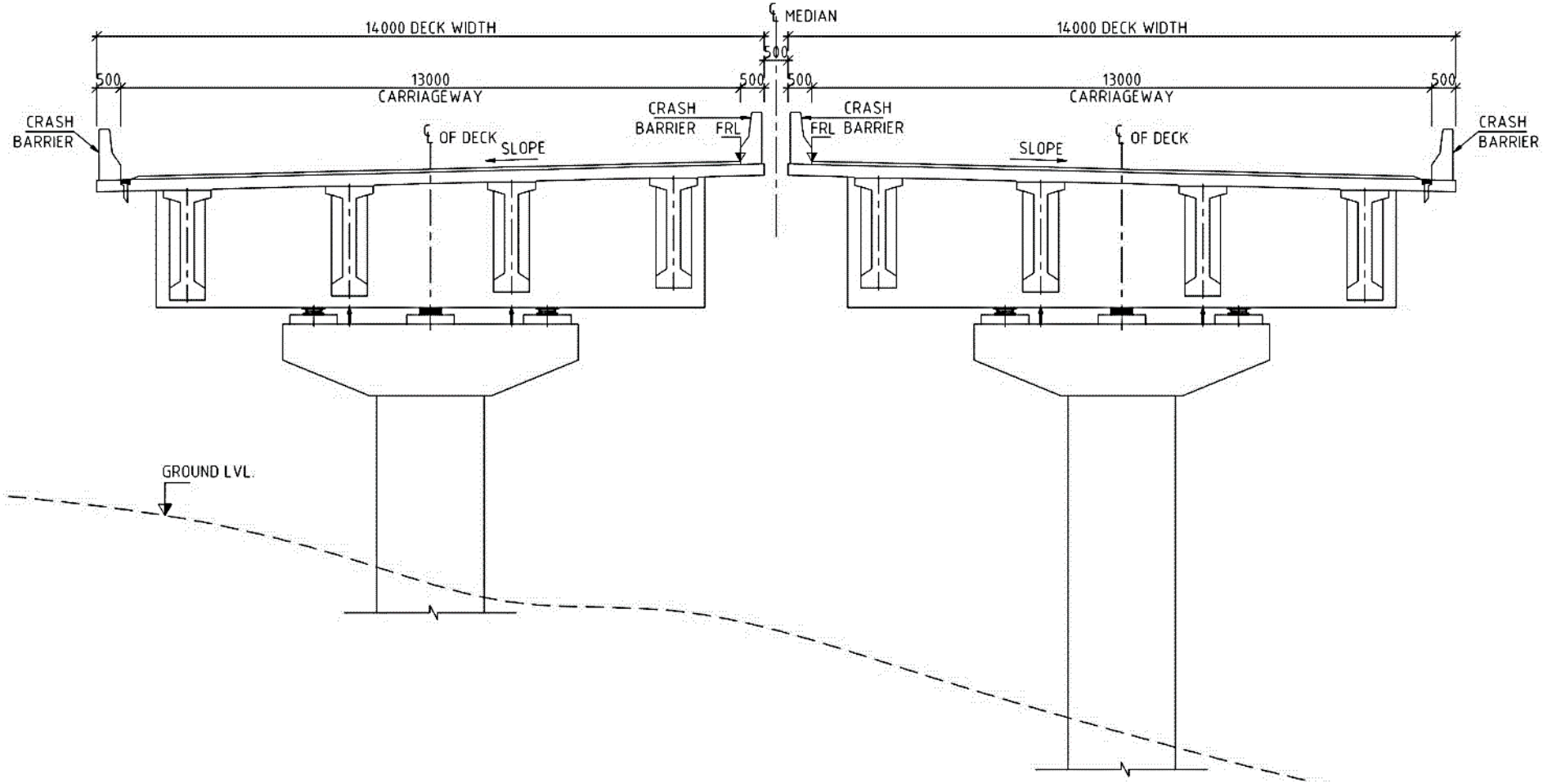
Notes for Appendix-BVII:

i) For elevated structure/viaduct, span arrangement mentioned above is tentative and may be changed based on innovative design of structure, latest construction techniques and aesthetics of structures.

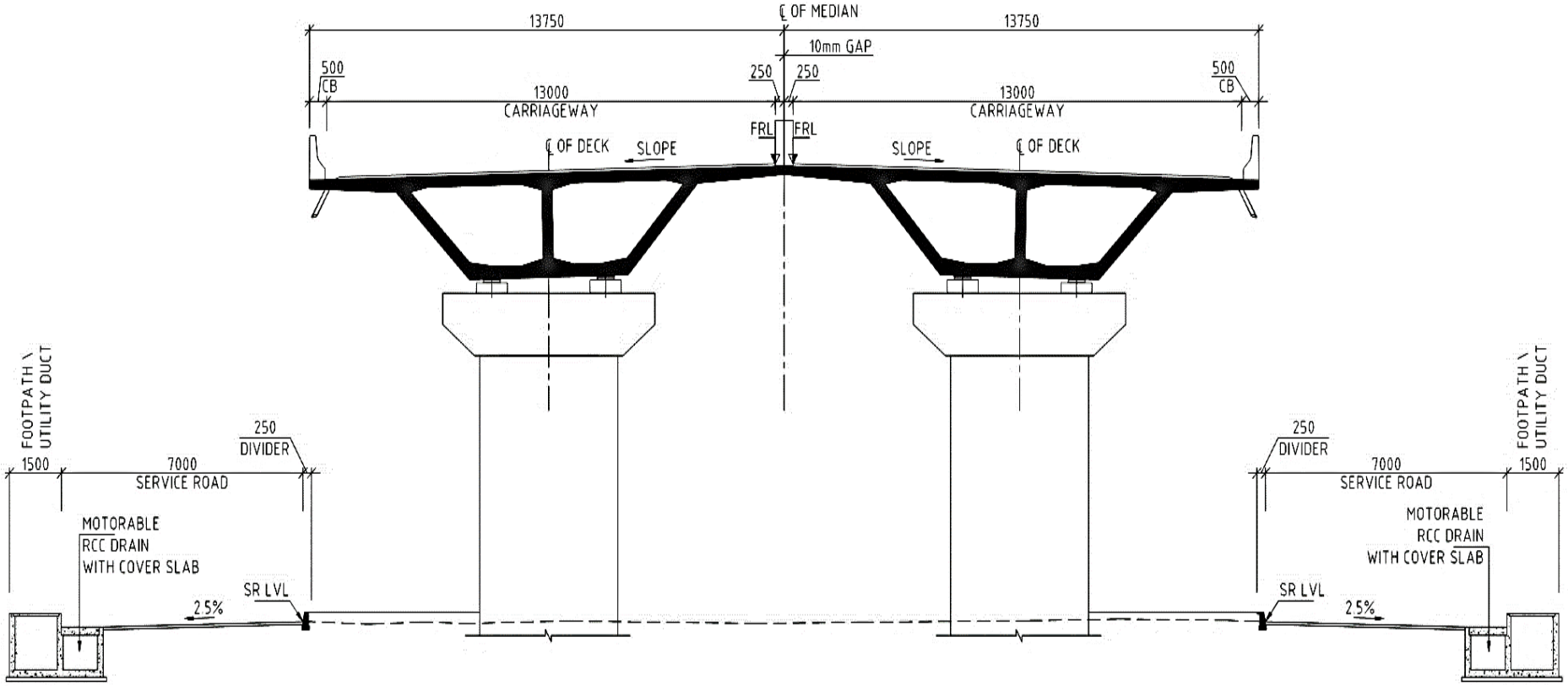
ii) The actual lengths as required on the basis of detailed investigations shall be determined by the Concessionaire in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule-B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 16.

iii) All concrete structures shall be designed for severe exposure condition as per IRC: 112-2019. In addition, steel reinforcement shall be given corrosion protection by use of Fusion Bonded Epoxy Coating (FBEC) or Galvanised steel / stainless steel shall be used for reinforcement.

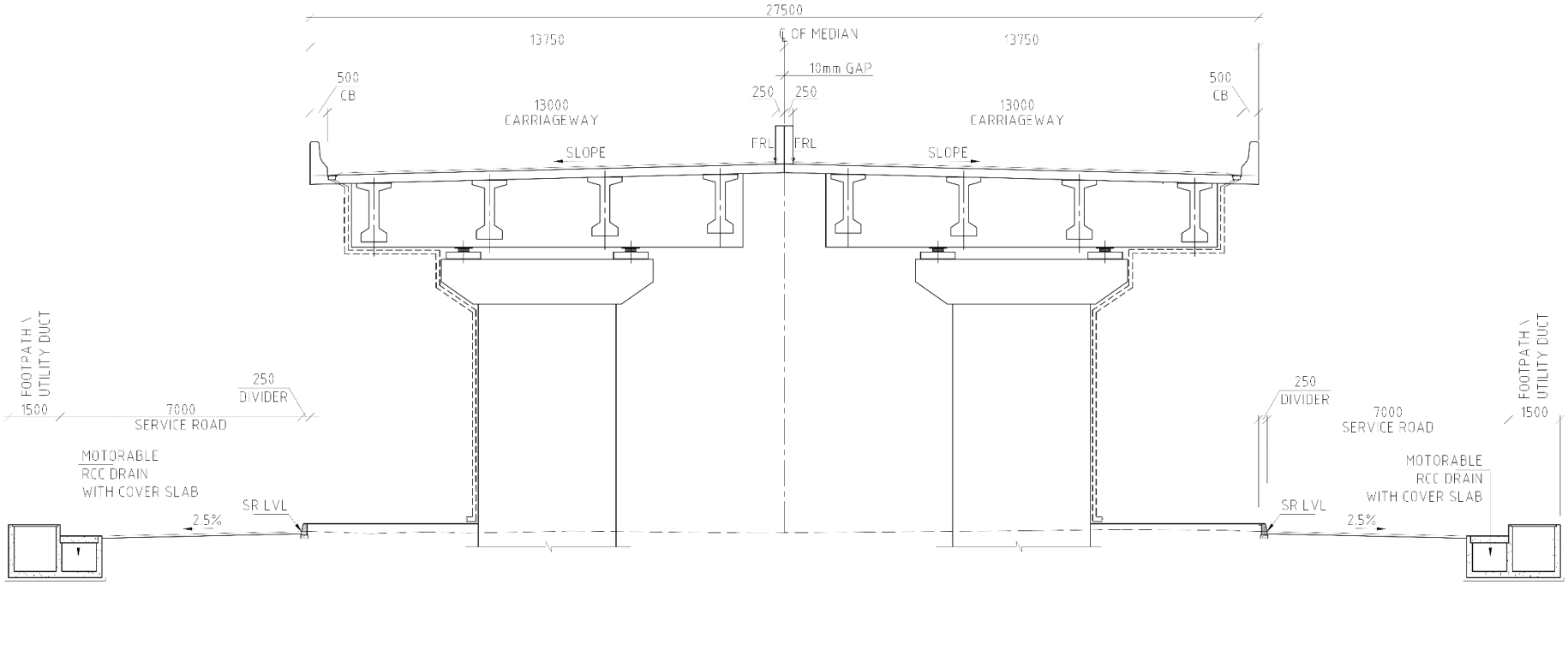
iv) Exposed concrete surfaces shall be protected by applying acrylic elastomeric coating confirming to IRC: 80-2008 Clause 6.5.1/ Clause 2808 of Specifications for Road & Bridge Works (Fifth Revision).



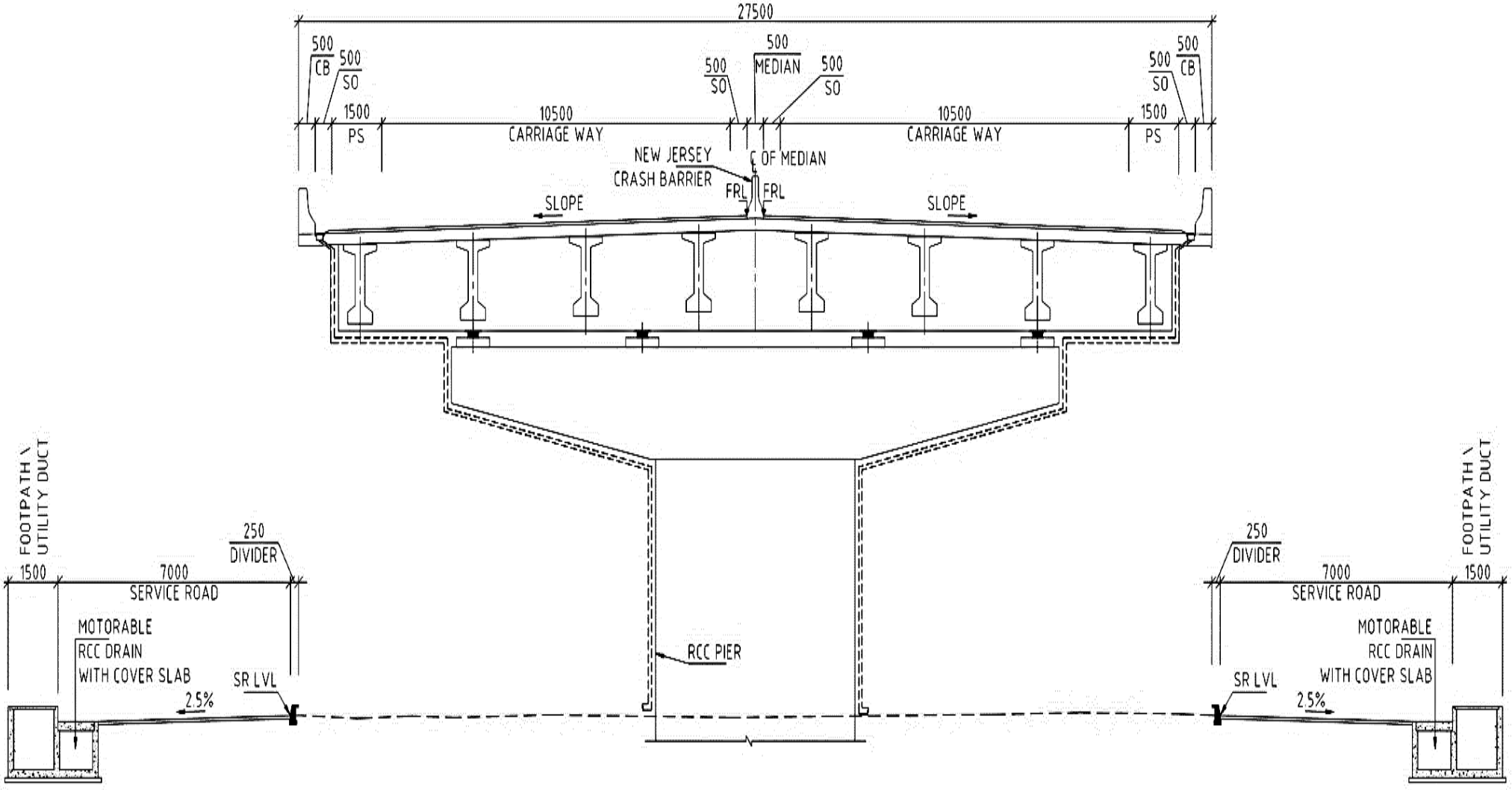
Cross Sectional Arrangement of Viaduct



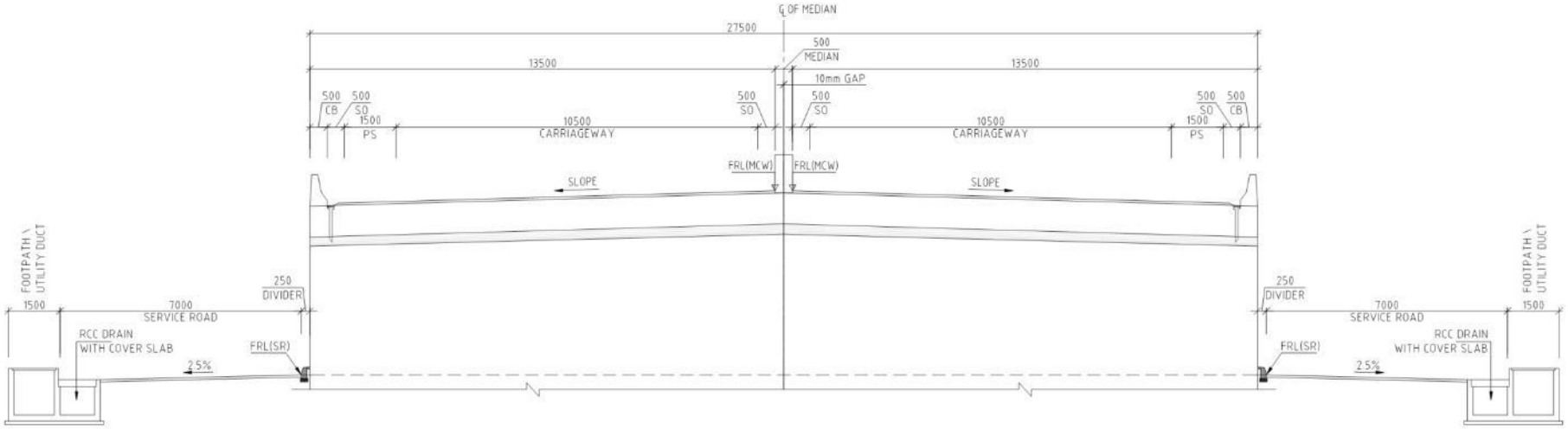
Cross Sectional Arrangement of Flyover cum Viaduct (13.75 + 13.75Deck width)



