ATTACHMENT TO ADDENDUM – 1

Amended full Schedules

- Schedule A
- Schedule B
- Schedule C
- Schedule D

Appendix 2 of Schedule L ToR for Facilitating Agency to Implement Green Intervention

SCHEDULE – A

SITE OF THE PROJECT

1. The Site

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

1.2 An inventory of the site including buildings, structures, road works, trees and any other immovable property on or attached to the site shall be prepared jointly by R&BD, GoG representative and the Concessionaire and such inventory shall form part of the Agreement.

1.3 Disclaimer

The survey data presented in this schedule is for an initial understanding only and guidance of the Concessionaire. R&BD, GoG will not be responsible for any mis-match/inaccuracy in the information provided and shall not be liable for or be bound by the data used by Concessionaire in evaluating the project viability.

The concessionaire will carry out his own independent surveys for assessing actual position of the project corridor.

The Concessionaire acknowledges that prior to the execution of this Agreement, the Concessionaire has satisfied himself (based on his own independent assessment) of the survey data, specifications and standards, site and all information provided by R&BD, GoG. The Concessionaire acknowledges this and agrees for the same during the course of performance of his obligations.

Annex – I

1. The Project Road

The project road Mehsana to Himatnagar is part of SH-55 and is subdivided into two links (an Index map is at Appendix I) for the purposes of this project. The project road starts at km 103+000 and ends at km 163+800. The lengths (design) of the project road links are given in Table below:

Links	From km	To km	Length (km)
1	103+000 N: 2608410.056 E: 236896.921	135+250	32.250
2	135+250	163+800 N: 2612777.267 E: 292357.269	28.550
		Total	**60.80**

The Project involves design, upgrading to 4-lane, Financing, Operation and Maintenance and transfer of existing State Highway (SH 55) from Mehsana to Himatnagar (the "Project Highway") from km 103+000 and ends at km 163+800 on DBFOMT (Annuity) Basis in the state of Gujarat. The Project Corridor passes through urban/semi urban areas of Vijapur and Vasai.

2. Chainage Referencing System

The design Chainage and corresponding existing chainage as per km stones for Project Road is given in Appendix II.

3. Land

The details of Right of Way with respect to Existing Centre Line in general are given at Appendix III.

4. Roadway

The details of Roadway are given at Appendix IV.

5. Structure

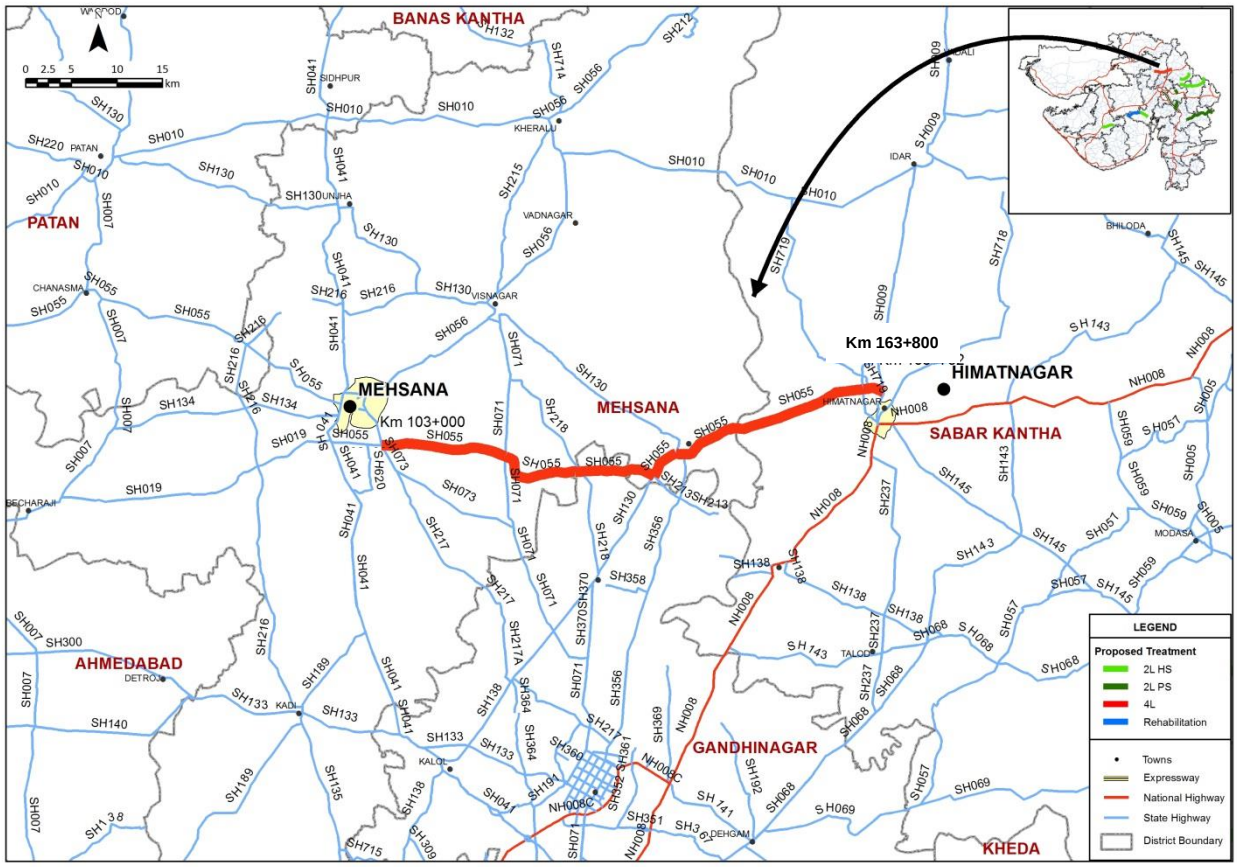
An inventory of existing structures is given at Appendix V.

6. Railway Crossings

The project corridor is passing through two existing at-grade railway level crossings. Those are 1. Railway Crossing at km 120+592 and 2. Railway Crossing at km 139+340.

Appendix – I

Index Map Showing Project Road



Appendix – II

Reference Chainage

Link ID	Road Details	State Highway No.	Existing Length, km	Design Length, km	Start of km Stone	Start Chainage of km Stone	End of km Stone	End Chainage of km Stone
1	Near Rampura Intersection to Pilvai intersection	55	32.24	32.25	103	103	135	135.250
2	Pilvai intersection to Himatnagar		28.50	28.50	135	135.250	164	163.800

Appendix – III

Right of Way

Existing Chainage	ROW
103+000 to 163+800	30 m (Construction Within 26m Rural, 30m Urban)

Appendix – IV

Roadway

A summary of Road Inventory is provided at **Appendix – IV (a)**

A summary of Details of Traffic Volume Count is provided at **Appendix – IV (b)**

A summary of Details of Road Geometry is provided at **Appendix – IV (c)**

A summary of Details of Land Use is provided at **Appendix – IV (d)**

A summary of Details of at Grade Junctions is provided at **Appendix – IV (e)**

A summary of Details of Existing Bus shelters are provided at **Appendix – IV (f)**

Appendix – IV (a)

Road inventory

Chainage		Terrain[A]	Paved (BT) Carriageway (CW+ Paved Shoulder)		Side Shoulder			
					Width (m)		Type[B]	Condition[C]
From	To		Width (m)	Surface Type[B]	L	R		
103.0	104.0	1	10.0	1	1.0	1.0	3	2
104.0	105.0	1	10.0	1	1.0	1.0	3	2
105.0	106.0	1	10.0	1	1.0	1.0	3	2
106.0	107.0	1	10.0	1	1.0	1.0	3	2
107.0	108.0	1	10.0	1	1.0	1.0	3	2
108.0	109.0	1	10.0	1	1.0	1.0	3	2
109.0	110.0	1	10.0	1	1.0	1.0	3	2
110.0	111.0	1	10.0	1	1.0	1.0	3	2
111.0	112.0	1	10.0	1	1.0	1.0	3	2
112.0	113.0	1	10.0	1	1.0	1.0	3	2
113.0	114.0	1	10.0	1	1.0	1.0	3	2
114.0	115.0	1	10.0	1	1.0	1.0	3	2
115.0	116.0	1	10.0	1	1.0	1.0	3	2
116.0	117.0	1	10.0	1	1.0	1.0	3	2
117.0	118.0	1	10.0	1	1.0	1.0	3	2
118.0	119.0	1	10.0	1	1.0	1.0	3	2
119.0	120.0	1	10.0	1	1.0	1.0	3	2
120.0	121.0	1	10.0	1	1.0	1.0	3	2
121.0	122.0	1	10.0	1	1.0	1.0	3	2
122.0	123.0	1	10.0	1	1.0	1.0	3	2
123.0	124.0	1	10.0	1	1.0	1.0	3	2
124.0	125.0	1	10.0	1	1.0	1.0	3	2
125.0	126.0	1	10.0	1	1.0	1.0	3	2
126.0	127.0	1	10.0	1	1.0	1.0	3	2
127.0	128.0	1	7.0	1	1.0	1.0	3	2
128.0	129.0	1	7.0	1	1.0	1.0	3	2
129.0	130.0	1	7.0	1	1.0	1.0	3	2
130.0	131.0	1	7.0	1	1.0	1.0	3	2
131.0	132.0	1	7.0	1	1.0	1.0	3	2
132.0	133.0	1	7.0	1	1.0	1.0	3	2
133.0	134.0	1	7.0	1	1.0	1.0	3	2
134.0	135.0	1	7.0	1	1.0	1.0	3	2

Chainage		Terrain[A]	Paved (BT) Carriageway (CW+ Paved Shoulder)		Side Shoulder			
					Width (m)		Type[B]	Condition[C]
From	To		Width (m)	Surface Type[B]	L	R		
135.0	136.0	1	10.0	1	1.0	1.0	3	2
136.0	137.0	1	10.0	1	1.0	1.0	3	2
137.0	138.0	1	10.0	1	1.0	1.0	3	2
138.0	139.0	1	10.0	1	1.0	1.0	3	2
139.0	140.0	1	10.0	1	1.0	1.0	3	2
140.0	141.0	1	10.0	1	1.0	1.0	3	2
141.0	142.0	1	10.0	1	1.0	1.0	3	2
142.0	143.0	1	10.0	1	1.0	1.0	3	2
143.0	144.0	1	10.0	1	1.0	1.0	3	2
144.0	145.0	1	10.0	1	1.0	1.0	3	2
145.0	146.0	1	10.0	1	1.0	1.0	3	2
146.0	147.0	1	10.0	1	1.0	1.0	3	2
147.0	148.0	1	10.0	1	1.0	1.0	3	2
148.0	149.0	1	10.0	1	1.0	1.0	3	2
149.0	150.0	1	10.0	1	1.0	1.0	3	2
150.0	151.0	1	10.0	1	1.0	1.0	3	2
151.0	152.0	1	10.0	1	1.0	1.0	3	2
152.0	153.0	1	10.0	1	1.0	1.0	3	2
153.0	154.0	1	10.0	1	1.0	1.0	3	2
154.0	155.0	1	10.0	1	1.0	1.0	3	2
155.0	156.0	1	10.0	1	1.0	1.0	3	2
156.0	157.0	1	10.0	1	1.0	1.0	3	2
157.0	158.0	1	10.0	1	1.0	1.0	3	2
158.0	159.0	1	10.0	1	1.0	1.0	3	2
159.0	160.0	1	10.0	1	1.0	1.0	3	2
160.0	161.0	1	10.0	1	1.0	1.0	3	2
161.0	162.0	1	10.0	1	1.0	1.0	3	2
162.0	163.0	1	10.0	1	1.0	1.0	3	2
163.0	163.800	1	10.0	1				

Terrain[A] : 1.Flat, 2.Rolling, 3.Mountainous, 4. Hilly, **Shoulder Type[B]** : 1.Paved, 2.Graveled, 3.Earthen **Shoulder Condition[C]** : 1.Good, 2.Fair, 3.Poor, 4. Very Poor

Appendix – IV (b)

Details of Traffic Volume Count Survey(2011)

Location	km 113+000, near Kamalpur	km 143+500, near Ranchhodpura
Modes	**AADT**	**AADT**
Scooter/Motor Cycle	1,149	2,064
Auto Rickshaw/Chakda	424	629
Car	1,331	1,560
Mini Bus	7	8
Std. Bus	100	199
LCV-Passenger	128	176
Tempo/LCV	281	331
2-Axle Trucks	322	671
3-Axle Truck	343	644
M-Axle Trucks-Articulated	186	179
M-Axle Trucks-Semi Articulated	182	177
Tractor	37	165
Cycle	33	81
Cycle Rickshaw	2	3
Animal Drawn	3	8
Hand Cart	0	1
Others	2	3
Total Vehicle nos.	**4,531**	**6,899**

Appendix – IV (c)

Details of Road Geometry

This existing road is relatively straight for the most part, although not well-defined geometrically. There are deficient horizontal curves (radius <230m) which needs improvement.

Appendix – IV (d)

Major Junctions/Intersections

Sr. No	Existing Chainage	Type	Surface Type	Intersecting Road	Category	Remarks
1	103+320.00	4 Arm	BT	Mehsana-Gandhinagar	Major	Rampura Chowkdi
2	117+110.00	4 Arm	BT	Gandhinagar-Visnagar	Major	Dabhla Chowkdi
3	127+000.00	4 Arm	BT	Mansa-Visnagar	Major	Vihar Chowkdi
4	135+300.00	4 Arm	BT	Mansa	Major	Pilvai Chowkdi
5	139+035.00	4 Arm	BT	Visnagar	Major	Vijapur Chowkdi
6	140+100.00	4 Arm	BT	Mahudi-Vijapur	Major	Vijapur Chowkdi
7	161+415.00	4 Arm	BT	Ahmedabad-Idar	Major	Ring Road Chokdi
8	163+800.00	4 Arm	BT	Himatnagar-Idar	Major	Idar Chokdi

Minor Junctions/Intersections

SR. NO	CHAINAGE
1	105+310.83
2	105+883.30
3	107+678.95
4	108+881.85
5	109+232.95
6	109+292.69
7	112+185.44
8	112+185.44
9	112+230.34
10	112+324.84
11	112+382.46
12	113+862.18
13	115+120.40
14	115+503.31
15	117+900.01
16	119+306.42
17	119+577.05
18	120+002.52
19	123+314.99
20	123+675.79
21	124+364.87
22	124+367.34
23	126+351.15
24	128+584.09
25	128+584.09
26	130+866.21

SR. NO	CHAINAGE
27	130+866.21
28	134+299.05
29	135+494.61
30	135+999.55
31	136+779.72
32	137+311.86
33	137+783.15
34	141+119.19
35	141+145.80
36	142+183.43
37	144+251.18
38	148+654.66
39	148+963.82
40	149+753.84
41	153+267.14
42	154+537.38
43	156+414.84
44	156+905.27
45	157+293.32
46	158+937.13
47	160+446.35
48	160+457.33
49	162+094.80
50	162+369.71
51	162+647.45
52	163+250.82

Appendix – IV (e)

Existing Bus Shelter

Sr. No	Chainage	Side	Village	Remarks
1	99+750	LHS	Sobhasan	All Existing Bus Stops To Be Demolished Due To Four Lane
2	101+700	RHS	Rupala	
3	103+320	LHS	Rampura	
4	107+675	RHS	Gunjada	
5	112+240	RHS	Kamalpur	
6	115+875	RHS	Dabhala	
7	115+895	LHS		
8	119+800	LHS	Vasai	
9	123+650	RHS	Motipura	
10	124+350	LHS	Titodan	
11	124+375	RHS	Kukarvada	
12	126+910	RHS	Vihar	
13	128+560	RHS	Pilodra	
14	130+850	LHS	Chadasana	
15	134+200	LHS	Fulwadi	
16	135+500	LHS	Pilwai	
17	136+775	RHS	Kotadi	
18	137+330	LHS	Khanusa	
19	139+000	RHS	Vijapur	
20	143+700	RHS	Nava Devpura	
21	144+225	LHS	Ranchod Pura	
22	144+275	RHS	Ranchod Pura	
23	148+975	RHS	Saroli	
24	149+775	RHS	Derol	
25	150+600	LHS	Krushna Nagar	
26	153+240	RHS	Navanagar	
27	154+510	LHS	Dedhrota	
28	156+430	RHS	Navalpur	
29	157+320	LHS	Satnagar	
30	157+325	RHS	Satnagar	
31	158+950	RHS	Lalpur	
32	160+425	RHS	Polajpur	
33	163+500	RHS	Himatnagar	

Appendix – V

Details of Existing Bridges

Sl. No.	Chainage	Existing Details								
	Km. Stone	R&B Str. No.	Type of Bridge	Flow Direction	Width m	No. of span	Span length (m)	Bridge Length (m)	Pier / Abut Type	Condition
1	106+400	107/1	Minor (Unlined Branch Canal)	R to L	16.00	2	5.00	10.00	Solid Wall	Condition: 5 (New Structure)
2	106+460	107/2	Minor (Unlined Main Canal)	R to L	12.00	4	2x7 + 2x6.5	27.00	Box	Condition: 5 (New Structure) Cracks in Wing/Return Wall Drainage spouts are blocked
3	111+700	112/1	Minor	L to R	17.50	2	4.50	9.00	Solid Wall	Condition: 5 (New Structure)
4	134+ 500	135/1	Box Minor	L to R	12.00	2	3.50	7.00	Box	Condition: 5 (New Structure)
5	137+020	138/1	Box Minor	L to R	12.00	2	3.60	7.20	Box	Condition: 5 (New Structure)
6	141+150	142/1	Minor	L to R	18	2	1x5 +1x8	13	Solid Wall	Condition: 4 1. Spalling in Ist Span (0.75m^2) 2. First Box then return then Second Box 3. Near forward School, Bijapur
7	146+700	147/1	Major (Sabarmati River)	L to R	7.6	8	37	296	Solid Wall	Condition: 3 1. Scour in Foundation 2. Cracks and exposed reinforcement 3. Return dislodged, gap between abutment and return : 25 cm
8	150+800	151/2	Box Minor	L to R	12.00	2	3.50	7.00	Box	Condition: 5 (one year old structure) 1. Scour and vegetation
9	153+020	154/1	Box Minor	L to R	12.00	2	3.50	7.00	Box	Condition: 5 (New Structure) 1. one pipe is passing through the box
10	153+800	154/1	Minor	R to L	12.00	2	10.00	20.00	Solid Wall	Condition: 5 (New Structure) 1. Fine crack, ravelling in wearing coat
11	157+960	158/3	Minor (Narrow)	L to R	8.00	3	5.00	15.00	Solid Wall	Condition: 3 1. New Parapet wall in left hand side with Metal Beam Crash Barrier 2. Spalling observed in second and third span (P2_A2 spall area: 0.75m^2), Earlier repair is done
12	158+400	159/1	Box Minor	L to R	12.00	2	3.50	7.00	Box	Condition: 5 (New Structure)
13	163+400	164/1	Box Minor	L to R	12.00	2	3.50	7.00	Box	Condition: 5 (New Structure) 1. Four nos. utility duct passing through 2. Near Nako No. 4, Himmatnagar Palika Arogya Bibhag

Condition Rating: 1: Serious Damage, 2: Major Damage, 3: Moderate Damage, 4: Minor Damage, 5: Good, 6: Not Applicable, 7: Not Visible/Accessible
RCC - Reinforced Cement Concrete
BM - Brick Masonry, CRM - Coursed Rubble Masonry, SS - Solid slab, BC – Bitumen, SM - Stone Masonry, CC - Cement Concrete, PCC - Plain Cement Concrete, L-R - Left To Right, R-L - Right To Left

Details of Existing Culverts

Sr. No	Identified Chainage (km)	Structure Number/ river Name	Type of Structures (Pipe/ Slab/ Box/ Arch)	Span Arrangement (m)		Total Length	Width of Culvert (m)	Flow Direction	Overall Structure Condition
				Nos.	Pipe Dia.\ Span Length (m)				
1	105+060	106/1	P.C.	2	0.60	-	16.00	L to R	Condition: 3 1. RHS Pipe Blockage, cracks in pipe
2	107+600	108/1	P.C.	2	0.75	-	16.20	R to L	Condition: 3 1. Blockage due to open pipe joint
3	108+100	109/1	P.C.	2	0.60	-	15.20	L to R	Condition : 3 1. LHS one pipe completely blocked
4	109+450*	110/1	P.C.	1	0.60	-	16.00		Condition: 2 RHS completely blocked, not functioning properly, Utility duct (telephone) passing through
5	110+700	111/1	P.C.	3	0.90	-	15.00	L to R	Condition: 4 1. 50% blockage in pipe
6	112+220	113/1	P.C.	2	0.60	-	16.50	L to R	Condition: 2
7	113+250	114/1	P.C.	2	0.60	-	17.70	R to L	Condition:4 1. 20% Blockage
8	115+350	116/1	P.C.	2	0.60	-	15.00	L to R	Condition: 3 1. Heavy Vegetation 2. 80% Blockage
9	115+750	116/2	P.C.	2	0.90	-	16.50	L to R	Condition: 3 1. 80% Blockage
10	116+950	117/1	P.C.	2	0.60	-	15.50	R to L	Condition :4 1. 30% Blockage 2. Loose Joints
11	117+300	118/1	P.C.	2	0.90	-	16.00	R to L	Condition : 5
12	119+500	120/1	P.C.	2	0.90	-	16.50	L to R	Condition:4 1. Vegetation
13	120+200	121/1	P.C.	1	0.90	-	15.80	R to L	Condition: 3
14	123+100	124/1	P.C.	2	0.60	-	16.50	L to R	Condition: 4 1. Blockage
15	125+400	126/1	P.C.	1	0.60	-	16.90	R to L	Condition:3

Sr. No	Identified Chainage (km)	Structure Number/ river Name	Type of Structures (Pipe/ Slab/ Box/ Arch)	Span Arrangement (m)		Total Length	Width of Culvert (m)	Flow Direction	Overall Structure Condition
				Nos.	Pipe Dia.\ Span Length (m)				
16	125+940	126/2	P.C.	1	0.75	-	16.70	R to L	Condition:2 1. Pipe 20% blocked
17	127+700	128/1	P.C.	4	0.60	-	16.60	L to R	Condition: 5 (New)
18	128+600	129/1	P.C.	2	0.60	-	15.50	L to R	Condition: 41. Near Vihar2. Blockage
19	128+750	129/2	P.C.	2	0.60	-	16.80	L to R	Condition:5 (New)
20	129+500	130/1	P.C.	3	0.60	-	16.20	R to L	Condition: 5 (New)
21	131+750	132/1	P.C.	3	0.60	-	20.40	L to R	Condition: 5 (New)
22	132+750	133/1	P.C.	2	0.60	-	16.00	R to L	Condition: 5 (New)
23	137+100	138/2	P.C.	1	0.60	-	16.40	L to R	Condition: 5 (New) 1. One Utility Duct (Water) of 300mm dia. Passing through
24	137+850	138/3	P.C.	3	0.60	-	15.80	R to L	Condition: 4 (New) 1. RHS 80% pipe blockage
25	138+200	139/1	P.C.	3	0.90	-	16.00	L to R	Condition: 4 1. Blockage due to widening 2. Near Ganga Cotton Industries 3. LHS gas line is in progress
26	140+068*	141/1	B.C.	1	2.5	2.5	16	L to R	Condition: 5
27	144+550	145/1	P.C.	3	0.60	-	16.60	R to L	Condition: 4 1. Blockage
28	147+900	148/1	P.C.	4	0.60	-	16.00	R to L	Condition: 4
29	149+700	150/1	S.C.	1	3.60	3.6	13.20	L to R	Condition: 4 1. Near Derol, Year of Construction: 1938 2. Weep hole dimension: 120+100 3. Approach Slab does not exist 4. Spall in slab ($0.5m^2$) 5. Abutment cap dimen.: 10 x 0.6 x 0.3 6. crack in parapet
30	150+350	151/1	P.C.	2	1.20	-	17.50	L to R	Condition: 5
31	151+100	152/1	B.C.	2	2.50	5	12.00	L to R	Condition: 5(New) 1. No weep holes 2.Drainage Spout : Verti. PVC, 2 nos.

