OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: July 2019

DFI No. D00845

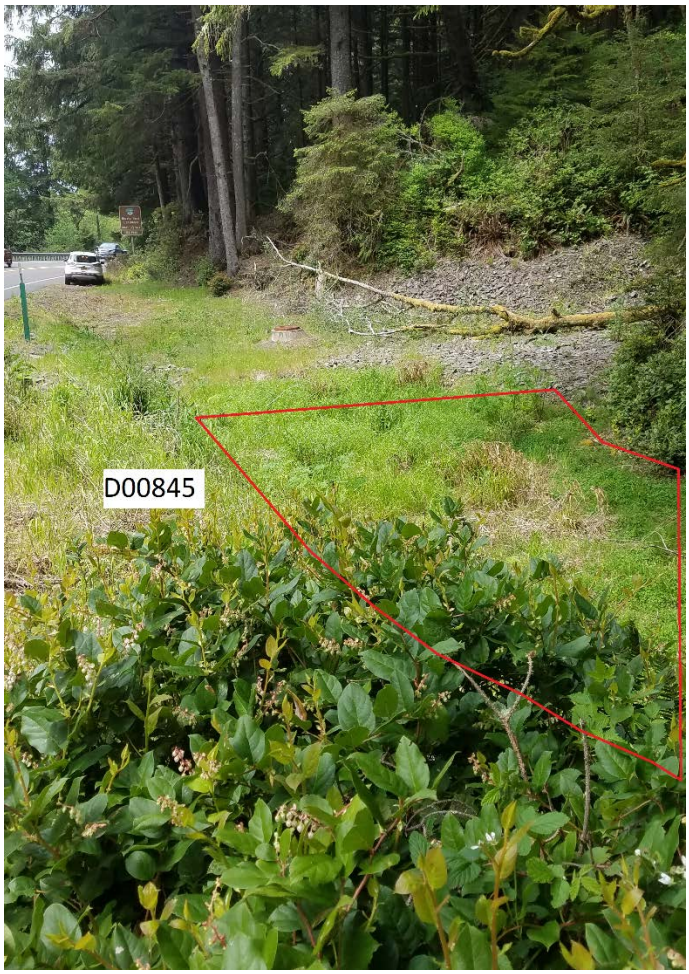


Figure 1: DFI No. D00845, looking [west]

Identification

Drainage Facility ID (DFI):	D00845
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 47v-093
Location:	District: 5
	Highway No.: 9
	Mile Post: 177.75 to 177.76, [right]

1. Manual Purpose

The purpose of this manual is to outline inspection needs and summarize maintenance actions.

2. Facility Location

The location map below details the facility location. The highway, mile posts, side streets, access location, and stormwater flow directions are noted on the map.

Facility location type: Roadway shoulder

Flow direction: [west]