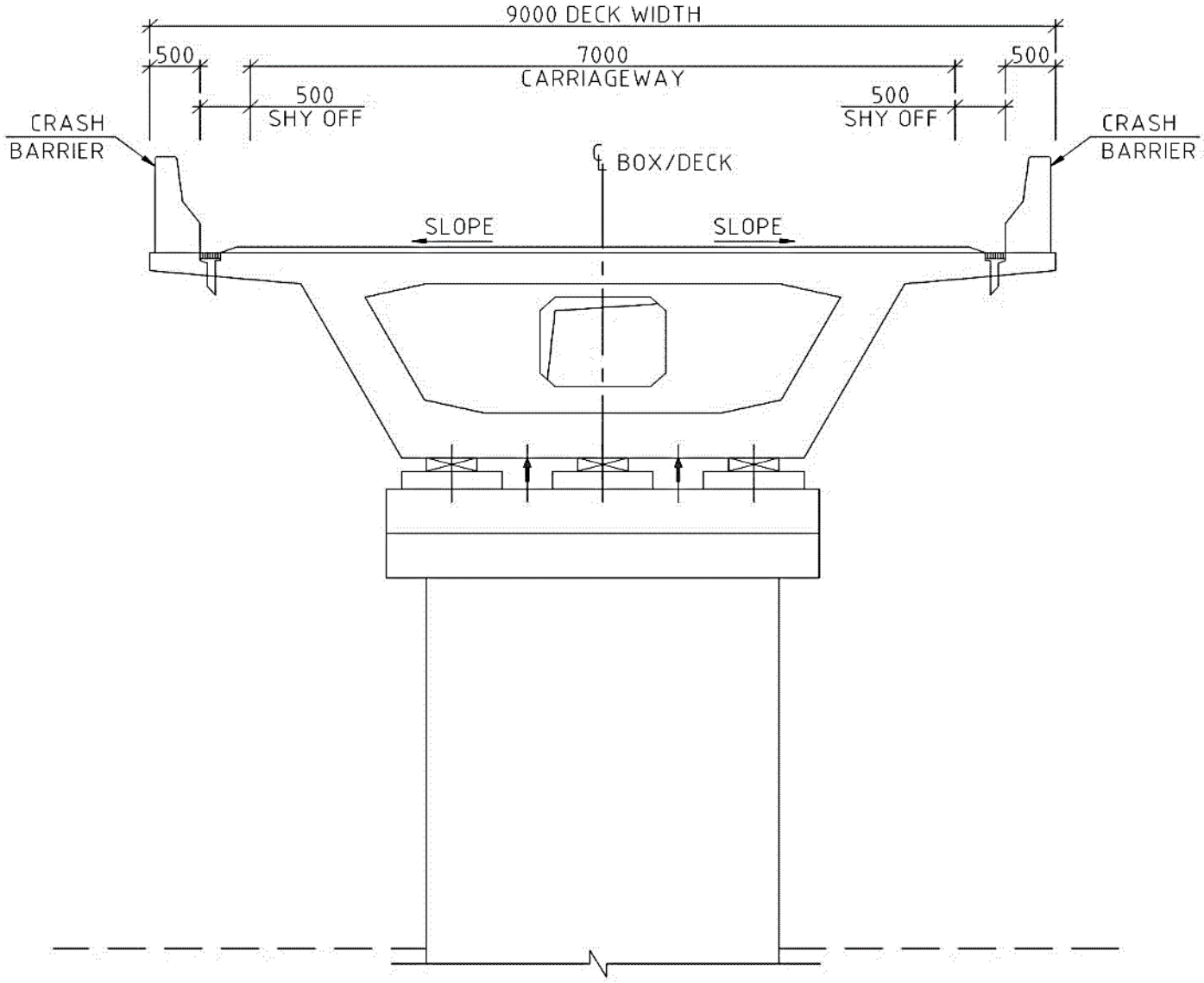
Cross Sectional Arrangement of Flyover cum Viaduct (13.75 + 13.75Deck width)



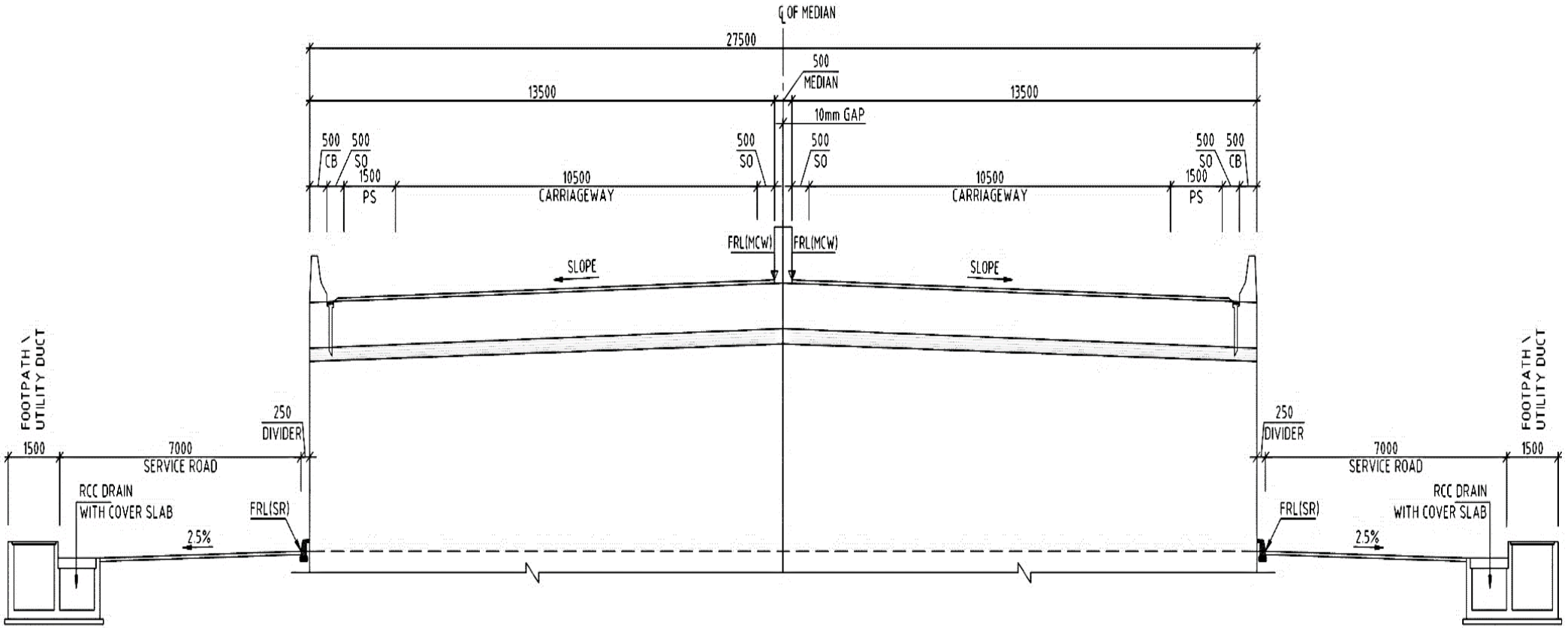
Cross Sectional Arrangement of Flyover (27.50m Deck width)



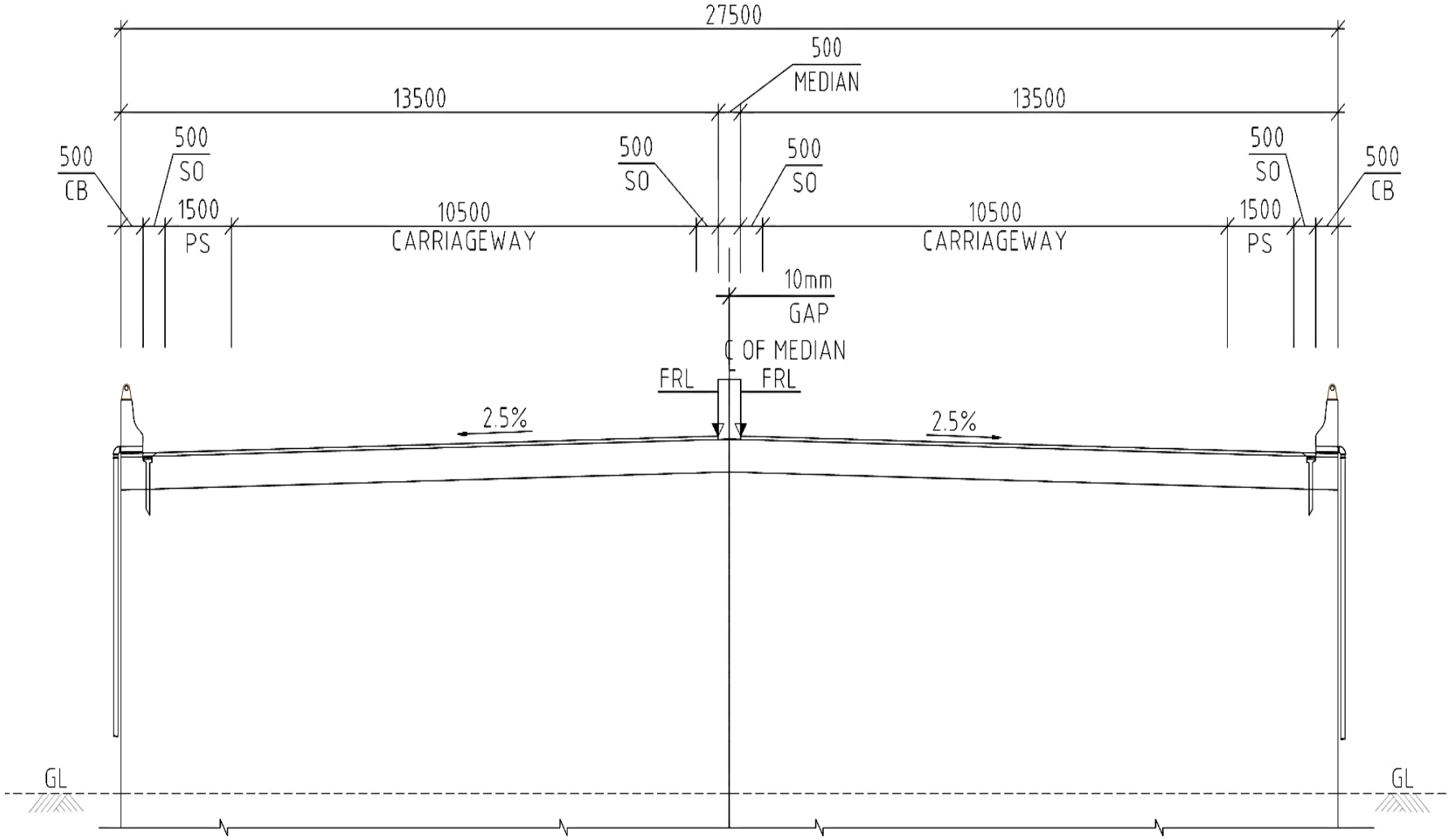
Cross Sectional Arrangement of Vehicular Underpasses/ Light Vehicular Underpasses



Cross Sectional Arrangement of Service Road Flyover (9.00m Deck width)



Cross Sectional Arrangement of Vehicular Underpasses / Light Vehicular Underpass



Cross Sectional Arrangement of Small Vehicular Underpasses

Appendix-BVIII

Details of Vehicular Overpasses

Sl. No.	Design Chainage (km)	Category of Intersecting Roads	Skew Angle (Deg.)	# Clear Span arrangement No. x L in m & Clear Minimum Height	Total Width of the structure	Remarks
1	304+930	Village Road	-	2x13.50 x 5.50	27.00	-
2	307+640	ODR	-	2x13.50 x 5.50	27.00	-
3	309+700	MDR	-	2x13.50 x 5.50	27.00	-

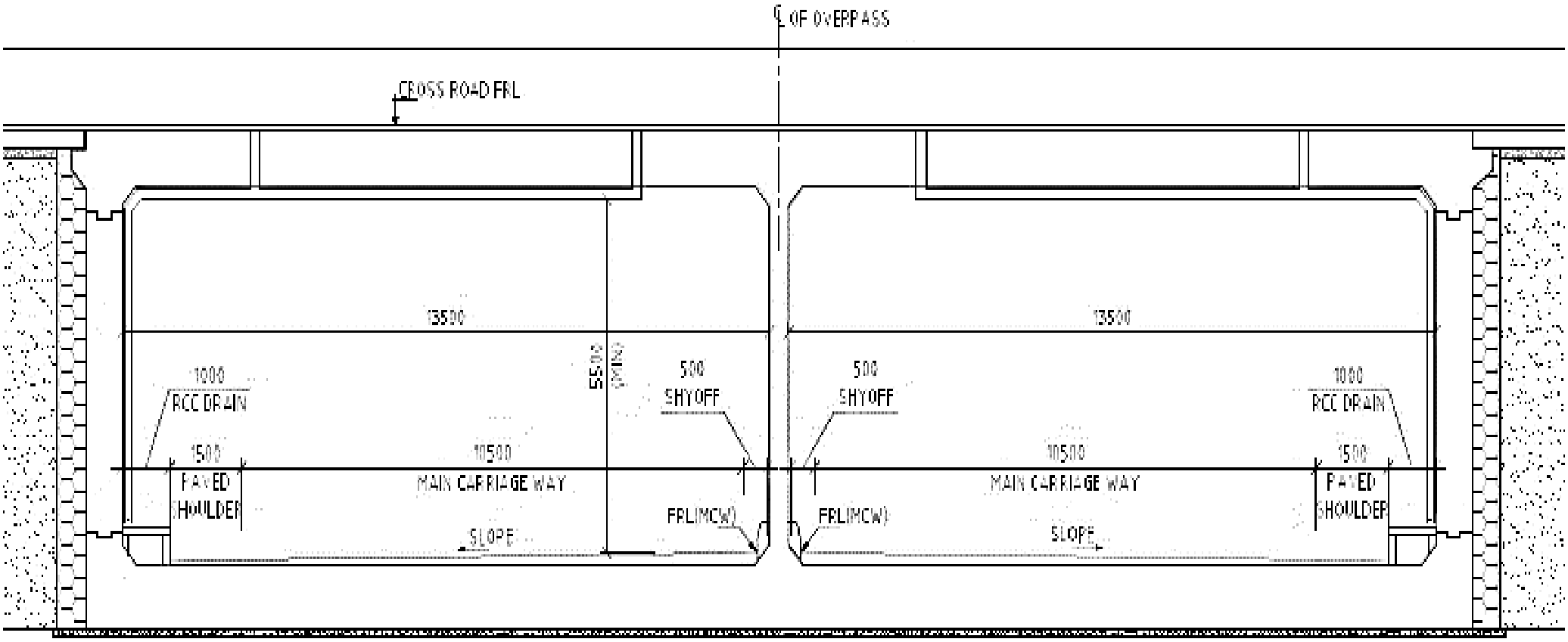
Lateral clearance mentioned is minimum clear span between the inner faces of substructure.

