Attachment D.

Storm Water Treatments

California Department of Transportation (Caltrans)
I-580 Eastbound
Truck Climbing Lane Project

Summary of Project Impacts

The I-580 EB Widening Project spans two Hydrological Sub-Areas (HSAs); HSA No. 543.00, and HSA No. 204.30. The Project would add 6.11 ac of impervious area within the Project limits. There would be 5.90 ac of reworked impervious area in HSA 204.30. Therefore, the total required stormwater treatment would be 12.01 ac of impervious area. The total required hydromodification mitigation would be 6.11 ac.

We considered all of the relevant water quality treatment best management practices (BMPs) given the following priority: biofiltration strips, biofiltration swales, infiltration devices, detention devices, and media filters. Stormwater treatment was placed in all feasible locations.

For hydromodification mitigation, biofiltration swales were used wherever possible. To supplement the mitigation provided by the swales, underground detention facilities are proposed in the shoulder of the highway. All of these underground detention facilities would be constructed of 48-in. Alternative Pipe Culvert (APC) with water quality weirs at the end.

Hydromodification systems were designed using the Bay Area Hydrology Model (BAHM) and using site-specific data. The impervious areas were input as flat roadway. The pervious areas were input as very steep type C/D soils. In order to determine the amount of mitigation provided, the impervious area in the existing condition was replaced with pervious area until the BMP would not provide more mitigation or there was no more impervious area left in the existing condition. The same process was used for the underground storage facilities, modeled as tanks, as for the biofiltration swales, modeled using the biofiltration swale module.

Four biofiltration swales, two biofiltration strips, one rock infiltration trench, and seven underground storage facilities are proposed to provide stormwater treatment and hydromodification mitigation to the maximum extent practicable. The overall stormwater treatment provided is 9.41ac (89%). Hydromodification measures are proposed to mitigate 6.11 ac, equivalent to 100% of the project's total added impervious area. Given the site constraints within the project areas draining to Altamont Creek and Mountain House Creek as described below, we believe that the current proposal meets the maximum extent practicable standard required for incorporation of stormwater treatment and hydromodification control BMPs in this project.

The summary table of stormwater treatment and hydromodification measures proposed is included in the Attachments as Table 1. The detailed breakdown by watershed is summarized below.

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Altamont Creek Watershed

Proposed Stormwater Treatment
Three biofiltration swales are proposed in this watershed. They would have a total length of 725 ft and they would treat 3.64 ac of impervious area. There are no feasible areas to accommodate biofiltration strips, infiltration devices, or media filters. The total stormwater treatment achieved for this watershed is 3.64 ac, or 37% of the sum of the added and reworked areas within the Altamont Creek watershed. The following narrative summarizes additional locations that were considered, but were not feasible due to site constraints.

Site Constraints
The site constraints that prevented the implementation of BMPs are as follows:

- The areas on the westbound side of the highway were not environmentally cleared, so no BMPs could be planned there.

- A biofiltration swale receiving flow from the downdrain currently at approximately 121+60 (Rt) was attempted. The flow would have been piped upstation, against grade, with a new downdrain location to allow space for a biofiltration swale downstream. However, due to the flowline of the receiving channel, the limited area within the R/W, and the large off-site watershed (14 ac), both a biofiltration swale and a ditch that would contain the Q_{25} could not be accommodated in the area available. The entire area was required to convey the Q_{25}, leaving no space for a biofiltration swale.

- For much of the site, the roadway is in cut, with no space for BMPs, and the cut could not be increased due to geotechnical concerns. The following summarizes locations where the cut slope is proposed to be 2:1 and treatment is not feasible:

    - 135+00 to 143+00
    - 145+00 to 188+50
    - 199+50 to 205+00
    - 234+00 to 239+00

- From 143+00 to 145+00, the highway is on fill, but the adjacent area is too steep (greater than 4:1) and the flow is too large to design an adequate BMP.

- From 205+00 to 234+00, the roadway is superelevated toward the median barrier, so the flow could not be treated.