Sr. No	Identified Chainage (km)	Structure Number/ river Name	Type of Structures (Pipe/ Slab/ Box/ Arch)	Span Arrangement (m)		Total Length	Width of Culvert (m)	Flow Direction	Overall Structure Condition
				Nos.	Pipe Dia.\ Span Length (m)				
32	151+384*	152/2	P.C.	3	1.20		16.00	-	Condition: 4
33	152+746*	153/1	P.C.	2	1.20		16.00	-	Condition: 4
34	155+650		Canal Inverted Syphon			3	-	-	
35	156+970	1571	B.C.	2	2.50	5	12.00	-	1. Approach slab : 3m x 12m2. Drainage spout: Vert. PVC, 2 nos.
36	157+250	15/1	P.C.	3	0.90		18.60	L to R	Condition: 4 1. 50% Blockage
37	157+600	158/2	B.C.	2	2.50	5	12.00	L to R	Condition: 4 1. Cement Concrete Wearing Coat in poor condition 2. Cone pitching required at abutment
38	159+670	160/1	P.C.	2	0.60		16.20	L to R	Condition:4 1. LHS one pipe completely blocked
39	160+100		Canal Inverted Syphon			2.00	-	-	
40	161+200	162/1	P.C.	3	0.90	-	17.20	R to L	Condition: 5 1. Slightly Blockage 2. Near Himmatnagar
41	161+900	162/2	P.C.	4	0.60	-	16.60	L to R	Condition: 4 1. 20% Blockage

Condition Rating: 1: Serious Damage, 2: Major Damage, 3: Moderate Damage, 4: Minor Damage, 5: Good, 6: Not Applicable, 7: Not Visible/Accessible

BM - Brick Masonry, RCC - Reinforced Cement Concrete, PCC- Plain cement Concrete, BC – Bitumen, CRM - Coursed Rubble Masonry * to be jointly verified and confirmed for future proposition with IC.

SCHEDULE-B

SCOPE OF THE PROJECT

1. GENERAL

This schedule highlights the scope of the work of the 'Project'. The descriptions of the requirements for the various elements of the Project Highway given herein under are the minimum requirements for the 'Project'. The 'Project' has the same meaning as defined in Article 1.

It is the responsibility of the Concessionaire to verify and own the data and design indicated in Schedules and reference drawings, DPR provided to the Concessionaire to meet the overall objectives spelt out under its obligations to the R&BD, GoG in the Concession Agreement before Bidding. The R&BD, GoG will not be responsible for any mis-match/inaccuracy in the information provided and shall not be liable for or be bound by the data used by Concessionaire in evaluating the project viability at any given point of time.

However if the Concessionaire is not able to ensure performance of the design or the Concessionaire intends to improve upon, he shall submit for the review and comment of the Independent Consultant, revised designs, subject to the Standards and Specifications mentioned in Schedule D.

Provided that any change in design as approved by the Independent Consultant, shall be within the Right of Way and the Annuity amount quoted by the Bidder in the financial bid submitted pursuant to the RFP remains unchanged.

The scope of work shall be as per Stipulations of Schedule B and Schedule C, design and construction in accordance with the Specifications and Standards mentioned in Schedule D which includes upgradation of Existing Road to 4-lane flexible pavement with the provision of CD structures and Project facilities.

2. PROJECT HIGHWAY

Development of project highway shall include construction/upgrading of Mehsana-Himatnagar Section of SH-55 to Four Lane with granular Shoulders in rural sections and wider facilities in specified stretches with urban treatments. The median width has been proposed as 0.8m with New Jersey type Crash Barrier. Facilities in form of pedestrian footpath, road safety facilities like Traffic Calming Zones, Raised Pedestrian Crossings etc., The development shall follow schedule B, C & D. The maintenance of different elements of the project highway and facilities during and at the end of concession period shall follow the minimum maintenance requirements as described in Schedule K. The planning, design, implementation and operation and maintenance shall strictly follow best of environmental standards, in any case Schedule L shall prevail as minimum standards to be followed with respect to EMP all through the concession.

3. CORE CONSTRUCTION REQUIREMENT

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

- Enable R&BD, GoG to provide an acceptably safe highway in respect of its condition (structural safety) and use (road safety);
- Enable R&BD, GoG to fulfil its statutory and common law obligations;
- Enable the R&BD-GoG to provide a congestion free uninterrupted flow of traffic on the Project Highway;
- Enable the R&BD-GoG to provide a level of highway service to the public not inferior to that of provided on the existing project road before construction, during the construction or improvement works ;
- Enable the Police, local authorities, and others with statutory duties or functions in relation to the Project Highway or adjoining roads to fulfil those duties and functions;
- Minimize the occurrence and adverse effects of accidents and ensure that all accidents and emergencies are responded to as quickly as possible;
- Minimize the risk of damage, destruction or disturbance to third party property;
- Ensure that members of the public are treated with all due courtesy and consideration;
- Provide a safe, clear and informative system of road signs;
- Comply with any specified program requirements, including for the completion of the new road;
- Enable standards of reliability, durability, accessibility, maintainability, quality control and assurance, and fitness for purpose appropriate to a highway of the character of the Project Highway to be achieved throughout the Contract Period;
- Employ and evaluate approved innovative technologies;
- Achieve aesthetic quality of the Project Highway;
- Provide Green Highway measures as stipulated in the Schedules C and D;
- Provide ATCC as per the Agreement, Schedule C;
- Undertake proper safety audit through an appropriate consultant (i.e. apart from the IC) before OD;
- Provide adequate bus bays for stopping of buses and bus shelters for commuters to wait under protection;
- Carry out accident recording and reporting (to IC and R&BD, GoG) by type on regular basis; and,
- Ensure adequate safety of the Project Workers on the work site.

Annexure-I

(Schedule-B)

1 Width of Carriageway

1.1 The Project Highway shall generally be widened/upgraded to have a 4-lane divided carriageway width. The paved width in general shall be 14.5m except central divider and the paved width at urban/semi urban sections shall be 22m except central divider. As the scope of work does not include addition of new bridge at Sabarmati River Bridge, the paved width of approaches to the bridge shall be 10m including paved shoulders. Except urban/semi-urban sections, granular shoulder of 1.25m width on either sides shall be provided.

1.2 The basic typical cross-section with 4-lane carriageway and required formation is applicable to the rural sections. The typical cross-sections for urban sections incorporate concrete closed drains, parking and medians as appropriate.

1.3 Except as otherwise provided in this agreement, the width of paved carriageway shall confirm to Clause 1.1 above and details provided in Appendix-I of this Annexure.

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 designed and constructed in conformity with the Specifications and Standards specified in Annex – I of Schedule D.

4 Other features of Project Highway

4.1 Cross Sections

The typical different types of road cross sections for upgradation to four lane in general is in rural sections and settlements/semi-urban/urban sections wider than four lane are required to be developed in different segments of the Project Highway, the same are given in **Appendix – I.**

4.2 Alignment Plan and Longitudinal Section

Horizontal and vertical alignment design shall be carried out to improve the geometry and sight distances at curves suiting to available corridor of impact of 26m in rural sections and 30 m in urban/semi-urban sections. For this minimum radius of horizontal curves shall be 360m for design speed of 100/80kph. Relaxation for reduction in speed and radii of curves shall be given at locations where it warrants and at such locations required

geometry shall be designed and achieved in accordance with IRC: 73 and adequate safety provisions are made. Drawing provided in Volume IV is for reference and guidance only. The FRL of the structures shall not be reduced/lowered than that of existing, unless where it is required and it is approved by IC.

The alignment of the Project Highway shall be improved as per the Standards set out in Schedule D.

Any change in horizontal and vertical alignment resulting in additional land acquisition by any agency at any part and stage of the project implementation is not permitted.

The change in design shall not adversely affect the access to the adjacent properties in the urban/semi-urban locations.

The change in design shall not affect the hydraulic requirement along the project road.

4.3 Pavement and Pavement Composition

The flexible pavement design including pavement characteristics requirements during Construction and till end of Concession period of the Project Highway shall be done in accordance with Schedule D, and maintained as per Schedule K.

Requirements for the various Pavement Layers of the Project Highway are given in **Appendix – II**. These are minimum thickness requirements that the Concessionaire needs to provide for the Project Highway with design CBR 9%. Innovative technology using Warm Mix Asphalt (WMA) approved by R&BD, GoG through IC and either IRC or MORTH shall be employed at location specified in Appendix – II and its performance is to be evaluated as specified in Schedule I.

4.4 Service Road

The details of service roads to be provided are NIL. (**Appendix – III)**

4.5 At-grade Junctions

The Schedule of Major and Minor junctions are given in **Appendix – IV.**

4.6 Major Re-alignments

The details of Major Re-alignments are presented in **Appendix – V.**

4.7 Cross-Drainage Structures (Bridges & Culverts)

Widening of existing culvert/bridge, New bridges and culverts shall be constructed wide enough to accommodate the full road cross section as given **Appendix –I** within available RoW.

The schedule of Bridges are given in **Appendix – VI.**

The schedule of culverts are given in **Appendix –VI.**

4.8 ROB/RUB

The details of ROB/RUB to be provided are NIL. (**Appendix – VII)**

4.9 Underpasses

The details of Underpasses to be provided are NIL. (**Appendix – VIII)**

4.10 Slope Protection and Drainage

Slope Protection & Drainage measures shall be provided as given in **Appendix – IX** and as per standards mentioned in Schedule D.

4.11 Carriageway and Drain Tapering Details

Carriageway & drains should be tapered suitably wherever required. The schedules and typical Carriageway & Drain Tapering Details to be considered are given in **Appendix – IX as reference**

4.12 Raised Pedestrian Crossing

Raised Pedestrian crossings shall be provided appropriately. The indicative schedule is provided through Volume-IV Drawings of this RFP. Such locations and/or any addition/change shall be carried out with consultation and approval with IC. The typical drawing is provided in **Appendix – X.**

4.13 Light Barriers/arresters

To arrest the light coming from the opposite direction vehicles, light barriers/arresters are envisaged in median at every median opening location and at curves. The schedule of locations is indicated in **Appendix-XI**. Such arrangement shall be worked out as per standards and in consultation with IC.

4.14 Crash Barriers (W-Metal Beam and New Jersey RCC)

Metal Beam Crash Barriers (W Beam) shall be installed on either sides of extremes of shoulder edges at the locations where the embankment height is more than 3m and on curves with less than 230m radius and also at all bridge and culvert approaches and other locations as directed by IC.

Central divider shall be New Jersey barrier (RCC) provided in centre, with black and white stripes in general and yellow and black stripes at median openings and retroreflective delineators on both sides of the crash barrier. For drain purpose the median is to be cut at regular interval also for placement of solar street light poles where required. This central barrier will act as divider all through the length of the project corridor, except median openings, cross roads, junctions, intersections, pedestrian crossings, solar street lights and any other locations as directed by IC.

The New Jersey crash barriers shall be provided as per standards and specifications, project plan, profile and other related drawings along with schedules provided in reference shall be utilised in finalising overall plan before seeking approval of integrated scheme from IC.

4.15 Green Highways Initiatives

4.15.1 Noise Barrier

Noise barrier shall be provided in situations wherever the school/ colleges/ hospitals/ residential areas/old age homes are abutting to the project road in order to avoid noise pollution. Tentative locations and typical drawings of Noise barriers are provided in **Appendix - XII**, the locations shall be confirmed to the site requirement in consultation with Independent Consultant.

4.15.2 Silt Traps, Rainwater Harvesting structures and Oil Interceptors

Silt Traps, Rainwater Harvesting Structures and Oil Interceptors are to be provided all along the project corridor. Tentative location and typical drawings of Silt Traps, Rainwater Harvesting Structures and Oil Interceptors are provided in **Appendix - XIII**, the locations shall be confirmed to the site requirement in consultation with Independent Consultant.

4.15.3 Enhancement Measures

The Concessionaire shall provide enhancement measures to (i) Paleshwar Mahadev Temple (Ch 119+600) and Chikotar Mata Temple (Ch 136+050). The enhancement measures include provision of foot path, gate, boundary wall, fencing, tree plantations as suggested in the enhancement drawing **Appendix – XIV**.

4.15.4 Landscaping

The Concessionaire shall provide landscaping in the parking area from Ch 161+400 to Ch 163+350, the landscaping shall include provision of shrubs, lawn and seating arrangement for public. The urban design for this stretch is given in drawing volume in Volume IV labelled as Urban Design.

For the stretch Vijapur – Himatnagar section (Ch 140+000 to Ch 161+400), the concessionaire shall provide creepers, turfing and other landscaping features on both sides of the road as measure to provide an aesthetic appearance to the project corridor and approved by the Independent Consultant.

4.15.5 Solar Street Lights

The Solar Street light units so designed to provide not less than 30 lux illumination all through on top of carriageway and footpath wherever provided during the operating hours

from dusk to dawn. The units are deemed to include foundation, erection of pole, installation of solar PV panel with battery and providing and fixing LED lights which shall be duly approved by the IC and satisfying MNRE standards. The furnishing labour and other incidental cost necessary shall also be considered for doing the work involved in erecting solar powered street lights in the respective places (at major intersections, all urban/semi-urban and settlement sections, also Bus bays and Bus Shelters (refer Schedule 'C' Project facilities)) as per the drawings and specifications or as directed by the IC. (Refer Drawing Volume IV for typical drawing). The concessionaire shall conduct regular maintenance, repair or replacement of the units either in part or in full as necessary throughout the concession period so as to ensure the rated illumination level specified herein.

4.15.6 Solar Fountain

The Solar fountain shall include, erection of fountain, powered by solar power at the major rotary junctions listed below:

Sr. No.	Chainage	Type
1	103.275	4-Arm-Rotary
2	117.070	4-Arm-Rotary
3	126.950	4-Arm-Rotary
4	135.260	4-Arm-Rotary
5	140.050	4-Arm-Rotary
6	161.340	4-Arm-Rotary

The fountain shall be provided at the island of a rotary intersection, the fountain shall contain a water storage tank in the rotary island at the centre of the intersection with arrangement of aesthetic fountain fitted with jets spreading water, pumped by pumping motor which is powered by Solar system (Suitable Solar system shall be found in the market to power the pumping motor by charging the battery). Design for the units shall be prepared by the concessionaire for functioning during the day and at-least a five hour operation during the night time as directed by the IC. The whole arrangement of solar fountain shall be regularly maintained / repaired / replaced either in part or in full by the concessionaire throughout the project period ensuring the rated operational hours during the night and day.

The main purpose of this fountain is to absorb the suspended particulate matter/ toxic gases produced by vehicles in the air to reduce air pollution on the highway.

4.15.7 Cattle Crossing Zones

The Concessionaire shall provide At-grade crossing zones at the identified cattle crossing locations or as confirmed with IC. Cattle crossing zone sign (S52) type in signage plan

along with schedule is provided in drawing **Volume IV.** The proposed design includes posting cautionary signs 120m before the cattle crossing zone locations.

4.15.8 Warm Mix Asphalt (WMA)

As part of the pilot green initiative, the Concessionaire shall introduce the WMA for a 3 km stretch in-between Ch 129+000 to 135+000 (1. 129.000 to 130.500 and 2. 133.500 to 135.000). The Concessionaire shall prefer advanced resource efficient construction technology (WMA).

4.15.9 Recycling of Pavement

Adopting the green concept of 3 R's (Recovery, Recycle and Reuse), the Concessionaire shall recycle a minimum of 50% of the excavated pavement. Based on the quality of the sub grade materials, it shall be proposed to recycle them for the purpose of pavement, strengthening embankment etc. In case if it does not meet the requirements in terms of quality, it shall be recycled as pavement for the approach road/ village roads.

4.15.10 Solid Waste Management (SWM)

The Concessionaire shall implement SWM in the green corridor by appointing a facilitating agency. Waste collecting bins shall be provided in Vijapur, Industrial area between km 144 and 145 and Himatnagar which are identified as sources for littering of solid waste on the roadside. The responsibility of collection and disposal of waste from these bins shall remain with the concerned municipalities / panchayat. The SWM shall be initiated through appointment of a facilitating agency. The bins provided will be maintained by the concessionaire in coordination with the facilitating agency.

4.15.11 Tree Transplantation

Tree transplantation and maintenance shall be performed by the Forest department, GoG; however, the Concessionaire shall have an additional responsibility in coordinating with the forest department in monitoring the surveillance of the transplanted trees. The proposed activity shall be initiated through the facilitating agency.

4.15.12 Facilitating Agency

The concessionaire shall appoint a facilitating agency within 6 months of signing of concession agreement for implementing the green interventions, which includes (i) Renewable Energy, (ii) Tree Transplantation, (iii) Cattle crossing and (iv) Solid Waste Management. The scope of the facilitating agency during construction and maintenance are given in the Schedule 'L'.

4.15.13 Environmental foot print and GHG measurement

Monitoring the pollution levels and estimating the level of carbon foot print shall give an overall performance of the green highways. The concessionaire shall monitor the GHG emission during the project construction and operation.

The responsibilities of concessionaire shall be:

1. Coordinate with the vendor agency and carryout performance monitoring with respect to the indicators specific to WMA (e.g quantity of fuel used, waste generated and GHG emissions released);
2. Preparation of suitable monitoring format in consultation with the vendor agency and IC for monitoring of Environmental parameters with respect to WMA (including monitoring of GHG emission);
3. Developing a data base with respect to the Environmental footprint information for the project corridor and publishing the same in the PIU website under the tab "Pilot GH Initiative."

5 Pre-Construction Activities

5.1 Land Acquisition (L A)

Any land required for the construction of the Project Highway as per the **Appendix – II** of **Schedule A** is acquired by the R&BD, GoG and made available to the Concessionaire. The width of the land made available would be as per the proposed Cross Sections provided in this Schedule of this Agreement. It is clarified here that the R&BD, GoG is obliged to hand over the existing Right of Way only and acquisition of any land beyond existing Right of Way will be at the risk of the Concessionaire.

5.2 Utility Shifting and Removal of Trees & Obstructions

The shifting of utilities and removal of trees is undertaken by the R&BD, GoG. However, if the Concessionaire encounters any unforeseen utilities including but not limited to electric lines, water pipes and telephone cables etc also which causes a material adverse effect on the construction, operation and maintenance of the Project Highway, the Concessionaire shall, subject to Applicable Laws and with prior approval and assistance of the R&BD, GoG, undertake shifting of the same to an appropriate location or alignment within or outside the Site. The cost of such shifting shall be borne by the R&BD, GoG or by the entity owning such utility, if the R&BD, GoG so directs.

It shall be the sole responsibility of the Concessionaire for shifting of utilities and removal of trees and obstructions which arise due to the Concessionaire's proposed design changes. The cost of such shifting of utilities and removal of trees and obstructions shall be borne by the Concessionaire. The Concessionaire shall not be entitled for any extension of time and cost claims from the R&BD, GoG with respect to the Project Highway.

5.3 Permits to be Obtained

The Concessionaire shall obtain all necessary Permits from all the concerned authorities required for implementing the project.

5.4 Encroachment Removal

R&BD, GoG shall provide the Site, free from encumbrances, in accordance with this Agreement. All necessary arrangements for accomplishing the tasks of physical removal of the encroachments will be the responsibility of the R&BD, GoG. However it is Concessionaire's responsibility to remove the encroachments resulting due to his proposed designs.

5.5 Compensatory Afforestation, Rehabilitation & Resettlement

R&BD, GoG shall bear all expenses as per the demand note raised by the concerned government or other agencies in respect of environmental clearances, tree cutting, compensatory afforestation and rehabilitation and resettlement.

5.6 Environment Management Plan (EMP)

The concessionaire shall adopt the stipulated Technical Specification (Clause 111.) while Safeguarding the Environment as indicated in the Schedule – D as well as for the Environmental Management Plan prescribed in the Schedule – L during the project construction and operation (concession) period. The Appendix – 1 enclosed with the Schedule – L shall form the Environmental Monitoring Report during the project construction and operation. The report shall be prepared by the concessionaire and will report to the Independent Consultant on the progress of the implementation of environmental conditions and management measures as per the Schedule –L.

5.7 Safety

The Concessionaire shall confirm all the construction and operation procedures adopted by him are based on the construction and road safety aspects as stipulated in the Schedule – L and Schedule –K (Table -1: Environmental Management Plan for Mehsana – Himatnagar Corridor, Clause 2.1.4.4 Safety). Necessary reporting formats shall be prepared by the Concessionaire and he in turn shall report to the Independent Consultant with regard the progress of the construction and road safety measures as per the Schedule –K.

5.8 At-grade Railway Crossings

Both the at-grade railway crossings as stated in Schedule-A are to be attended with widening of gates as per four lane cross section. Railway authorities have been requested to increase the width of gate opening to match the improved highway.