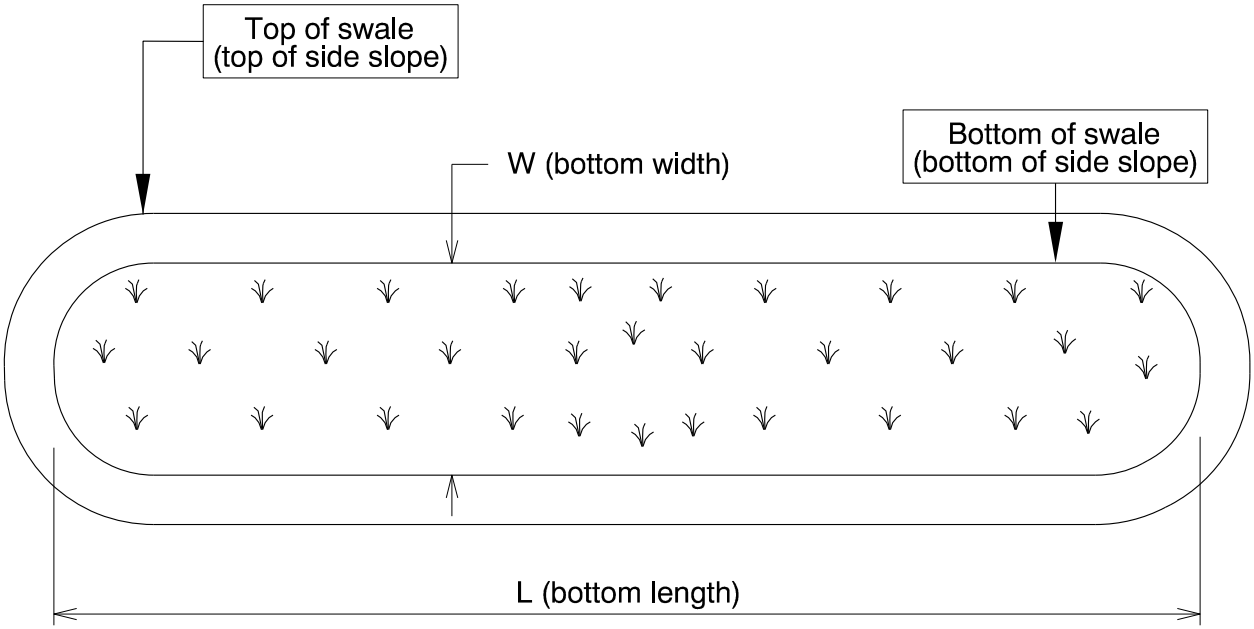
Figure 2: Facility location map

3. Facility Summary

The length and width of a swale is based on the bottom dimensions.

The bottom length and bottom width of the swale is:

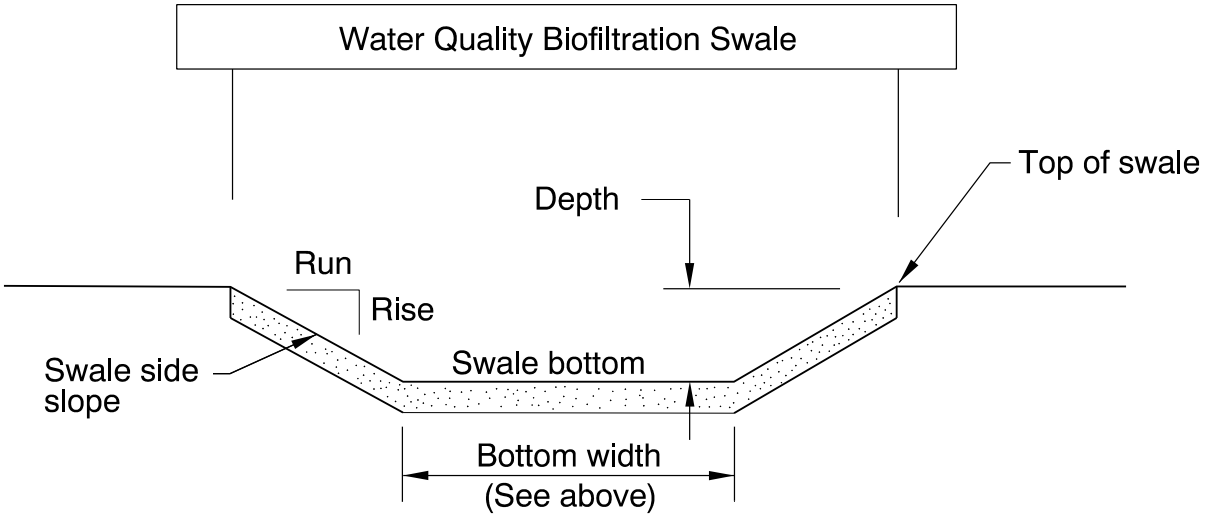
Bottom Length (feet)	Bottom Width (feet)
50	Varies 0 – 20



The depth of the swale is the vertical distance measured from the bottom of the swale to the top. The slope of the swale sides is presented by a vertical distance (rise) followed by the horizontal distance (run).

Depth and side slopes:

Depth (feet)	Rise (feet)	Run (feet)
Unknown	**1**	**2**



Site Specific Information: Water enters the biofiltration swale from the ditch alongside US101 and flows through the water quality soil before infiltrating into the stone embankment. From the stone embankment, water enters the perforated manhole from either the 18", partially perforated pipe or the stone embankment itself. Water is finally conveyed underneath US101 before discharging into an open channel.