Proposed Hydromodification Mitigation Measures
For Hydrological Sub Area No. 204.30, the entire site is tributary to Altamont Creek. The added impervious area would be 3.81 ac. The three biofiltration swales would mitigate for 1.47 ac of added impervious area. In other locations underground detention facilities with water quality weirs are proposed under the shoulder. Five systems, with a

total storage length of 943 ft of 48-in. pipe, are proposed. These detention facilities would mitigate for 2.37 ac of added impervious area. The total hydromodification mitigation provided would be 3.84 ac, or 101% of the added impervious area within this region.

Mountain House Creek Watershed

Proposed Stormwater Treatment
The added impervious area within this watershed would be 2.30 ac. Biofiltration strips were placed in the two locations where they would be suitable. These BMPs would treat 0.69 ac of impervious area. A 400 ft biofiltration swale is also proposed. It would treat 1.65 ac of impervious area.

Also, a gravel infiltration trench is proposed at an access road downslope from the eastbound side of the highway. This infiltration trench would treat 4.7 ac of impervious area. The stormwater treatment feasible within this watershed would amount to 7.04 ac, or 306% of the added impervious area.

Proposed Hydromodification Mitigation Measures
For Hydrological Sub-Area No. 543.00, the entire site is tributary to Mountain House Creek. One biofiltration swale is proposed, which would mitigate for 0.67 ac of added impervious area. Two underground 48" pipe storage facilities with water quality weirs are proposed, totaling in length to 741 ft. There would be five weirs distributed in these two systems. The total hydromodification mitigation provided by these systems would be 1.63 ac. The total mitigation provided in this watershed would be 2.30 ac, or 100% of the added impervious area.

Table 1. I-580 Treatment and Mitigation Summary Table

Outfall	POC ID	POC Location	Project Impacts			Proposed Mitigation			
			AIA (ac)	RIA (ac)	Total AIA and RIA (ac)	BMP #	Description	Stormwater Area (ac)	Hydromod Area (ac)
Altamont Creek (Region 2)	0	Lt 121+20	0.00	5.9	9.71	1	250' Biofiltration Swale	0.66	0.40
						2	175' Biofiltration Swale	0.96	0.20
	1	Lt 145+45	0.32			3	142' x 48" APC; 1 weir	-	0.38
	2	Rt 143+50	0.75			-	-	-	-
	3	Lt 160+95	0.21			4	200' x 48" APC; 1 weir	-	0.37
	4	Lt 167+90	0.35			5	160' x 48" APC; 1 weir	-	0.42
	5	Lt 176+70	0.19			-	-	-	-
	6	Lt 183+00	0.62			6	300' Biofiltration Swale	2.02	0.87
	7	Lt 190+30	1.37			7	147' x 48" APC; 1 weir	-	0.35
						8	294' x 48" APC; 1 weir	-	0.85
Altamont Creek/Region 2 Subtotals			3.81	5.9	9.71			3.64	3.84
Altamont Creek/Region 2 Percent Mitigation								37%	101%
Mountain House Creek (Region 5)	8	Rt 302+00	2.30	N/A	2.30	9	300' Biofiltration Strip	0.32	-
						10	Rock Infiltration Trench	4.7	-
						11	450' x 48" APC; 3 weirs	-	0.95
						12	291' x 48" APC; 2 weirs	-	0.68
						13	400' Biofiltration Swale	1.65	0.67
						14	165' Biofiltration Strip	0.37	-
Mountain House Creek/Region 5 Subtotals			2.30	N/A	2.30			7.04	2.30
Mountain House Creek/Region 5 Percent Mitigation								306%	100%
Project Totals			6.11	5.9	12.0			10.68	6.14
Project Total Percent Mitigation								89%	100%

Notes:
AIA = Added Impervious Area. RIA = Reworked Impervious Area.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Ala	580	R4.7/R8.2		