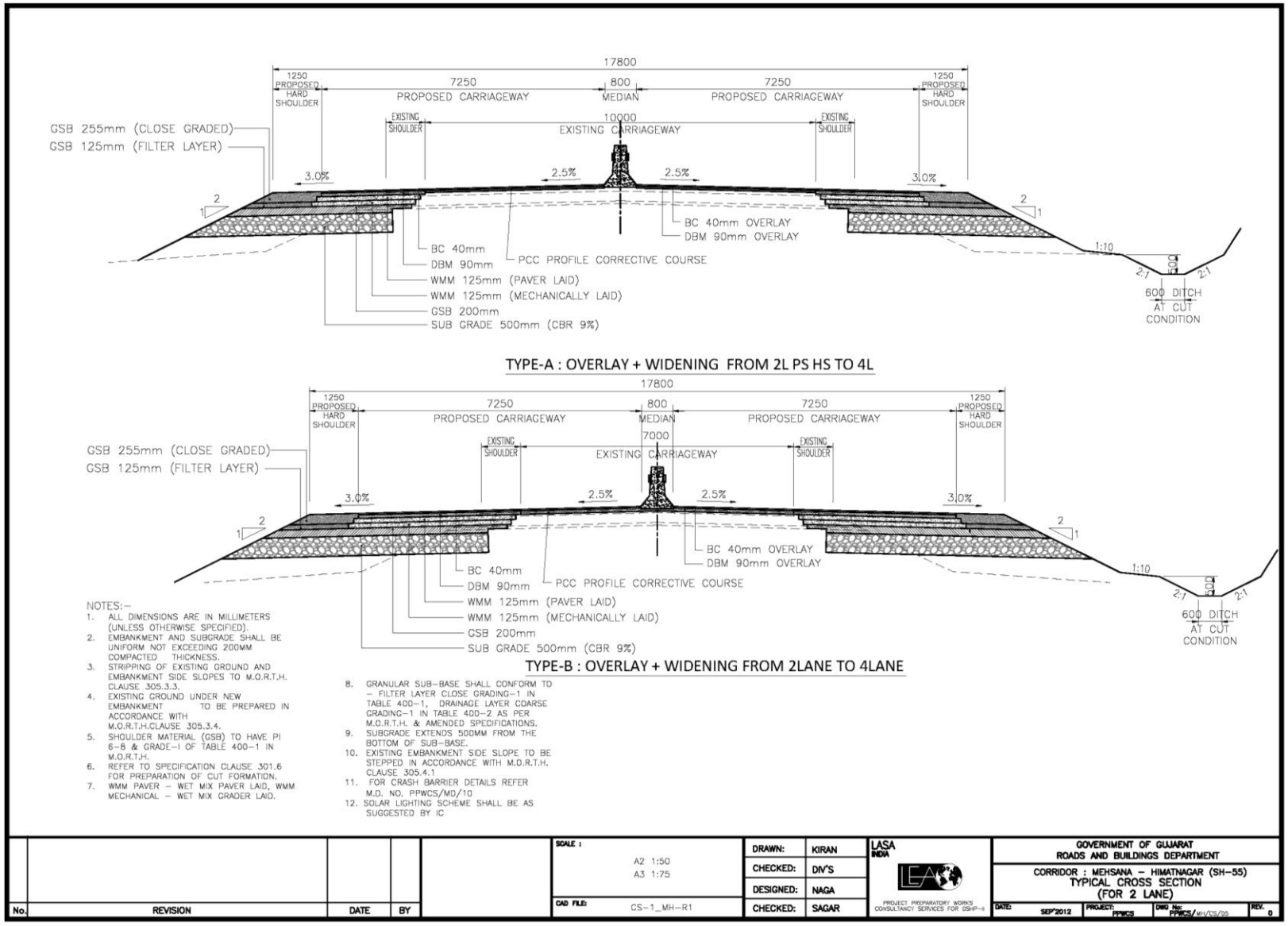
Appendix – I

Type of Road Cross Sections

Chainage		Length in km	LHS Carriage way width (m)	RHS Carriage way width (m)	Granular Shoulder either sides (m)	Covered Drain with Foot Path	Cross Section Type
From	To						
km 103.000	km 127.000	24.000	7.250	7.250	1.250		Type-A
km 127.000	km 129.000	2.000	7.250	7.250	1.250		Type-B
km 129.000	km 135.259	6.259	7.250	7.250	1.250		Type-C
km 135.259	km 138.400	3.141	7.250	7.250	1.250		Type-D
km 138.400	km 141.000	2.600	11.000	11.000		1.500	Type-E
km 141.000	km 145.950	4.950	7.250	7.250	1.250		Type-D
km 145.950	km 147.400	1.450	5.0	5.0	1.00		Type-F
km 147.400	km 161.340	13.940	7.250	7.250	1.250		Type-D
km 161.340	km 163.751	2.000	7.250	7.250		1.500	Type-G*
	Total	**60.751**					

* to be developed along with enhancement design for Himatnagar urban section as shown with parking and other requirements provided through reference drawings.

Appendix – II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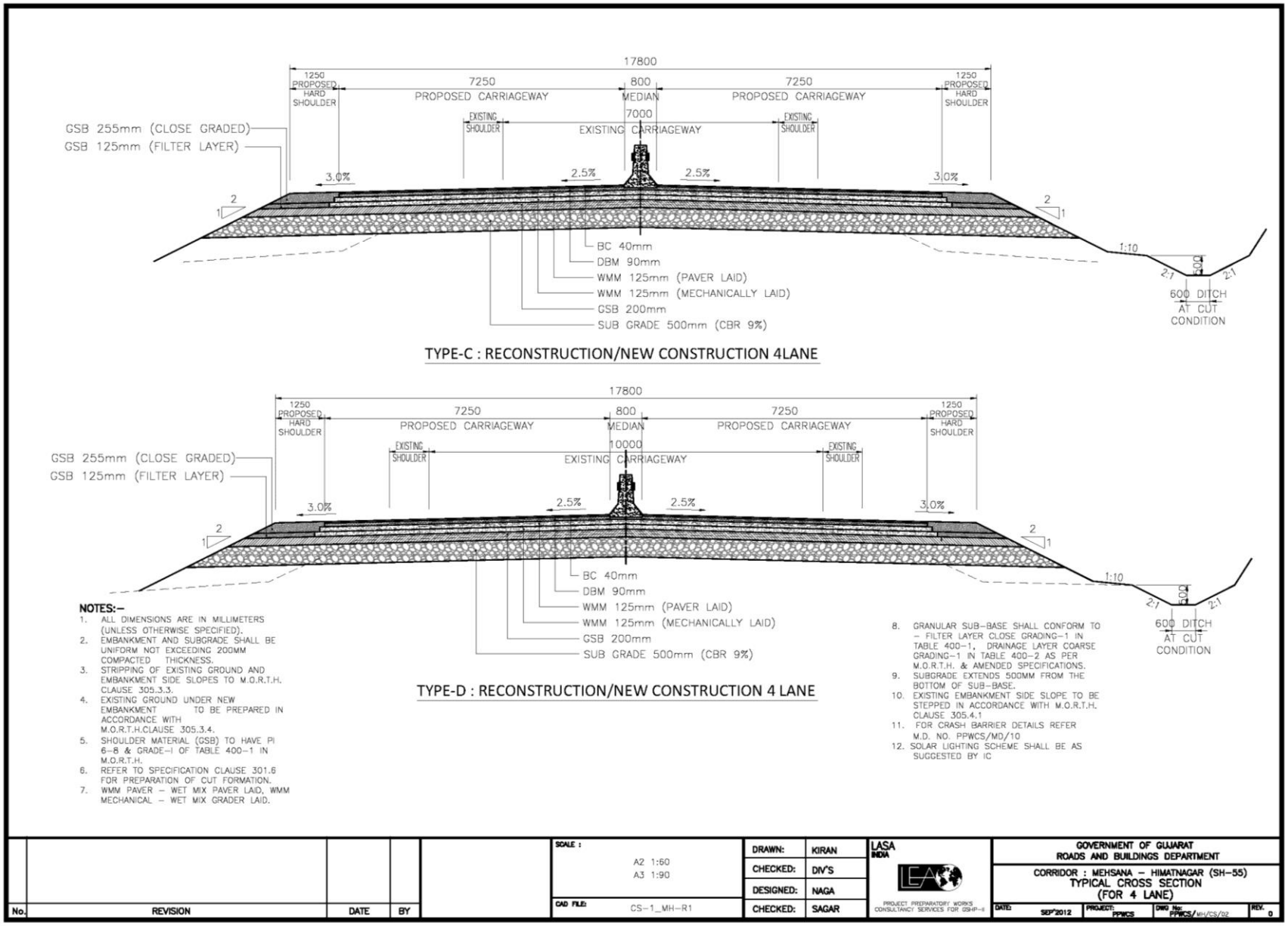
1250 PROPOSED HARD SHOULDER
7250 PROPOSED CARRIAGEWAY
800 MEDIAN
7250 PROPOSED CARRIAGEWAY
1250 PROPOSED HARD SHOULDER
EXISTING SHOULDER
10000 EXISTING CARRIAGEWAY
EXISTING SHOULDER
GSB 255mm (CLOSE GRADED)
GSB 125mm (FILTER LAYER)
3.0%
2.5%
2.5%
3.0%
BC 40mm OVERLAY
DBM 90mm OVERLAY
BC 40mm
DBM 90mm
PCC PROFILE CORRECTIVE COURSE
WMM 125mm (PAVER LAID)
WMM 125mm (MECHANICALLY LAID)
GSB 200mm
SUB GRADE 500mm (CBR 9%)
1:10
2:1
2:1
600
600 DITCH AT CUT CONDITION
TYPE-A : OVERLAY + WIDENING FROM 2L PS HS TO 4L
17800
1250 PROPOSED HARD SHOULDER
7250 PROPOSED CARRIAGEWAY
800 MEDIAN
7250 PROPOSED CARRIAGEWAY
1250 PROPOSED HARD SHOULDER
EXISTING SHOULDER
7000 EXISTING CARRIAGEWAY
EXISTING SHOULDER
GSB 255mm (CLOSE GRADED)
GSB 125mm (FILTER LAYER)
3.0%
2.5%
2.5%
3.0%
BC 40mm OVERLAY
DBM 90mm OVERLAY
BC 40mm
DBM 90mm
PCC PROFILE CORRECTIVE COURSE
WMM 125mm (PAVER LAID)
WMM 125mm (MECHANICALLY LAID)
GSB 200mm
SUB GRADE 500mm (CBR 9%)
1:10
2:1
2:1
600
600 DITCH AT CUT CONDITION
TYPE-B : OVERLAY + WIDENING FROM 2LANE TO 4LANE
NOTES:–
1. ALL DIMENSIONS ARE IN MILLIMETERS (UNLESS OTHERWISE SPECIFIED).
2. EMBANKMENT AND SUBGRADE SHALL BE UNIFORM NOT EXCEEDING 200MM COMPACTED THICKNESS.
3. STRIPPING OF EXISTING GROUND AND EMBANKMENT SIDE SLOPES TO M.O.R.T.H. CLAUSE 305.3.3.
4. EXISTING GROUND UNDER NEW EMBANKMENT TO BE PREPARED IN ACCORDANCE WITH M.O.R.T.H.CLAUSE 305.3.4.
5. SHOULDER MATERIAL (GSB) TO HAVE PI 6–8 & GRADE–I OF TABLE 400–1 IN M.O.R.T.H.
6. REFER TO SPECIFICATION CLAUSE 301.6 FOR PREPARATION OF CUT FORMATION.
7. WMM PAVER – WET MIX PAVER LAID, WMM MECHANICAL – WET MIX GRADER LAID.
8. GRANULAR SUB–BASE SHALL CONFORM TO – FILTER LAYER CLOSE GRADING–1 IN TABLE 400–1, DRAINAGE LAYER COARSE GRADING–1 IN TABLE 400–2 AS PER M.O.R.T.H. & AMENDED SPECIFICATIONS.
9. SUBGRADE EXTENDS 500MM FROM THE BOTTOM OF SUB–BASE.
10. EXISTING EMBANKMENT SIDE SLOPE TO BE STEPPED IN ACCORDANCE WITH M.O.R.T.H. CLAUSE 305.4.1
11. FOR CRASH BARRIER DETAILS REFER M.D. NO. PPWCS/MD/10
12. SOLAR LIGHTING SCHEME SHALL BE AS SUGGESTED BY IC
No. REVISION DATE BY
SCALE : A2 1:50 A3 1:75
CAD FILE: CS-1_MH-R1
DRAWN: KIRAN
CHECKED: DIV'S
DESIGNED: NAGA
CHECKED: SAGAR
LASA INDIA
PROJECT PREPARATORY WORKS CONSULTANCY SERVICES FOR GSHP-II
GOVERNMENT OF GUJARAT
ROADS AND BUILDINGS DEPARTMENT
CORRIDOR : MEHSANA – HIMATNAGAR (SH–55)
TYPICAL CROSS SECTION
(FOR 2 LANE)
DATE: SEP'2012
PROJECT: PPWCS
DWG No: PPWCS/MH/CS/05
REV. 0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1250 PROPOSED HARD SHOULDER
7250
PROPOSED CARRIAGEWAY
800
MEDIAN
7250
PROPOSED CARRIAGEWAY
1250 PROPOSED HARD SHOULDER
EXISTING SHOULDER
7000
EXISTING CARRIAGEWAY
EXISTING SHOULDER
GSB 255mm (CLOSE GRADED)
GSB 125mm (FILTER LAYER)
3.0%
2.5%
2.5%
3.0%
2
1
2
1
BC 40mm
DBM 90mm
WMM 125mm (PAVER LAID)
WMM 125mm (MECHANICALLY LAID)
GSB 200mm
SUB GRADE 500mm (CBR 9%)
1:10
2:1
2:1
600
600 DITCH AT CUT CONDITION
TYPE-C : RECONSTRUCTION/NEW CONSTRUCTION 4LANE
17800
1250 PROPOSED HARD SHOULDER
7250
PROPOSED CARRIAGEWAY
800
MEDIAN
7250
PROPOSED CARRIAGEWAY
1250 PROPOSED HARD SHOULDER
EXISTING SHOULDER
10000
EXISTING CARRIAGEWAY
EXISTING SHOULDER
GSB 255mm (CLOSE GRADED)
GSB 125mm (FILTER LAYER)
3.0%
2.5%
2.5%
3.0%
2
1
2
1
BC 40mm
DBM 90mm
WMM 125mm (PAVER LAID)
WMM 125mm (MECHANICALLY LAID)
GSB 200mm
SUB GRADE 500mm (CBR 9%)
1:10
2:1
2:1
600
600 DITCH AT CUT CONDITION
TYPE-D : RECONSTRUCTION/NEW CONSTRUCTION 4 LANE
NOTES:–
1. ALL DIMENSIONS ARE IN MILLIMETERS (UNLESS OTHERWISE SPECIFIED).
2. EMBANKMENT AND SUBGRADE SHALL BE UNIFORM NOT EXCEEDING 200MM COMPACTED THICKNESS.
3. STRIPPING OF EXISTING GROUND AND EMBANKMENT SIDE SLOPES TO M.O.R.T.H. CLAUSE 305.3.3.
4. EXISTING GROUND UNDER NEW EMBANKMENT TO BE PREPARED IN ACCORDANCE WITH M.O.R.T.H.CLAUSE 305.3.4.
5. SHOULDER MATERIAL (GSB) TO HAVE PI 6–8 & GRADE–I OF TABLE 400–1 IN M.O.R.T.H.
6. REFER TO SPECIFICATION CLAUSE 301.6 FOR PREPARATION OF CUT FORMATION.
7. WMM PAVER – WET MIX PAVER LAID, WMM MECHANICAL – WET MIX GRADER LAID.
8. GRANULAR SUB–BASE SHALL CONFORM TO – FILTER LAYER CLOSE GRADING–1 IN TABLE 400–1, DRAINAGE LAYER COARSE GRADING–1 IN TABLE 400–2 AS PER M.O.R.T.H. & AMENDED SPECIFICATIONS.
9. SUBGRADE EXTENDS 500MM FROM THE BOTTOM OF SUB–BASE.
10. EXISTING EMBANKMENT SIDE SLOPE TO BE STEPPED IN ACCORDANCE WITH M.O.R.T.H. CLAUSE 305.4.1
11. FOR CRASH BARRIER DETAILS REFER M.D. NO. PPWCS/MD/10
12. SOLAR LIGHTING SCHEME SHALL BE AS SUGGESTED BY IC
No. REVISION DATE BY
SCALE : A2 1:60 A3 1:90
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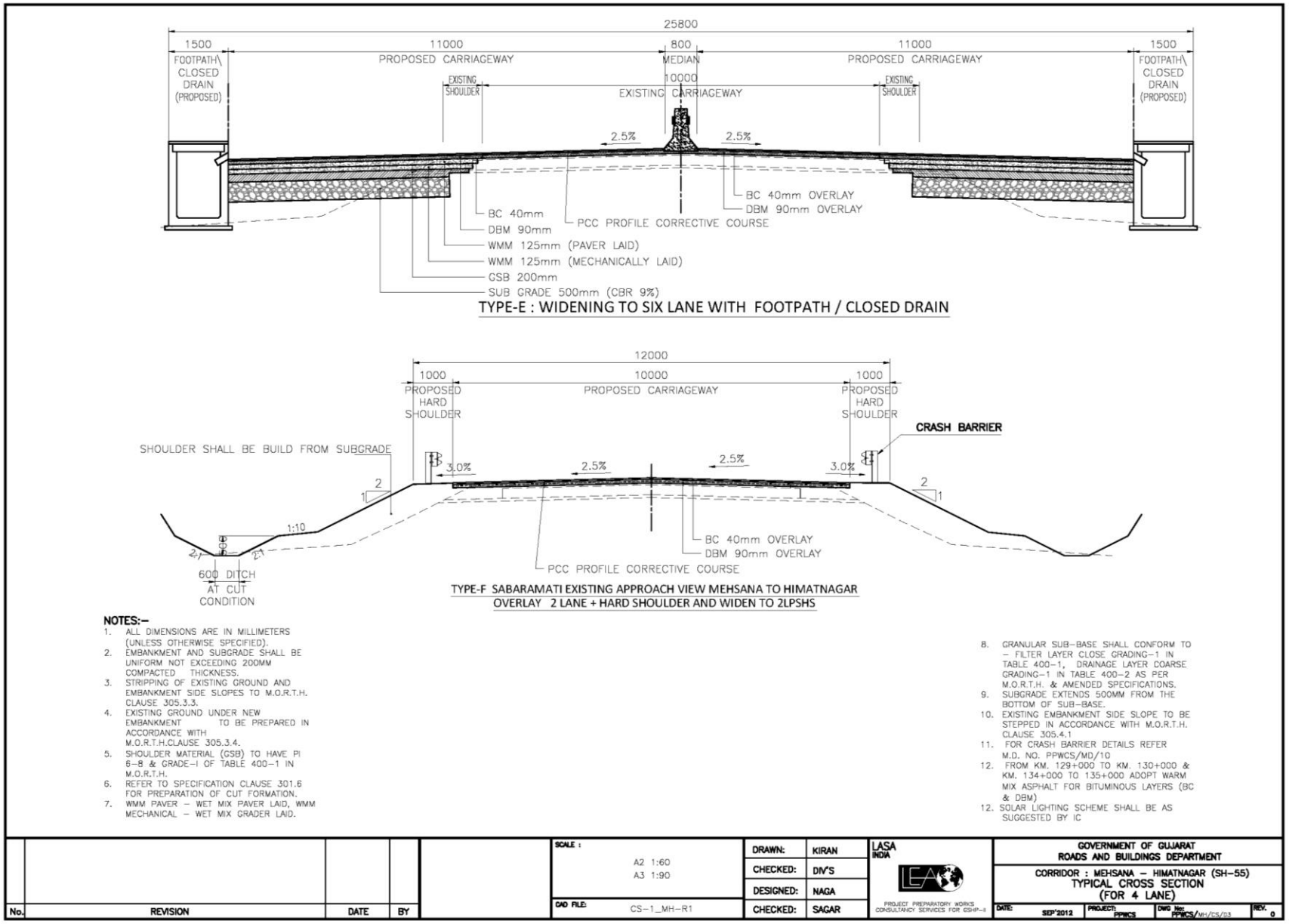
TYPICAL CROSS SECTION
(FOR 4 LANE)
DATE: SEP'2012
PROJECT: PPWCS
DWG No: PPWCS/MH/CS/02
REV. 0



NOTES:–

1. ALL DIMENSIONS ARE IN MILLIMETERS (UNLESS OTHERWISE SPECIFIED).
2. EMBANKMENT AND SUBGRADE SHALL BE UNIFORM NOT EXCEEDING 200MM COMPACTED THICKNESS.
3. STRIPPING OF EXISTING GROUND AND EMBANKMENT SIDE SLOPES TO M.O.R.T.H. CLAUSE 305.3.3.
4. EXISTING GROUND UNDER NEW EMBANKMENT TO BE PREPARED IN ACCORDANCE WITH M.O.R.T.H.CLAUSE 305.3.4.
5. SHOULDER MATERIAL (GSB) TO HAVE PI 6–8 & GRADE–I OF TABLE 400–1 IN M.O.R.T.H.
6. REFER TO SPECIFICATION CLAUSE 301.6 FOR PREPARATION OF CUT FORMATION.
7. WMM PAVER – WET MIX PAVER LAID, WMM MECHANICAL – WET MIX GRADER LAID.
8. GRANULAR SUB–BASE SHALL CONFORM TO – FILTER LAYER CLOSE GRADING–1 IN TABLE 400–1, DRAINAGE LAYER COARSE GRADING–1 IN TABLE 400–2 AS PER M.O.R.T.H. & AMENDED SPECIFICATIONS.
9. SUBGRADE EXTENDS 500MM FROM THE BOTTOM OF SUB–BASE.
10. EXISTING EMBANKMENT SIDE SLOPE TO BE STEPPED IN ACCORDANCE WITH M.O.R.T.H. CLAUSE 305.4.1
11. FOR CRASH BARRIER DETAILS REFER M.D. NO. PPWCS/MD/10
12. FROM KM. 129+000 TO KM. 130+000 & KM. 134+000 TO 135+000 ADOPT WARM MIX ASPHALT FOR BITUMINOUS LAYERS (BC & DBM)
12. SOLAR LIGHTING SCHEME SHALL BE AS SUGGESTED BY IC

No.	REVISION	DATE	BY

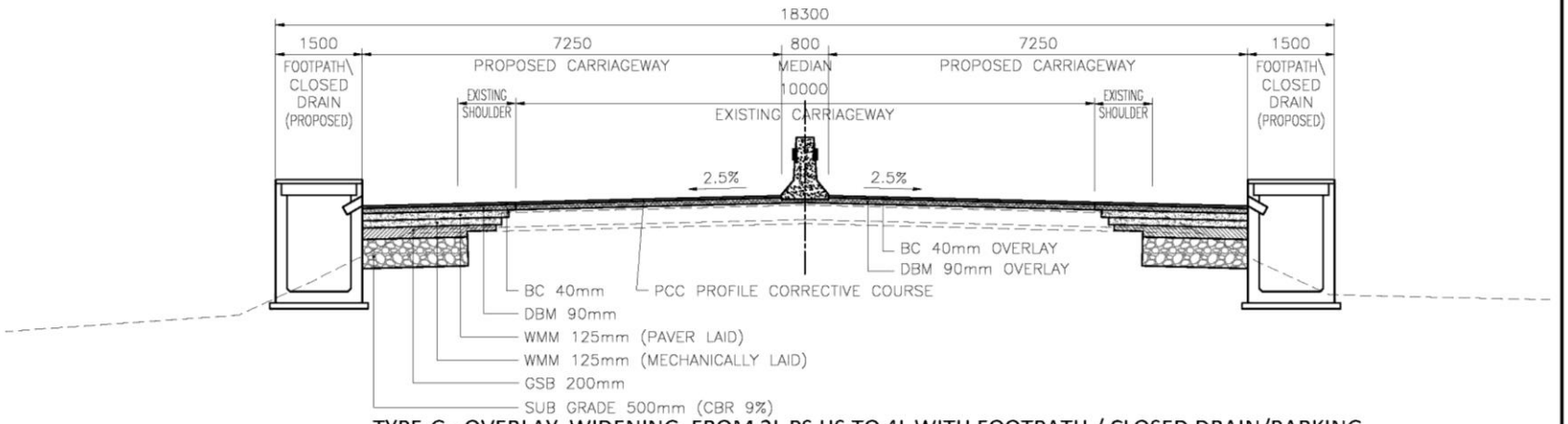
SCALE : A2 1:60, A3 1:90
CAD FILE: CS–1_MH–R1