4. Facility Access

Maintenance access to the facility:

☐Roadside pad	☒Roadside shoulder
☐Access road with Gate	☐Access road without Gate

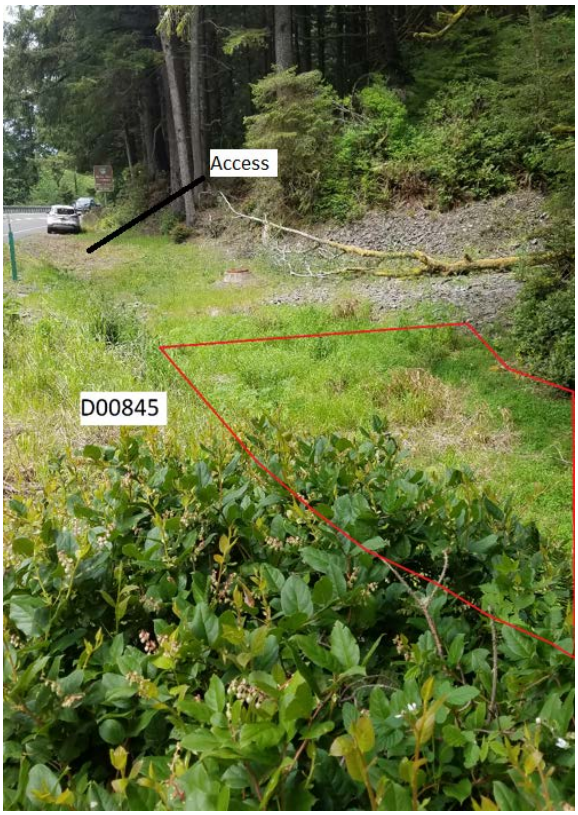


Figure 3: [looking west]

5. Operational Components / Maintenance Items

Classification

This facility is classified as an:

☒ On-line Swale	☐ Off-line Swale
A swale that does not include a high flow bypass component; flow drains into and through the facility	**A swale that treats low/small flows and diverts high flows using a bypass component**

Bypass Component

This facility includes a high flow bypass component:

☒ No	☐ Yes
There is no bypass component. High flows drains into and through the facility	**There is a bypass component. Only low/small flows drain into the swale. High flows are diverted around the swale using a bypass component**

Operational Components

A swale has many components that assist with treatment, conveyance, and reducing flow velocity to minimize erosion. The components in use can vary depending if the facility was designed to operate on-line or off-line. The facility components table (**Table 1**) has been provided to highlight the applicable components for this facility. The component is in use when the box contains an "x" (e.g. ☒).

The Standard Operation Manual for Water Quality Biofiltration Swales (implemented March 2017) outlines facility operation, typical footprint configuration, and component definitions and details. A link to the manual is attached to the feature marker in TransGIS.
https://gis.odot.state.or.us/TransGIS/

Operational Plan

The applicable standard operational plan for this facility is:

☒ Operational Plan A	☐ Operational Plan B	☐ Operational Plan C
An on-line swale with roadside ditches	**An on-line swale with piped inlets and outlets**	**An off-line swale with a piped high flow bypass**
A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A, B, C) are provided in the Standard Operation Manual.		

See Appendix A for the site specific operational plan.

Maintenance Items

Operational components marked in **Table 1** should be inspected and maintained according to Section 7. Each facility component is defined and detailed in the Standard Operation Manual using the associated ID number indicated below.