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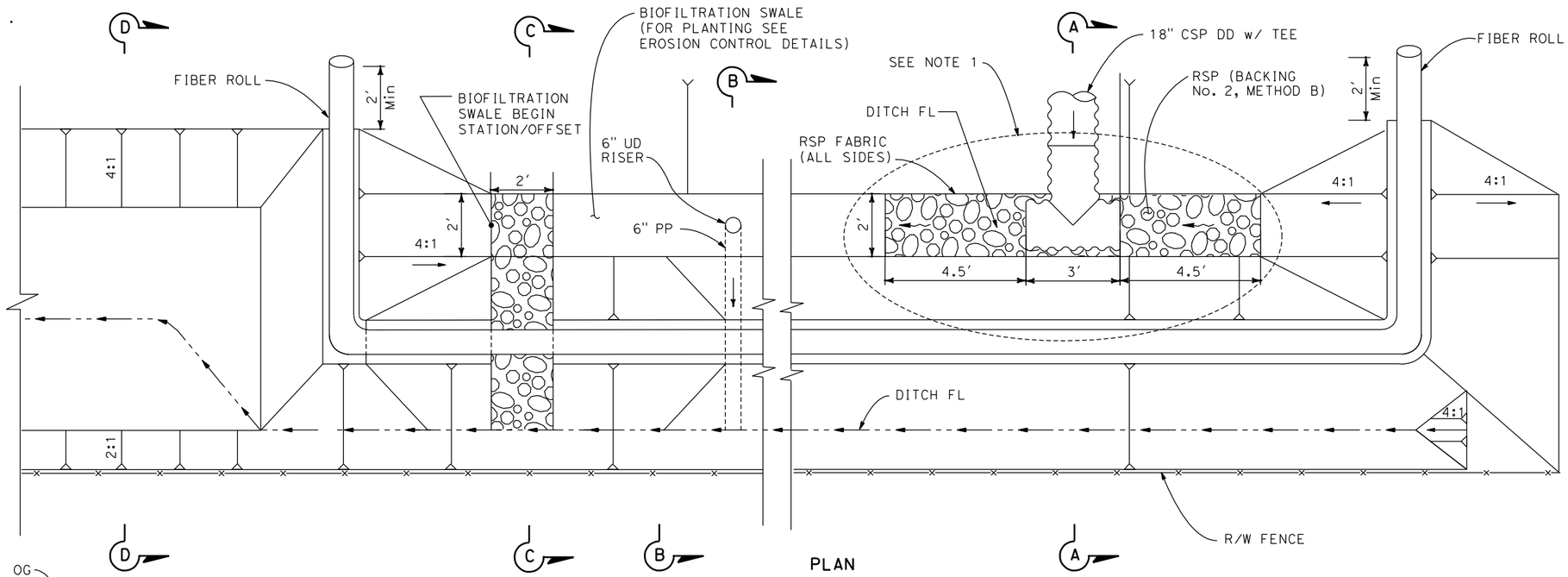
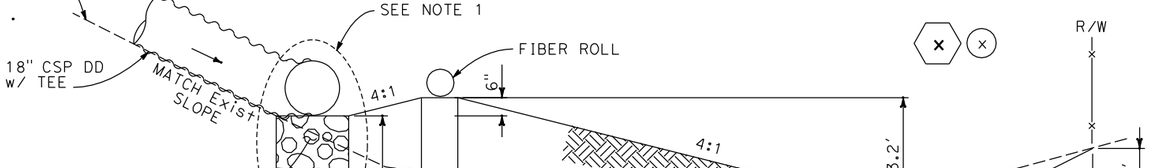
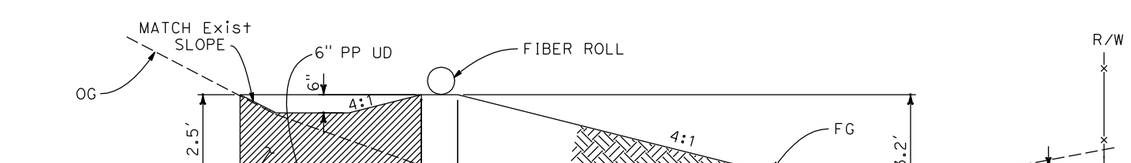