Note for Appendix-B VIII:

i) The actual lengths as required on the basis of detailed investigations shall be determined by the Concessionaire 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 16.

ii) All concrete structures shall be designed for severe exposure condition as per IRC:112-2019. In addition, steel reinforcement shall be given corrosion protection by use of Fusion Bonded Epoxy Coating (FBEC) or Galvanised steel / stainless steel shall be used for reinforcement.

iii) Exposed concrete surfaces shall be protected by applying acrylic elastomeric coating confirming to IRC: 80-2008 Clause 6.5.1/ Clause 2808 of Specifications for Road & Bridge Works (Fifth Revision).



Cross Sectional Arrangement of Vehicular Overpass

Appendix-BIX

Details of New Major Bridges and Rehabilitation/Repair/Widening Scheme for existing Major Bridges

a) Construction of New Major Bridges

The bridge shall be designed to carry the bridge structure utilities viz optical fiber cables and electricity cable or any other utilities as per requirement.

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Name of River / Bridge	Skew Angle (Deg.)	Proposed span arrangement (No. x L)/ Total length in m	Overall Width in m
1	-	311.914	Bharathapuzha River	-	1x10.00 + 11x32.5 + 1x10.00	16.00 + M + 16.00
2	14.143	326.270	Canoli Canal	-	3 x 32.00 + 1 x 48.80 + 3 x 32.00	16.00 + M + Existing
3	342.462	329.054	Kanjiramukku River - Puduponnani Bridge	-	2 x 16.60 + 7 x 24.30 + 2 x 16.60	Existing + M + 16.00
4	-	* 329.290	Submergence of Water body	-	RHS - 3x32.00	RHS-16.00

M-Clear Median width
* Based on CRZ requirements, At Des.Ch.329+290, RHS-MCW-Major Bridge of length 96m is proposed.

b) Rehabilitation/Repair and Strengthening of existing Major Bridges:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Name of River / Bridge	Span arrangement (No. x L)/ Total length in m	Details of Rehabilitation Measures
1	14.143 in Ponnani Bypass	326+270	Canoli Canal	3 x 32.00 + 1 x 48.80 + 3 x 32.00	Repair and Rehabilitation measures shall be carried out as mentioned in notes. Necessary measures / treatments for protecting structures in marine environment shall be carried out in accordance with relevant IRC codes and Guidelines.
2	342.462	329+054	Kanjiramukku River - Puduponnani Bridge	1 x 16.60 + 7 x 24.30 + 1 x 16.60	

Note: - Location and span are indicative. Exact location may be decided in consultation with IE/concerned authority. If any Cross drainage structure found to be inadequate in the detailed hydraulic studies, additional vent/spans shall be provided. This does not constitute any change of scope.

If the existing structure during detailed investigation is found structurally unsafe to cater the design loads as per the latest applicable codes, the same shall be reconstructed/ rehabilitated to make it safe for carrying the design loads. This does not constitute any change of scope.

Necessary repairs to existing structure shall be carried out in consultation with Concerned Authority/ Independent Engineer.

c) Re-construction of existing Major Bridges

The bridge shall be designed to carry the bridge structure utilities viz optical fibre cables and electricity cable or any other utilities as per requirement.

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Name of River / Bridge	Skew Angle (Deg.)	Proposed Span Arrangement (No. x L) / Total length in m	Total width In m
Nil						

d) Widening of existing Major Bridges

The bridge shall be designed to carry the bridge structure utilities viz optical fiber cables and electricity cable or any other utilities as per requirement

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Skew Angle (Deg.)	Proposed Span Arrangement (No. x L)/ Total length in m	Total width In m
Nil					

Notes for Appendix B IX:

1. Width is excluding Median gap and the gap between Main Carriageway & Service Road.
2. Location and span are indicative. Exact location may be decided in consultation with Authority/IE and the same shall not constitute a Change of Scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 16.
3. Span arrangement mentioned above is tentative and may be changed based on innovative design of structure, latest construction techniques and aesthetics of structures. The span lengths mentioned are bare minimum and should not be reduced. The actual lengths as required on the basis of detailed investigations shall be determined by the Concessionaire in accordance with the Specifications and Standards. 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 16.
4. Repairs and rehabilitation of all existing bridges shall include but not limited to general cleaning of bridge and area around bridge, restoration of slopes and protective works, removal and relaying of existing wearing coat, repair and replacement of drainage spouts, construction of new crash barriers in place of old railing, providing of new expansion joints and bearings in place of old ones wherever required and repair and rehabilitation of damaged concrete, if any, and providing floor protection with rigid and flexible apron and embankment slope protection if any etc. to the complete satisfaction and as per directions of Independent Engineer/Authority. All the repairs and rehabilitation works shall be carried out as per standards and manuals.
5. In case of bridges proposed for widening/repair as per details above, the same shall be re-constructed if the design shows that these are unsafe for design loads and inadequate for hydrology. No change of scope shall be considered in such cases.

6. The proposed span length of structure at Irrigation/Navigational canal crossing locations is tentative and subject to change as per requirement of the Irrigation Department/Inland waterway authority of India/concerned authorities. Any change in proposed length shall not be treated as change in scope of work.

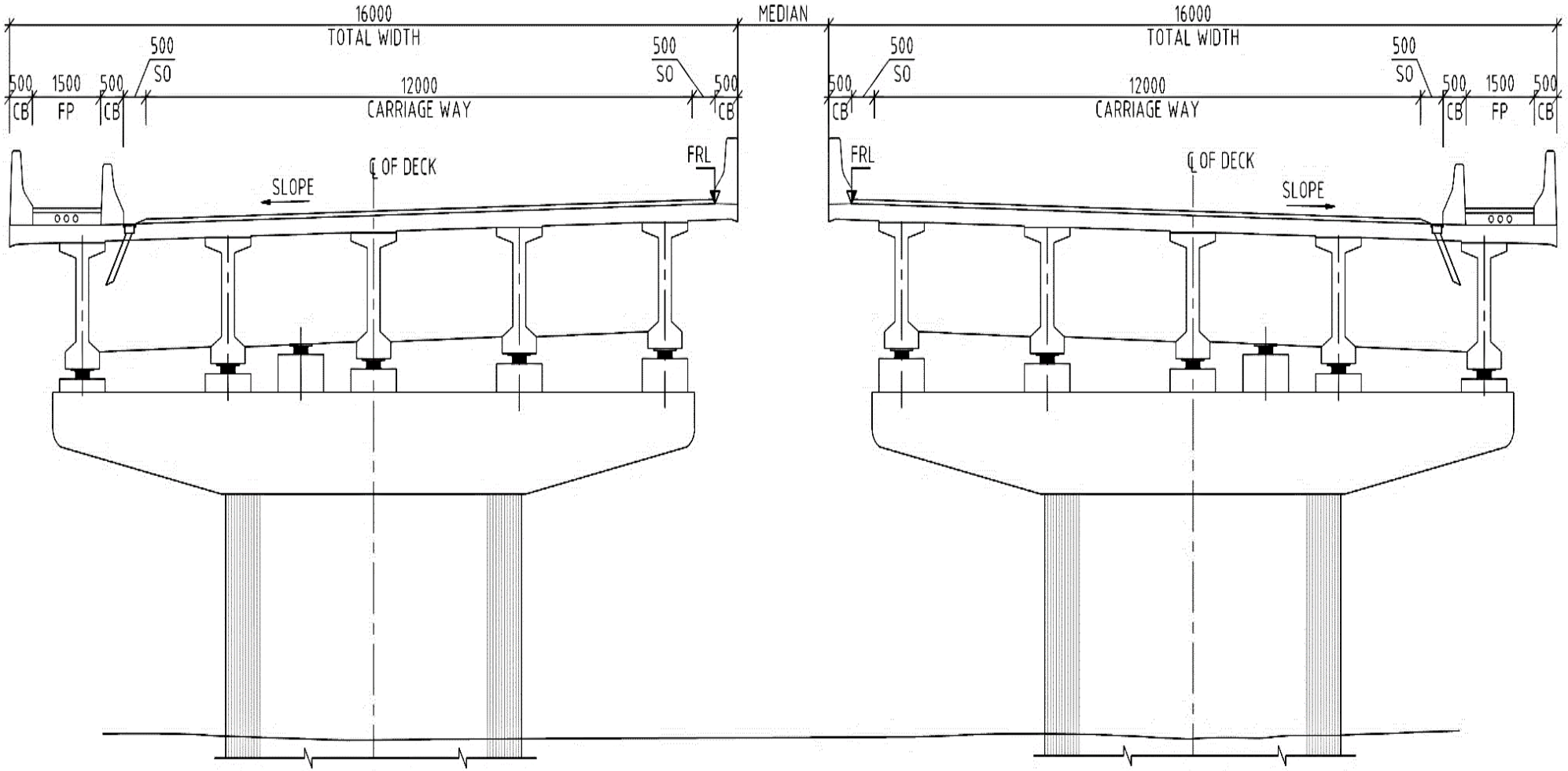
7. Structures Proposed at Irrigation/Navigational canal crossing locations shall be designed, constructed and maintained as per the requirement of Irrigation Department/Inland waterway authority of India/concerned authorities. Designs and Drawings shall be prepared in consultation with concerned authorities and concurrence shall be obtained from concerned authorities before construction.

8. Bridges/structures are located in marine environment corrosion prevention monitoring and remedial measures are required may be taken as per IRC: SP:80-2008.

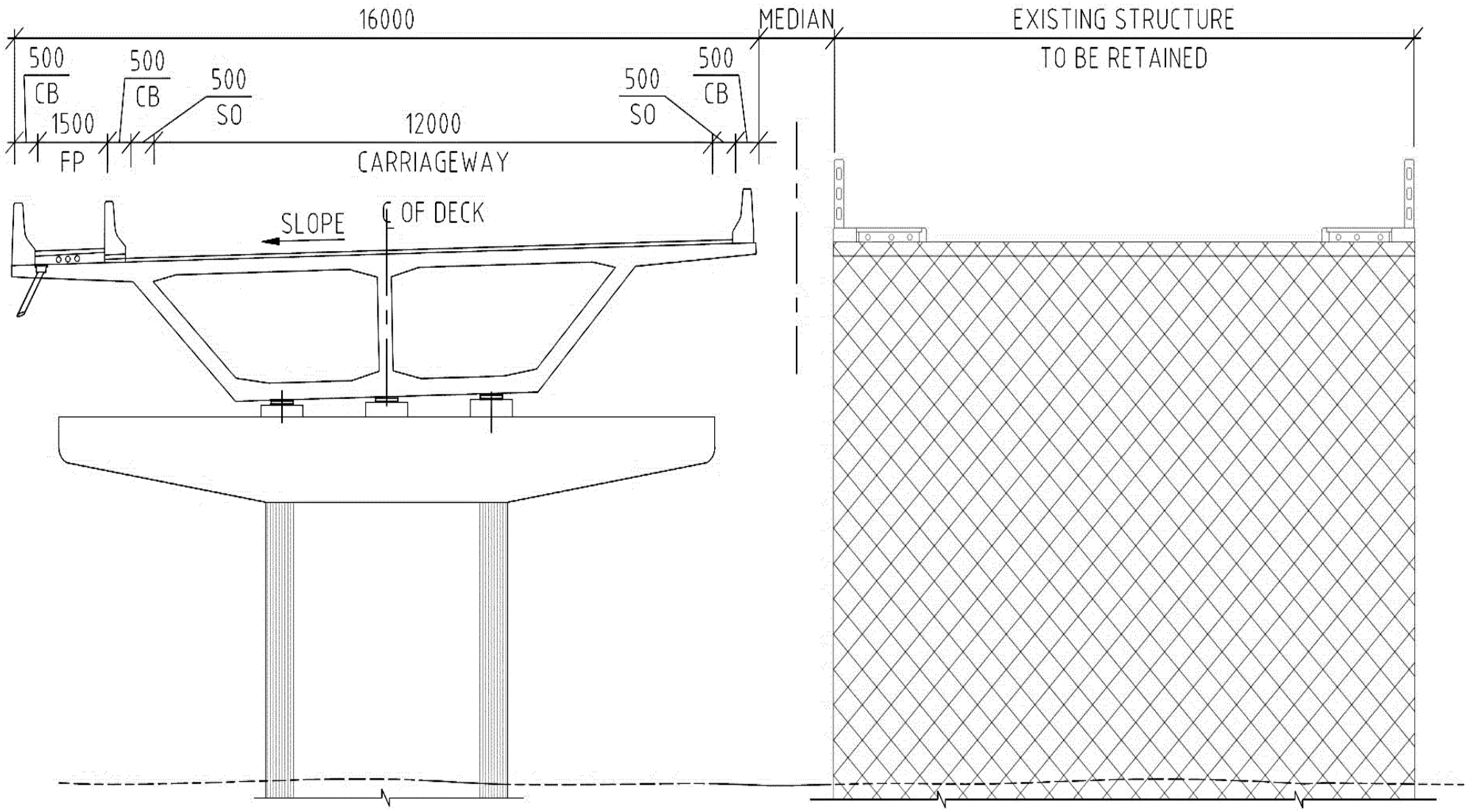
9. All concrete structures shall be designed for severe exposure condition as per IRC: 112-2019. In addition, steel reinforcement shall be given corrosion protection by use of Fusion Bonded Epoxy Coating (FBEC) or Galvanised steel / stainless steel shall be used for reinforcement.

10. Exposed concrete surfaces shall be protected by applying acrylic elastomeric coating confirming to IRC: 80-2008 Clause 6.5.1/ Clause 2808 of Specifications for Road & Bridge Works (Fifth Revision).

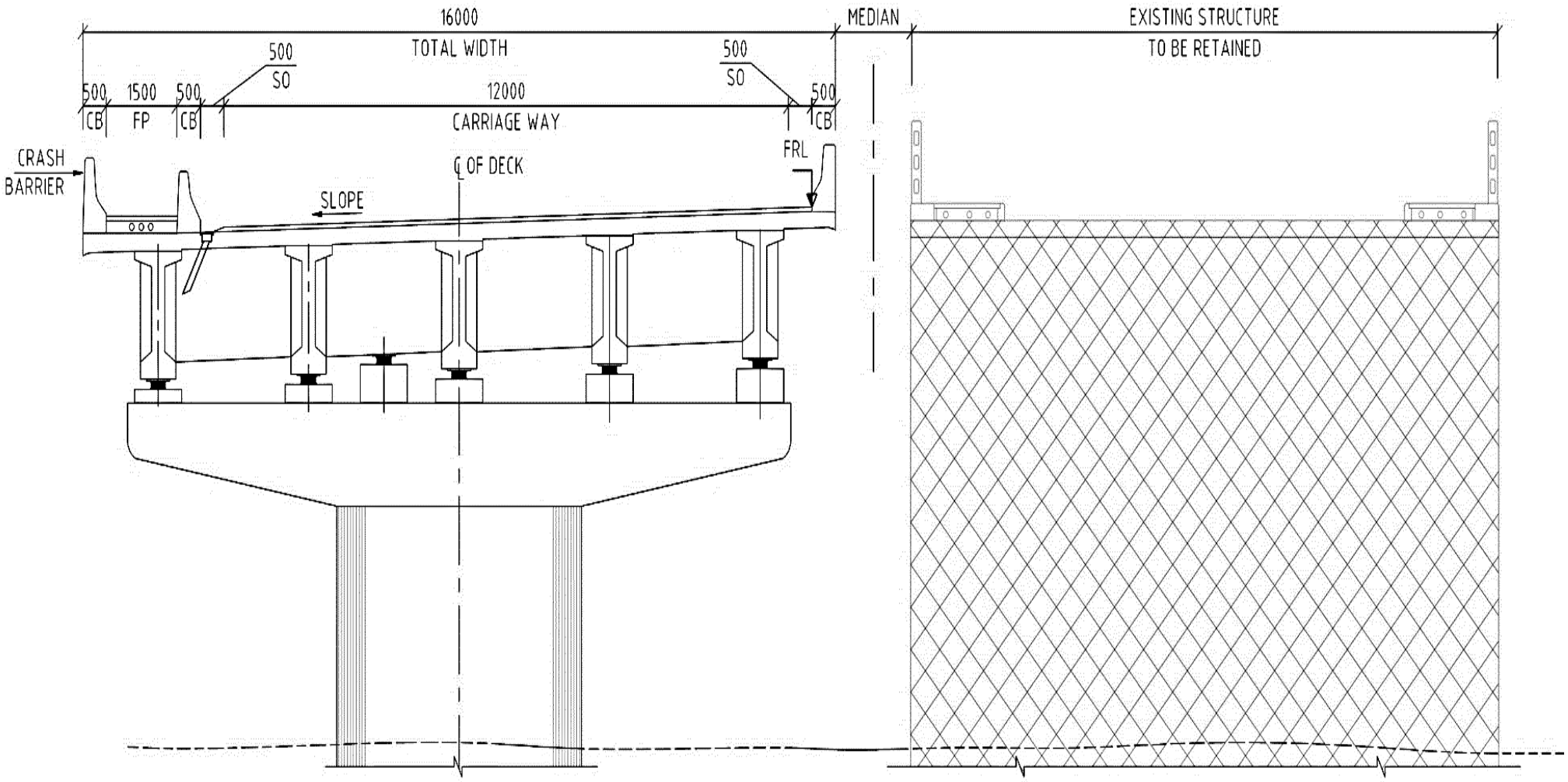
11. Refer to paragraph 7.22 of the manual and specify the necessary measures/treatments for protecting structures in marine environment, where applicable.