Table 1: Swale Components		ID #
Manholes/Structures		
Pre-treatment manhole	☐	**S1**
Weir type flow splitter/flow splitter manhole	☐	**S2**
Orifice type flow splitter/flow splitter manhole	☐	**S3**
Standard manhole	☒	**S4**
Swale Inlet		
Pavement sheet flow	☒	**S5**
Inlet Pipe (s)	☐	**S6**
Open channel inlet	☒	**S7**
Riprap pad	☐	**S8**
Ground Cover		
Grass bottom	☒	**S9**
Grass side slopes	☒	**S10**
Granular drain rock	☐	**S11**
Plantings	☐	**S12**
Underground Components		
Geotextile fabric	☐	**S13**
Water quality mix	☒	**S14**
Perforated pipe	☒	**S15**
Porous pavers (access grid)	☐	**S16**
Flow Spreader		
Rock basin (used at inlet)	☐	**S17**
Anchored board (midpoint of swale or every 50 feet along swale bottom)	☐	**S18**
Other: N/A	☐	**S19**
Swale Outlet		
Catch basin with grate	☐	**S20**
Outlet Pipe (s)	☒	**S21**
Open channel outlet	☐	**S22**
Auxiliary Outlet: N/A	☐	**S23**
Outfall Type		
Waterbody (**C**reek/**L**ake/**O**cean)	☒ **C** ☐ **L** ☐**O**	**S24**
Ditch	☐	**S25**
Storm drain system	☐	**S26**
Outfall Components		
Riprap pad	☐	**S27**
Riprap bank protection	☐	**S28**

6. Maintenance

Maintenance Frequency/Maintain Records

a. Inspect annually. Preferably prior to the rainy season.
b. Clean and maintain as necessary. Refer to Activity 125 for conditions when maintenance is needed.
c. Keep a record of inspections, maintenance, and repairs.

Maintenance Guide/Maintenance Actions

The ODOT Routine Road Maintenance Water Quality and Habitat Guide (the *Blue Book*) outlines the standard maintenance actions for water quality facilities under Activity 125.

There are standard maintenance tables for standard ODOT designs. The maintenance tables describe the maintenance component, the defect or problem, the condition when maintenance is needed, and the recommended maintenance to correct the problem. Use the following tables to maintain ODOT swales:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities
- Table 3 (Maintenance of Water Quality or Biofiltration Swales): Contains maintenance information for swales

The *Blue Book* can be viewed at the following website:
http://www.oregon.gov/ODOT/Maintenance/Documents/blue_book.pdf

7. Limitations

Access grid installed:

☒ No	☐ Yes
There are no duty porous pavers installed in this swale	

Swales are designed to allow equipment access along the bottom. If an access grid is **NOT** installed, vehicles entering the swale can create depressions (tire ruts), damage vegetation, and damage structural components (e.g. flow spreaders). These conditions may result in poor treatment and drainage performance.

Equipment wheels should be kept on the tops and side slopes. Mower arms may be run along the swale bottom.

8. Waste Material Handling

Material removed from the facility is defined as waste by the Department of Environmental Quality (DEQ). Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options:

http://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf

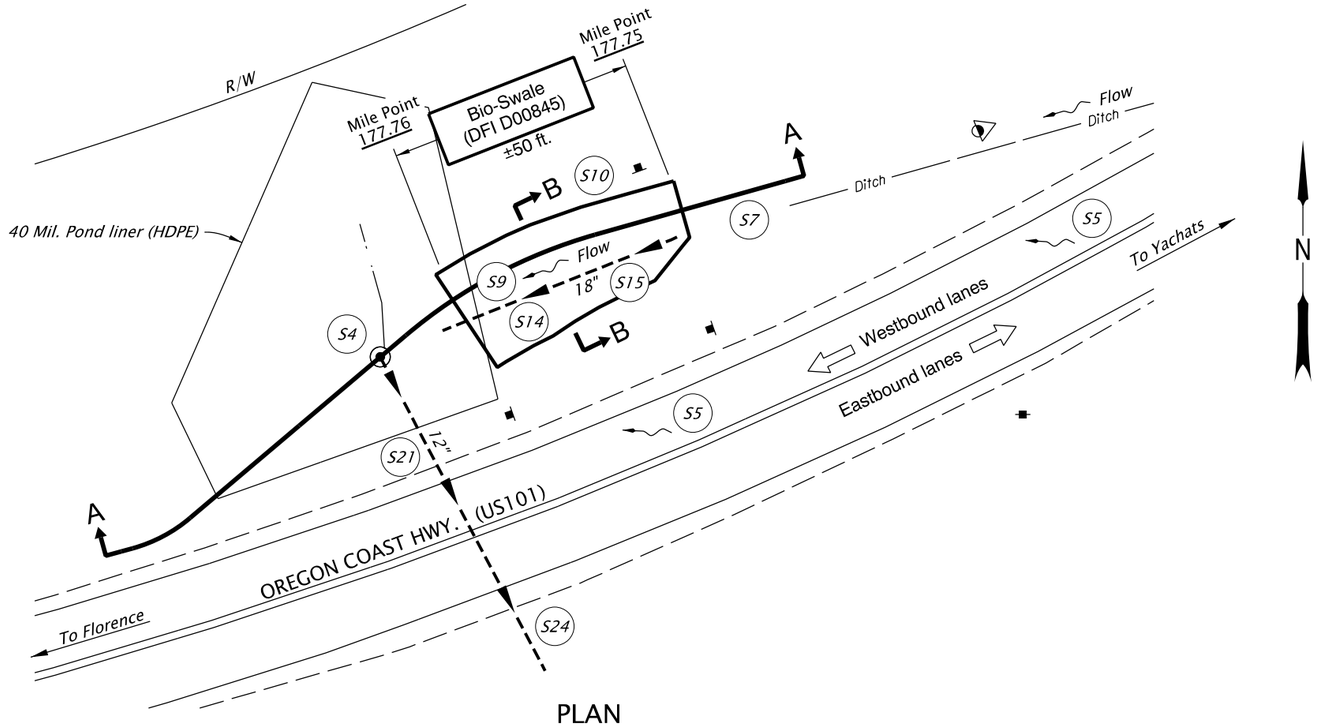
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647
ODOT Region 3 Hazmat Coordinator	(541) 957-3594
ODOT Region 4 Hazmat Coordinator	(541) 388-6186
ODOT Region 5 Hazmat Coordinator	(541) 963-1590
ODEQ Northwest Region Office	(503) 229-5263

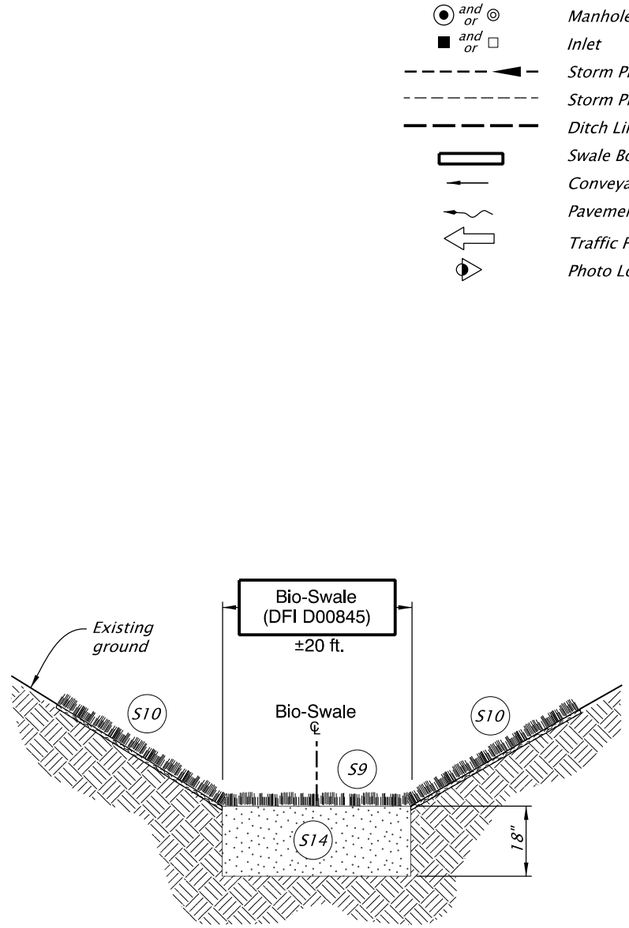
A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D00845



PLAN
N.T.S.



SECTION A–A
N.T.S.