PLAN

BIOFILTRATION SWALE



SECTION A-A



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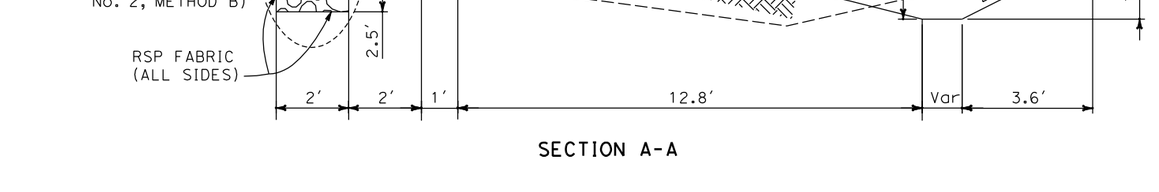

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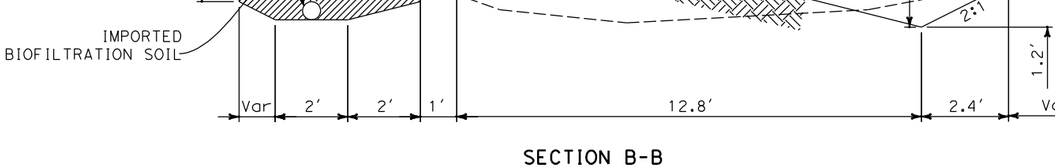
BIOFILTRATION SWALE TYPICAL SECTION



SECTION D-D

NOTES:

1. RSP DIMENSIONS SHOWN FOR (28)(a)(29)(a)
2. RSP DIMENSIONS SHOWN FOR (31)(b)(c)

DRAINAGE DETAILS

NO SCALE

DD-8

CALCULATED-DESIGNED BY	CHECKED BY	REVISED BY	DATE REVISED
JENNIFER ABRAMS		J.ABRAMS	06/09/10

CONSULTANT FUNCTIONAL SUPERVISOR: HAN-BIN LIANG

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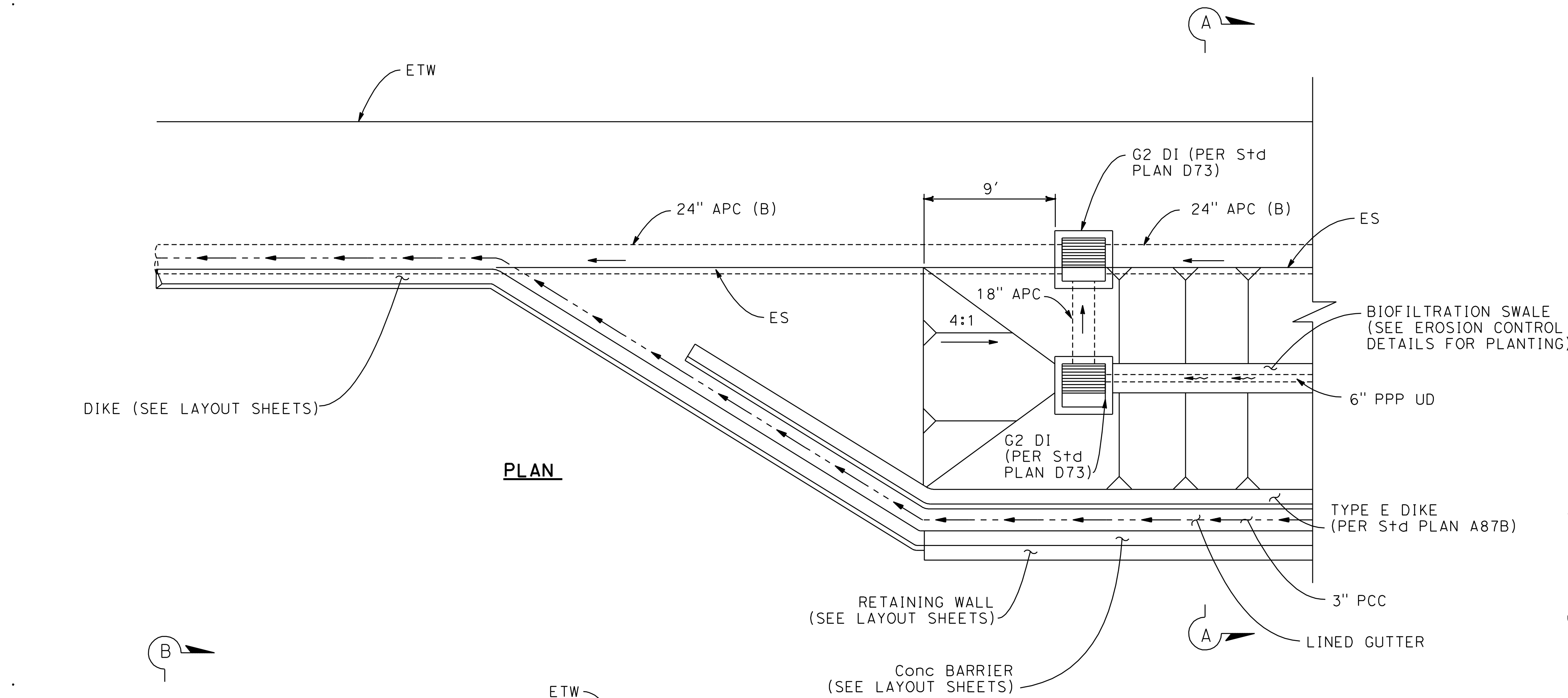