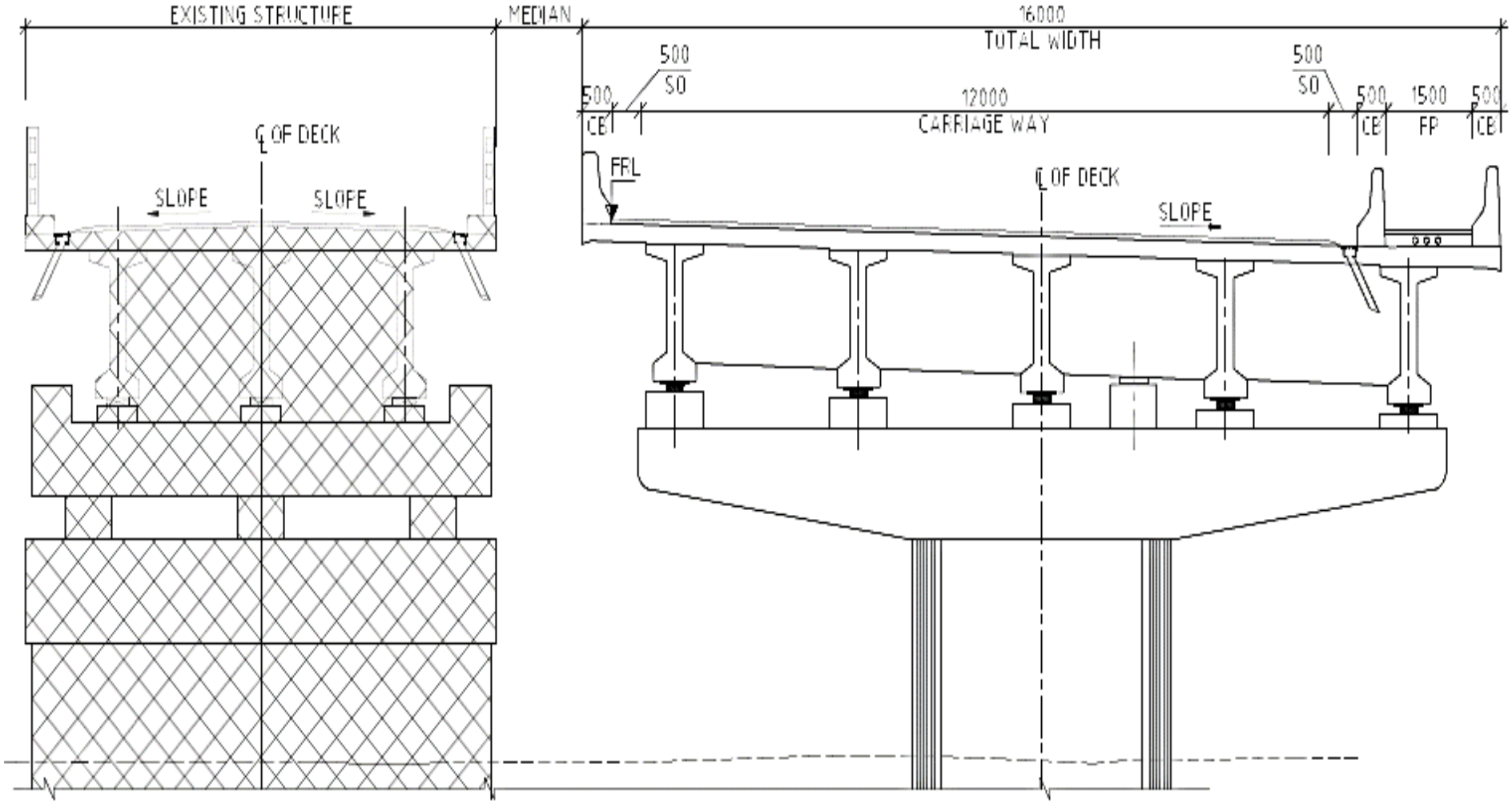
Cross Sectional Arrangement of New Construction of Major Bridge (16.00+M+16.00 Deck width)



Cross Sectional Arrangement of Major Bridge at Design Ch. 326+270 (Canal Crossing Portion)



Cross Sectional Arrangement of Major Bridge at Design Ch. 326+270 (Viaduct Portion)



Cross Sectional Arrangement of Major Bridge at Design Ch. 329+054

Appendix-BX

Details of new Minor Bridges and Rehabilitation/Repair/Widening Scheme for existing Minor Bridges

a) Construction of New Minor Bridges on Main Carriageway:

The bridges shall be designed to carry structure utilities viz optical fiber cables and electricity cable or any other utilities as per requirement.

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Skew Angle (Deg.)	Proposed span arrangement (No. x L)	Proposed bridge type	* Overall Width in m	Remark
1	Valanchery Bypass	303+614	45°	1 x 17.00 (SK)	RCC I-Girder + Deck Slab	16.00 + 16.00	Nala training to be done for a length of 21m on LHS. (From Des.ch. 303+590 to Des.ch. 303+611)
2	Valanchery Bypass	304+115	57°	1 x 25.00 (SK)	PSC I-Girder + Deck Slab	14.00 + 14.00	-
3	-	**329+290	-	LHS - 1 x 32.00	PSC I-Girder + Deck Slab	LHS-16.00	At CRZ Zone

SK – Skew span.
* Width is excluding Median gap and the gap between Main Carriageway & Service road if any.
** Based on CRZ requirements, At Des.Ch.329+290, LHS MCW-Minor Bridge of length 32m is proposed.

b) Construction of New Minor Bridges on Service Road

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Skew Angle (Deg.)	Proposed span arrangement (No. x L)	Proposed Bridge Type	Overall Width in (m)
Nil						

Rehabilitation/Repair and strengthening of existing Minor Bridges on main carriageway

Sl. No.	Existing Chainage (km)	Design Chainage km)	Skew Angle (Deg.)	Span Arrangement (No. x L)	Proposed Width (m)	Details of Repair	Details of widening
Nil							

c) Re-construction of existing Minor Bridges

The bridge shall be designed to carry the bridge structure utilities viz optical fiber cables and electricity cable or any other utilities as per requirement.

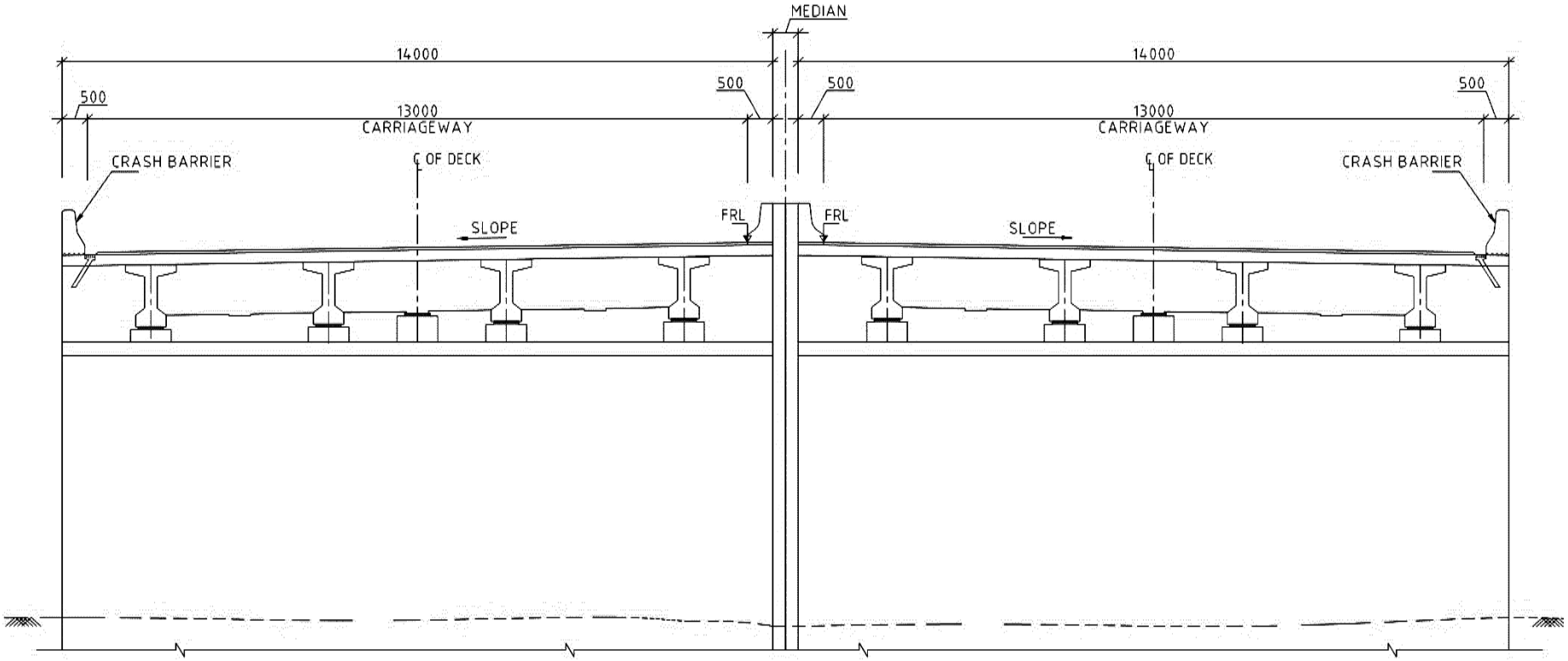
Sl. No.	Existing Chainage (km)	Design Chainage km)	Skew Angle (Deg.)	Proposed span arrangement (No. x L)	Overall width (m)	Remarks
Nil						

Note for Appendix-B X:

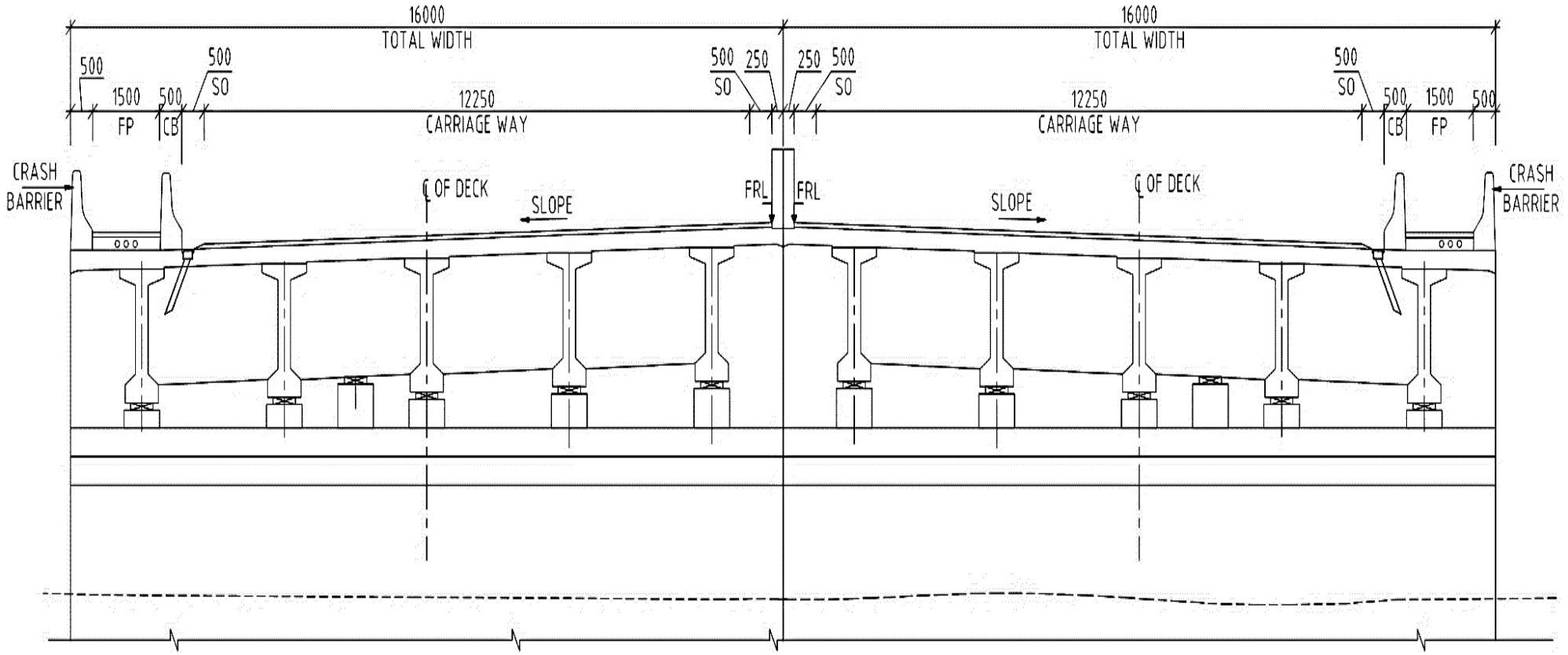
1. Width is excluding Median gap and the gap between Main Carriageway & Service Road.
2. Location and span are indicative. Exact location may be decided in consultation with Authority/IE and the same shall not constitute a Change of Scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 16.
3. Span arrangement mentioned above is tentative and may be changed based on innovative design of structure, latest construction techniques and aesthetics of structures. The span lengths mentioned are bare minimum and should not be reduced. The actual lengths as required on the basis of detailed investigations shall be determined by the Concessionaire in accordance with the Specifications and Standards. 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 16.
4. Repairs and rehabilitation of all existing bridges shall include but not limited to general cleaning of bridge and area around bridge, restoration of slopes and protective works, removal and relaying of existing wearing coat, repair and replacement of drainage spouts, construction of new crash barriers in place of old railing, providing of new expansion joints and bearings in place of old ones wherever required and repair and rehabilitation of damaged concrete, if any, and providing floor protection with rigid and flexible apron and embankment slope protection if any etc. to the complete satisfaction and as per directions of Independent Engineer/Authority. All the repairs and rehabilitation works shall be carried out as per standards and manuals.
5. In case of bridges proposed for widening/repair as per details above, the same shall be re-constructed if the design shows that these are unsafe for design loads and inadequate for hydrology. No change of scope shall be considered in such cases.
6. The proposed span length of structure at Irrigation/Navigational canal crossing locations is tentative and subject to change as per requirement of the Irrigation Department/Inland waterway authority of India/concerned authorities. Any change in proposed length shall not be treated as change in scope of work.
7. Structures Proposed at Irrigation/Navigational canal crossing locations shall be designed, constructed and maintained as per the requirement of Irrigation Department/Inland waterway authority of India/concerned authorities. Designs and Drawings shall be prepared in consultation with concerned authorities and concurrence shall be obtained from concerned authorities before construction.
8. Bridges/structures are located in marine environment corrosion prevention monitoring and remedial measures are required may be taken as per IRC: SP:80-2008.
9. All concrete structures shall be designed for severe exposure condition as per IRC: 112-2019. In addition, steel reinforcement shall be given corrosion protection by use of Fusion Bonded Epoxy Coating (FBEC) or Galvanised steel / stainless steel shall be used for reinforcement.