SECTION B–B
N.T.S.

LEGEND:

- X# — *Facility Component (see table 1 in O&M Manual)*
- and / or — *Manhole*
- and / or — *Inlet*
- *Storm Pipe (Facility)*
- *Storm Pipe*
- *Ditch Line*
- *Swale Boundary*
- *Conveyance Direction*
- *Pavement / Facility Flow Path*
- *Traffic Flow Direction*
- *Photo Location / Direction*

OREGON DEPARTMENT OF TRANSPORTATION

Sht. ## of ##

Prepared By: Christopher Carman

Drafted By: Jeff Coon

DFI D00845
MAINTENANCE DISTRICT 5 US101
WATER QUALITY BIOFILTRATION SWALE
OREGON COAST HIGHWAY MP 177.75
LANE COUNTY

DFI_D00845.dgn :: Default-Sheet 7/26/2019 8:58:47 AM hwyr64u

Rotation: 0° Scale: 1"=30'

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 47v-093

47V-93

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont.

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED PROJECT

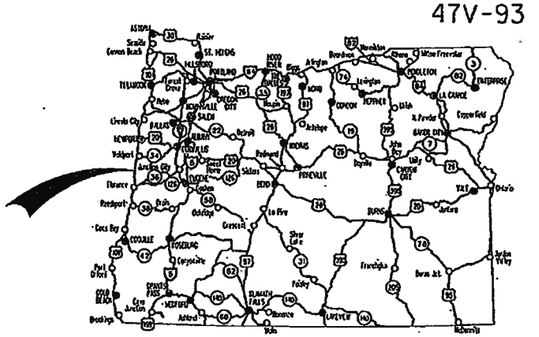
STRUCTURES, PAVING, DRAINAGE

US101: BRAYS POINT - SUTTON LAKE ROAD SLIDE REPAIRS PROJECT

OREGON COAST HIGHWAY

LANE COUNTY

JUNE 2014



Overall Length Of Project - 0.53 Miles

REVISED AS CONSTRUCTED
2-25-2015
DATE
PROJECT MANAGER

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

NHPP-S009(421)
BEGINNING OF PROJECT
STA. "B" 0+00.00 (M.P. 170.23)

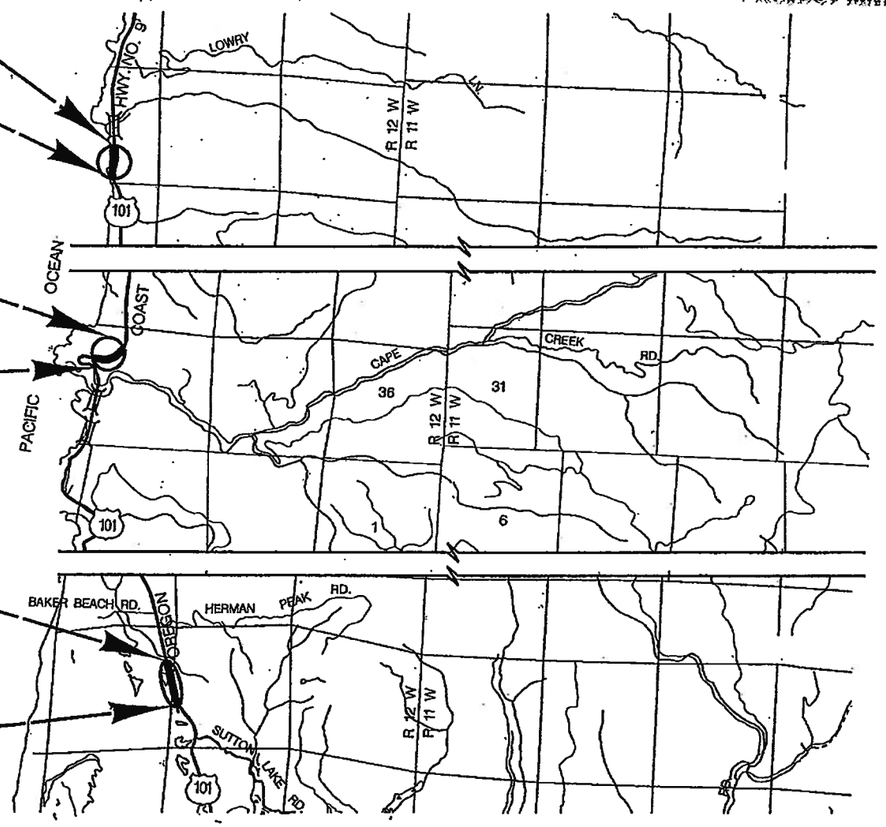
END WORK AREA
STA. "B" 7+75.00 (M.P. 170.38)