DRAWN:	KIRAN
CHECKED:	DIV'S
DESIGNED:	NAGA
CHECKED:	SAGAR

LASA INDIA
PROJECT PREPARATORY WORKS CONSULTANCY SERVICES FOR GSHP–II

GOVERNMENT OF GUJARAT
ROADS AND BUILDINGS DEPARTMENT
CORRIDOR : MEHSANA – HIMATNAGAR (SH–55)
TYPICAL CROSS SECTION (FOR 4 LANE)

DATE:	PROJECT:	DWG No:	REV.
SEP'2012	PPWCS	PPWCS/MH/CS/03	0



TYPE-G : OVERLAY WIDENING FROM 2L PS HS TO 4L WITH FOOTPATH / CLOSED DRAIN/PARKING

NOTES:–

1. ALL DIMENSIONS ARE IN MILLIMETERS (UNLESS OTHERWISE SPECIFIED).
2. EMBANKMENT AND SUBGRADE SHALL BE UNIFORM NOT EXCEEDING 200MM COMPACTED THICKNESS.
3. STRIPPING OF EXISTING GROUND AND EMBANKMENT SIDE SLOPES TO M.O.R.T.H. CLAUSE 305.3.3.
4. EXISTING GROUND UNDER NEW EMBANKMENT TO BE PREPARED IN ACCORDANCE WITH M.O.R.T.H.CLAUSE 305.3.4.
5. SHOULDER MATERIAL (GSB) TO HAVE PI 6–8 & GRADE–I OF TABLE 400–1 IN M.O.R.T.H.
6. REFER TO SPECIFICATION CLAUSE 301.6 FOR PREPARATION OF CUT FORMATION.
7. WMM PAVER – WET MIX PAVER LAID, WMM MECHANICAL – WET MIX GRADER LAID.
8. GRANULAR SUB–BASE SHALL CONFORM TO – FILTER LAYER CLOSE GRADING–1 IN TABLE 400–1, DRAINAGE LAYER COARSE GRADING–1 IN TABLE 400–2 AS PER M.O.R.T.H. & AMENDED SPECIFICATIONS.
9. SUBGRADE EXTENDS 500MM FROM THE BOTTOM OF SUB–BASE.
10. EXISTING EMBANKMENT SIDE SLOPE TO BE STEPPED IN ACCORDANCE WITH M.O.R.T.H. CLAUSE 305.4.1
11. FOR CRASH BARRIER DETAILS REFER M.D. NO. PPWCS/MD/10
12. SOLAR LIGHTING SCHEME SHALL BE AS SUGGESTED BY IC

No.	REVISION	DATE	BY

SCALE : A2 1:60, A3 1:90
CAD FILE: CS–1_MH–R1

DRAWN:	KIRAN
CHECKED:	DIV'S
DESIGNED:	NAGA
CHECKED:	SAGAR

LASA INDIA
PROJECT PREPARATORY WORKS CONSULTANCY SERVICES FOR GSHP–II

GOVERNMENT OF GUJARAT
ROADS AND BUILDINGS DEPARTMENT
CORRIDOR : MEHSANA – HIMATNAGAR (SH–55)
TYPICAL CROSS SECTION
(FOR 4 & 6 LANE)

DATE: SEP'2012 | PROJECT: PPWCS | DWG No: PPWCS/MH/CS/04 | REV. 0

Pavement Schedule

Chainage		Length in km	Cross Section Type	Proposed Pavement Treatment
From	To			
km 103.000	km 127.000	24.000	Type-A	Widening and Strengthening
km 127.000	km 129.000	2.000	Type-B	Widening and Strengthening
km 129.000	km 135.259	6.259	Type-C	Reconstruction
km 135.259	km 138.400	3.141	Type-D	Reconstruction
km 138.400	km 141.000	2.600	Type-E	Widening and Strengthening
km 141.000	km 145.950	4.950	Type-D	Reconstruction
km 145.950	km 147.400	1.450	Type-F	Widening and Strengthening
km 147.400	km 161.340	13.940	Type-D	Reconstruction
km 161.340	km 163.751	2.000	Type-G*	Widening and Strengthening
	Total	**60.751**		

The Pavement treatment shown above is minimum, actual provision shall be as per bidder's detailed assessments and investigations.

The Concessionaire however shall ensure the pavement design for its adequacy based on the latest IRC standards and updated traffic counts and properties of available material, traffic analysis as per standards & specifications mentioned in Schedule D.

Widening and strengthening also reconstruction pavement layer thicknesses as shown in typical cross sections in Schedule-B are minimum requirements with CBR 9% in any case. Widening and reconstruction shall be from 500 mm subgrade to wearing course as stipulated. Strengthening (overlay) has to be ascertained as per actual structural requirement through BBD surveys and investigations but in no case the strengthening treatment shall be less than 40mm BC and 90mm DBM along with required profile correction.

The Concessionaire shall use Warm Mix Asphalt technology approved by IC and either IRC or MORT&H for DBM and BC layers at Km 129.000 to 130.500 and at Km 133.500 to 135.000. The performance of these two stretches shall be measured as per procedures and tests specified in Schedule I.

Appendix – III

Service road Schedule

NIL

Appendix – IV

Schedule of Major and Minor Road Junctions/Intersections

Major

Chainage	Junction Type	Surface Type	Intersecting Road	Category
103+275.00	4 Arm	BT	Mehsana-Gandhinagar	Major
117+075.00	4 Arm	BT	Gandhinagar-Visnagar	Major
127+050.00	4 Arm	BT	Mansa-Visnagar	Major
135+250.00	4 Arm	BT	Mansa	Major
139+025.00	4 Arm	BT	Visnagar	Major
140+150.00	4 Arm	BT	Mahudi-Vijapur	Major
161+460.00	4 Arm	BT	Ahmedabad-Idar	Major
163+752.00	4 Arm	BT	Himatnagar-Idar	Major

Minor Junctions/Intersections

SR. NO	CHAINAGE
1	105+310.83
2	105+883.30
3	107+678.95
4	108+881.85
5	109+232.95
6	109+292.69
7	112+185.44
8	112+185.44
9	112+230.34
10	112+324.84
11	112+382.46
12	113+862.18
13	115+120.40
14	115+503.31
15	117+900.01
16	119+306.42
17	119+577.05
18	120+002.52
19	123+314.99
20	123+675.79
21	124+364.87
22	124+367.34
23	126+351.15
24	128+584.09
25	128+584.09
26	130+866.21

SR. NO	CHAINAGE
27	130+866.21
28	134+299.05
29	135+494.61
30	135+999.55
31	136+779.72
32	137+311.86
33	137+783.15
34	141+119.19
35	141+145.80
36	142+183.43
37	144+251.18
38	148+654.66
39	148+963.82
40	149+753.84
41	153+267.14
42	154+537.38
43	156+414.84
44	156+905.27
45	157+293.32
46	158+937.13
47	160+446.35
48	160+457.33
49	162+094.80
50	162+369.71
51	162+647.45
52	163+250.82

Refer Volume IV for Typical Major/minor Road Junction/Intersection details for reference.

Appendix – V

Major realignment Schedule

Sabarmati river realignment is deleted

No Major Realignment

Appendix – VI

List of Bridges to be improved by the Concessionaire

a) Bridges Proposed for New Construction/Repair/Widening and Strengthening

Sl.No	Design Chainage (km)	Type of Bridge	Nos. of span	Span length (m)	Total Length of Bridge (m)	Proposed Width of bridge (m)	Improvement Proposal
1	106+400	Minor (Unlined Branch Canal)	2	5.00	10.00	21.00	Retain & widening
2	106+475	Minor (Main Canal)	4	2x7 + 2x6.5	27.00	21.00	Retain & widening
3	111+631	Minor	2	4.50	9.00	21.00	Retain & widening
4	134+435	Box Minor	2	3.50	7.00	21.00	Retain & widening
5	137+045	Box Minor	2	3.60	7.20	21.00	Retain & widening
6	141+167	Minor	2	1x5 +1x8	13	21.00	Replace by new Structure 2 span x8m
7	146+700	Major (Sabarmati River)	8	37	296	7.6	Retain and Repair Existing Bridge, New Structure on RHS is not in the scope of this contract. Maintenance of existing bridge is in the scope as below: • Cleaning of vegetation and blockage • Providing and fixing expansion joints • Remedial measures for embankment protection by stone pitching and scoured river-bed protection where required and as directed by IC. • Restoration of Returns. • Repair of cracks, honeycombs, spalling, leaching, exposed reinforcement etc. • Removing existing wearing course and laying new layer including 6mm mastic asphalt and 50 mm of asphaltic concrete. • Any other repairs/maintenance suggested by IC/R&BD shall not be treated as change of scope.
8	150+755	Box Minor	2	3.50	7.00	21.00	Retain & widening
9	153+010	Box Minor	2	3.50	7.00	21.00	Replace with B.C. 3 span x 3 m with 3 m vent height to be finalised as per vertical profile of road
10	153+770	Minor	2	10.00	20.00	21.00	Retain & widening
11	157+960	Minor (Narrow)	3	5.00	15.00	21.00	Replace by new Structure 3 spans x 7m
12	158+386	Box Minor	2	3.50	7.00	21.00	Retain & widening
13	163+262	Box Minor	2	3.50	7.00	21.00	Retain & widening

Details of the Culverts

(b) Culverts Proposed for New Construction/Repair/Widening and Strengthening

Sr. No	Design Chainage (km)	Type of Structures (Pipe/ Slab/ Box/ Arch)	Span Arrangement (m)		Total Length	Proposed Width# of Culvert (m)	Proposed Treatment
			Nos.	Pipe Dia.\ Span Length (m)			
1	103+278 SH-73 Mehsana Side	P.C.	2	1.2	-	Near junction 30.00	Additional (New)
2	103+278 SH-73 Gandhinagar Side	P.C.	2	1.2	-	Near junction 30.00	Additional (New)
3	105+092	P.C.	2	0.60	-	21.0	Retain & Widening
4	107+605	P.C.	2	0.75	-	21.0	Retain & Widening
5	108+138	P.C.	2	0.60	-	21.0	Repair & widening
6	109+464	P.C.	1	0.60	-	21.0	*Retain & widening
7	110+695	P.C.	3	0.90	-	21.0	Replace with 3 nos. 1.20 m. dia. NP4 pipe
8	112+206	P.C.	2	0.60	-	21.0	Retain & widening
9	113+190	P.C.	2	0.60	-	21.0	Retain & widening
10	115+287	P.C.	2	0.60	-	21.0	Retain & widening
11	115+755	P.C.	2	0.90	-	21.0	Retain & widening
12	116+955	P.C.	2	0.60	-	21.0	Retain & widening
13	117+067 SH-71 Visnagar Side	P.C.	2	1.2	-	21.0	Additional (New)
14	117+067 SH-71 Mansa Side	P.C.	2	1.2	-	21.0	Additional (New)
15	117+337	P.C.	2	0.90	-	21.0	Retain & widening
16	119+504	P.C.	2	0.90	-	21.0	Replace with B.C. 2 spans x 2 m
17	120+133	P.C.	1	0.90	-	21.0	Retain & widening
18	123+095	P.C.	2	0.60	-	21.0	Retain & widening
19	125+384	P.C.	1	0.60	-	21.0	Retain & widening
20	125+959	P.C.	1	0.75	-	21.0	Retain & widening
21	126+960 SH-218 Visnagar Side	P.C.	2	1.2	-	Near junction 30.00	Additional (New)
22	126+960 SH-218 Mansa Side	P.C.	2	1.2	-	Near junction 30.00	Additional (New)
23	127+675	P.C.	4	0.60	-	21.0	Retain & widening
24	128+578	P.C.	2	0.60	-	21.0	Repair & widening
25	128+752	P.C.	2	0.60	-	21.0	Retain & widening
26	129+465	P.C.	3	0.60	-	21.0	Replace with 3 nos. 1.20 m. dia. NP4 pipe
27	131+730	P.C.	3	0.60	-	21.0	Replace with 3 nos. 1.20 m. dia. NP4 pipe
28	132+734	P.C.	2	0.60	-	21.0	Replace with 3 nos. 1.20 m. dia. NP4 pipe
29	135+260 SH-130 Mansa Side	P.C.	2	1.2	-	Near junction 30.00	Additional (New)
30	135+475 SH-213 Mahudi Side	P.C.	2	1.2	-	Near junction 30.00	Additional (New)

Sr. No	Design Chainage (km)	Type of	Span Arrangement (m)		Total	Proposed Width# of	Proposed Treatment
31	137+119	P.C.	1	0.60	-	21.0	Retain & widening
32	137+857	P.C.	3	0.60	-	21.0	Repair & widening
33	138+216	P.C.	3	0.90	-	21.00	Replace with B.C. 2 spans x 2 m
34	140+068	B.C.	1	2.50	2.5	21.00	*Retain & widening
35	144+571	P.C.	3	0.60	-	21.0	Retain & widening
36	147+927	P.C.	4	0.60	-	21.00	Replace with B.C. 2 spans x 2 m
37	149+729	S.C.	1	3.60	3.6	21.00	Repair & widening
38	150+325	P.C.	2	1.20	-	21.0	Retain & widening
39	151+088	B.C.	2	2.50	5	21.00	Retain & widening
40	151+384	P.C.	3	1.20	-	21.0	*Repair & widening
41	152+746	P.C.	2	1.20	-	21.0	*Repair & widening
42	155+605	Canal Inverted Syphon	-	-	3	-	Retain
43	156+962	B.C.	2	2.50	5	21.00	Retain & widening
44	157+237	P.C.	3	0.90	-	21.0	Repair & widening
45	157+550	B.C.	2	2.50	5	21.00	Retain & widening
46	159+667	P.C.	2	0.60	-	21.0	Repair & widening
47	160+135	Canal Inverted Syphon	-	-	2.00	-	Retain
48	161+200	P.C.	3	0.90	-	21.0	Repair & widening
49	161+340 Ring Road A'bad Side	P.C.	2	1.2	-	Near junction 30.00	*Additional (New)
50	161+842	P.C.	4	0.60	-	21.0	Repair & widening

* to be jointly verified and confirmed for future proposition with IC.

Widening, replacement and additional new structure width shall be as per the road cross section at respective places and in commensuration with original ground profile within RoW. IC and R&BD shall be final authority to approve and advice on overall width of all structures and CD works.

Any additional culverts or irrigation pipes or other miscellaneous services found during the Project Implementation stage shall be covered within the scope of work and shall not be treated as change in scope of work.

All bridges and culverts those are existing and proposed for either retain or repair and widening are proposed to be retained after carrying out necessary repairs and rehabilitation in consultation with IC. Such repairs shall include but not limited to general cleaning of bridges/culverts and area around, restoration of slopes and protection works, removal and relaying of existing wearing coat, required camber corrections, repair and replacement of drainage spouts, construction of new crash barriers, providing of new expansion joints and bearings in place of old ones wherever required and repair and rehabilitation of damaged concrete of any element etc to the complete satisfaction of the IC. All the repairs and rehabilitation works shall be carried out as per standards and manuals.

Refer Volume IV for Typical General Arrangement Drawings for reference.

Appendix – VII

ROBs/RUBs proposed- Nil

Appendix – VIII

Underpasses proposed-Nil

Appendix – IX

Drainage & Slope Protection

The improvements in the drainage and the slope protection shall be as follows.

Drainage

i) Side ditches of required cross section area for efficient drainage shall be provided on both sides of carriageway in rural section.

ii) Covered reinforced cement concrete drains underneath the sidewalk in the urban/semi-urban sections as per **Appendix - 1**

iii) In case 4-lane divided carriageway, Median drains at super elevated sections with proper outfall connections

iv) Chute drains along with shoulder side kerbs in high embankment (3 m and above)

v) Covered reinforced cement concrete drains underneath the sidewalk of proposed facility (bus bays etc.) in urban sections.

Slope Protection

i) Side slope of embankments 3m high shall be protected with turfing. Further higher embankments for roads, structures and abutting the tanks/irrigated lands shall be provided with by pitching or geo-meshes or geonets or geo-grids in consultation with the Independent Consultant.

ii) Embankment less than 3m in height shall also be turfed as per MORT&H.

iii) The typical detail of Drains, Drain with Footpath and Kerb to be considered are given below.

The dimensions of the drains as shown in drawings are the minimum to be provided. However Concessionaire shall ensure the adequacy of drain sizes as per standards & Specifications mentioned in Schedule D.

Appendix 1 :Typical Detail of Drains, Drain with Footpath & Kerb

Refer Volume IV for Typical details for reference.

Appendix – X: Typical Drawing Raised Pedestrian Crossing

Refer Volume IV for Typical details for reference.

Appendix – XI : Light Barrier/Arrester Arrangement

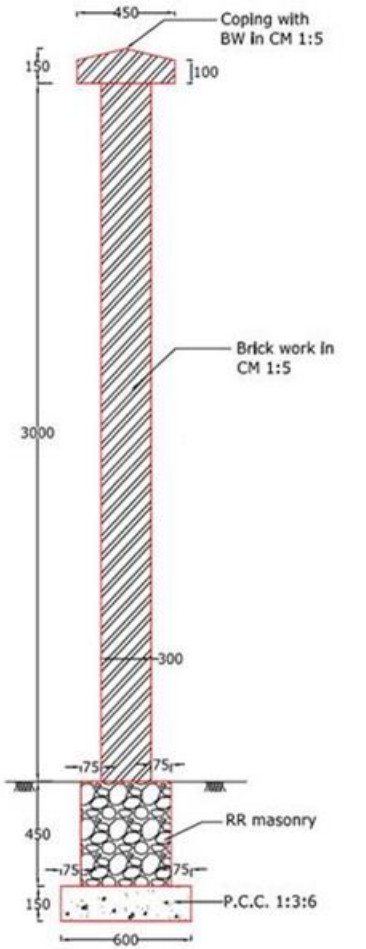
Refer Volume IV for Typical details for reference.

Appendix – XII

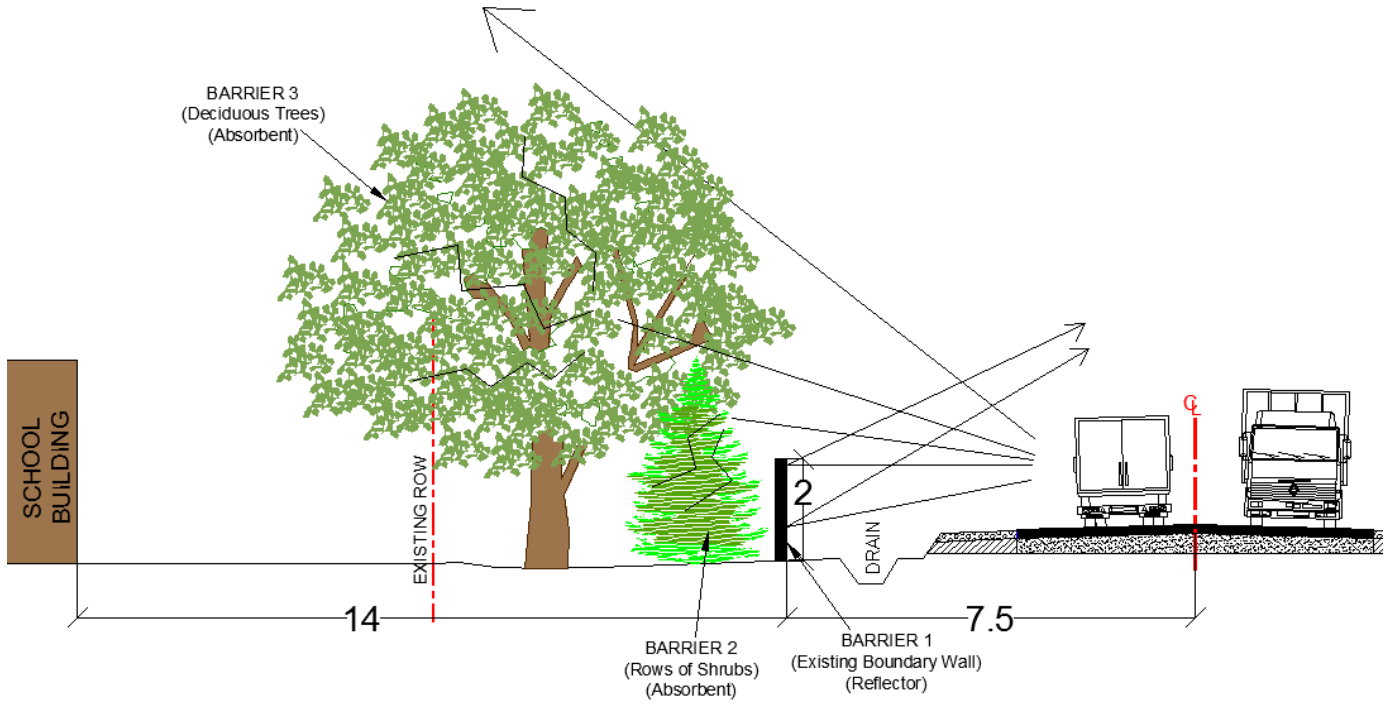
Noise Mitigation measures

Concessionaire shall provide noise barriers at the suggested locations of identified schools/ Temples/health centres prior to commencement of work in consultation with Independent Consultant and local Authorities at locations given below. The height of the boundary walls shall be increased upto 3m to function as a noise barrier at these sensitive receptors. Typical drawing of the proposed wall is given below. The concessionaire shall ensure that the proposed boundary wall is sited outside the RoW, within the boundaries of the sensitive receptors.

Sl. No.	Chainage	Sensitive Receptors	Length (m)
1	109+000	Sri Saraswati Vidyalaya, Udalpur	70
2	109+250	Community Health Centre, Udalpur	50
3	117+700	Veer Maharaj Temple	70
4	119+600	Paleshwar Mahadev Temple, Vasai	105
5	119+825	Govt. Hospital (Animal Husbandry)	95
6	124+000	Sree Ram Foundation	65
7	126+475	Mata Temple	25
8	127+175	Chanakya Vidya Mandir	45
9	132+025	Radhaswami Satsang Hall	145
10	134+675	Primary School	70
11	135+440	Govt. High School, Pilvai	80
12	135+850	Kamla Sanskar Peeth Vidyalaya	150
13	136+730	Anganwadi School	65
14	161+500	St. Xavier School and College	180
15	162+300	Govt Hospital	78
16	162+525	MMI Trust Women’s College	60
17	162+825	Kendriya Vidyalaya	235



Noise Barrier for Sensitive Locations



Cross Section showing Plantation and the Noise Barrier

Schematic Sketch for Noise Barrier

Appendix – XIII

Silt Traps, Rainwater Harvesting Structures and Oil Interceptors

(i) Silt Traps:

Concessionaire shall provide silt trap to prevent sediments from the construction site entering into the nearby watercourses. The silt trap consists of geotextile (MIRAFI 140N or equal) with extremely small openings supported by a wire-mesh mounted on a panel made up of angle frame. Modules of 625 mm each are designed to allow ease of handling and construction. It is expected a single person will be able to drive the angles 300 mm into the ground by pressing from the top. The frame will be installed around stockpiles close to water bodies. The wire-mesh will provide structural stability and the 25x25x3 mm angle section will act as posts for the silt trap. Silt trap shall be provided at the locations given in the table. Typical drawing is depicted below.