10. Exposed concrete surfaces shall be protected by applying acrylic elastomeric coating confirming to IRC: 80-2008 Clause 6.5.1/ Clause 2808 of Specifications for Road & Bridge Works (Fifth Revision).

11. Refer to paragraph 7.22 of the manual and specify the necessary measures/treatments for protecting structures in marine environment, where applicable.



Cross Sectional Arrangement of New Construction of Minor Bridges (14.00+M+14.00 deck width)



Cross Sectional Arrangement of New Construction of Minor Bridges (16.00+M+16.00 deck width)

Appendix-BXI

a) Reconstruction of Culverts

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposed Type of Structure	Skew Angle (Deg.)	Span arrangement no. x l x ht. (m)	Remarks
1	304.650	298+947	Box Culvert	-	1 x 4.00 x 2.00	In approach of Grade separator
2	304.920	299+219	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
3	305.150	299+449	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
4	311.225	304+546	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
5	311.825	305+140	Box Culvert	-	1 x 2.00 x 2.00	-
6	312.025	305+334	Box Culvert	-	1 x 2.00 x 2.00	-
7	312.325	305+626	Box Culvert	-	1 x 3.00 x 2.00	-
8	313.275	306+548	Box Culvert	23°	1 x 3.00 x 2.00	In approach of Grade separator
9	315.100	308+300	Box Culvert	-	1 x 2.00 x 2.00	-
10	315.400	308+599	Box Culvert	-	1 x 2.00 x 2.00	-
11	317.715	310+902	Box Culvert	-	1 x 2.00 x 2.00	In approach of ROB & Grade separator
12	317.810	311+002	Box Culvert	-	1 x 2.00 x 2.00	In approach of ROB & Grade separator
13	0.017	312+200	Box Culvert	-	1 x 2.00 x 2.00	-
14	0.400	312+570	Box Culvert	-	1 x 2.00 x 2.00	-
15	0.961	313+117	Box Culvert	-	1 x 2.00 x 2.00	-
16	1.844	313+984	Box Culvert	-	1 x 2.00 x 2.00	-
17	2.541	314+666	Box Culvert	-	1 x 3.00 x 2.00	-
18	2.966	315+091	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
19	3.285	315+420	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
20	3.552	315+680	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
21	3.874	316+001	Box Culvert	-	1 x 2.00 x 2.00	-
22	5.301	317+429	Box Culvert	-	1 x 4.00 x 2.50	Nala training to be done for length of 28.0m on LHS (From Design Ch.317+427 to 317+455) & for 256.0m length on RHS (From Design Ch.317+175 to 317+431)
23	5.979	318+107	Box Culvert	-	1 x 5.00 x 2.00	In approach of Grade separator; Nala training to

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposed Type of Structure	Skew Angle (Deg.)	Span arrangement no. x l x ht. (m)	Remarks
						be done for length of 162m on RHS(From Des.ch.317+948 to 318+110) & for length of 43.0m(From Design Ch.318+104 to 318+147) & 167.0m(From Design Ch.318+203 to 318+370) on LHS.
24	6.320	318+449	Box Culvert	-	1 x 3.00 x 2.00	In approach of Grade separator
25	6.664	318+792	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
26	6.964	319+092	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
27	7.249	319+377	Box Culvert	-	1 x 3.00 x 2.00	In approach of Grade separator
28	8.975	321+102	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
29	9.411	321+538	Box Culvert	-	1 x 2.00 x 2.00	-
30	9.917	322+044	Box Culvert	-	1 x 2.00 x 2.00	-
31	10.432	322+559	Box Culvert	-	1 x 2.00 x 2.00	-
32	11.746	323+872	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
33	12.105	324+232	Box Culvert	-	1 x 2.00 x 2.00	-
34	12.650	324+776	Box Culvert	-	1 x 2.00 x 2.00	-
35	13.188	325+314	Box Culvert	-	1 x 2.00 x 2.00	-
36	13.374	325+500	Box Culvert	-	1 x 2.00 x 2.00	-
37	14.478	326+603	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
38	340.417	327+039	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator
39	340.564	327+186	Box Culvert	-	1 x 2.00 x 2.00	In approach of Grade separator

b) Culvert to be Dismantled:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Skew Angle (Deg.)	Type of Culvert	Existing Span Arrangement (m)
1	312.975	306+288	-	Slab Culvert	1 x 4.00 x 2.00
2	316.425	309+628	18°	Slab Culvert	1 x 1.20 x 0.50
3	11.222	323+349	-	Box Culvert	1 x 2.00 x 1.20
4	11.507	323+633	-	Slab Culvert	1 x 2.00 x 0.80

Note: Culverts falling in cutting section / at grade separator substructure location are proposed for

dismantling.

c) **Construction of New Culverts:**

Sl. No.	Design Chainage (km)	Proposed Type of Structure	Skew (Deg.)	Span arrangement no. x l x ht. (m)
1	303+200	Box Culvert	-	1 x 2.00 x 2.00
2	303+400	Box Culvert	-	1 x 2.00 x 2.00
3	304+040	Box Culvert	-	1 x 2.00 x 2.00
4	304+300	Box Culvert	-	1 x 2.00 x 2.00
5	304+400	Box Culvert	-	1 x 3.00 x 2.00
6	306+269	Box Culvert	-	1 x 4.00 x 2.00
7	306+694	Box Culvert	-	1 x 2.00 x 2.00
8	306+869	Box Culvert	-	1 x 4.00 x 2.00
9	307+235	Box Culvert	-	1 x 2.00 x 2.00
10	323+360	Box Culvert	-	1 x 2.00 x 2.00
11	323+625	Box Culvert	-	1 x 2.00 x 2.00
12	330.110	Box Culvert	-	1 x 2.00 x 2.00
13	330.590	Box Culvert	-	1 x 2.00 x 2.00
14	330.870	Box Culvert	-	1 x 2.00 x 2.00
15	331.350	Box Culvert	-	1 x 2.00 x 2.00
16	331.650	Box Culvert	-	1 x 2.00 x 2.00
17	332.100	Box Culvert	-	1 x 2.00 x 2.00
18	332.890	Box Culvert	-	1 x 2.00 x 2.00
19	333.060	Box Culvert	-	1 x 2.00 x 2.00
20	333.500	Box Culvert	-	1 x 2.00 x 2.00
21	334.140	Box Culvert	-	1 x 2.00 x 2.00
22	335.220	Box Culvert	-	1 x 2.00 x 2.00
23	335.800	Box Culvert	-	1 x 2.00 x 2.00

Additional box culverts of 5 no of size 2mx2m as per site requirement for field channels as decided by the IE/NHAI.

d) Additional New Construction of Cross Drain Culverts at Cutting Sections:

Sl. No.	Design Chainage (km)	Type of Culvert	Side	Remarks/Drawing Type
1	300+230	Pipe Culvert	LHS to RHS	TCS Option-2
2	300+740	Pipe Culvert	LHS & RHS	Drain out connectivity on LHS & RHS
3	304+720	Pipe Culvert	LHS to RHS	TCS Option-2
4	305+700	Pipe Culvert	LHS to RHS	TCS Option-2
5	307+380	Pipe Culvert	RHS	TCS Option-1
6	308+170	Pipe Culvert	LHS to RHS	TCS Option-2
7	310+400	Pipe Culvert	RHS	TCS Option-1
8	310+500	Pipe Culvert	LHS	TCS Option-1
9	312+400	Pipe Culvert	RHS	TCS Option-1 (SR of RHS to be drain out into MCW)

Note: Above mentioned culverts are provided to drain out the water from main carriageway drain to service road drain in cutting sections.

e) At Junction Improvement on Cross road

1. New Cross road Pipe culverts proposed at Grade Separated Junctions

Sl. No.	Existing Chainage(km)	Design Chainage (km)	Type of Junction	No. of Culverts	No. x Dia. of Culvert
1	305.110	299+360	3 Legged	1	1 x 1.20
2	Valanchery Bypass	302+090	4 Legged	2	1 x 1.20
3	Valanchery Bypass	302+800	4 Legged	2	1 x 1.20
4	Valanchery Bypass	303+815	4 Legged	2	1 x 1.20
5	311.275	304+468	3 Legged	1	1 x 1.20
6	311.727	304+930	3 Legged	1	1 x 1.20
7	313.045	306+295	3 Legged	1	1 x 1.20
8	315.555	307+640	3 Legged	1	1 x 1.20
9	316.585	309+700	3 Legged	1	1 x 1.20
10	317.645	310+780	4 Legged	2	1 x 1.20
11	317.800	311+185	3 Legged	1	1 x 1.20
12	3.250	315+380	4 Legged	2	1 x 1.20
13	6.200	318+345	4 Legged-RHS	1	1 x 1.20
14	7.050	319+174	4 legged	2	1 x 1.20
15	8.880	321+005	4 legged	2	1 x 1.20
16	11.350	323+472	4 legged	2	1 x 1.20
17	13.865	325+985	4 Legged	2	1 x 1.20
18	340.170	326+800	3 Legged	1	1 x 1.20
19	344.480	331+075	4 Legged	2	1 x 1.20
20	348.290	334+870	3 legged	1	1 x 1.20

2. New Cross road Box culvert proposed at Grade Separated Junctions

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Junction	No. of Culverts	Span arrangement no. x l x ht. (m)
1	6.200	318+345	4 Legged-LHS	1	1 x 5.00 x 2.00

3. New Cross road Pipe culverts proposed at "At Grade Junctions"

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Junction	No. of Culverts	Span arrangement No. x Dia. of Culvert
1	-	305+315	3 Legged	1	1x1.20
2	-	305+950	3 Legged	1	1x1.20
3	Realignment	306+600	4 Legged	2	1x1.20
4	Realignment	307+500	3 Legged	1	1x1.20
5	316.030	308+155	3 Legged	1	1x1.20
6	316.725	309+860	Staggered Junction	2	1x1.20
7	0.250	312+420	3 Legged	1	1x1.20
8	3.465	315+595	3 Legged	1	1x1.20
9	10.070	322+195	4 Legged	2	1x1.20
10	10.530	322+650	4 Legged	2	1x1.20

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Junction	No. of Culverts	Span arrangement No. x Dia. of Culvert
11	12.220	324+350	4 legged	2	1x1.20
12	12.590	324+720	4 legged	2	1x1.20
13	12.690	324+820	3 Legged	1	1x1.20
14	12.735	324+860	3 Legged	1	1x1.20
15	13.360	325+490	4 legged	2	1x1.20
16	340.680	327+300	3 Legged	1	1x1.20
17	340.960	327+560	3 Legged	1	1x1.20
18	342.150	328+740	3 Legged	1	1x1.20
19	343.310	329+892	3 Legged	1	1x1.20
20	343.410	329+990	3 Legged	1	1x1.20
21	344.810	331+390	3 Legged	1	1x1.20
22	345.315	331+890	3 Legged	1	1x1.20
23	346.150	332+725	3 Legged	1	1x1.20
24	346.225	332+800	3 Legged	1	1x1.20
25	346.525	333+100	3 Legged	1	1x1.20
26	347.040	333+620	4 Legged	2	1x1.20
27	347.750	334+330	3 Legged	1	1x1.20
28	348.245	334+825	3 Legged	1	1x1.20
29	349.090	335+680	3 legged	1	1x1.20

f) Widening of Culverts

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structures	Skew Angle (Deg.)	Proposed Span arrangement no. x l x ht. (m)	Overall width in m
1	0.440	312+608	Box Culvert	-	1 x 2.00 x 1.50	As per Cl. 4.1 of Annex – I (Schedule -B)
2	0.753	312+912	Box Culvert	-	1 x 2.00 x 1.60	As per Cl. 4.1 of Annex – I (Schedule -B)
3	4.177	316+305*	Box Culvert	-	1 x 2.40 x 1.80	As per Cl. 4.1 of Annex – I (Schedule -B)
4	4.474	316+602	Box Culvert	-	1 x 2.00 x 1.80	As per Cl. 4.1 of Annex – I (Schedule -B)
5	4.848	316+976**	Box Culvert	-	1 x 4.00 x 2.50	As per Cl. 4.1 of Annex – I (Schedule -B)
6	5.648	317+776***	Box Culvert	-	1 x 5.00 x 2.00	As per Cl. 4.1 of Annex – I (Schedule -B)
7	7.724	319+851	Box Culvert	-	1 x 3.00 x 1.10	As per Cl. 4.1 of Annex – I (Schedule -B)
8	8.082	320+209	Box Culvert	-	1 x 2.00 x 1.60	As per Cl. 4.1 of Annex – I (Schedule -B)
9	8.430	320+557	Box Culvert	-	1 x 3.00 x 1.00	As per Cl. 4.1 of Annex – I (Schedule -B)
10	343.000	329+595	Box Culvert	-	1x 1.50 x 1.50	As per Cl. 4.1 of Annex – I (Schedule -B)
11	347.850	334+420	Box Culvert	-	1 x 1.50 x 1.50	As per Cl. 4.1 of Annex – I (Schedule -B)

*Nala training to be done for length of 21.0m on LHS (From Design Ch.316+285 to 316+306) & for 33.0m length on RHS. (From Design Ch.316+304 to316+337).

**Nala training to be done for 27.0m length on RHS. (From Des.Ch.316+975 to 317+002).

***Nala training to be done for length of 14.0m on LHS (From Design Ch.317+764 to 317+778) & for 16.0m length on RHS (From Des.Ch.317+775 to 317+791).

Note for Appendix-B XI:

1. The overall width of the above culverts shall be equal to Roadway width. In other words, the above culverts shall also be provided in median gap and also in gap between main carriageway & service road, in case if there is any service road. Any additional Barrel length required as per site conditions shall not constitute a Change of Scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 16.

2. Location and span arrangements of the above culverts are indicative. Exact location of these culverts may be decided in consultation with Authority/Independent Engineer. The span lengths mentioned are bare minimum and should not be reduced. The actual vent way/span arrangements of culverts shall be determined on the basis of detailed investigations by the Concessionaire in accordance with the Specifications and Standards. Any increase in vent way/span arrangements 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 16.

3. Repairs and rehabilitation of all existing culverts proposed to be retained shall include but not limited to general cleaning of culvert and area around culvert, restoration of slopes and protective works, removal and relaying of existing wearing coat, apron & quadrilateral pitching to be done for all existing culverts, cracks to be sealed in head walls and return walls and repair and rehabilitation of damaged concrete if any etc. to the complete satisfaction of Authority/Independent Engineer. All the repairs and rehabilitation works shall be carried out as per standards and manuals.

4. In Case of culverts proposed for widening/repair as per details above, the same shall be re-constructed if the design shows that these are unsafe for design loads. No change of scope shall be considered in such cases.

5. Cross drainage structures mentioned are bare minimum. Actual size and no. of structure may increase based on the detailed hydraulic study. Any such changes shall not constitute change of scope.

6. Nala training length mentioned is tentative. Exact length shall be decided in consultation with Concerned Authority/IE and the same shall not constitute any change of scope.

Appendix-BXII

(a) Construction of New ROB/RUBs:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Skew Angle (Deg.)	Overall Width (m)	Span Arrangement (No. x L) m	Remark
1	317.425	310+663	15°	Existing Retained + M + 16.728 (at Railway Spans) & 14.00 (at approach spans)	LHS - 4x22.50 + (2x22.50) + 6x22.50; RHS- 3x22.50 + (1x26.360 + 1x63.480) + 5x22.50	ROB cum Viaduct; In railway boundary spans mentioned is straight and approach spans outside railway boundary is in skew of 15 deg.

M – Median gap.

Notes for Appendix-B XII:

1. The proposed span arrangements of the ROB's are tentative and subject to change as per availability of railway boundaries/ requirements of the railways and as per the latest circular of Railway. The span lengths mentioned are bare minimum and should not be reduced. Any increase in the proposed span arrangement shall not be treated as change in scope of work, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 16.

2. ROB shall be designed, constructed and maintained as per the requirement of Railway Authority. The construction plans and design shall be prepared in consultation with the concerned Railway Authority.