END WORK AREA
STA. "H" 719+19.31 (M.P. 177.54)

BEGIN WORK AREA
STA. "H" 705+96.92 (M.P. 177.79)

BEGIN WORK AREA
STA. "S" 1+00.00 (M.P. 183.05)

NHPP-S009(421)
END OF PROJECT
STA. "S" 7+00.00 (M.P. 183.16)



N

T. 15,16,17, S.,
R. 12 W., W.M.

OREGON TRANSPORTATION COMMISSION

Pat Egan	CHAIR
David Lohman	COMMISSIONER
Mark Frohnmayer	COMMISSIONER
Tammy Baney	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

These plans were developed using ODOT design standards. Exceptions to these standards, if any, have been submitted and approved by the ODOT Chief Engineer or their delegated authority.

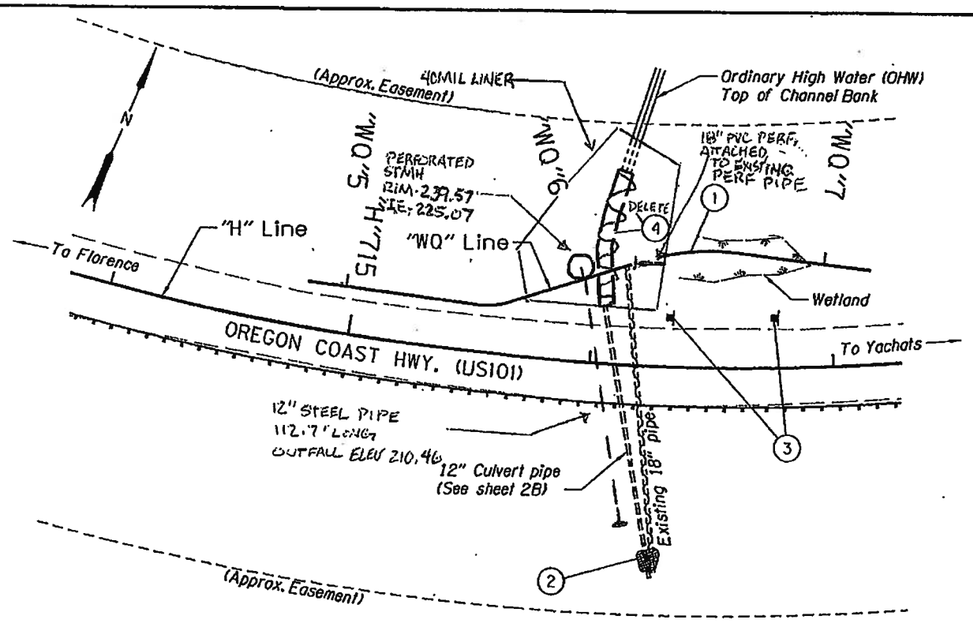
By: Carol A. Cartwright 5/6/14
Signature & Date

Carol A. Cartwright - R2 Tech Center Manager
Print name and title

Concurrence by ODOT Chief Engineer

US101: BRAYS POINT - SUTTON LAKE ROAD SLIDE REPAIRS PROJECT
OREGON COAST HIGHWAY
LANE COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	NHPP-S009(421)	1



PLAN

SWALE NO. 00845 MARKER TABLE

TYPE				FACILITY LOCATION	
S1	S2	RED	GREEN	STATION	OFFSET
✓			✓	"H" 716+32.14	20.0' Lt.
✓		✓		~~"H" 716+76.32~~	~~20.5' Lt.~~ 718+00
	✓			~~"H" 716+76.32~~	~~35.5' Lt.~~ 718+00 35' LT