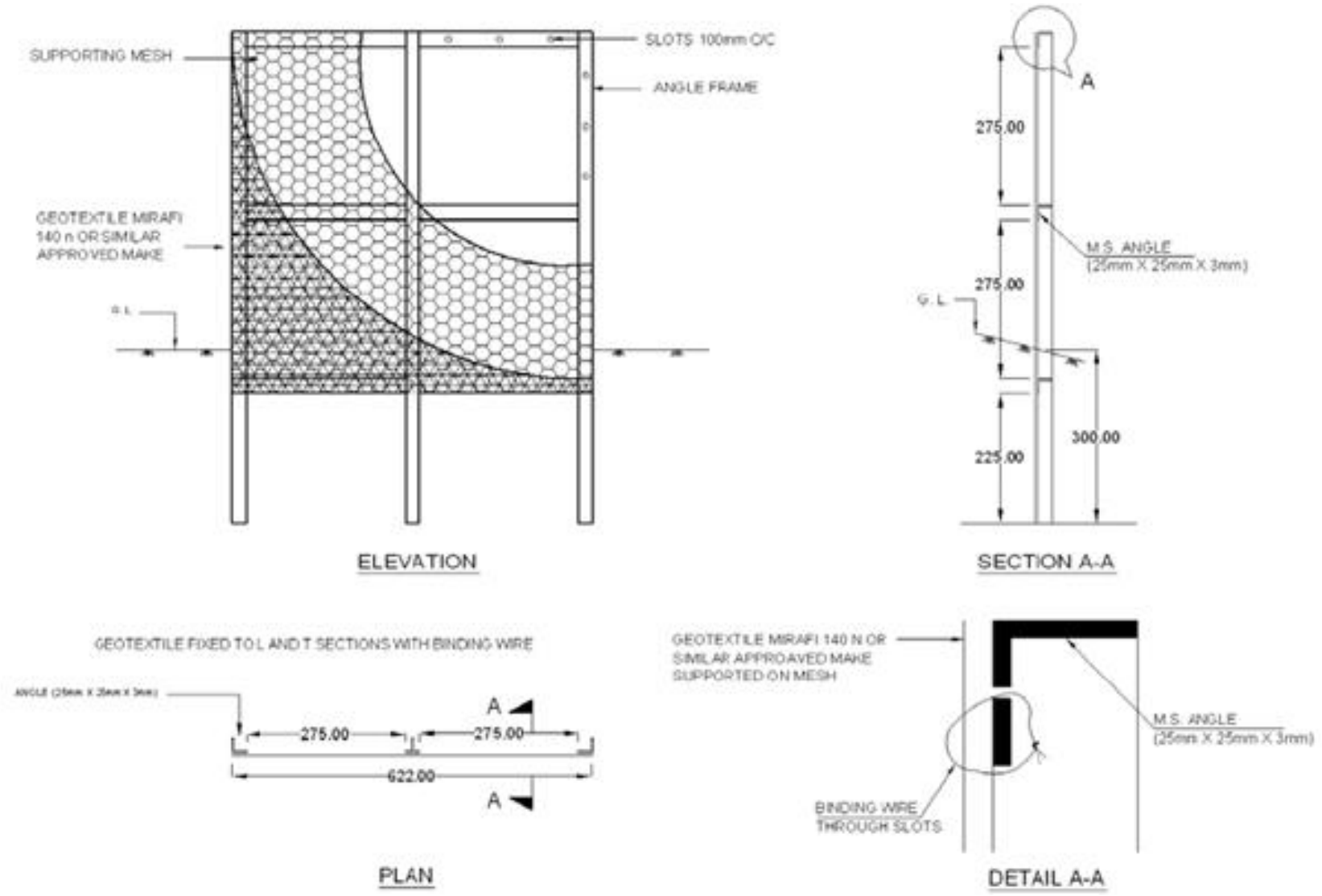
Sl.no	Type of water body	Chainage
1.	Pond	118+200
		123+200
		133+025
		144+500
2.	Sabarmati River	146+525
3.	Sujalam suphalam canal	106+400
		106+425

(ii) Rainwater Harvesting Structures:

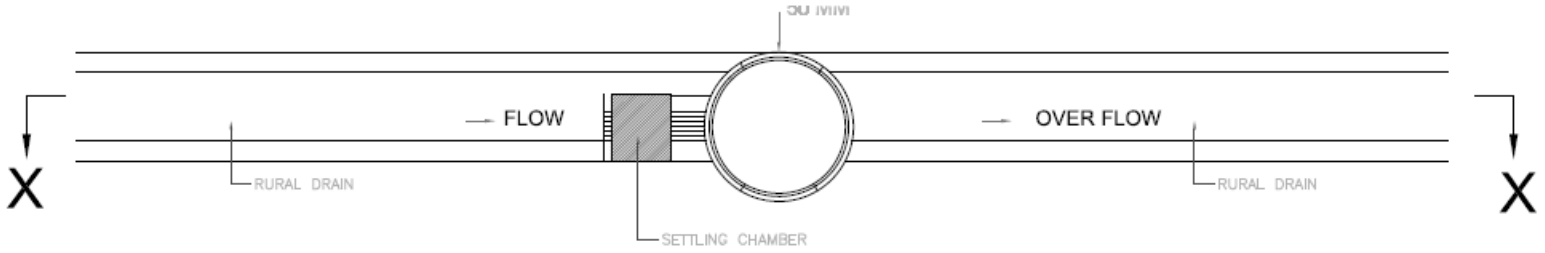
The concessionaire shall provide the rainwater harvesting pits at appropriate locations as instructed by the Independent Consultant. The concessionaire shall construct the rainwater harvesting structure as per the drawing and technical specification section 300, 1300, 1500, 1700 or as directed by the Independent Consultant. Typical cross section is given below. The locations for these structures shall be selected such that there is no requirement for additional tree felling.

(iii) Oil interceptors:

The concessionaire shall provide oil interceptors at vehicle parking area, vehicle repair area, workshops and nearby water bodies to the construction camp. Tentative locations for the surface water bodies along the project corridor are referred in the silt trap section. Slope of the prepared and paved site (1:40) ensures that all the wastewater flows into the interceptor before discharge. Periodic cleaning (once in a week) will be done from outside by skimming off film of oil from the surface, the typical drawing provides the details of the arrangements made for the oil interceptor for the removal of oil and grease from ‘point’ sources. The indicative locations of oil interceptors are given in Schedule L.



Typical drawing for Silt Fencing



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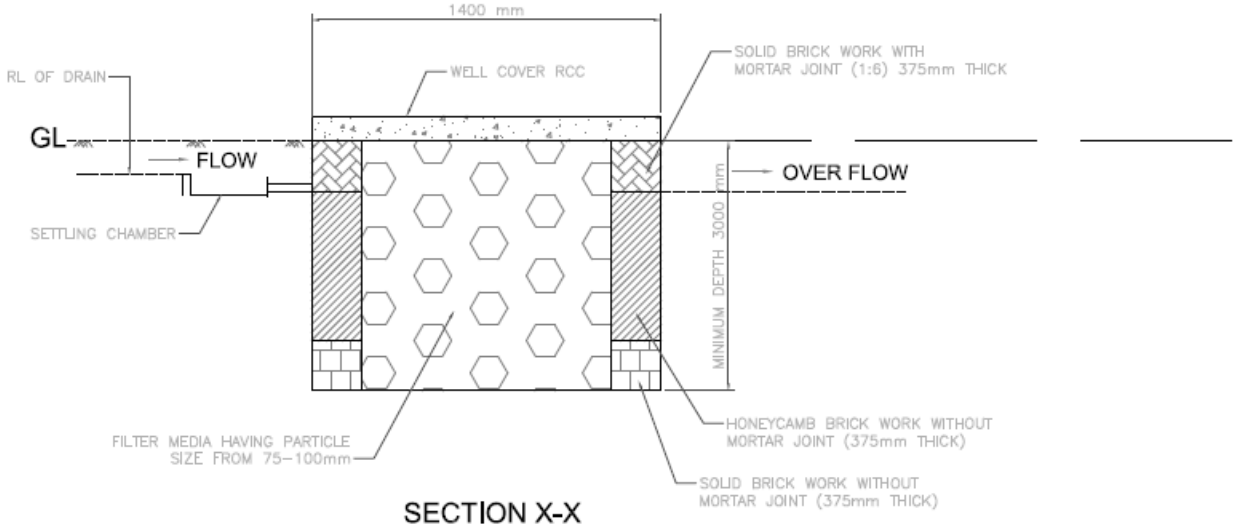
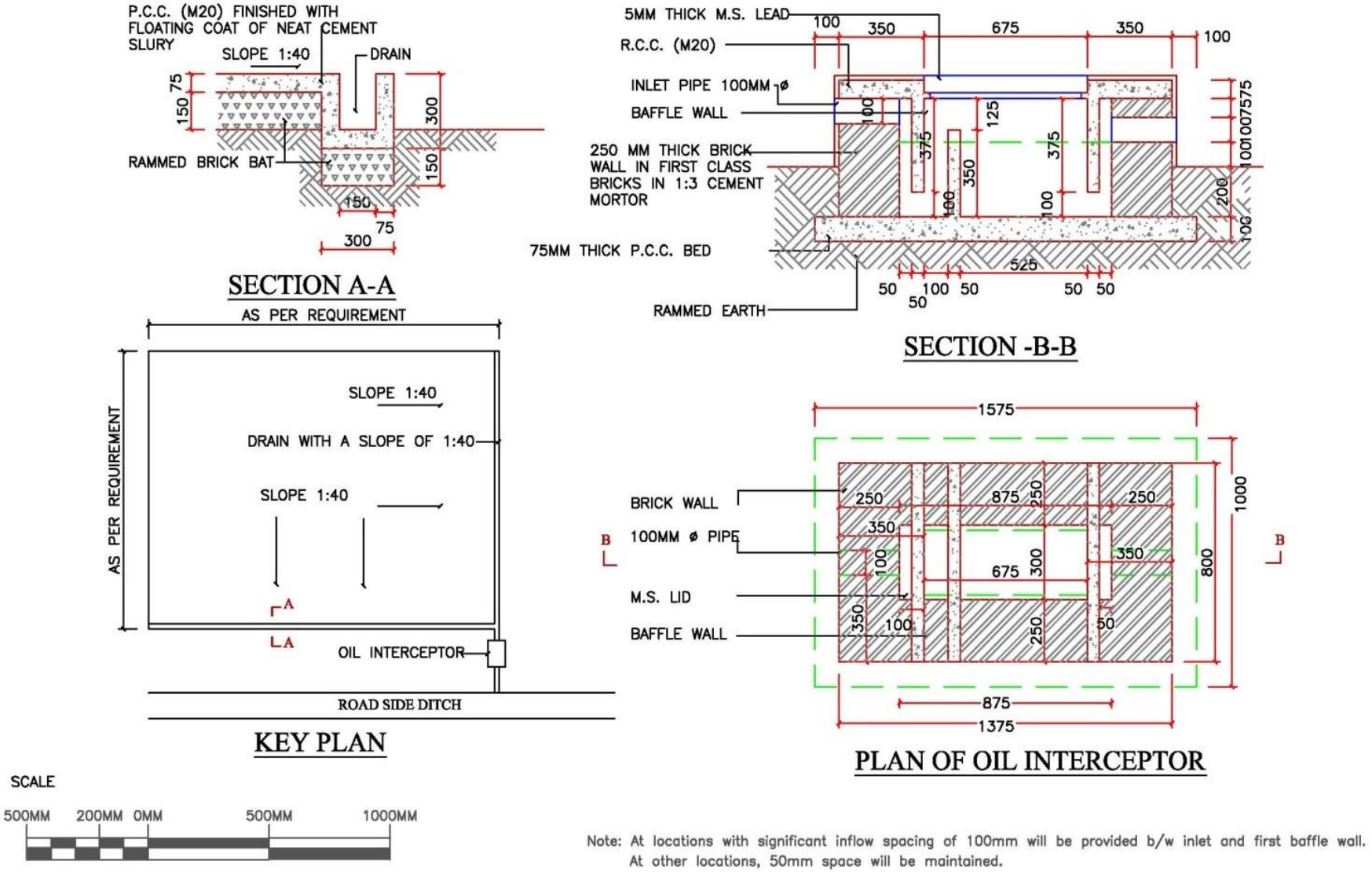


SECTION X-X

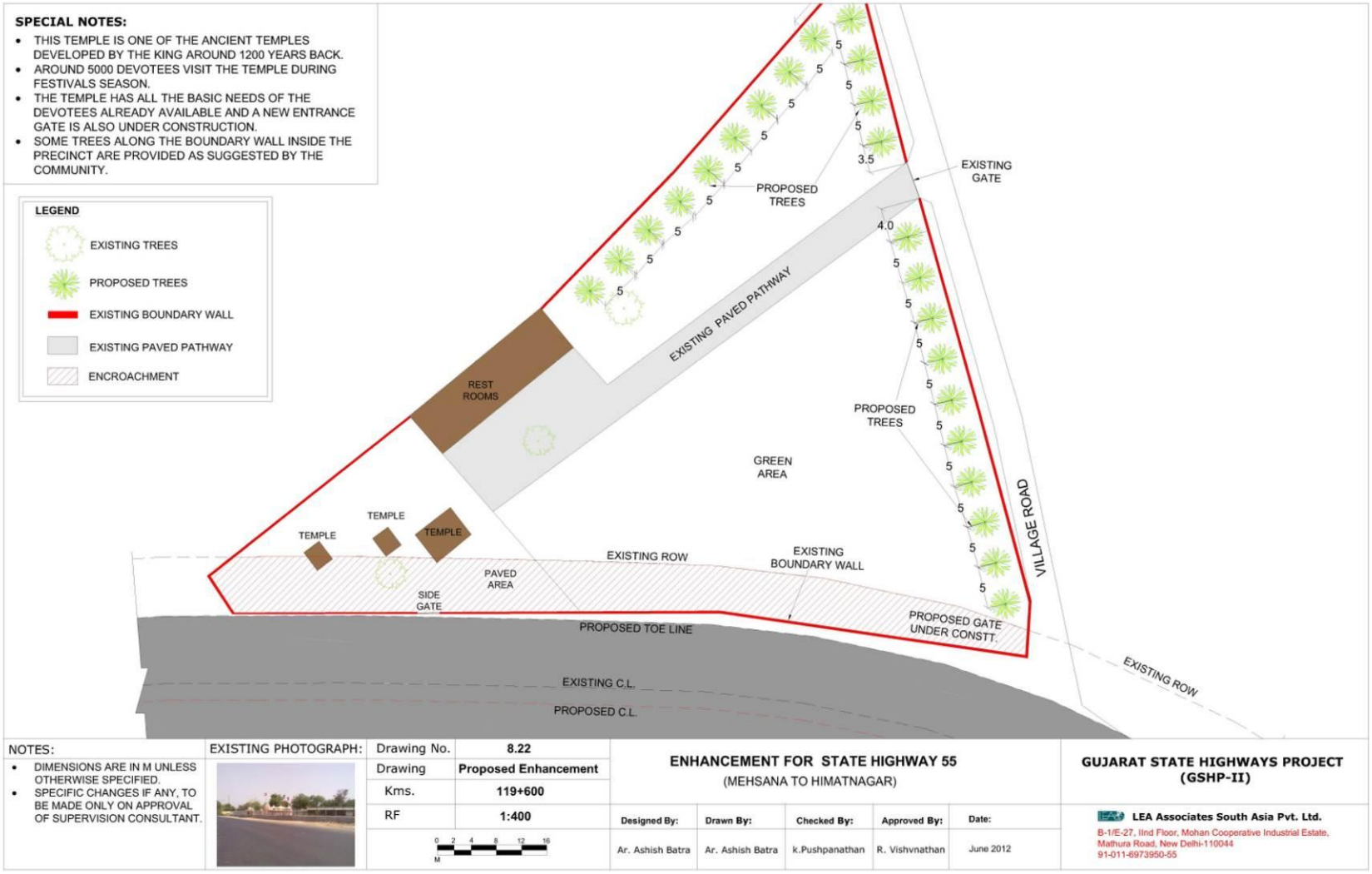
DETAIL OF RECHARGE DUGWELL FOR WATER HARVESTING

Typical drawing for Water harvesting Structure

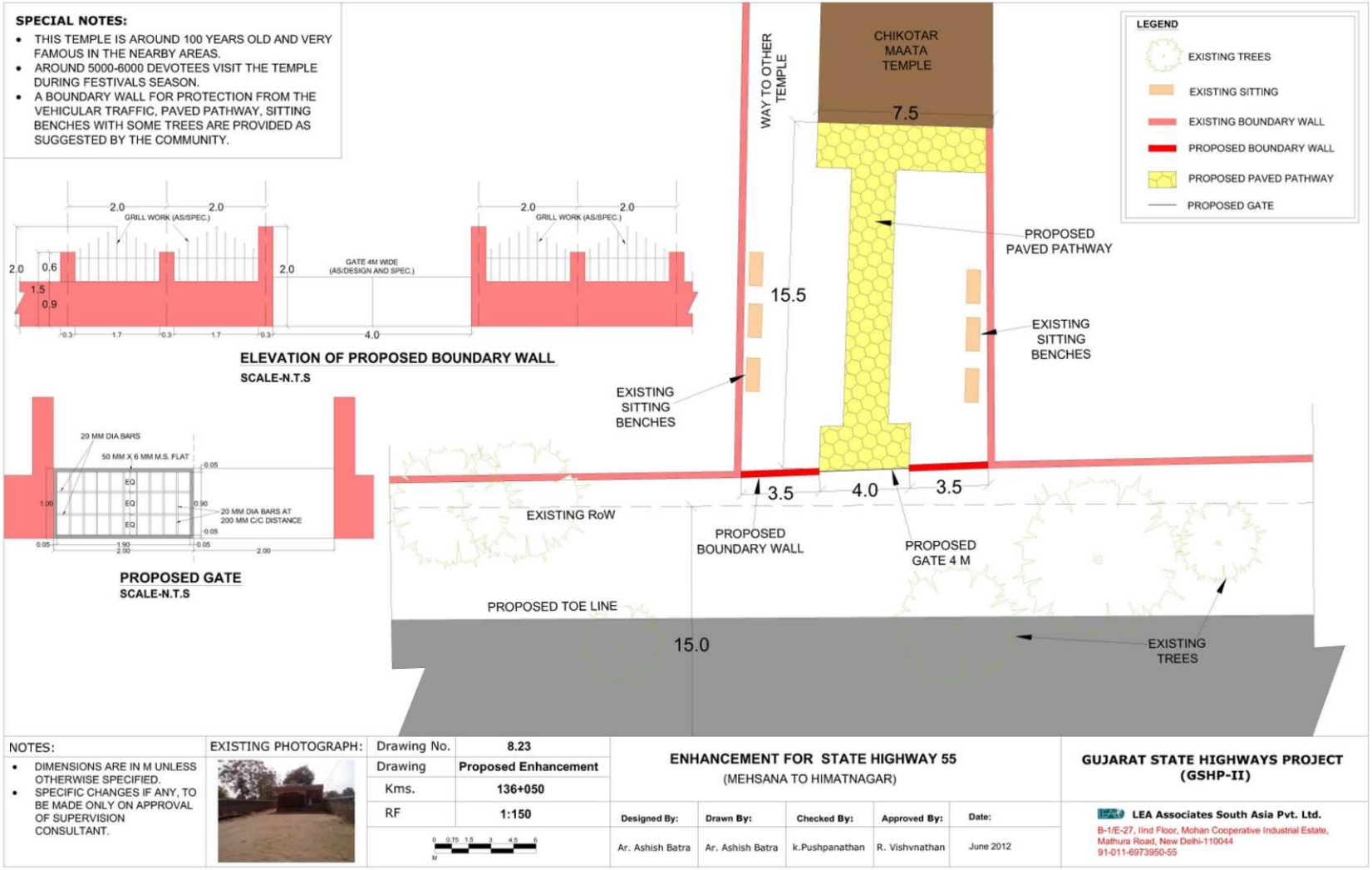


Typical drawing for Oil Interceptor

Appendix – XIV



Enhancement Drawing for Paleshwar Mahadev Temple (Ch 119+600)



Enhancement Drawing for Chikotar Mata Temple (Ch 136+050)

SCHEDULE-C

PROJECT FACILITIES

1 Project Facilities

The Concessionaire shall construct the project facilities described in Annex – I of Schedule C to form part of project highway and to be completed on or before Scheduled Project Completion Date.

Annex – I

(Schedule C)

1 Project facilities described in this Annex – I shall include:

(a) Road Side furniture,
(b) Pedestrian facilities,
(c) Bus-bays and bus shelters,
(d) Noise Barrier,
(e) Silt Trap, Rainwater Harvesting Structures and Oil Interceptors,
(f) Enhancement Measures,
(g) Landscaping
(h) Solar Fountain
(i) Solar Street Lights, and
(j) Traffic Counters

2 Description of project facilities

1.1 Road side furniture

The road side furniture described in Schedule C are the minimum to be provided in the project. However Concessionaire shall asses the same for its adequacy as per the schedule D and if required shall provide the additional road furniture at his own cost.

2.1.1 Traffic Signs and Pavement Markings

The pavement markings shall be retro-reflective Plastic material. The design and marking for the project shall be as per the design standards indicated in Schedule D and the locations for various types of sign and markings shall be finalized in consultation with Independent Consultant.

Traffic Signage shall be reflective type with high intensity retro-reflective sheeting of encapsulated type. The height, lateral clearance, location, and installation shall be as per standards and specifications mentioned in Schedule D.

2.1.2 Kilometer, Hectometer and Boundary stones

Kilometer stones shall be in accordance with standards and specifications mentioned in Schedule D. Both ordinary and fifth kilometer stones shall be provided.

Hectometer stones (200m stones) shall be in accordance with standards and specifications mentioned in Schedule D.

Boundary stones shall be in accordance with standards and specifications mentioned in Schedule D. Closer intervals other than specified in standards can be adopted consultation with Independent Consultant as per site condition.

The letter RB, indicating road boundary, shall be inscribed on each stone and below it the name of the authority in which the road rests.

2.1.3 Delineators and Object Markers

Delineators and object markers are to be provided in accordance with standards and specifications mentioned in Schedule D. Delineators shall be provided at all curves and in village, semi-urban/urban locations along the length and beside uncovered drains. Object Markers shall be provided in channelizing and median islands of junctions and at culvert approaches on both sides in consultation and approval of IC.

2.1.4 Raised Pavement Markers (RPM)/ Road Studs

Road studs shall be at all curves and on carriageway edge, at median openings, at urban & village areas and at intersections as per the design standards indicated in Schedule D and with approval of IC.

2.1.5 Light Barriers/arresters

To arrest the light coming from the opposite direction vehicles, light barriers/arresters are envisaged in median at every median opening location and at curves. The schedule of locations is indicated in **Appendix-XI of Schedule B**. Such arrangement shall be worked out as per standards and in consultation with IC.