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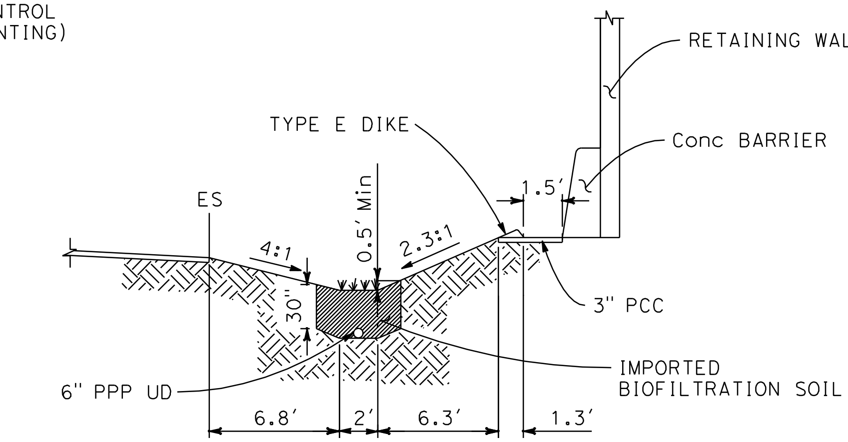
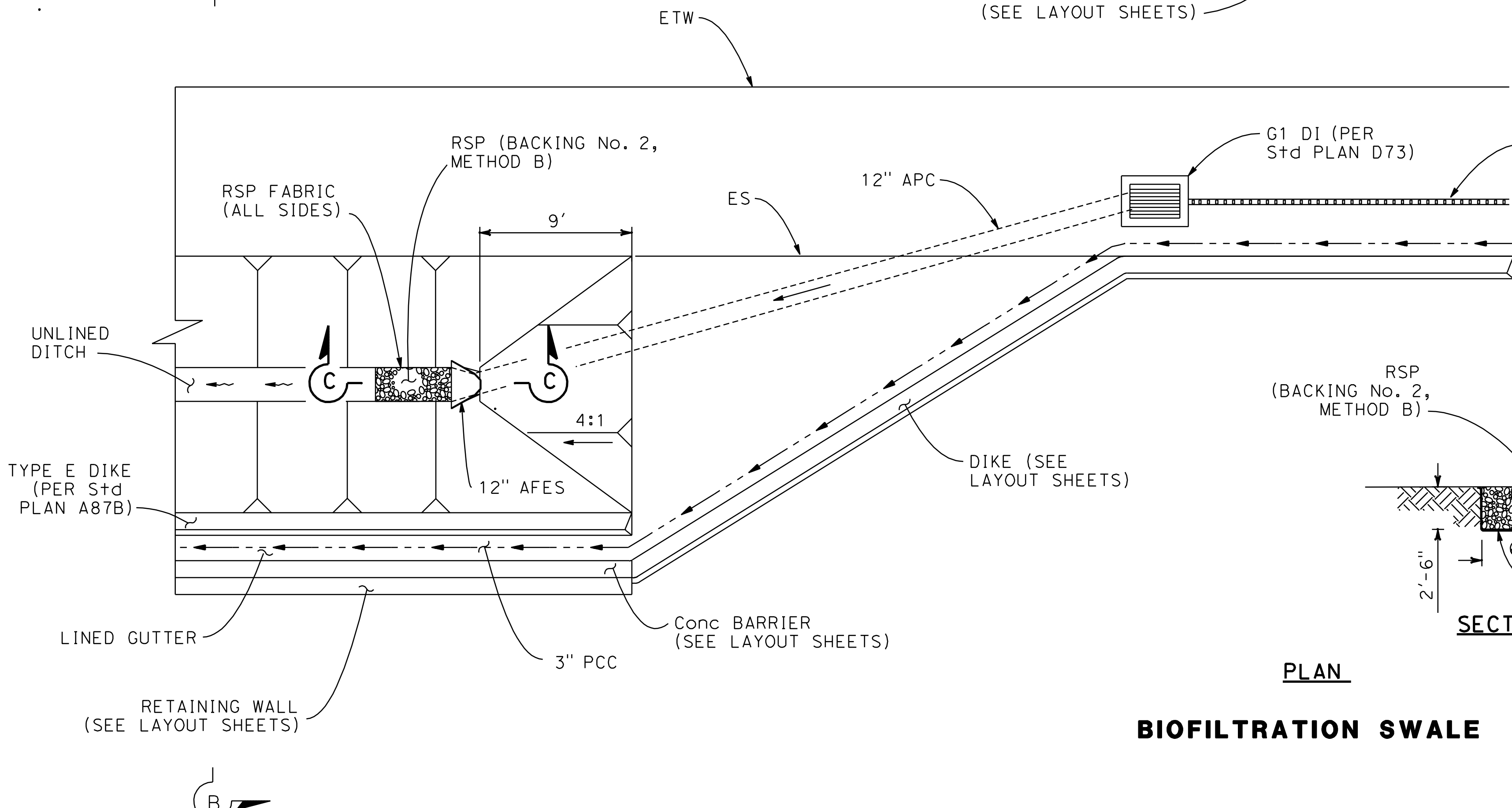
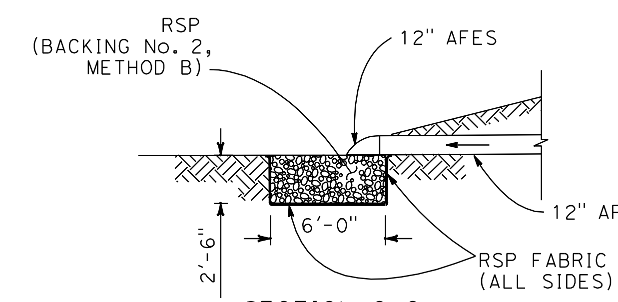