3. The ROB shall be constructed and maintained by the concessionaire under the supervision of Railways.

4. All expenditure related to construction, maintenance and supervision of ROB/RUB shall be borne by the Concessionaire

5. All charges payable to the Railways like P&E, D&G, Supervision Charges, maintenance, operating charges etc. shall be borne by the Concessionaire.

6. In any case the total length of viaduct portion shall not be less than indicated in the table.

7. Repairs and rehabilitation of existing ROB shall include but not limited to general cleaning of bridge and area around bridge, restoration of slopes and protective works, removal and relaying of existing wearing coat, repair and replacement of drainage spouts, construction of new crash barriers in place of old railing, providing new expansion joints and bearings in place of old ones wherever required, repair and rehabilitation of damaged concrete, if any, and embankment slope protection if any etc. to the complete satisfaction and as per directions of Independent Engineer/Authority. All the repairs and rehabilitation works shall be carried out as per standards and manuals.

8. Necessary repairs to existing structure shall be carried out in consultation with Authority/ independent engineer.

9. All concrete structures shall be designed for severe exposure condition as per IRC: 112-2019. In addition, steel reinforcement shall be given corrosion protection by use of Fusion Bonded Epoxy Coating (FBEC) or Galvanised steel / stainless steel shall be used for reinforcement.

10. Exposed concrete surfaces shall be protected by applying acrylic elastomeric coating confirming to IRC: 80-2008 Clause 6.5.1/ Clause 2808 of Specifications for Road & Bridge Works (Fifth Revision).

(b) Rehabilitation/Repair and Strengthening of existing ROB/RUB:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Span arrangement (No. x L)/ Total length in m	Details of Rehabilitation Measures
1	317.425	310+663	LHS - 4x22.50 + (2x22.50) + 6x22.50	Rehabilitation measures for ROB cum Viaduct is as mentioned below

All the existing structures shall be inspected by a specialized agency having relevant experience and expertise. Both visual inspection and Non-Destructive/ Destructive testing shall be carried out for assessment of condition of the structure and to finalize its repair and rehabilitation. Based on the defects observed and test results, a comprehensive repair and rehabilitation plan shall be prepared for the repair and rehabilitation of distressed structure components. Both testing and repair and rehabilitation plan shall get approved from IE/Authority Engineer.

Common Repair/Rehabilitation measures for all structures:

1) Remove debris/vegetation from pier/abutment cap, expansion joints and bridge deck.
2) Paint Structure numbers in continuous and uniform Chainage.
3) Provide RCC Drainage chutes with energy dissipater basins at ground at 5m intervals with one drainage chute at start and end of water collector channel.
4) Clean drainage spouts. Provide missing/damaged gratings. Fill up the hole in the deck slab around spout. Replace drainage spouts with short/missing down take pipes. Install missing drainage spouts at locations where they are missing/not provided at all originally.
5) Construct Concrete inspection ladders on stone pitching around abutments for an easy access to the riverbed for inspection.
6) Remove vegetation from vent way and pitching around abutments.
7) Replace all damaged bearings.
8) Replace expansion joints of old bridges with RCC/PSC Girder and slab type superstructure with strip seal type expansion joints after rehabilitating/strengthening/thickening the deck slab near expansion joints suitably.
9) Replace/Rehabilitate damaged stone pitching on embankments.
10) Replace all RCC railing adjoining carriageway with RCC Crash barrier.
11) Provide drip course.

Appendix B-XIII

Tunnels shall be provided at the following stretches.

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length
	From	To	From	To	
Nil					

Appendix B-XIV
Cut Slope Stability Measures with Soil Nailing.

A) Between Main Carriageway & Service road

Sl. No.	Design Chainage (km)		Length, m	Side	Total Length*, m	Type of Retaining Structure
	From	To				
1	300+440	300+670	230	LHS	230	Nailed RE Wall
2	300+530	300+700	170	RHS	170	Nailed RE Wall
3	314+250	314+420	170	LHS	170	Nailed RE Wall
Total, m					**570**	

B) Edge of Service road

Sl. No.	Design Chainage (km)		Length, m	Side	Total Length*, m	Type of Retaining Structure
	From	To				
1	306+920	307+210	290	Both	580	Nailed RE Wall
2	312+620	312+970	350	LHS	350	Nailed RE Wall
3	312+620	312+810	190	RHS	190	Nailed RE Wall
4	313+380	313+710	330	LHS	330	Nailed RE Wall
5	313+600	313+710	110	RHS	110	Nailed RE Wall
6	314+160	314+250	90	Both	180	Nailed RE Wall
7	314+420	314+540	120	LHS	120	Nailed RE Wall
8	314+420	314+510	90	RHS	90	Nailed RE Wall
Total, m					**1950**	

Note: Any variation in lengths specified in the above table(s) shall not constitute a Change of Scope, save and except any variation in the length arising out of a change of scope expressly undertaken in accordance with the provisions of Article 16.

Appendix B-XV

Earth Retaining Structures (RE wall / RCC) shall be provided at the edge of Service Road.

A) On LHS Service Road

Sl. No.	Design Chainage (km)		Length, m	Type of Retaining Structure
	From	To		
1	299+280	299+360	80	RE Wall
2	299+390	299+440	50	RE Wall
3	300+160	300+240	80	RE Wall
4	304+200	304+460	260	RE Wall
5	304+500	304+550	50	RE Wall
6	304+590	304+660	70	RE Wall
7	304+730	304+800	70	RE Wall
8	305+060	305+520	460	RE Wall
9	305+570	305+660	90	RE Wall
10	305+720	305+760	40	RE Wall
11	305+880	306+030	150	RE Wall
12	306+410	306+690	280	RE Wall
13	306+730	306+880	150	RE Wall
14	307+210	307+340	130	RE Wall
15	307+450	307+630	180	RE Wall
16	307+700	307+980	280	RE Wall
17	309+970	310+540	570	RE Wall
18	310+810	311+040	230	RE Wall
19	311+310	311+400	90	RE Wall
20	312+260	312+590	330	RE Wall
21	312+970	313+120	150	RE Wall
22	313+310	313+380	70	RE Wall
23	315+590	315+870	280	RE Wall
24	318+430	318+510	80	RE Wall
25	318+690	318+870	180	RE Wall
26	319+000	319+160	160	RE Wall
27	319+290	319+470	180	RE Wall
28	319+560	319+600	40	RE Wall
29	320+950	321+190	240	RE Wall
30	323+280	323+350	70	RE Wall
31	323+700	323+860	160	RE Wall
32	324+140	324+240	100	RE Wall
33	324+460	324+530	70	RE Wall
34	326+470	326+660	190	RE Wall
35	327+000	327+090	90	RE Wall
36	328+820	328+950	130	RE Wall
37	329+340	329+470	130	RE Wall
Total			**5960**	

B) On RHS Service Road

Sl. No.	Design Chainage (km)		Length, m	Type of Retaining Structure
	From	To		
1	298+510	298+560	50	RE Wall
2	298+930	298+950	20	RE Wall
3	299+110	299+130	20	RE Wall
4	299+170	299+210	40	RE Wall
5	299+240	299+300	60	RE Wall
6	299+370	299+420	50	RE Wall
7	299+440	299+480	40	RE Wall
8	299+500	299+530	30	RE Wall
9	299+550	299+570	20	RE Wall
10	299+800	299+840	40	RE Wall
11	300+200	300+460	260	RE Wall
12	304+200	304+470	270	RE Wall
13	304+530	304+770	240	RE Wall
14	304+860	304+990	130	RE Wall
15	305+350	305+500	150	RE Wall
16	306+320	306+580	260	RE Wall
17	306+720	306+920	200	RE Wall
18	307+210	307+310	100	RE Wall
19	307+500	307+600	100	RE Wall
20	307+650	308+100	450	RE Wall
21	308+180	308+490	310	RE Wall
22	309+350	309+430	80	RE Wall
23	309+930	310+110	180	RE Wall
24	310+250	310+540	290	RE Wall
25	310+810	311+320	510	RE Wall
26	311+540	311+700	160	RE Wall
27	312+550	312+620	70	RE Wall
28	313+020	313+220	200	RE Wall
29	313+340	313+380	40	RE Wall
30	313+950	314+100	150	RE Wall
31	314+250	314+420	170	RE Wall
32	315+620	315+870	250	RE Wall
33	318+360	318+480	120	RE Wall
34	318+710	318+850	140	RE Wall
35	319+020	319+170	150	RE Wall
36	319+290	319+460	170	RE Wall
37	319+520	319+600	80	RE Wall
38	320+960	321+190	230	RE Wall
39	321+330	321+390	60	RE Wall
40	323+250	323+330	80	RE Wall
41	323+790	323+880	90	RE Wall
42	324+190	324+280	90	RE Wall

Sl. No.	Design Chainage (km)		Length, m	Type of Retaining Structure
	From	To		
43	324+680	324+830	150	RE Wall
44	326+390	326+630	240	RE Wall
45	328+840	328+920	80	RE Wall
46	329+330	329+380	50	RE Wall
Total			**6670**	

Note: Any variation in lengths specified in the above table(s) shall not constitute a Change of Scope, save and except any variation in the length arising out of a change of scope expressly undertaken in accordance with the provisions of Article 16.

Appendix B-XVI

Earth Retaining Structures (RE wall / RCC) shall be provided between Main Carriageway and service Road

A) On LHS Carriageway

Sl. No.	Design Chainage (km)		Length, m	Type of Retaining Structure
	From	To		
1	298+500	298+530	30	Retaining Wall
2	298+740	298+920	180	Retaining Wall
3	298+920	298+990	70	RE Wall
4	298+990	299+130	140	Retaining Wall
5	299+130	299+660	530	RE Wall
6	299+660	300+000	340	Retaining Wall
7	300+000	300+020	20	Retaining Wall
8	300+020	300+280	260	RE Wall
9	300+280	300+440	160	Retaining Wall
10	300+670	300+770	100	RE Wall
11	302+730	302+960	230	RE Wall
12	303+290	303+990	700	Toe Wall
13	303+990	304+200	210	RE Wall
14	304+200	304+270	70	Retaining Wall
15	304+270	304+680	410	RE Wall
16	304+680	304+830	150	Retaining Wall
17	304+830	304+990	160	RE Wall
18	304+990	305+480	490	Retaining Wall
19	305+480	305+580	100	RE Wall
20	305+580	305+930	350	Retaining Wall
21	305+930	306+030	100	RE Wall
22	306+030	306+150	120	Retaining Wall
23	306+150	306+800	650	RE Wall
24	306+800	306+910	110	Retaining Wall
25	307+240	307+440	200	Retaining Wall
26	307+440	307+750	310	RE Wall
27	307+750	307+900	150	Retaining Wall
28	307+900	308+120	220	RE Wall
29	308+120	308+480	360	Retaining Wall
30	308+590	308+690	100	Retaining Wall
31	308+690	309+130	440	RE Wall
32	309+130	309+400	270	Retaining Wall
33	309+400	310+370	970	RE Wall
34	310+370	310+510	140	Retaining Wall
35	310+900	310+980	80	Retaining Wall
36	310+980	311+650	670	RE Wall
37	311+650	311+700	50	Retaining Wall
38	311+700	311+735	35	Retaining Wall

Sl. No.	Design Chainage (km)		Length, m	Type of Retaining Structure
	From	To		
39	312+090	312+560	470	Retaining Wall
40	312+750	312+860	110	Retaining Wall
41	313+100	313+370	270	Retaining Wall
42	313+670	314+160	490	Retaining Wall
43	314+870	315+010	140	Retaining Wall
44	315+010	315+740	730	RE Wall
45	315+740	315+860	120	Retaining Wall
46	317+950	318+040	90	Retaining Wall
47	318+040	318+690	650	RE Wall
48	318+690	318+860	170	Retaining Wall
49	318+860	319+510	650	RE Wall
50	319+510	319+600	90	Retaining Wall
51	320+610	320+740	130	Retaining Wall
52	320+740	321+340	600	RE Wall
53	321+340	321+390	50	Retaining Wall
54	322+970	323+070	100	Retaining Wall
55	323+070	323+870	800	RE Wall
56	323+870	324+200	330	Retaining Wall
57	324+450	325+080	630	Retaining Wall
58	325+330	325+470	140	Retaining Wall
59	325+670	325+880	210	Retaining Wall
60	325+880	326+150	270	RE Wall
61	326+390	327+140	750	RE Wall
62	327+140	327+310	170	Retaining Wall
63	328+200	328+340	140	Retaining Wall
64	328+730	328+890	160	Retaining Wall
65	328+890	328+950	60	RE Wall
66	329+330	330+180	850	Retaining Wall
67	330+490	330+720	230	Retaining Wall
68	330+720	331+450	730	RE Wall
69	331+450	331+560	110	Retaining Wall
70	331+690	332+290	600	Retaining Wall
71	332+290	332+730	440	RE Wall
72	332+730	332+880	150	Retaining Wall
73	333+100	333+420	320	Retaining Wall
74	333+570	334+040	470	Retaining Wall
75	334+370	334+520	150	Retaining Wall
76	334+520	335+140	620	RE Wall
77	335+140	335+280	140	Retaining Wall
Total			**23005**	

B) On RHS Carriageway

Sl. No	Design Chainage (km)		Length, m	Type of Retaining Structure
	From	To		
1	298+500	298+880	330	Retaining Wall
2	298+880	299+040	160	RE Wall
3	299+040	299+110	70	Retaining Wall
4	299+110	299+660	550	RE Wall
5	299+660	299+860	200	Retaining Wall
6	299+860	300+180	320	RE Wall
7	300+180	300+370	190	Retaining Wall
8	300+370	300+390	20	Retaining Wall
9	300+390	300+530	140	Retaining Wall
10	300+700	300+770	70	RE Wall
11	302+730	302+960	230	RE Wall
12	303+210	303+990	780	Toe Wall
13	303+990	304+200	210	RE Wall
14	304+200	304+290	90	Retaining Wall
15	304+290	304+660	370	RE Wall
16	304+660	304+780	120	Retaining Wall
17	304+780	305+020	240	RE Wall
18	305+020	305+100	80	Retaining Wall
19	305+160	305+380	220	Retaining Wall
20	305+440	306+100	660	Retaining Wall
21	306+100	306+780	680	RE Wall
22	306+780	306+870	90	Retaining Wall
23	307+240	307+470	230	Retaining Wall
24	307+470	307+740	270	RE Wall
25	307+740	307+950	210	Retaining Wall
26	307+950	308+100	150	RE Wall
27	308+100	308+350	250	Retaining Wall
28	308+350	308+480	130	RE Wall
29	308+480	308+700	220	Retaining Wall
30	308+700	309+120	420	RE Wall
31	309+120	309+390	270	Retaining Wall
32	309+390	309+870	480	RE Wall
33	309+870	310+540	670	Retaining Wall
34	310+910	310+990	80	Retaining Wall
35	310+990	311+570	580	RE Wall
36	311+570	311+700	130	Retaining Wall
37	311+700	311+735	35	Retaining Wall
38	312+090	312+130	40	Retaining Wall
39	312+750	313+170	420	Retaining Wall
40	314+600	314+980	380	Retaining Wall
41	314+980	315+730	750	RE Wall
42	315+730	315+860	130	Retaining Wall

Sl. No	Design Chainage (km)		Length, m	Type of Retaining Structure
	From	To		
43	317+950	318+020	70	Retaining Wall
44	318+020	318+680	660	RE Wall
45	318+680	318+850	170	Retaining Wall
46	318+850	319+490	640	RE Wall
47	319+490	319+600	110	Retaining Wall
48	320+610	320+710	100	Retaining Wall
49	320+710	321+290	580	RE Wall
50	321+290	321+370	80	Retaining Wall
51	322+970	323+080	110	Retaining Wall
52	323+080	323+870	790	RE Wall
53	323+870	324+200	330	Retaining Wall
54	324+360	325+160	800	Retaining Wall
55	325+330	325+470	140	Retaining Wall
56	325+580	325+700	120	Retaining Wall
57	325+830	325+890	60	Retaining Wall
58	325+890	326+150	260	RE Wall
59	326+390	327+170	780	RE Wall
60	327+170	327+360	190	Retaining Wall
61	328+200	328+340	140	Retaining Wall
62	328+430	328+680	250	Retaining Wall
63	328+680	328+950	270	RE Wall
64	329+160	329+240	80	Retaining Wall
65	329+330	329+430	100	RE Wall
66	329+430	329+530	100	Retaining Wall
67	330+600	330+730	130	Retaining Wall
68	330+730	331+420	690	RE Wall
69	331+420	331+560	140	Retaining Wall
70	332+110	332+290	180	Retaining Wall
71	332+290	332+770	480	RE Wall
72	332+770	333+000	230	Retaining Wall
73	334+410	334+540	130	Retaining Wall
74	334+540	335+120	580	RE Wall
75	335+120	335+270	150	Retaining Wall
Total			**21305**	

C) Between LHS & RHS Carriageway (Median location)

Sl. No	Design Chainage		Length, m	Type of Retaining Structure
	From	To		
1	325+630	326+150	520	Retaining Wall
2	326+390	327+340	950	Retaining Wall
3	328+590	328+760	170	Retaining Wall
4	328+760	328+950	190	RE wall
5	329+160	329+270	110	Retaining Wall
6	329+310	329+540	230	Retaining Wall
Total			**2170**	

D) At Service road Flyover

Sl. No	Design Chainage (km)		Length, m	Side	Total Length, m	Type of Retaining Structure	Remarks
	From	To					
1	312+200	312+400	200	Both	400	RE Wall	on Main Carriageway
2	0+490*	0+670*	180	RHS	180	RE Wall	on crossroad
3	0+490*	0+670*	180	b/w Ramp & SR	180	RE Wall	
4	0+500*	0+670*	170	LHS	170	Nailed RE wall	
Total					**930**		

**Service road Chainages*

Note: Any variation in lengths specified in the above table(s) shall not constitute a Change of Scope, save and except any variation in the length arising out of a change of scope expressly undertaken in accordance with the provisions of Article 16.