2.1.6 Chevron Sign Boards

Chevron sign boards shall be installed at 10m c/c at all circular portion of the curves of radius less than 230 m along the outer edge facing the traffic of nearby lane as per specifications indicated in Schedule D

2.1.7 Crash Barriers (W-Metal Beam and New Jersey RCC)

2.1.8 Metal Beam Crash Barriers (W Beam) shall be installed on either sides of extremes of shoulder edges at the locations where the embankment height is more than 3m and on curves with less than 230m radius and also at all bridge and culvert approaches and other locations as directed by IC.

2.1.9 Central divider shall be New Jersey barrier (RCC) provided in centre, with black and white stripes in general and yellow and black stripes at median openings and retroreflective delineators on both sides of the crash barrier. For drain purpose the median is to be cut at regular interval also for placement of solar street light poles where required. This central barrier will act as divider all through the length of the project corridor, except median openings, cross roads, junctions, intersections, pedestrian crossings, solar street lights and any other locations as directed by IC.

The New Jersey crash barriers shall be provided as per standards and specifications, project plan, profile and other related drawings along with schedules provided in reference shall be utilised in finalising overall plan before seeking approval of integrated scheme from IC.

2.1.10 Speed Humps

Speed humps shall be located at T-junctions/intersections (and cross road intersections) on minor roads or perpendicular arms about 25m away from the inner edge of the carriageway. Proper signboards and markings are provided to advise the drivers in advance of the situation. Such humps are extended across carriageway up to the edge of paved shoulder.

2.1.11 Rumble Strips

Rumble Strips are formed by a sequence of transverse strips laid across a carriageway. Maximum permitted height of 25mm. There will be 6 such transverse strips spaced at 1.0m c/c. Rumble strips are proposed at:

- Sharp curves with radius less than 230m.
- Transition zones (speed limit zones).
- Village/urban approaches.

Proper signboards and marking are proposed to advise the drivers in advance of the situation.

2.1.12 Solar Powered Traffic Blinkers

Traffic blinkers powered with solar energy shall be installed at all intersections and junctions also median openings and start and end of the settlements. Locations and appropriate numbers are to be firmed with IC.

1.2 Pedestrian facilities

Pedestrian barriers

Pedestrian Barriers shall be provided in all urban/semi-urban, village locations and bus shelters where side walk/foot path are provided. The integrated plan shall be finalized in consultation with Independent Consultant. Typical details are given in **Appendix – I.**

1.3 Bus Shelters

The details of bus shelters to be provided are given in **Appendix – II.**

1.4 Noise Barrier

Noise barrier shall be provided in situations wherever the school/ colleges/ hospitals/ residential areas/ old age homes are abutting to the project road in order to avoid noise pollution. Tentative locations and typical drawings of Noise barriers are provided in **Appendix - III**, the locations shall be confirmed to the site requirement in consultation with Independent Consultant.

1.5 Silt Traps, Rainwater Harvesting structures and Oil Interceptors

Silt Traps, Rainwater Harvesting Structures and Oil Interceptors are to be provided all along the project corridor. Tentative location and typical drawings of Silt Traps, Rainwater Harvesting Structures and Oil Interceptors are provided in **Appendix - IV**, the locations shall be confirmed to the site requirement in consultation with Independent Consultant.

1.6 Enhancement Measures

The Concessionaire shall provide enhancement measures to (i) Paleshwar Mahadev Temple (Ch 119+600) and Chikotar Mata Temple (Ch 136+050). The enhancement measures include provision of foot path, gate, boundary wall, fencing, tree plantations as suggested in the enhancement drawing **Annexure –V**.

1.7 Landscaping

1. The Concessionaire shall provide landscaping in the parking area from Ch 161+400 to Ch 163+350, the landscaping shall include provision of shrubs, lawn and seating arrangement for public. The urban design for this stretch is given in drawing volume in Volume IV labelled as Urban Design.
2. For the stretch Vijapur – Himatnagar section (Ch 140+000 to Ch 161+400), the concessionaire shall provide creepers, turfing and other landscaping features on both sides of the road as measure to provide an aesthetic appearance to the project corridor and approved by the Independent Consultant.

2.1 Solar Fountain

The Solar fountain shall include, erection of fountain, powered by solar power at the major rotary junctions listed below:

Sr. No.	Chainage	Type
1	103.275	4-Arm-Rotary
2	117.070	4-Arm-Rotary
3	126.950	4-Arm-Rotary
4	135.260	4-Arm-Rotary
5	140.050	4-Arm-Rotary
6	161.340	4-Arm-Rotary

The fountain shall be provided at the island of a rotary intersection, the fountain shall contain a water storage tank in the rotary island at the centre of the intersection with arrangement of aesthetic fountain fitted with jets spreading water, pumped by pumping motor which is powered by Solar system (Suitable Solar system shall be found in the market to power the pumping motor by charging the battery). Design for the units shall be prepared by the concessionaire for functioning during the day and atleast a five hour operation during the night time as directed by the IC. The whole arrangement of solar fountain shall be regularly maintained / repaired / replaced either in part or in full by the

concessionaire throughout the project period ensuring the rated operational hours during the night and day.

The main purpose of this fountain is to absorb the suspended particulate matter/ toxic gases produced by vehicles in the air to reduce air pollution on the highway

2.2 Solar Street Lights

The Solar Street light units so designed to provide not less than 30 lux illumination all through on top of carriageway and footpath wherever provided during the operating hours from dusk to dawn. The units are deemed to include foundation, erection of pole, installation of solar PV panel with battery and providing and fixing LED lights which shall be duly approved by the IC and satisfying MNRE standards. The furnishing labour and other incidental cost necessary shall also be considered for doing the work involved in erecting solar powered street lights in the respective places (at major intersections, all urban/semi-urban and settlement sections, also Bus bays and Bus Shelters (refer Schedule 'C' Project facilities)) as per the drawings and specifications or as directed by the IC. (Refer Drawing Volume IV for typical drawing). The concessionaire shall conduct regular maintenance, repair or replacement of the units either in part or in full as necessary throughout the concession period so as to ensure the rated illumination level specified herein.

2.1.13 Solid Waste Management (SWM)

The Concessionaire shall implement SWM in the green corridor by appointing a facilitating agency. Waste collecting bins shall be provided in Vijapur, Industrial area between km 144 and 145 and Himmatnagar which are identified as sources for littering of solid waste on the roadside. The responsibility of collection and disposal of waste from these bins shall remain with the concerned municipalities / panchayat. The SWM shall be initiated through appointment of a facilitating agency. The bins provided will be maintained by the concessionaire in coordination with the facilitating agency.

2.1.14 Tree Transplantation

Tree transplantation and maintenance shall be performed by the Forest department, GoG; however, the Concessionaire shall have an additional responsibility in coordinating with the forest department in monitoring the surveillance of the transplanted trees. The proposed activity shall be initiated through the facilitating agency.

2.1.15 Facilitating Agency

The concessionaire shall appoint a facilitating agency within 6 months of signing of concession agreement for implementing the green interventions, which includes (i) Renewable Energy, (ii) Tree Transplantation, (iii) Cattle crossing and (iv) Solid Waste

Management. The scope of the facilitating agency during construction and maintenance are given in the Schedule 'L'.

2.1.16 Environmental foot print and GHG measurement

Monitoring the pollution levels and estimating the level of carbon foot print shall give an overall performance of the green highways. The concessionaire shall monitor the GHG emission during the project construction and operation.

The responsibilities of concessionaire shall be:

1. Coordinate with the vendor agency and carryout performance monitoring with respect to the indicators specific to WMA (e.g quantity of fuel used, waste generated and GHG emissions released);

2. Preparation of suitable monitoring format in consultation with the vendor agency and IC for monitoring of Environmental parameters with respect to WMA (including monitoring of GHG emission);

Developing a data base with respect to the Environmental footprint information for the project corridor and publishing the same in the PIU website under the tab "Pilot GH Initiative."

2.3 Traffic Counters

ATCC SYSTEM

The Automatic Traffic Counting & Classification system is to be installed, commissioned, operated and maintained for Concession Period on 4 lane section of the Mehsana – Himatnagar Highway at minimum 2 (two) identified locations at km. 128+00 and km. 160+000 with the objective of carrying out traffic study and survey to enable the Roads and Buildings Department, GoG collect vehicle count data by classes. The locations provided are indicative only, the locations shall be verified on site for suitability of the installation of the ATCC cabin with all requirements, and as directed by IC

GENERAL REQUIREMENT

a) The ATCC system shall classify the vehicles as defined in IRC: 3-1983 and IRC: 9-1972. Calibration of the instruments / system shall be done in consultation with the Independent Consultant and the Employer. The concessionaire under discussion with the Independent Consultant and the Employer shall plan such manual counts. The approval of the Independent Consultant and the Employer shall be obtained in writing before starting manual count and including it in the traffic data at GoG's Central Data Centres. In case of a long term count station, if the slow moving vehicle is to be counted manually due to limitations of the technology, it should be carried out at least for consecutive 7 days (24 hrs. continuously) every month.

b) This information of nos. of categorised vehicle shall be stored in a secured database and further transmitted to the GoG's central data centres (CDC) by using any of the available communication mode at site like GSM (Global System for Mobile Communications) / GPRS (General Packet Radio Service), landline modem, CDMA (Code Division Multiple Access) or any other links depending upon the effective and economic operation of the particular mode available at the site.
c) The system should be able to work as true Multi-lane free flow operation in which the Lane crossing classification should be possible together with simultaneous passages. The system should be capable of recognising the flow of traffic in either direction.
d) Vehicles that change the lanes while passing across the ATCCs, shall be detected and classified as accurate as vehicles.
e) Vehicles passing at the same time – side by side shall be separately detected and classified.
f) Trailers with the shafts shall be detected and classified as one vehicle and not classified and counted as separate vehicles.
g) The system shall be electric / solar power operated depending upon the availability of source.
h) The design and installation of ATCCs should be such that no manpower shall be required at ATCC locations. However, personnel for its security etc. shall be provided by the concessionaire as part of this work.

TECHNICAL REQUIREMENT

Performance Requirement

The system shall be capable of the following performance criteria:

(i) Counting the traffic to an accuracy of more than 95% of actual traffic.
(ii) Classifying traffic to the specified classes with the accuracy of more than 95%.
(iii) Operating speed of vehicles shall be of up to 160 kmph.
(iv) Operating temperature shall be -10o C to +55 o C
(v) Sufficient standalone storage for each device for 15 days of traffic data.
(vi) Each ATCC should have a unique local address that shall allow for remote access.
(vii) The software shall enable full remote and local status monitoring of the following functions.
    a) Power status
    b) Sensor status
    c) Memory status
(viii) The system shall be capable of operating using mains as well as battery power. Batteries shall have sufficient capacity to operate the system for a period of not less than 7 days without recharging. Batteries shall be fitted with a solar recharging device that enable the batteries to support the system indefinitely in average daylight conditions.
(ix) The Road-side unit shall be lockable stainless steel cabinet and shall comply with IP 65 standards.

ATCC Reporting Requirements

It is a requirement that the ATCC system shall be capable of providing data and reports on a regular, usually hourly, daily and weekly basis, by remote log in by the Independent Consultant / Roads and Buildings Department. The ATCC and CDC system shall be capable of collecting real time traffic data, data storage in a secured database, immediate data transmission from ATCC to CDC by suitable / reliable latest technology viz GSM (Global System for Mobile Communications) / GPRS (General Packet Radio Service), landline modem, CDMA (Code Division Multiple Access) or any other links, available at the

location. The ATCC system shall validate process, store and transfer the processed data at least every hour. The design and structure of the data base shall be submitted to the Independent Consultant and Roads and Buildings Department for approval prior to the final development and deployment thereof.

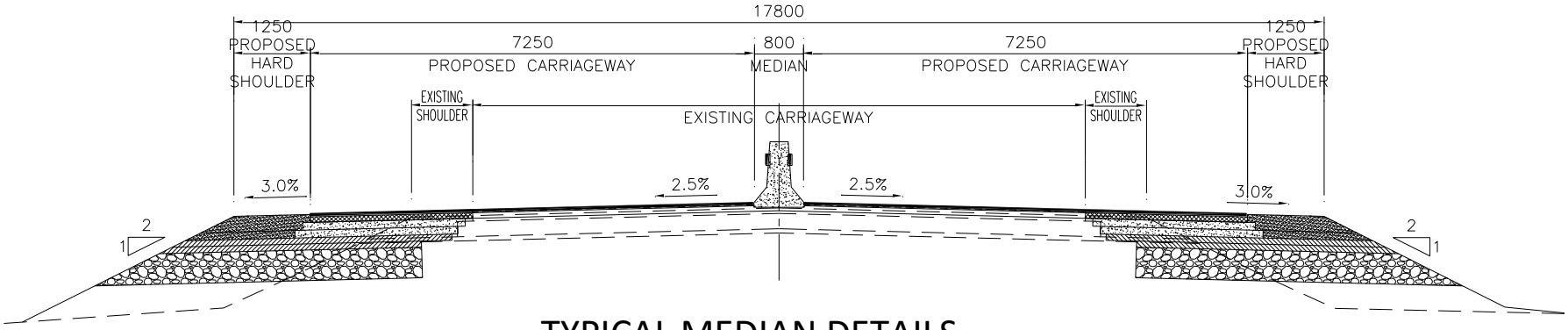
In case there is no communication link available at the location, the seven day data shall be transmitted to CDC within 48 hours of completing the seven day count on optical media like DVD or CD.

The reporting shall consist of the following:

(i) Position and status of the ATCC and in the event of failures the time of the failures.
(ii) Hourly traffic reports by number, class and direction of vehicles.
(iii) Daily/ weekly/ monthly / quarterly / annual summary of the above hourly reports.

Appendix - I

Details of Typical Central Divider



TYPICAL MEDIAN DETAILS

NOTES FOR REFLECTOR :

RETRO REFLECTIVE DELINEATORS SHOULD BE FIXED ON BOTH FACES OF NEW JERSEY CRASH BARRIER.
THE COLOUR OF THE REFLECTIVE SHEETING ON THE
REFLECTOR TABS SHALL BE OF THE COLOUR SAME AS COLOUR OF
ROAD STUDD PLACED ON SHOULDER LINE PAVEMENT MARKING
IN FRONT OF THE BARRIER.

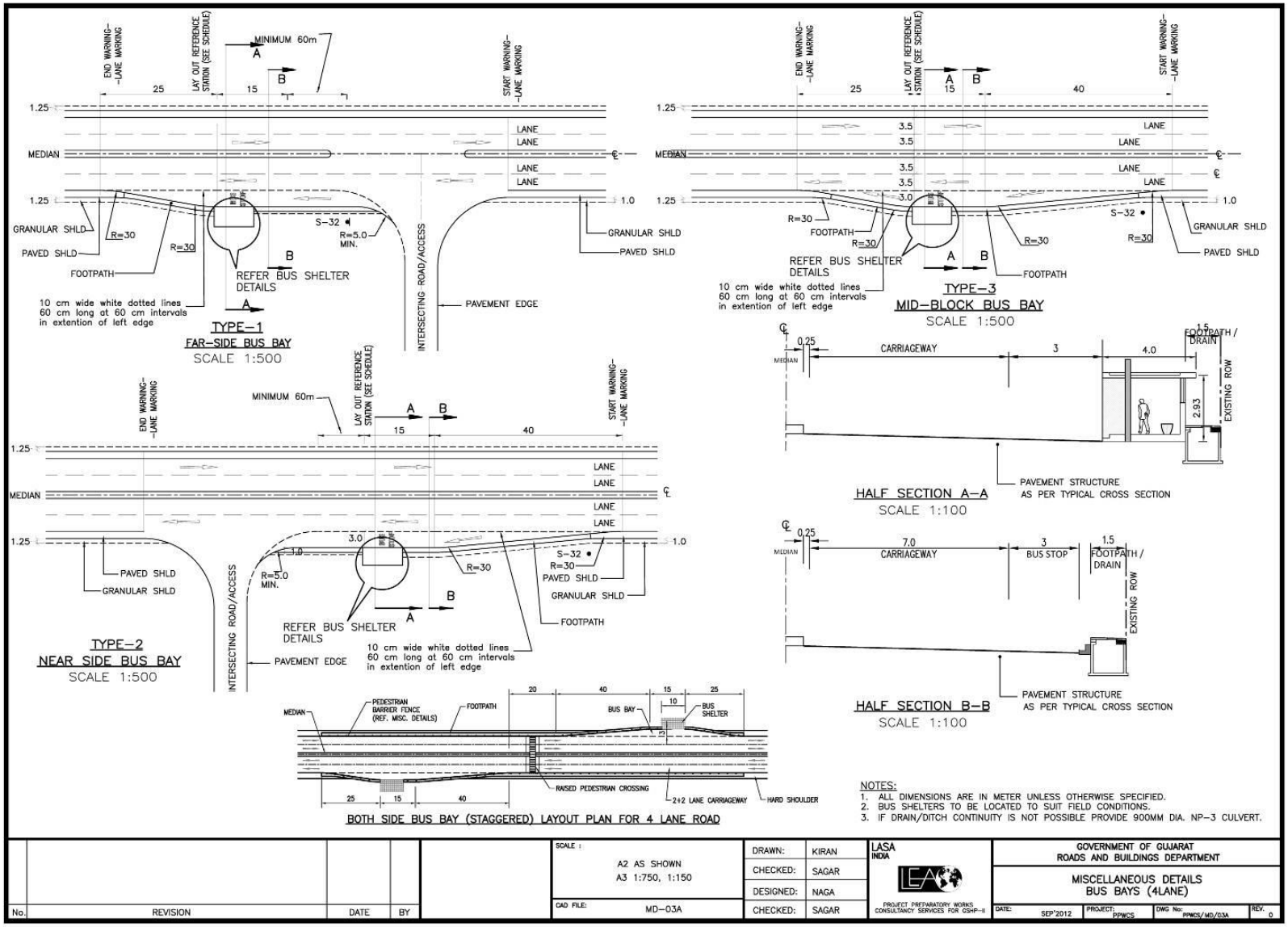
Appendix – II

Bus Bay & Bus Shelter Locations along Project Highway

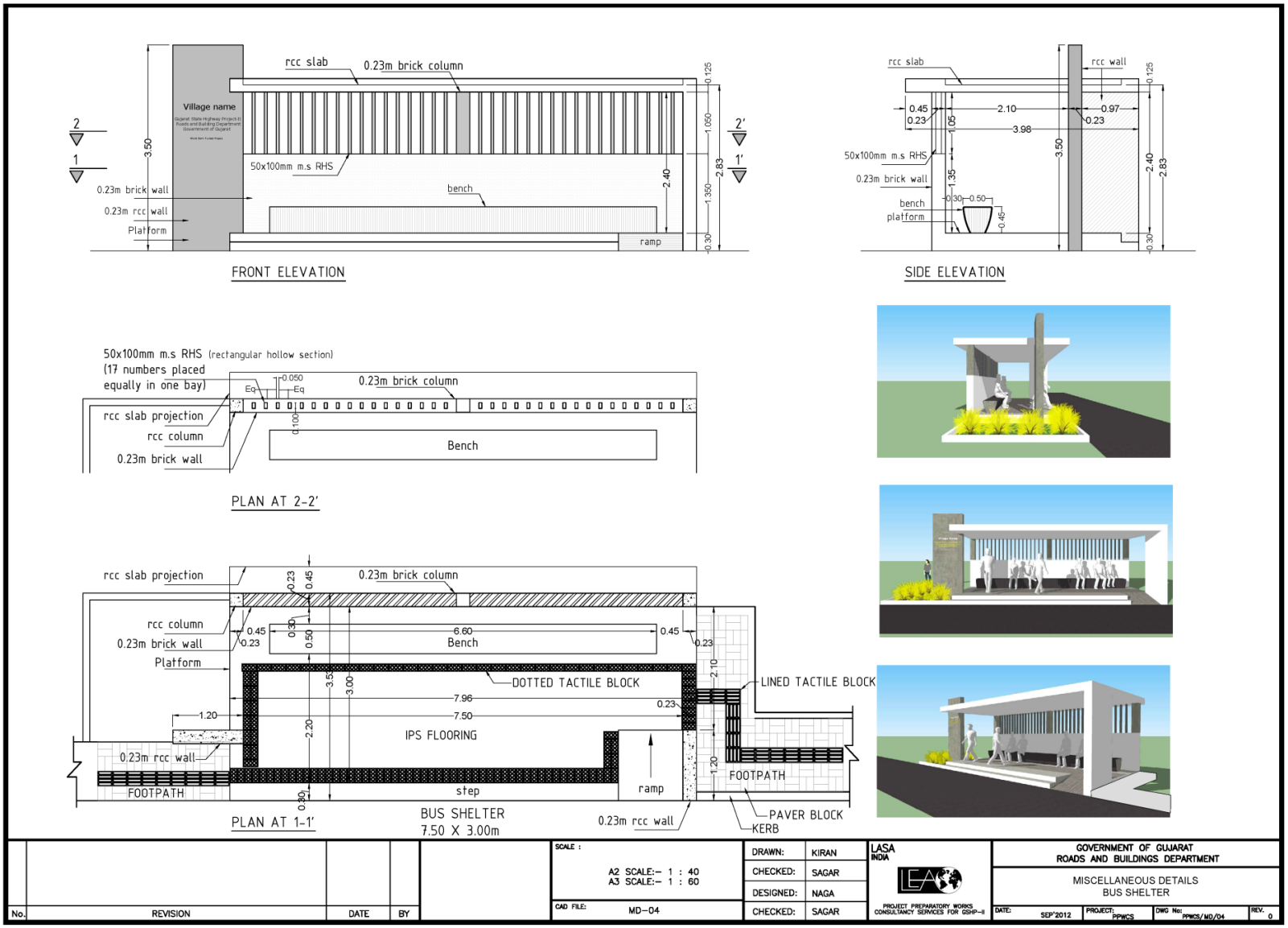
Sr. No	Chainage	Side	Village	Remarks	Type
1	103+136	LHS	Rampura	New BS With Bay	Type-3
2	103+405	RHS	Rampura	New BS With Bay	Type-3
3	105+353	RHS	Devrasan	New BS With Bay	Type-2
4	105+462	LHS	Devrasan	New BS With Bay	Type-3
5	107+619	RHS	Gunjada	New BS With Bay	Type-3
6	107+745	LHS	Gunjada	New BS With Bay	Type-3
7	109+184	LHS	Udalpur	New BS With Bay	Type-3
8	109+350	RHS	Udalpur	New BS With Bay	Type-3
9	112+129	LHS	Kamalpur	New BS With Bay	Type-3
10	112+273	RHS	Kamalpur	New BS With Bay	Type-1
11	115+816	RHS	Dabhala	New BS With Bay	Type-3
12	115+957	LHS	Dabhala	New BS With Bay	Type-3
13	119+804	RHS	Vasai	New BS With Bay	Type-3
14	119+905	LHS	Vasai	New BS With Bay	Type-3
15	123+575	RHS	Motipura	New BS With Bay	Type-3
16	123+746	LHS	Motipura	New BS With Bay	Type-3
17	124+326	LHS	Titodan	New BS With Bay	Type-2
18	124+407	RHS	Kukarvada	New BS With Bay	Type-2
19	126+800	LHS	Vihar	New BS With Bay	Type-3
20	127+130	RHS	Vihar	New BS With Bay	Type-3
21	128+533	RHS	Pilodra	New BS With Bay	Type-2
22	128+638	LHS	Pilodra	New BS With Bay	Type-2
23	130+826	LHS	Chadasana	New BS With Bay	Type-2
24	130+904	RHS	Chadasana	New BS With Bay	Type-2
25	134+261	LHS	Fulwadi	New BS With Bay	Type-2
26	134+351	RHS	Fulwadi	New BS With Bay	Type-3
27	135+630	RHS	Pilwai	New BS With Bay	Type-3
28	135+638	LHS	Pilwai	New BS With Bay	Type-3
29	136+728	RHS	Kotadi	New BS With Bay	Type-3
30	137+375	LHS	Khanusa	New BS With Bay	Type-1
31	138+935	LHS	Vijapur	Only Bus Stop	Bus Stop
32	138+935	RHS	Vijapur	Only Bus Stop	Bus Stop
33	143+656	LHS	Nava Devpura	New BS With Bay	Type-3
34	143+755	RHS	Nava Devpura	New BS With Bay	Type-3
35	144+187	RHS	Ranchod Pura	New BS With Bay	Type-3
36	144+207	LHS	Ranchod Pura	New BS With Bay	Type-3
37	148+917	LHS	Saroli	New BS With Bay	Type-3
38	149+000	RHS	Saroli	New BS With Bay	Type-2
39	149+805	RHS	Derol	Only Bus Stop	Bus Stop
40	149+830	LHS	Derol	New BS With Bay	Type-3
41	150+429	RHS	Krushna Nagar	New BS With Bay	Type-3
42	150+557	LHS	Krushna Nagar	New BS With Bay	Type-3
43	153+213	RHS	Navanagar	New BS With Bay	Type-1
44	153+336	LHS	Navanagar	New BS With Bay	Type-3
45	154+500	LHS	Dedhrota	New BS With Bay	Type-2
46	154+590	RHS	Dedhrota	New BS With Bay	Type-3
47	156+360	LHS	Navalpur	New BS With Bay	Type-3