SECTION A-A

BIOFILTRATION SWALE TYPICAL SECTION

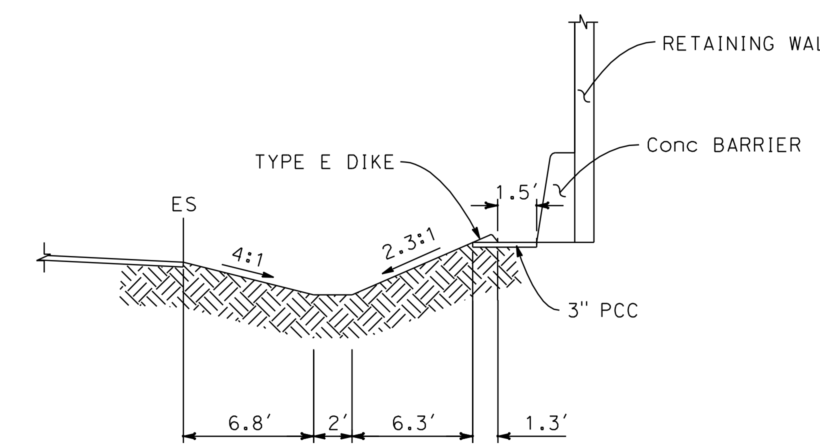




SECTION C-C

PLAN

BIOFILTRATION SWALE



SECTION B-B

DITCH TYPICAL SECTION

DRAINAGE DETAILS

NO SCALE

DD-9

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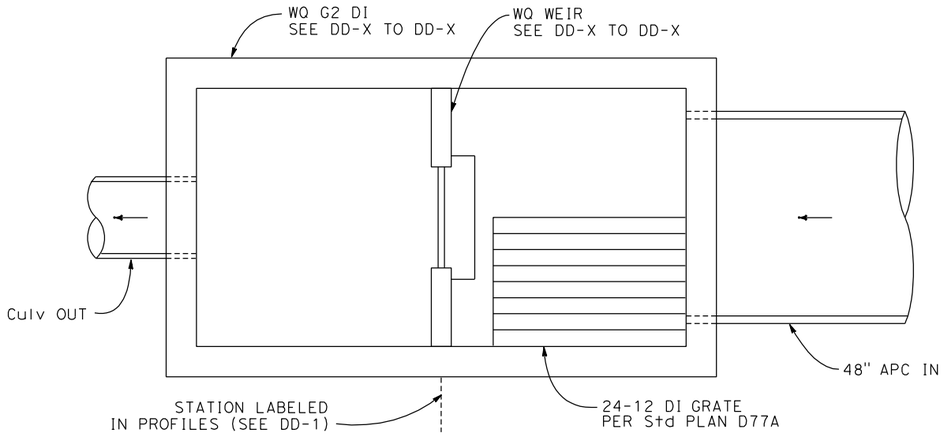