Appendix B- XVII

RCC covered lined drain shall be provided as below:

a) Total length of drain shall be 64.700 km. This drain shall be part of main carriageway / service road as shown in TCS referred in Clause 4.1 of Annexure 1 of Schedule B and shall be designed for live load of Service Road/ Main carriageway.

Appendix B- XVIII

Utility shifting

Shifting of obstructing utilities to an appropriate location in accordance with the standards and specifications of concern Utility Departments is a part of scope of work for the contractor. Shifting of all over-ground utilities including electrical/ power utilities shall be responsibility of the contractor, whether indicated in Schedule-B or not. No Change of Scope (CoS) shall be allowed for such over ground utilities whether indicated in Schedule-B or not. However, underground utilities as indicated in the Schedule-B will only be considered as part of scope of work . Underground utilities, if any, not included in the Schedule B shall be treated as Change of Scope. The bidder may visit the site and assess the quantum of shifting of utilities for the project before submission of their bid. Copy of Utility relocation plan is enclosed. The specifications are to be as per the specification of concerned utility owning department.

(I) Electrical Utilities

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

Sl No.	Chainage		Circuit (TC/DC/SC)	Crossings (Nos)		Poles		Conductor		Size of Cable
	From	To		Over Head	Under Ground	Tower Truss/ Uni-pole	No	No	Size	
1	Design Ch 300+540			1						

TC- Triple Circuit, DC-Double Circuit, SC- Single Circuit, U/G Underground

(b) High Tension Lines (HT Lines)

Sl No	Chainage		Circuit (TC/DC /SC)	Poles		Conductor		Cable		Crossings		Transformer	
	From	To		Type	No	No/m	size	No/m	Size	U/G	Overhead	Capacity	No
1	D.Ch. 298+500 to D.Ch. 338+850		As required	A- Pole 12m	136	20025m	ACSR Raccoon	5750m	3X300 Sq.mm. XLPE 11KV UG CABLE			100 kva	5
				A- Pole 13m	242								

TC- Triple Circuit, DC-Double Circuit, SC- Single Circuit, U/G Underground

(c) Low Tension Lines (LT Lines)

Sl No	Chainage		Circuit (TC/DC /SC)	Poles		Conductor		Cable		Crossings		Transformer	
	From	To		Type	No	No/m	size	No/m	Size	U/G	Over head	Capacity	No
1	D.Ch. 298+500 to D.Ch. 338+850		As required	8m PSC Pole	251	68701m	ACSR Rabbit	400m	PVC Cable 120 Sq.mm.				
								980m	XLPE Cable 95 Sq.mm.				
				9m PSC Pole	291			5260m	XLPE Cable 120 Sq.mm.				
								350m	XLPE Cable 185 Sq.mm.				
								8870m	3.5 X 150 Sq.mm. LT UG Cable				

			A-Pole 11m	38			800m	3.5 X 185 Sq.mm. LT UG Cable				
							26000m	CABLE 1.1 kV PVC AI 2 X 2.5 Sq.mm. Sheathed				
							7700m	CABLE 1.1 kV PVC AI 2 X 6 Sq.mm. Sheathed				

TC- Triple Circuit, DC-Double Circuit, SC- Single Circuit, U/G Underground

(ii) Public Health Utilities (Water Sewage Pipelines)

The site includes the following Public health utilities: -

(a) Water Pipelines

Sl No	Chainage			Water Pipelines			Valve	Remarks
	From	To	Pipelines type	Type	Size	Length, km	Nos	
1	D.Ch. 298+500 to D.Ch. 338+850		Under gravity/ pressure	Main Line/Crossing	DI - 150mm Dia	0.055	57	Valve Types may include CI Air Valve, PVC Air Valve and CI Double Flanged Sluice Valve etc., along with chambers
			Under gravity/ pressure	Main Line/Crossing	DI - 200mm Dia	3.955		
			Under gravity/ pressure	Main Line/Crossing	DI - 250mm Dia	0.110		
			Under gravity/ pressure	Main Line/Crossing	DI - 300mm Dia	0.890		
			Under gravity/ pressure	Main Line/Crossing	DI - 350mm Dia	4.325		

Sl No	Chainage			Water Pipelines			Valve	Remarks
	From	To	Pipelines type	Type	Size	Length, km	Nos	
			Under gravity/ pressure	Main Line/Crossing	DI - 400mm Dia	0.900		
			Under gravity/ pressure	Main Line/Crossing	PVC - 200mm Dia	0.175		
			Under gravity/ pressure	Main Line/Crossing	PVC - 160mm Dia	5.295		
			Under gravity/ pressure	Main Line/Crossing	PVC - 140mm Dia	1.460		
			Under gravity/ pressure	Main Line/Crossing	PVC - 110mm Dia	7.465		
			Under gravity/ pressure	Main Line/Crossing	PVC - 90mm Dia	4.085		
			Under gravity/ pressure	Main Line/Crossing	PVC - 75mm Dia	0.473		
			Under gravity/ pressure	Main Line/Crossing	PVC - 63mm Dia	1.50		
			Under gravity/ pressure	Main Line/Crossing	GI - 100mm Dia	0.155		
			Under gravity/ pressure	Main Line/Crossing	GI - 80mm Dia	2.500		
			Under gravity/ pressure	Main Line/Crossing	MS - 700mm Dia	0.065		
			Household Connections			100 numbers		
			CI/MS surface boxes			25 numbers		

(b) Sewage Pipelines -Nil

(i) Any other line

(* This is illustrative and may change as per features of existing utilities.)

Notes:

(a) The type/spacing/size/specifications of poles/ towers/ lines/cables to be used in shifting work are as per the guidelines of utility owning department and it is solely between the Contractor and the utility owning department. No change of scope shall be eligible or no cost shall be paid for using different type/spacing /size/specifications in shifted work in comparison to those in the existing or for making any overhead crossings to underground as per requirement of utility owning department/construction of project highway. The Contractor shall carry out joint inspection with utility owning department and get the estimates sanctioned from utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor to utility owning department whenever asked by the Contractor. The decision /Approval of utility owing department shall be binding on the contractor. No CoS or no cost shall be eligible on any account.

(b) The supervision charges at the rates/ charges applicable between implementing agencies of MoRTH and utility owning department shall be paid directly by the Authority to the Utility Owning Entity as and when Contractor furnishing a demand of Utility Owning Department along with a copy of sanctioned estimate

(c) The credit of dismantled materials has been accounted for in the estimated cost. The dismantled material /scrap of existing Utility to be shifted/dismantled shall belong to the Contractor/Concessionaire who would be free to dispose-off the dismantled material as deemed fit by them . If the Contractor is forced to deposit the dismantled material to utility owning department then the amount of credit for dismantled material indicated in the sanctioned estimates of 1Jtility owning department will be reimbursed to the Contractor after submitting the duly authenticated receipt of the dismantled material from utility owning department to the Authority.

(d) The utilities shall be handed over after shifting work is completed to Utility Owning Department up to their entire satisfaction. The maintenance liability shall rest with the Utility Owning Department after handing over process is complete as far as utility shifting works are concerned.

(e) No change of scope shall be paid for any over-ground utilities. However, for any underground utilities not mentioned in Schedule 'B' shall form change of scope, which shall be worked out as per the estimation of the concerned utility owning dept. and shall be payable to the contractor accordingly.

SCHEDULE – C
(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

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

a. Toll Plaza;
b. Roadside Furniture;
c. Street Lighting;
d. Pedestrian Facilities;
e. Landscaping and Tree Plantation;
f. Rest Area
g. Truck Lay-byes;
h. Bus-bays and Passenger Shelters;
i. Cattle Crossings;
j. Traffic Aid Post;
k. Medical Aid Post;
l. Vehicle Rescue Post; and
m. Advance Traffic Management System;
n. Highway Patrol Units;
o. Operation & Maintenance Centre
p. Traffic Safety Device

2 Project Facilities forming part of Six laning and to be completed on or before the project completion date have been described in **Annex-I** of this **Schedule-C.**

Annex - I

(Schedule-C)

Project Facilities for Six -Laning

1 Project Facilities

The Concessionaire shall construct the Project Facilities described in this Annex-I to form part of the Six-Lane Project Highway. The Project Facilities shall include:

a. Toll Plaza;
b. Roadside Furniture;
c. Street Lighting;
d. Pedestrian Facilities;
e. Landscaping and Tree Plantation;
f. Rest Area
g. Truck Lay-byes;
h. Bus-bays and Passenger Shelters;
i. Cattle Crossings;
j. Advance Traffic Management System;
k. Traffic Safety Device

2. Description of Project Facilities for Six laning

Each of the Project Facilities is briefly described below:

(a) Toll Plaza

Toll Plazas shall be provided as per the Schedule D at locations given in **Table C-1.**

In case tunnel is not possible for the operation of Toll Plaza, the requirement of overhead structure for cash transfer and movement shall be provided.

Table C-1: Location of Toll Plazas

Start	End	Remarks
Nil		

(b) Roadside Furniture

Roadside furniture comprising road signs, road markings, object markers, hazard marker, studs, delineators, attenuators, safety barriers, pedestrian guard rails, boundary stones, kilometer stone etc. shall be provided as per Schedule-D.

The roadside furniture shall also include the following minimum provisions:

(i) Crash Barrier: Concrete/ Metal beam crash barrier shall be provided throughout the project highway. These locations will be as under:

a) Concrete crash barrier shall be provided at all Major Bridges, Minor Bridges, box culverts, Flyovers, underpasses, ROBs and their approaches on RE Wall as per TCS.

b) Metal Beam crash barrier to be provided as per codal provision and as shown in TCS

(ii) Traffic Signs: The Traffic signs including roadside sign and chevron sign along the project highway. These shall be provided as per guidelines given in IRC: 67 2012 and section 800 of MoRTH specifications.

i. **Overhead signs**: Overhead sign boards, excluding those provided at Toll Plaza location, are to be provided as per Manual of Specifications and Standards as referred in Schedule D. However, minimum 26nos Cantilever signs and 3nos of Overhead Gantry signs excluding toll plaza location shall be provided at following locations.

Table C-2: Location of Overhead Signs

Sl. No.	Design Chainage (km)	Side	Type
1	299+470	LHS	Cantilever
2	300+070	RHS	Cantilever
3	303+910	LHS	Cantilever
4	304+470	LHS	Cantilever
5	304+510	RHS	Cantilever
6	305+070	RHS	Cantilever
7	306+900	LHS	Cantilever
8	307+500	RHS	Cantilever
9	307+920	LHS	Cantilever
10	308+520	RHS	Cantilever
11	310+500	LHS	Cantilever
12	311+100	RHS	Cantilever
13	312+000	RHS	Cantilever
14	311+735	RHS	Cantilever
15	312+700	RHS	Gantry
16	314+600	LHS	Cantilever
17	316+260	RHS	Cantilever
18	317+550	LHS	Cantilever
19	320+040	RHS	Cantilever
20	320+200	LHS	Cantilever
21	321+820	RHS	Cantilever
22	322+560	LHS	Gantry
23	324+300	RHS	Gantry
24	325+400	LHS	Cantilever
25	327+600	RHS	Cantilever
26	330+300	LHS	Cantilever
27	332+100	RHS	Cantilever
28	334+100	LHS	Cantilever
29	335+600	RHS	Cantilever

Note:

Above locations of overhead sign boards shall be finalized in consultation with Independent Engineer/Project Director, as per site requirement. Any increase in the number specified in this Clause of Schedule-C shall not constitute a change of scope, save and except any variations arising out of a change of scope expressly undertaken in accordance with the provisions of Article 16

(iii) Pavement Markings: Pavement markings shall cover the entire project highway and will be provided as per guideline of IRC: 35-2015 and section 800 of MoRTH specifications.

(iv) LED Traffic Beacons (Solar Blinkers 24hrs): These shall be provided on the entire project Highway near pedestrian crossings, public gathering places (Educational Institutions, Hospitals, Worship places etc.) and crossroads at Major and Minor Junctions.

(v) Delineators and Studs: Studs (100mm x 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 nighttime visibility shall be provided for the entire project Highway as per manual.

(vi) Hectometre / Kilometre stones: Shall be provided for the entire Project Highway as per the manual.

(c) Street Lighting: Street Lighting shall be provided in accordance with provisions of Schedule-D in concurrence to Schedule B. At following locations street lighting shall be provided as per typical cross sections indicated in Appendix-B I of Schedule B as minimum.

Table C-3: Locations of Street lighting

Sl. No.	Design Chainage (km)		Length (m)	Lighting Requirement
	From	To		
1	298+750	300+200	1450	Lighting shall be provided as per proposed Widening Scheme and Typical Cross Section
2	300+650	303+000	2350	
3	304+200	306+500	2300	
4	307+000	309+900	2900	
5	310+500	311+700	1200	
6	311+700	312+980	1280	
7	313+390	313+720	330	
8	314+165	314+520	355	
9	314+850	315+900	1050	
10	317+950	319+600	1650	
11	320+600	321+400	800	
12	322+950	323+950	1000	
13	325+650	335+850	10200	
Total			**26865**	

(d) Pedestrian Facilities

Pedestrian facilities shall be provided in accordance with the Manual of Specifications and Standards as referred in Schedule "D".

(e) Landscaping and Tree Plantation:

I. **Tree Plantation:** Minimum 10738 numbers {The Kerala govt. orders (G.O(Rt)No.68/2010/F&WLD and G.O(Rt)No.172/2010/F&WLD and as per prevailing guidelines/norms} of trees of local species shall be planted and maintained throughout the contract period as per National Green Highway policy. If all of these trees are not planted in RoW due to non-availability of land, in such case, the Concessionaire shall deposit the requisite amount to the forest department for planting the balance trees as a deposit work.

II. Tree plantation and landscaping shall be done as per IRC: SP:21: 2009 and Section 11 of the Manual on the project highway.

(f) Rest Areas (Wayside Amenities):

Wayside Amenities shall be provided at locations as given below:

Table C-4: Locations of Rest Area

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Side	Location
1	5.400 of Ponnani Bypass	317+600	RHS	Ponnani Bypass
2	8.550 of Ponnani Bypass	320+700	LHS	Ponnani Bypass

Comprehensive Rest Area (way side amenities) shall be provided with provision for food court/ restaurant, dhaba for truckers, retail arcade, toilet facilities, drinking water kiosk, car parking, bus/ truck parking and emergency health care facilities for accident victims. The Facilities at Rest Area shall be finalized in consultation with Independent Engineer/Project Director, NHAI.