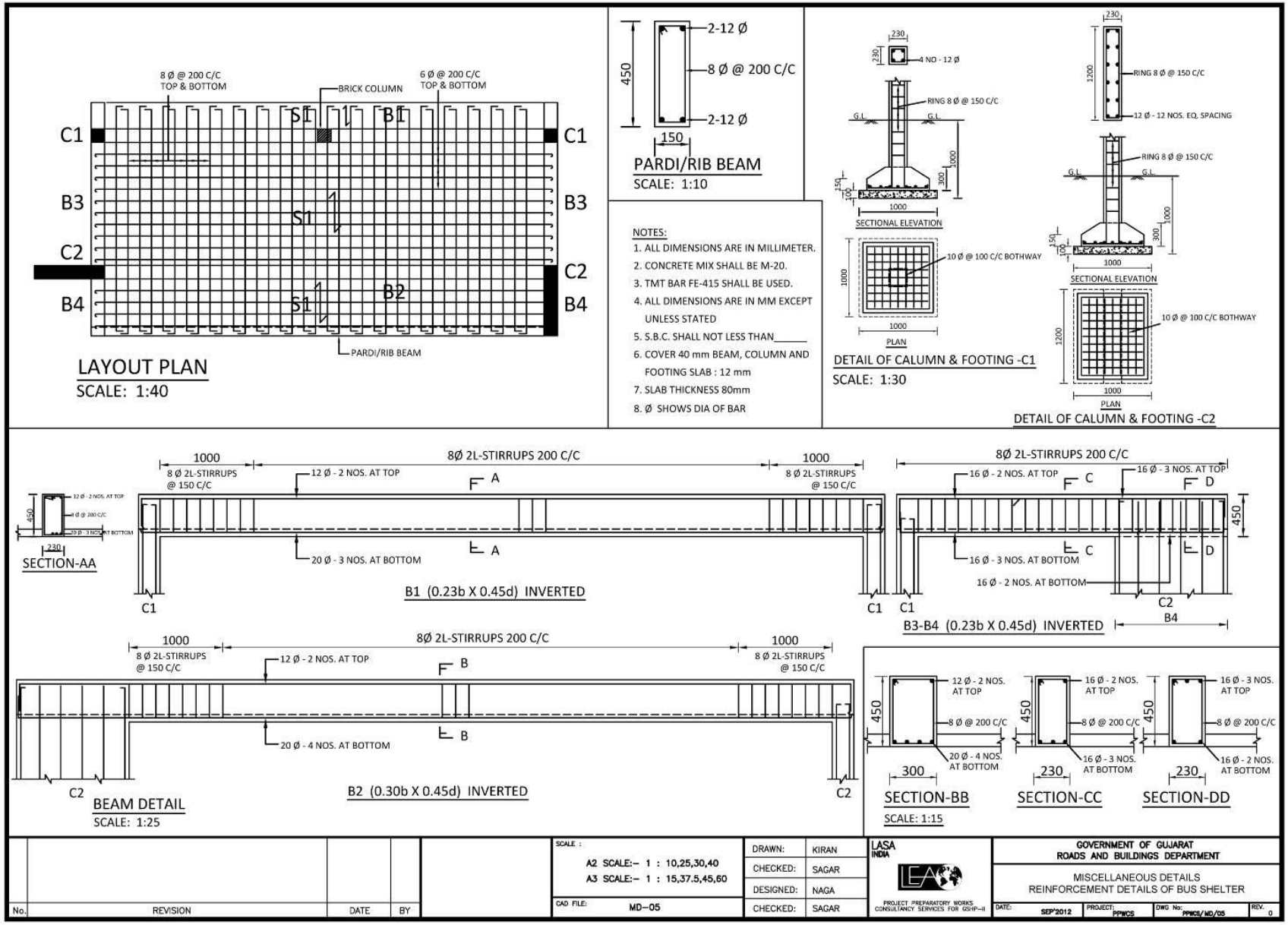
Sr. No	Chainage	Side	Village	Remarks	Type
48	156+455	RHS	Navalpur	New BS With Bay	Type-2
49	157+216	RHS	Satnagar	New BS With Bay	Type-3
50	157+346	LHS	Satnagar	New BS With Bay	Type-1
51	158+870	RHS	Lalpur	New BS With Bay	Type-3
52	158+990	LHS	Lalpur	New BS With Bay	Type-1
53	160+392	RHS	Polajpur	New BS With Bay	Type-1
54	160+519	LHS	Polajpur	New BS With Bay	Type-3
55	163+535	RHS	Himmatnagar	Only Bus Stop	Bus Stop
56	163+613	LHS	Himmatnagar	Only Bus Stop	Bus Stop

Typical Layout Plan of Bus Bays



Typical Bus Shelter Drawing



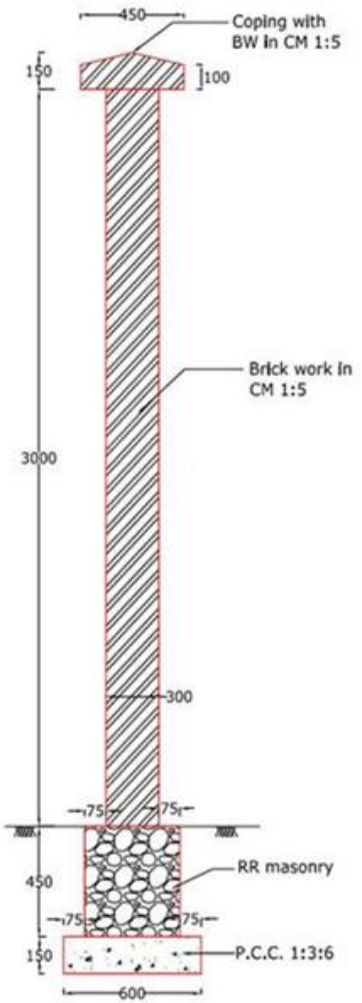

8 Ø @ 200 C/C TOP & BOTTOM
BRICK COLUMN
6 Ø @ 200 C/C TOP & BOTTOM
C1
B3
C2
B4
S1
B1
B2
PARDI/RIB BEAM
LAYOUT PLAN
SCALE: 1:40
2-12 Ø
8 Ø @ 200 C/C
150
PARDI/RIB BEAM
SCALE: 1:10
NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. CONCRETE MIX SHALL BE M-20.
3. TMT BAR FE-415 SHALL BE USED.
4. ALL DIMENSIONS ARE IN MM EXCEPT UNLESS STATED
5. S.B.C. SHALL NOT LESS THAN_____
6. COVER 40 mm BEAM, COLUMN AND FOOTING SLAB : 12 mm
7. SLAB THICKNESS 80mm
8. Ø SHOWS DIA OF BAR
4 NO - 12 Ø
RING 8 Ø @ 150 C/C
SECTIONAL ELEVATION
10 Ø @ 100 C/C BOTHWAY
PLAN
DETAIL OF CALUMN & FOOTING -C1
SCALE: 1:30
12 Ø - 12 NOS. EQ. SPACING
DETAIL OF CALUMN & FOOTING -C2
8Ø 2L-STIRRUPS 200 C/C
8 Ø 2L-STIRRUPS @ 150 C/C
12 Ø - 2 NOS. AT TOP
20 Ø - 3 NOS. AT BOTTOM
B1 (0.23b X 0.45d) INVERTED
SECTION-AA
16 Ø - 2 NOS. AT TOP
16 Ø - 3 NOS. AT TOP
16 Ø - 3 NOS. AT BOTTOM
16 Ø - 2 NOS. AT BOTTOM
B3-B4 (0.23b X 0.45d) INVERTED
20 Ø - 4 NOS. AT BOTTOM
B2 (0.30b X 0.45d) INVERTED
BEAM DETAIL
SCALE: 1:25
SECTION-BB
SECTION-CC
SECTION-DD
SCALE: 1:15
A2 SCALE:– 1 : 10,25,30,40
A3 SCALE:– 1 : 15,37.5,45,60
CAD FILE: MD–05
DRAWN: KIRAN
CHECKED: SAGAR
DESIGNED: NAGA
CHECKED: SAGAR
LASA INDIA
PROJECT PREPARATORY WORKS CONSULTANCY SERVICES FOR GSHP–II
GOVERNMENT OF GUJARAT
ROADS AND BUILDINGS DEPARTMENT
MISCELLANEOUS DETAILS
REINFORCEMENT DETAILS OF BUS SHELTER
DATE: SEP'2012
PROJECT: PPWCS
DWG No: PPWCS/MD/05
REV. 0
No. REVISION DATE BY

Appendix – III

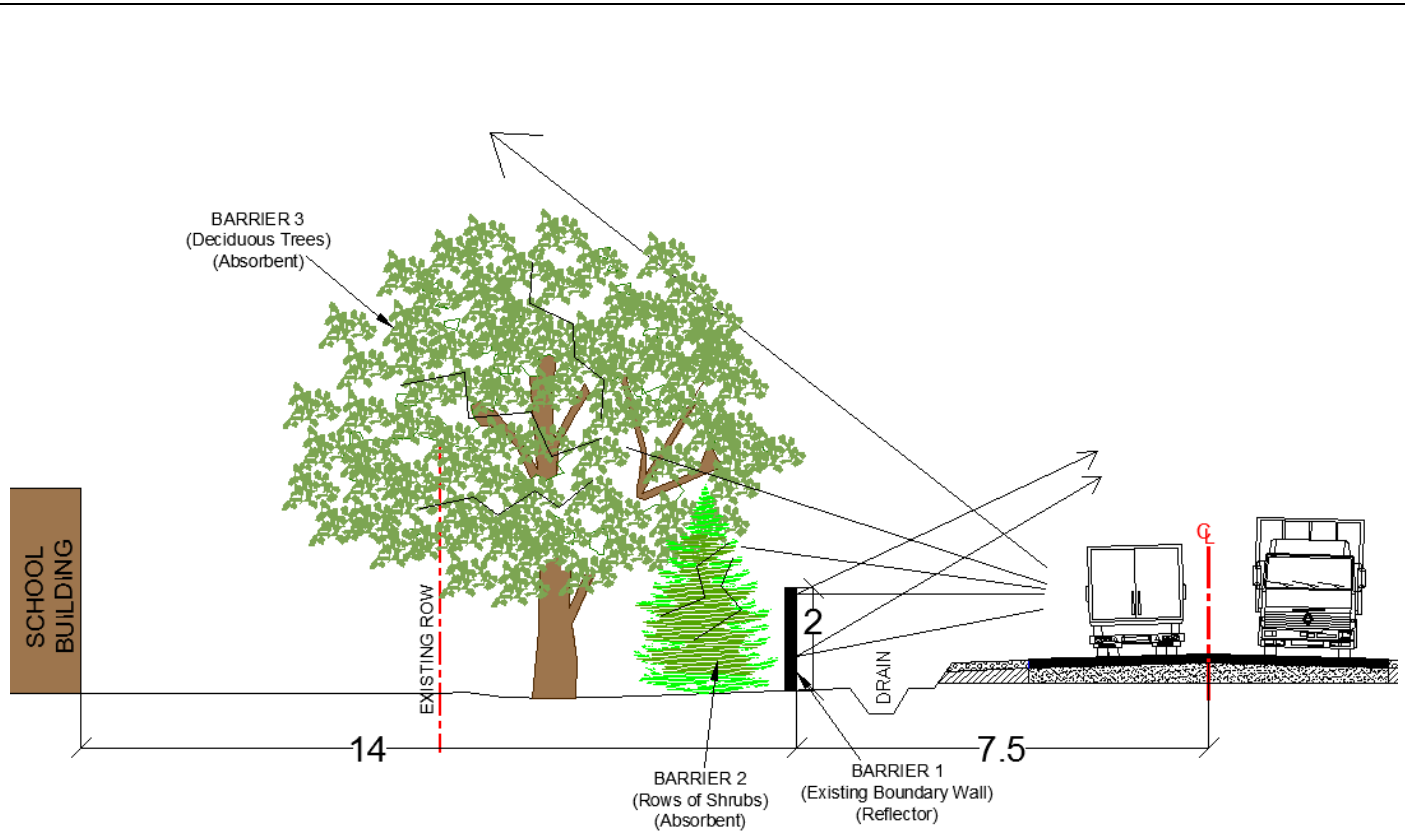
Noise Mitigation measures

Concessionaire shall provide noise barriers at the suggested locations of identified schools/ Temples/health centres prior to commencement of work in consultation with Independent Consultant and local Authorities at locations given below. The height of the boundary walls shall be increased upto 3m to function as a noise barrier at these sensitive receptors. Typical drawing of the proposed wall is given below. The concessionaire shall ensure that the proposed boundary wall is sited outside the RoW, within the boundaries of the sensitive receptors.

Sl. No.	Chainage	Sensitive Receptors	Length (m)
1	109+000	Sri Saraswati V idyalaya, Udalpur	70
2	109+250	Community Health Centre, Udalpur	50
3	117+700	Veer Maharaj Temple	70
4	119+600	Paleshwar Mahadev Temple, Vasai	105
5	119+825	Govt. Hospital (Animal Husbandary)	95
6	124+000	Sree Ram Foundation	65
7	126+475	Mata Temple	25
8	127+175	Chanakya Vidya Mandir	45
9	132+025	Radhaswami Satsang Hall	145
10	134+675	Primary School	70
11	135+440	Govt. High School, Pilvai	80
12	135+850	Kamla Sanskar Peeth Vidyalaya	150
13	136+730	Anganwadi School	65
14	161+500	St. Xavier School and College	180
15	162+300	Govt Hospital	78
16	162+525	MMI Trust Women’s College	60
17	162+825	Kendriya Vidyalaya	235



Noise Barrier for Sensitive Locations



Cross Section showing Plantation and the Noise Barrier

Schematic Sketch for Noise Barrier

Appendix – IV

Silt Traps, Rainwater Harvesting Structures and Oil Interceptors

(i) Silt Traps:

Concessionaire shall provide silt trap to prevent sediments from the construction site entering into the nearby watercourses. The silt trap consists of geotextile (MIRAFI 140N or equal) with extremely small openings supported by a wire-mesh mounted on a panel made up of angle frame. Modules of 625 mm each are designed to allow ease of handling and construction. It is expected a single person will be able to drive the angles 300 mm into the ground by pressing from the top. The frame will be installed around stockpiles close to water bodies. The wire-mesh will provide structural stability and the 25x25x3 mm angle section will act as posts for the silt trap. Silt trap shall be provided at the locations given in the table. Typical drawing is depicted below.

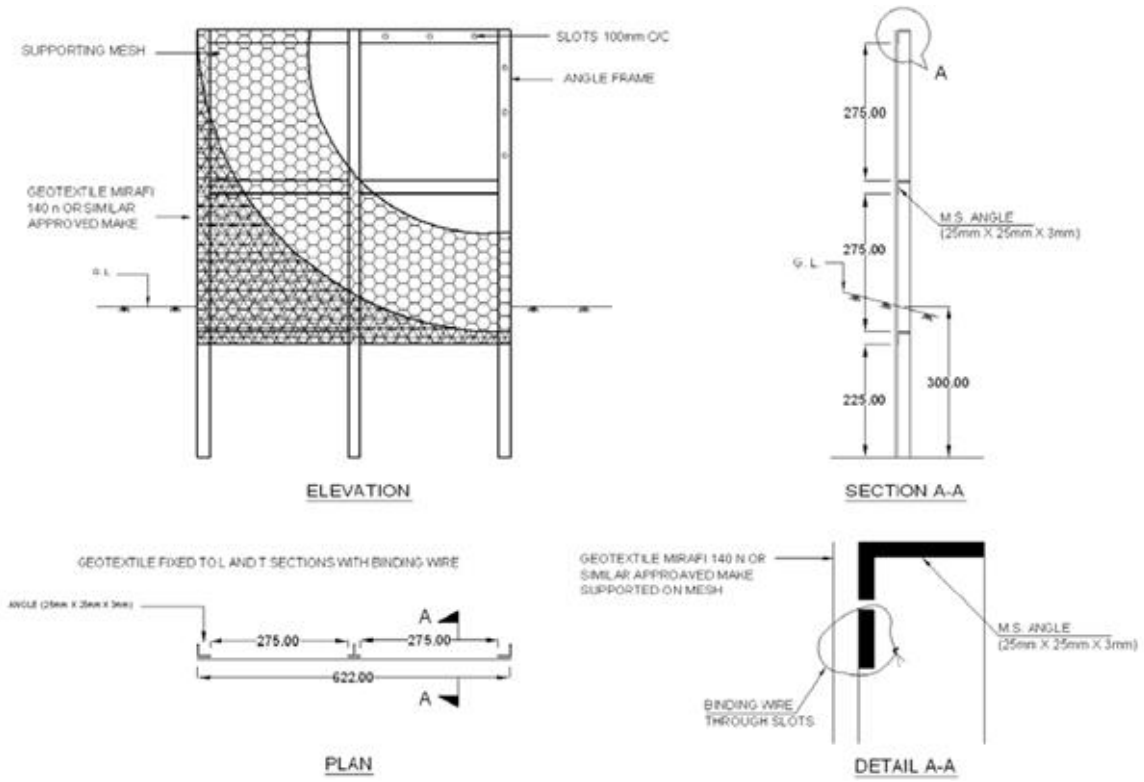
Sl.no	Type of water body	Chainage
1.	Pond	118+200
		123+200
		133+025
		144+500
2.	Sabarmati River	146+525
3.	Sujalam suphalam canal	106+400
		106+425

(ii) Rainwater Harvesting Structures:

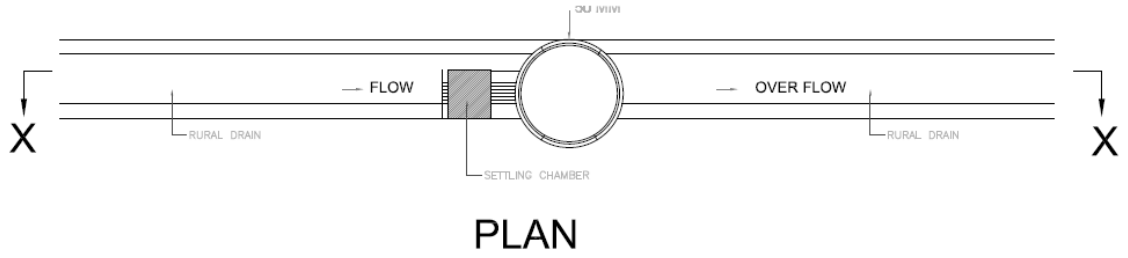
The concessionaire shall provide the rainwater harvesting pits at appropriate locations as instructed by the Independent Consultant. The concessionaire shall construct the rainwater harvesting structure as per the drawing and technical specification section 300, 1300, 1500, 1700 or as directed by the Independent Consultant. Typical cross section is given below. The locations for these structures shall be selected such that there is no requirement for additional tree felling.

(iii) Oil interceptors:

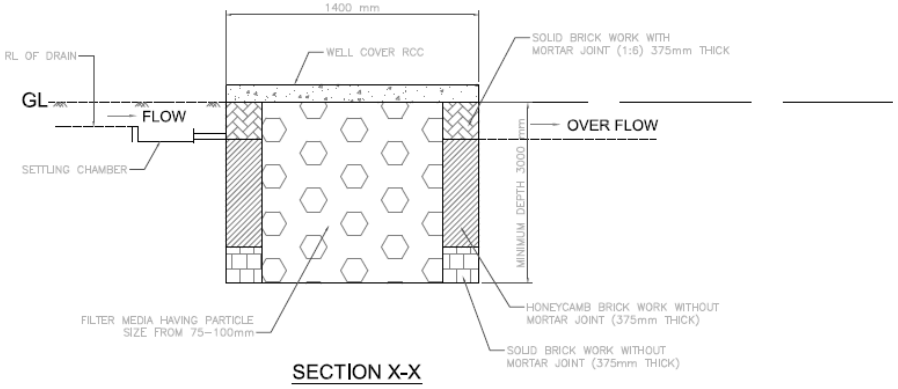
The concessionaire shall provide oil interceptors at vehicle parking area, vehicle repair area, workshops and nearby water bodies to the construction camp. Tentative locations for the surface water bodies along the project corridor are referred in the silt trap section. Slope of the prepared and paved site (1:40) ensures that all the wastewater flows into the interceptor before discharge. Periodic cleaning (once in a week) will be done from outside by skimming off film of oil over the surface, provides the details of the arrangements made for the oil interceptor for the removal of oil and grease from ‘point’ sources.