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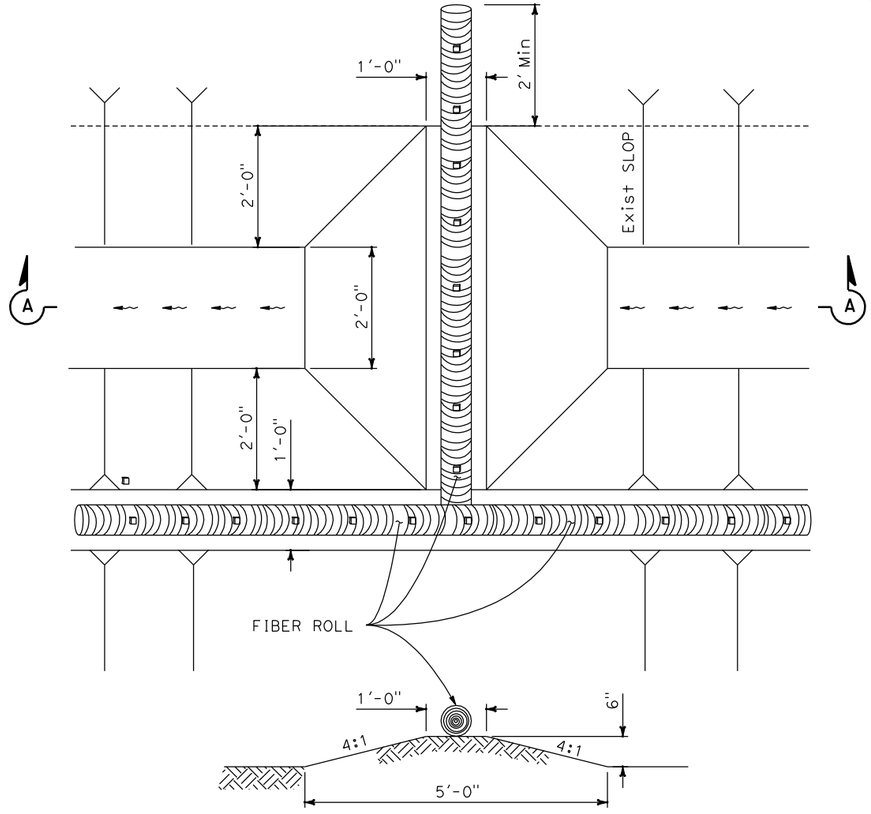
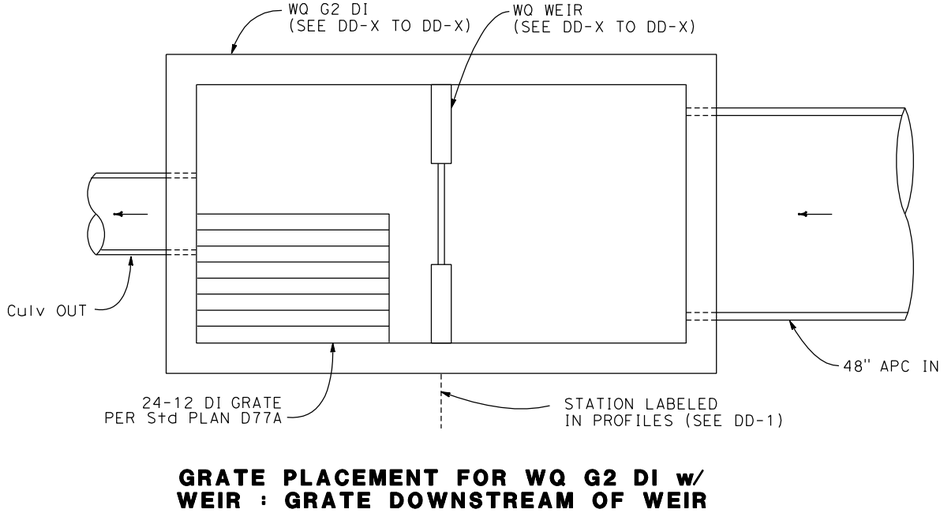


SECTION A-A

BERM DETAIL



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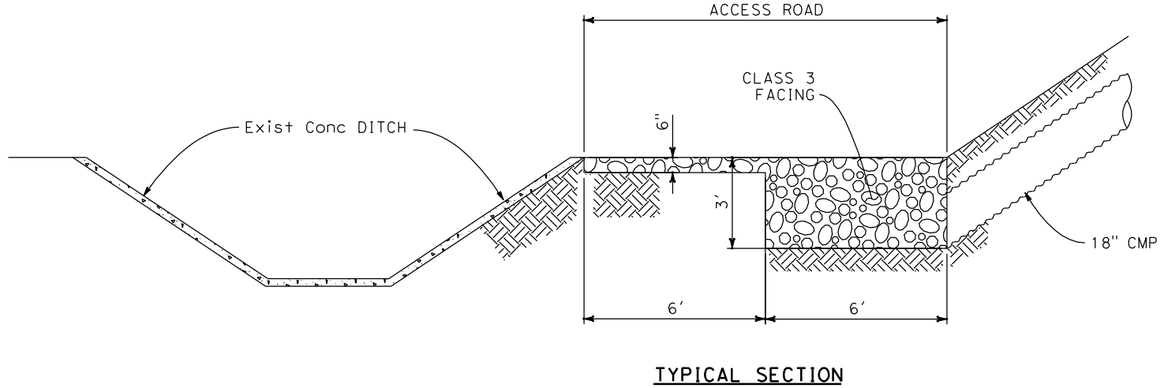

TYPICAL SECTION

ROCK TRENCH

X ×

DRAINAGE DETAILS

NO SCALE

DD-10

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