(g) Truck Lay-byes:

Truck lay-byes shall be constructed at locations given in **Table C-5**. It shall have facilities in accordance with Schedule-D. Toilet block on each Truck Lay bye shall be provided in consultation with Independent Engineer/Project Director, NHAI. These toilets facilities must be constructed with 24 hours functional including maintenance.

Table C-5: Locations of Truck Lay Byes

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Side	Remarks
1	269.110	264+860	LHS	Kohinoor
2	284.100	279+600	RHS	Karumbil

(h) Bus-bays and bus Shelters

Bus Shelter shall be provided at locations given in **Table C-6**. The number indicated below shall be minimum requirement and any additional requirement shall not be treated as change of scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 16.

Table C-6: Locations of Bus Shelters

Sl. No.	Design Chainage (km)	Side
1	299+260	LHS
2	299+460	RHS
3	304+370	LHS
4	304+570	RHS
5	304+830	LHS
6	305+030	RHS
7	307+540	LHS
8	307+740	RHS
9	309+600	LHS
10	309+800	RHS
11	311+080	LHS
12	311+120	RHS
13	312+250	LHS
14	312+700	RHS
15	315+280	LHS
16	315+480	RHS

Sl. No.	Design Chainage (km)	Side
17	318+245	LHS
18	318+445	RHS
19	319+075	LHS
20	319+275	RHS
21	323+100	LHS
22	323+780	RHS
23	325+890	Both
24	327+500	Both
25	330+980	LHS
26	331+180	RHS
27	332+440	LHS
28	332+640	RHS
29	334+770	LHS
30	334+970	RHS

Note: Above locations are tentative, however this may be finalized in consultation with Transport Department Government of Kerala / Engineer in charge.

(i) Cattle Crossing: Nil

(j) ATMS

Advanced Traffic Management Systems (ATMS) shall be provided in the project highway as per Schedule D.

(k) Traffic Safety Devices

Traffic Control Devices, Road Safety Devices, Road side and Median safety barriers shall be provided / installed as per Schedule-D. 60cm high (above the adjoining ground level) and 200mm wide concrete boundary wall along with suitable foundation shall be provided at the outer edge of ROW on either side as per Typical cross sections indicated in section 4.1 of Schedule B. Boundary stones shall be provided at the boundary on both sides of Right of Way at every 50m interval (shall be provided at locations where boundary wall is not provided).

SCHEDULE - D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1 Six Laning of Project Highway

The Concessionaire shall comply with the Specifications and Standards set forth in Annex-I of this Schedule-D for construction of the Six Lane Project Highway.

ANNEX-I

(Schedule-D)

SPECIFICATIONS AND STANDARDS FOR SIX LANE PROJECT HIGHWAY

Specifications and Standards for Construction

1 Manual of Specifications and Standards

All materials, works and construction operations shall conform to the Manual of Specifications and Standards for Six-Laning of Highways (IRC: SP: 87-2019), published by IRC (referred to as "Manual" in this Schedule) 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

Notwithstanding anything to the contained in the aforesaid Manual, the following specification and Standard shall apply to the six lane project highway, and for purpose of this Agreement, the aforesaid Manual shall be deemed to be amended to the extent set forth below:

Sl. No	Item	Clause referred in the Manual	Provision as per Manual	Modified provision
1	Right of Way	Clause 2.3	Proposed Right of way – 60m	45m
2	Sight distances	Clause 2.9.5	Existing road- Absolute minimum sight distance (Except at Grade separators) New Road- Desirable Minimum sight distance	Desirable Minimum sight distance shall be provided for entire project length
3	Horizontal C learances of VUP & LVUP	Clause 2.10.1	VUP – not less than 20.00m LVUP – not less than 12.00m	Horizontal clearance of VUP & LVUP shall be as per Appendix-BVII of Schedule B
4	Service road	Clause 2.12.2	Width of service road shall be 10m minimum	Shall be provided as per Appendix-B IV of Schedule B
5	Utility Corridor	Clause 2.16	2 m utility corridor at ROW edge on either side to be provided	Shall be followed as per TCS indicated in Clause 4.1 of Schedule B
6	Typical cross section	Clause 2.17	-	Typical Cross section shall be followed as per Clause 4.1 of Schedule B
7	Width of Major Bridge at Design Ch. 326+270	Clause 7.3-Fig.7.4	Main Carriageway: LHS- 17.0m RHS- Existing bridge + 13.5m	Width of Major Bridge at Design Ch. 326+270 shall be as per Appendix B IX of Schedule B
8	Width of Major Bridge at	Clause 7.3-Fig.7.4	Main Carriageway: LHS -13.5m + Existing bridge	Width of Major Bridge at Design Ch. 329+054 shall be as per Appendix B IX of Schedule B

<table>
<tr><th>Sl. No</th><th>Item</th><th>Clause referred in the Manual</th><th>Provision as per Manual</th><th>Modified provision</th></tr>
<tr><td></td><td>Design Ch. 329+054</td><td></td><td>RHS- 17.0m</td><td></td></tr>
<tr><td>9</td><td>Width of Major Bridge new construction</td><td>Clause 7.3- Fig.7.2</td><td>Main Carriageway:
LHS- 17.0m
RHS- 17.0m</td><td>Width of Major Bridge (new construction) Shall be as per Appendix B IX of Schedule B</td></tr>
<tr><td>10</td><td>Width of Minor Bridges without Service Road Bridges</td><td>Clause 7.3- Fig.7.2</td><td>Main Carriageway:
LHS- 17.0m
RHS- 17.0m</td><td>Width of all Minor Bridges without Service Road Bridges shall be as per Appendix B X of Schedule B</td></tr>
<tr><td>11</td><td>Width of Grade Separated Structures &Viaducts</td><td>Clause 7.19- Fig.7.8</td><td>Main Carriageway:
LHS- 15.10m
RHS- 15.10m</td><td>Width of all Grade Separated structures and Viaducts shall be as per Appendix B VII of Schedule B</td></tr>
<tr><td>12</td><td>Width of Road over Bridge (ROB) at Design Ch.310+663</td><td>Clause 7.18.2- Fig.7.4</td><td>Main Carriageway:
LHS- 13.5m + Existing bridge
RHS- 17.0m</td><td>Width of Road over Bridge (ROB) at Design Ch.310+663 shall be as per Appendix B XII of Schedule B</td></tr>
<tr><td>13</td><td>Use of Anti Corrosive steel</td><td>IRC: 112 – 2019, Cl.14.4.1</td><td>Use of Anti corrosive steel in extreme environments</td><td>Exposure condition considered is severe. Still Anti corrosive steel is used due to coastal environment and also corrosion is expected to affect the durability of the structures.</td></tr>
<tr><td>14</td><td>Boundary Wall</td><td>Clause 12.2</td><td>Boundary wall shall be provided at the boundary on both side of Right of way</td><td>Boundary wall shall be provided as per Clause 2. (k) of Schedule C</td></tr>
<tr><td>15</td><td>Bus bays</td><td>Clause 12.7</td><td>Bus bays shall be provided for bus dropping points</td><td>Bus shelters shall be provided as per Clause 2. (h) of Schedule C</td></tr>
<tr><td>16</td><td>Design Speed</td><td>Clause 2.2</td><td>Ruling Design speed (100kmph) shall be followed</td><td>
<table>
<tr><th colspan="2">Design Chainage (km)</th><th rowspan="2">Deign Speed, kmph</th></tr>
<tr><th>From</th><th>To</th></tr>
<tr><td>304+641</td><td>305+049</td><td>80</td></tr>
<tr><td>305+248</td><td>305+459</td><td>80</td></tr>
<tr><td>307+741</td><td>308+090</td><td>80</td></tr>
<tr><td>325+770</td><td>326+500</td><td>65#</td></tr>
<tr><td>328+462</td><td>328+920</td><td>80</td></tr>
<tr><td>328+920</td><td>329+114</td><td>65*</td></tr>
<tr><td>329+115</td><td>329+505</td><td>80*</td></tr>
</table>
Note:</td></tr>
</table>

Sl. No	Item	Clause referred in the Manual	Provision as per Manual	Modified provision
				* Vertical profile LHS Carriageway # Vertical profile RHS Carriageway

3 Utility Shifting

As regards, the work of utility shifting, the relevant rules, regulations and acts of Utility Owning Department /Agencies shall be applicable.

SCHEDULE - G
(See Clause 12.1)
PROJECT COMPLETION SCHEDULE

1 Project Completion Schedule

During Construction Period, the Concessionaire shall comply with the requirements set forth in this Schedule-G for each of the Project Milestones and the Scheduled Completion Date (the "Project Completion Schedule"). Within 15 (fifteen) days of the date of each Project Milestone, the Concessionaire 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 **290th (Two Hundred and Ninetieth)** day from the Appointed Date (the "Project Milestone-I").

2.2 Prior to the occurrence of Project Milestone-I, the Concessionaire shall have expended not less than 20% (twenty per cent) of the total capital cost set forth in the Financial Package.

2.3 Prior to the occurrence of Project Milestone –I, the Concessionaire shall have commenced construction of the Project and achieved 20% Physical Progress.

3 Project Milestone-II

3.1 Project Milestone-II shall occur on the date falling on the **430th (Four Hundred Thirtieth)** day from the Appointed Date (the "Project Milestone-II").

3.2 Prior to the occurrence of Project Milestone-II, the Concessionaire shall have expended not less than 35% (thirty five per cent) of the total capital cost set forth in the Financial Package. Provided, however, that at least 70% (seventy percent) of the expenditure referred to hereinabove shall have been incurred on physical works which shall not include advances of any kind to any person or expenditure of any kind on plant and machinery.

3.3 Prior to the occurrence of Project Milestone –II, the Concessionaire shall have commenced construction of the Project and achieved 35% Physical Progress

4 Project Milestone-Ill

4.1 Project Milestone-Ill shall occur on the date falling on the **690th (Six Hundred and Ninetieth**) day from the Appointed Date (the "Project Milestone-Ill").

4.2 Prior to the occurrence of Project Milestone-Ill, the Concessionaire shall have commenced construction of all Project Facilities and expended not less than 75% (seventy five per cent) of the total capital cost set forth in the Financial Package.

4.3 Prior to the occurrence of Project Milestone –III, the Concessionaire shall have commenced construction of the Project and achieved 75% Physical Progress

5 Scheduled Completion Date

5.1 The Scheduled Completion Date shall be the **910th (Nine Hundred and Tenth)** day from the Appointed Date.

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

6 Extension of period

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.

Annexure-I of Schedule G

Format for Contract Price Weightages for Highway Projects with Flexible Pavements

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	Stage for measurement of Physical Progress	Unit	Qty.	Weightage in percentage to the Contract Price
1	2	3	4	5
Road works including culverts, minor bridges, underpasses, overpasses, approaches to ROB/RUB/ Major Bridges/ Structures (but excluding service roads)	**A- Widening and strengthening of existing road**			
	(1) Earthwork up to top of the sub-grade	Km	[***]	[***]
	(2) Granular work (sub- base, base, shoulders)			
	(a) GSB	Km	[***]	[***]
	(b) WMM	Km	[***]	[***]
	(3) Shoulders	Km	[***]	[***]
	(4) Bituminous work			
	(a) DBM	Km	[***]	[***]
	(b) BC	Km	[***]	[***]
	(5) Rigid Pavement			
	Concrete work	Km	[***]	[***]
	(6) Widening and repair of culverts	No.	[***]	[***]
	(7) Widening and repair of minor bridges	No.	[***]	[***]
	B- New realignment/bypass			
	(1) Earthwork up to top of the sub-grade	Km	[***]	[***]
	(2) Granular work (sub- base, base, shoulders)			
	(a) GSB	Km	[***]	[***]
	(b) WMM	Km	[***]	[***]
	(3) Shoulders	Km	[***]	[***]
	(4) Bituminous work			
	(a) DBM	Km	[***]	[***]
	(b) BC	Km	[***]	[***]
	(5) Rigid Pavement			
	Concrete work	Km	[***]	[***]

	C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:			
	(1) Culverts	No.	[***]	[***]
	(2) Minor bridges			
	(a) Foundation	No.	[***]	[***]
	(b) Sub-structure	No.	[***]	[***]
	(c) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	(3) Cattle/Pedestrian underpasses			
	(a) Foundation	No.	[***]	[***]
	(b) Sub-structure	No.	[***]	[***]
	(c) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	(4) Pedestrian overpasses			
	(a) Foundation	No.	[***]	[***]
	(b) Sub-structure	No.	[***]	[***]
	(c) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	(5) Grade separated structures			
	(a) Underpasses			
	(i) Foundation	No.	[***]	[***]
	(ii) Sub-structure	No.	[***]	[***]
	(iii) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	(b) Overpass			
	(i) Foundation	No.	[***]	[***]
	(ii) Sub-structure	No.	[***]	[***]
	(iii) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	(c) Flyover			
	(i) Foundation	No.	[***]	[***]
	(ii) Sub-structure	No.	[***]	[***]
	(iii) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	(d) Foot over Bridge	No.	[***]	[***]
Major Bridge works and ROB/RUB	**A- Widening and repairs of Major Bridges**			
	(1) Foundation			
	(a) Open Foundation	No.	[***]	[***]
	(b) Pile Foundation/Well Foundation	No.	[***]	[***]

	(2) Sub-structure	No.	[***]	[***]
	(3) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	B- Widening and repair of			
	(a) ROB			
	(1) Foundation	No.	[***]	[***]
	(2) Sub-structure	No.	[***]	[***]
	(3) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	(b) RUB			
	(1) Foundation	No.	[***]	[***]
	(2) Sub-structure	No.	[***]	[***]
	(3) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	C- New Major Bridges			
	(1) Foundation	No.	[***]	[***]
	(a) Open Foundation	No.	[***]	[***]
	(b) Pile Foundation/Well Foundation	No.	[***]	[***]
	(2) Sub-structure	No.	[***]	[***]
	(3) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	D- New rail-road bridges			
	(a) ROB			
	(1) Foundation	No.	[***]	[***]
	(2) Sub-structure	No.	[***]	[***]
	(3) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	(b) RUB			
	(1) Foundation	No.	[***]	[***]
	(2) Sub-structure	No.	[***]	[***]
	(3) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
Structures (elevated sections, reinforced earth)	(1) Foundation	No.	[***]	[***]
	(2) Sub-structure	No.	[***]	[***]
	(3) Super-structure (including crash barriers etc. complete)	No.	[***]	[***]
	(4) Reinforced Earth Wall (includes Approaches of ROB, Underpasses, Overpasses, Flyover etc.	Sqm	[***]	[***]
Other Works	**(i) Service roads/ Slip Roads**	Km	[***]	[***]
	(ii) Toll Plaza	No.	[***]	[***]

	(iii) Road side drains	Km	[***]	[***]
	(iv) Road signs, markings, km stones, safety devices, ….			
	(a)Road signs, markings, km stones, ….	Km	[***]	[***]
	(b) Concrete Crash Barrier/ W-Beam Crash Barrier in Road work	Km	[***]	[***]
	(v) Project facilities			
	(a) Bus bays	No.	[***]	[***]
	(b) Truck lay-byes	No.	[***]	[***]
	(c) Rest areas	No.	[***]	[***]
	(vi) Repairs to bridges/structures	No.	[***]	[***]
	(vii) Road side plantation	Km	[***]	[***]
	(viii) Protection works			
	(a) Boulder Pitching on slopes	Km	[***]	[***]
	(b) Toe/Retaining wall	Km	[***]	[***]
	(ix) Tunnel			
	(a) Excavation	Metre	[***]	[***]
	(b) Construction of support system including rock bolting, lining etc.	Metre	[***]	[***]
	(c) On complete completion of tunnel	Metre	[***]	[***]
	(x) Miscellaneous	Lump sum	[***]	[***]
			Total	**100.00%**

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

** Measurement of Progress

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

Physical progress of bituminous work =Weightage for bituminous work x (L'/L)

L = Total length of bituminous work in km

L' = Executed length of bituminous work in km

Similarly, the physical progress for other stages shall be worked out and addition of all will give the total progress achieved.