✓ Check where appropriate
Red = Beginning of facility
Green = End of facility

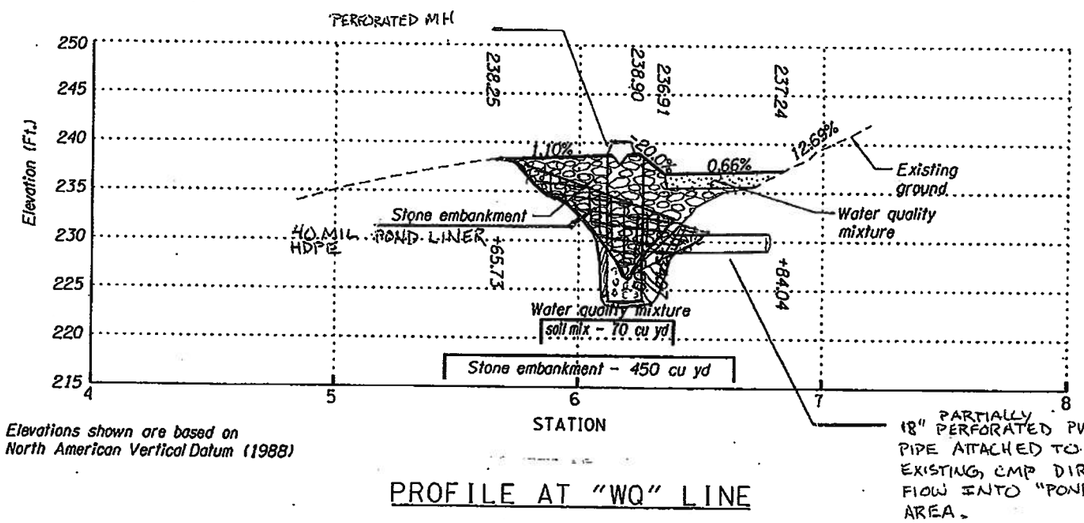
REVISED AS CONSTRUCTED
2-27-2015
DATE
PROJECT MANAGER

(1) Sta. "WQ" 5+65.73 to 6+84.00
Construct Embankment
Stone Embankment - 450 cu. yd.
Water Quality Mix - 70 cu. yd
Riprap Geotextile (Type-1) - 150 sq. yd.

(2) Sta. "H" 716+27.03
Construct Riprap Pad (See GJ-2 details)
General Excavation - 5 cu. yd.
Loose riprap, (Class 50) - 5 cu. yd.
Riprap geotextile (Type-1) - 13 sq. yd.
Aggr. base - 0.05 cu. yd.
18" storm sewer - 5'

(3) Stormwater facility marker
(See Swale No. 00845 Marker table)
(See dwg. RD399)

(4) ~~Construct channel 1:3 side slopes~~
~~3/4" minus - 6 cu. yd.~~
~~Riprap Geotextile (Type-1) - 55 sq. yd.~~
~~(For details, see sht. GJ-3)~~
REMOVED AND DELETED DURING EWO TO RELIEVE IMPOUNDED WATER IN "BOWL" AREA.



Elevations shown are based on North American Vertical Datum (1988)

PROFILE AT "WQ" LINE

18" PARTIALLY PERFORATED PVC PIPE ATTACHED TO EXISTING CMP DIRECTING FLOW INTO "POND LINED" AREA.

Plug and abandon extg. pipe shown thus: ~~~~

REGISTERED PROFESSIONAL ENGINEER
17807
OREGON
JULY 25, 1995
CHRIS CARMAN
RENEWS: 12-31-2015

OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

US101:BRAYS POINT - SUTTON LAKE RD.
SLIDE REPAIRS PROJECT
OREGON COAST HIGHWAY
LANE COUNTY

Reviewed By - Bruce Carmichael
Designed By - Christopher Carmon
Drafted By - Julie Rentz

STORMWATER PLAN/PROFILE

SHEET NO. GJ