Typical drawing for Silt Fencing



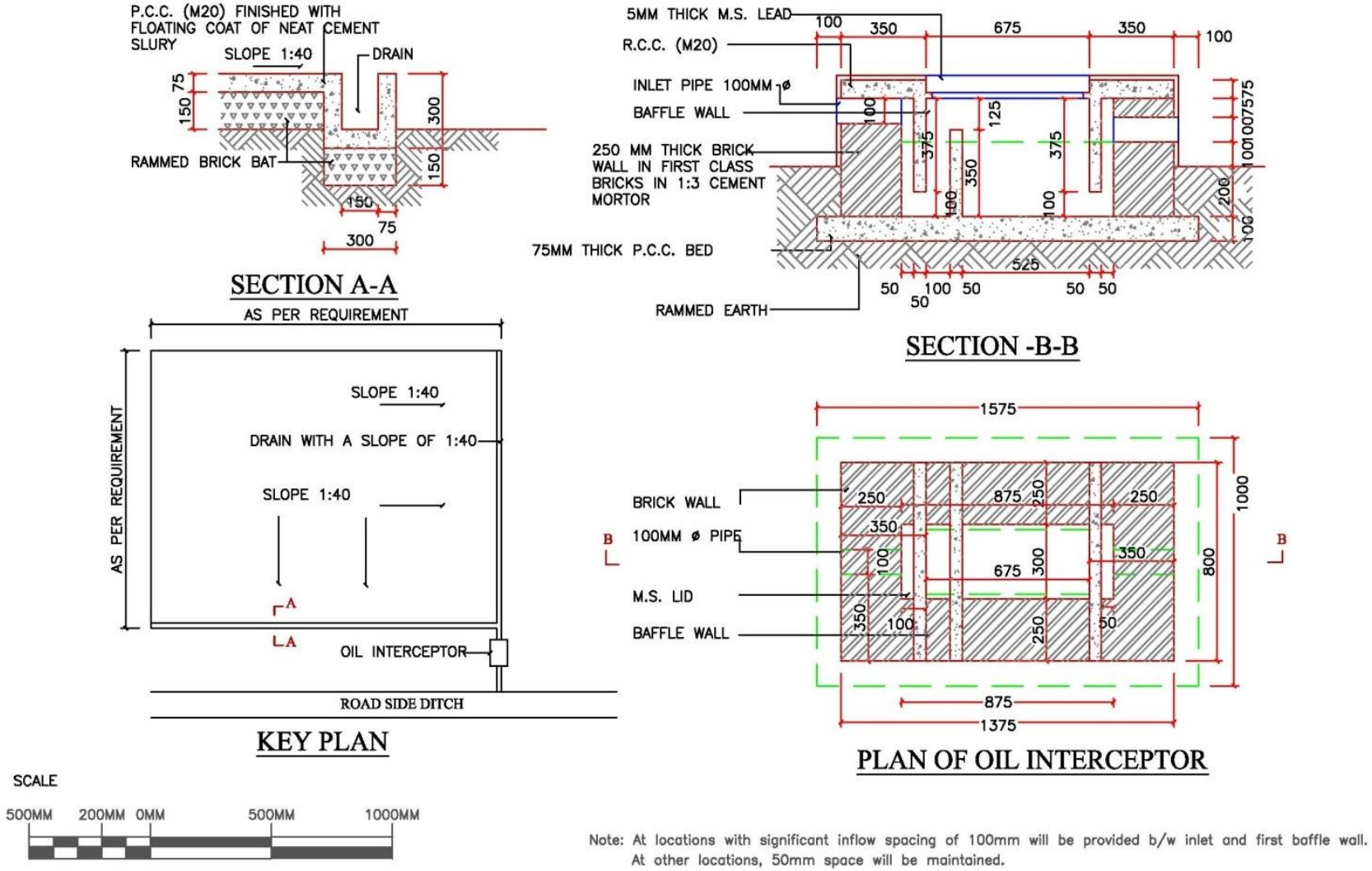
PLAN



SECTION X-X

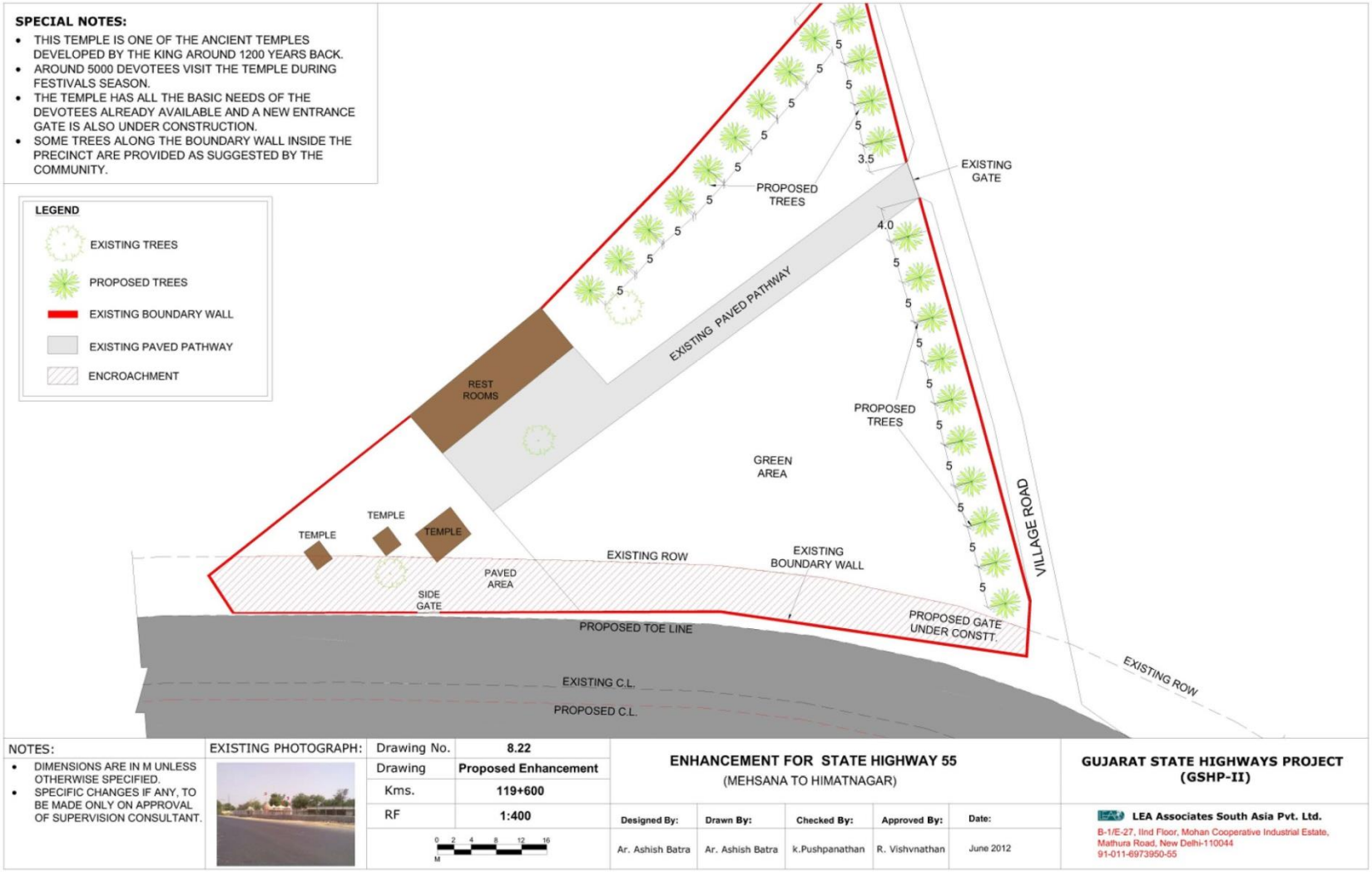
DETAIL OF RECHARGE DUGWELL FOR WATER HARVESTING

Typical drawing for Water harvesting Structure

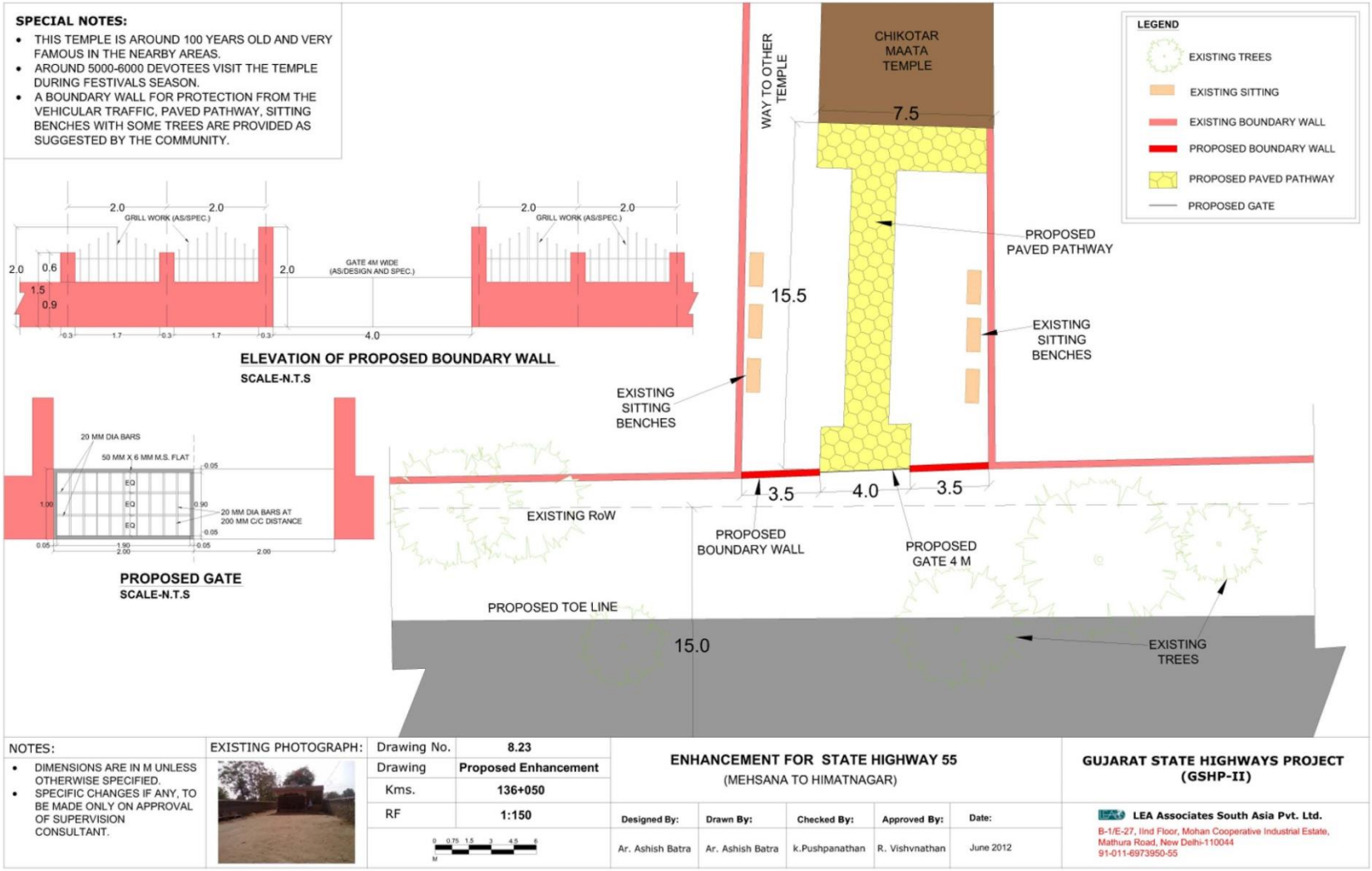


Typical drawing for Oil Interceptor

Appendix – V



Enhancement Drawing for Paleshwar Mahadev Temple (Ch 119+600)



Enhancement Drawing for Chikotar Mata Temple (Ch 136+050)

SCHEDULE – D

SPECIFICATIONS AND STANDARDS

1 Four-Laning

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

ANNEX – I

1 Manual of Specifications and Standards to apply

Subject to the provisions of Paragraph 2 of this Annex-I, Four-Laning of the Project Highway shall conform to the Manual of Specifications and Standards for Four Laning of Highways Through PPP, published by Indian Roads Congress on August 2014 (IRC-SP-84:2014 First Revision).

2 Deviations from the Manual

Notwithstanding anything to the contrary contained in the aforesaid Manual, the following Specifications and Standards shall apply to the Four Laning Project Highway within ROW of 30m, and for purposes of this Agreement, the aforesaid Manual shall be deemed to be amended to the extent set forth below:

Deviations in standards

Sl No.	Item Deviated	Description of Deviation	Reference Clause/Sub Clause Four lane Manual (2014)
1	Design service Volume and Carriageway Provision	Carriageway provisions as per the Road Cross sections indicated in Appendix – I to the Schedule B	1.13 &1.14
2	Design Speed	Relaxation for reduction in speed and radii of curves shall be given at locations where it warrants in consultation with Independent Consultant and at such locations required geometry shall be designed for lower design speeds and design radius.	2.2
3	Right of Way	Right of Way Available for Concessionaire shall be 30m and Corridor of Impact (CoI) is 26m in rural and 30m in urban sections. Concessionaire has to upgrade the project highway within available CoI as per given cross sections in Schedule-B after discussion and approval from IC.	2.3
4	Median	The maximum Median Width of 0.8m with New Jersey Type Crash Barrier (RCC) shall be kept in order to develop the corridor with in COI of 26m in rural sections and 30m in urban sections. Median shall be as per cross sections given in Schedule B and any modifications shall be after discussion and approval from IC.	2.5
5	Shoulders	Provision of shoulders shall be as per cross sections given in Schedule B and any modifications shall be after discussion and approval from IC.	2.6
6	Roadway Width	Traffic calming measures has been provided in such curves and roadway width is accommodated in available right of Way and any modifications shall be after discussion and approval from IC	2.7
7	Median openings	Considering narrow median width and safety of road user median openings are only provided at major access roads, villages, urban and semi urban settlements. Shelter lanes are not provided because of restricting the cross section in available right of way. Median opening shall be as per Volume IV of RFP and any modifications shall be after discussion and approval from IC.	2.14
8	Separator, Footpath and Drain in Built-up Areas	Footpath and Drain in Built-up Areas shall be as per given cross sections in Schedule-B and any modifications shall be after discussion and approval from IC.	2.15
9	Utility Corridor	Utility corridor has not been provided to minimise the land acquisition; Cross sections have been fitted into available RoW. Provision of Utility Corridors may be made by Concessionaire after discussions and with an approval of IC.	2.16
10	Typical Cross sections	Typical Cross sections developed based on accommodating the four lane width in available right of Way. Concessionaire has to upgrade/follow the given cross sections in Schedule-B after discussion and approval from IC.	2.17
11	At Grade Intersections	At grade intersections are designed and accommodated in	3.2

Sl No.	Item Deviated	Description of Deviation	Reference Clause/Sub Clause Four lane Manual (2014)
		available right of way or with minimum land acquisition. At grade intersections shall be as per schedule B and any modifications shall be after discussion and approval from IC.	
12	Pavement Design	(i) As mentioned in schedule B for 3 kilometres stretch Warm Mix Asphalt shall be used.	5.3
13	Design of Structures	(i) Add following to clause 7.1 of Four lane Manual - Canal bridges shall be designed as per hydraulic requirements of irrigation authorities. The construction plans shall be prepared as per closure schedule of canals. Approval of GAD from irrigation department may be required. (ii) The new/ reconstructed pipe culverts of minimum 1.2 m diameter shall be provided within RoW and as directed by IC. (iii) The existing pipe culverts of minimum 600/900 mm Diameter shall be retained and extended and as directed by IC. (iv) Widening, replacement and additional new structure width shall be as per the road cross section at respective places and in commensuration with original ground profile within RoW. IC and R&BD shall be final authority to approve and advice on overall width of all structures and CD works.	7.1 7.7.2 (ii) 7.3
14	Landscaping and Tree Plantation	Landscaping and tree plantation is as per standards except those locations where urban enhancement and enhancement of temple locations are provided as per Schedule-C and any modifications shall be after discussion and approval from IC.	11.3
15	Pedestrian Facilities	Pedestrian Facilities shall be provided as specified in schedule-B and Schedule-C and any modifications shall be after discussion and approval from IC.	12.2
16	Street Lighting	Street Lighting shall be provided as specified in schedule-B and Schedule-C and any modifications shall be after discussion and approval from IC.	12.3
17	Bus Bays and Passenger Shelters	Bus Bays and Passenger Shelters are well accommodated in available right of Way and those shall be provided as specified in schedule-B and Schedule-C and any modifications shall be after discussion and approval from IC.	12.5
18	Cattle Crossings	Cattle Crossings are indicated as cattle crossing zones and shall be provided as per Schedule B and any modifications shall be after discussion and approval from IC.	12.7

Appendix-2 of Schedule L

ToR for Facilitating Agency to Implement Green Intervention

I. Introduction

1. The Roads and Buildings Department (R&BD), Government of Gujarat (GoG) has taken up the preparation of the second Gujarat State Highway Project (GSHP-II), covering up-gradation, maintenance and improvement of identified core road network. It is proposed to adopt green interventions in one of the corridors of GSHP-II on a pilot basis and a stretch from Vijapur (Ch 140+000) to Himatnagar (Ch 163+000) in Mehsana – Himatnagar corridor has been selected.

2. The proposed upgradation of Mehsana – Himatnagar will be under annuity format, in which the additional responsibility of implementing Green Interventions will be assigned to the Concessionaire. To support the Concessionaire in the implementation, a Facilitating Agency is proposed to be engaged for a period of 5 years (2 years during construction and 3years (intermediate) during the operation/maintenance of the corridor).

II. Objective

3. The main objective of this green initiative is to foster partnerships for improving the existing natural, built and social environmental conditions, while sustaining life-cycle functional requirements of transportation infrastructure such as safety, structural and service levels. The suggested green interventions are:

(i) ***Solid Waste Management***: To initiate SWM practices along the project corridor through interventions towards improvement of the collection, storage and transportation of wastes along the corridor in addition to creating community awareness.

(ii) ***Tree transplantation***: this measure is suggested to avoid felling of trees due to road widening, small trees having girth size from 30 – 90cm can survive transplantation when transplanted to other location.

(iii) ***Cattle crossing***: Cattle crossing locations are identified based on the consultation with the local people; suitable designs are prepared for execution.

(iv) ***Solar Streetlight***: It is proposed to have Solar PV's in the median.

(v) ***Warm Mix Asphalt***: A sample stretch of the corridor (for a length of about 2km) is proposed to be laid with WMA and shall result in environmental benefits in terms of fuel, dust and emission reduction during the construction stage.

III. Scope of work

4. The scope of work for the Facilitating Agency is detailed in the subsequent section.

(i) Solid Waste Management

- Develop the guidelines for community based participatory solid waste management system, in collaboration with Concessionaire;
- Identify, in consultation with Concessionaire, the components of such a system based on the principle of 3R's (reduce, reuse and recycle) including but not limited to segregation at source; in-house composting; fee based simple collection system; elimination of the practice of the dumping of house waste on the streets/adjacent open spaces; identification and management of collection points for house waste; elimination of manual handling of waste to the extent possible; separation of systems of disposal of solid waste from liquid waste; simple processing for composting; simple management of land-fill sites, etc;
- Coordinating with the existing industries and creating awareness in implementing the effective solid/ industrial waste management practices and monitoring;
- Organize public awareness campaign for imparting solid waste management messages such as reducing the use of plastics; segregation at source; dumping of house waste at the designated places instead of dumping it on streets/adjacent open spaces; in-house composting; keeping the public places clean and not littering them; elimination of open defecation; elimination of urination in public places;
- Coordinate effectively with local governments and ensure that community-based activities are integrated into the overall solid waste management practices (waste collection, transportation and final disposal) of the local governments;
- Coordinate with Community Awareness and People's participation; Capacity Building activities as related to Solid Waste Management.
- Coordinating with the local municipalities/panchayat for collection and disposal of waste from the bins provided at various locations as part of the green highway initiatives towards solid waste management.

(ii) Cattle crossing

- Coordinating with the concessionaire in implementing the cattle crossing measures as suggested in the EMP;
- Consultation with the local communities to identify any additional crossing locations required for the project corridor;
- Creating awareness to the road users, truckers etc. by issuing IEC/ pamphlets/ dissemination notices on the cattle crossing locations and recommended speed limits along the project corridor;
- Identify the locations requiring additional signages for cattle crossing;
- Conducting awareness to the local people in restricting the parallel movement of cattle along the corridor;

- Coordinate for the purpose of creating Community Awareness and People's participation; Capacity Building activities those related to Cattle crossing and monitoring.

(iii) Tree Transplantation

- Facilitating and mobilization of the local community and committees.
- Conducting periodic site visits with the authorized representatives/ government officials/ forest department;
- Conducting awareness among the people in protecting the transplanted trees and coordinating with the forest department in maintenance activities.

(iv) Renewable Energy

- Coordinate with Community for Awareness and People's participation; Capacity Building activities as related to renewable energy;
- Creating awareness among locals in preventing vandalism, and Creating awareness among the road users in preventing damages to the structure provided for solar PV's and road lights.

(v) Environmental performance of the Green initiatives

- Coordinate with the vendor agency and carryout performance monitoring with respect to the indicators specific to WMA (e.g quantity of fuel used, waste generated and GHG emissions released);
- Preparation of suitable monitoring formats in consultation with the vendor agency and Concessionaire for monitoring of Environmental parameters with respect to WMA (including monitoring of GHG emission);
- Assist the Concessionaire in developing a data base with respect to the Environmental footprint information for the project corridor and publishing the same in the PIU website under the tab "Pilot GH Initiative."

IV. Monitoring Activities

Sl.no	Activities	Responsibility
1.	Solid Waste Management	• Monitoring the maintenance of the corridor with respect to MSW • Monitoring the collection and disposal facilities and maintain records pertaining to Prevention of damage/ vandalism to the provided Bins and maintain records for the same
2.	Cattle crossing	• Monitoring and evaluating the functioning of cattle crossing facility provided along the corridor • Need to ensure that the road furniture is in good condition and the sign boards are appropriately maintained and maintenance records are in place. • Maintain Record of accident / injury due to the cattle crossing and its related issues and intimate to the concessionaire
3.	Tree transplantation	• Maintain records for the transplanted trees (tree numbers, land etc) • Monitoring the maintenance of transplanted trees • Monitoring the survival of trees as per the format enclosed in the EMP

Sl.no	Activities	Responsibility
4.	Renewable Energy	• Monitor and evaluate the performance of road users and villagers with respect to protection of the solar PV. • Need to ensure that the given solar PVs are at their respective position and in good condition • Ensure functioning of solar fountain and its functioning w,r,t air pollution control. • Maintaining records on AMC (if any) for the solar PVs, Backup Battery and Led Bulbs, water pump in solar fountain,
5.	Warm Mix Asphalt	• Monitoring the performance of WMA against stated monitoring indicators (fuel, dust , GHG emissions)

V. Reporting Requirements/ Deliverables

Sl.no	Deliverables	Construction	Operation/ Maintenance
1.	Observation report	Within 3 months from the start of the construction activities	-
2.	Consultation report	Within 6 months from the start of the construction activities	-
3.	Training report	Every 6 months from the start of the construction activities	Training shall be conducted at every 3rd year of the operation/maintenance period for all given green highways initiatives and training report shall be submitted
4.	Half yearly progress / monitoring report	Every 6 months till the construction activities. The report shall contain all the information as detailed in section IV (Monitoring activities)	
5.	Annual progress/ maintenance report	-	Every year of the maintenance period for three years. The report shall contain all the information as detailed in section IV (Monitoring activities).