

OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: February, 2019

DFI No. D00839



Figure 1: DFI No. D00839, looking [southwest]

Identification

Drainage Facility ID (DFI):	D00839
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 47V-086
Location:	District: 5
	Highway No.: 91
	Mile Post: 121.18 to 121.39

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: [south to north]



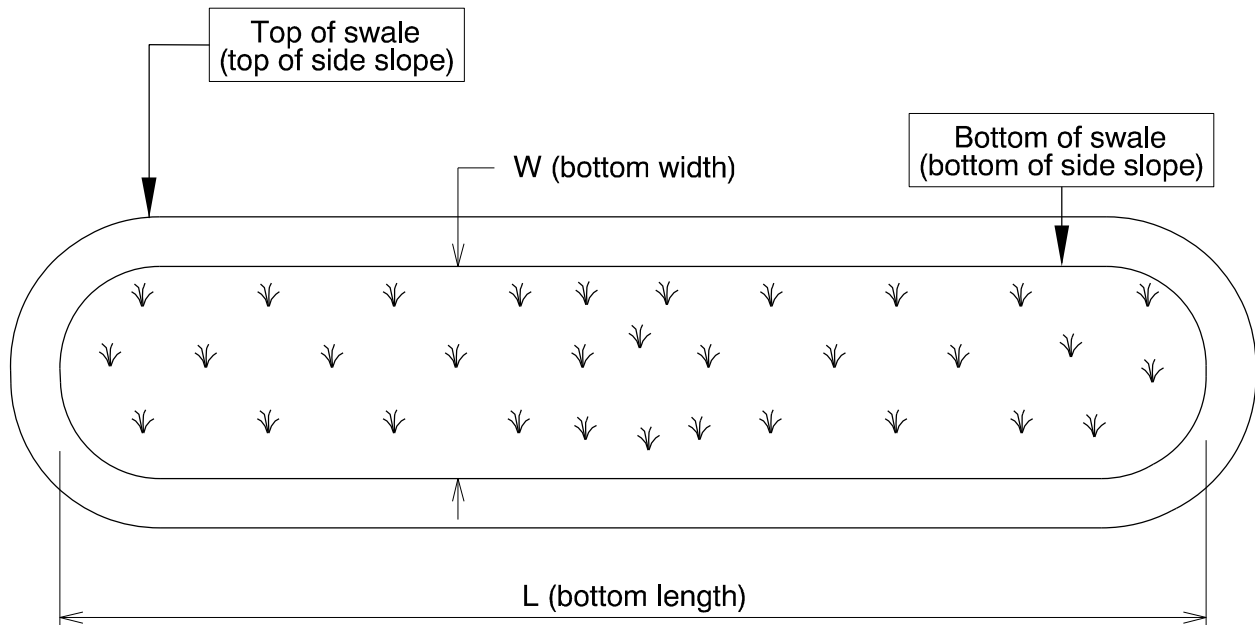
Figure 2: Facility location map

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:

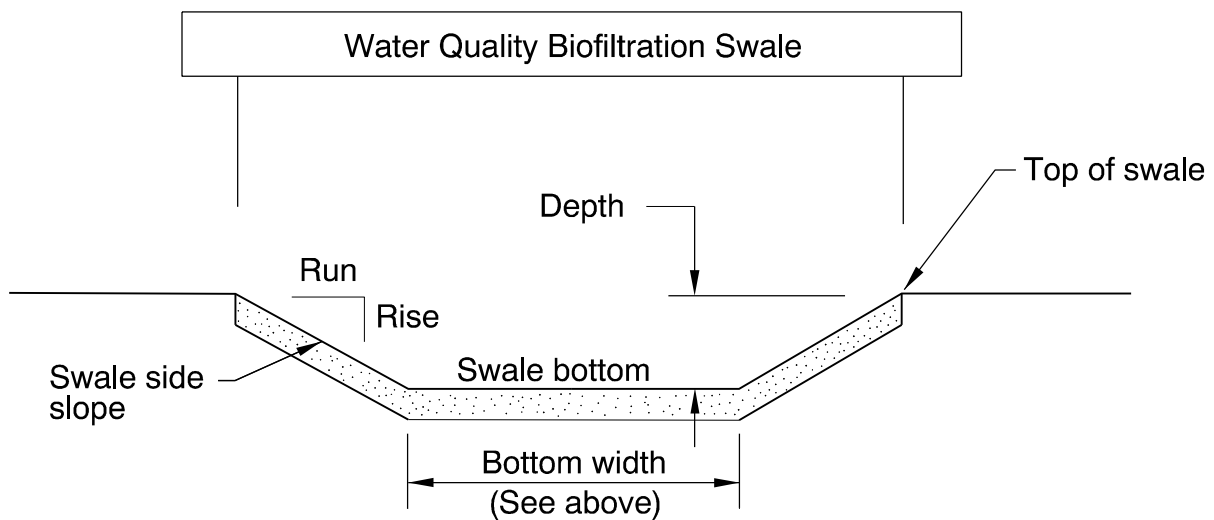
Bottom Length (feet)	Bottom Width (feet)
1100	2-13



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)
Varies	1	3



Site Specific Information: This facility includes a 6" perforated drain pipe and 6" PVC non-perforated standpipes for cleanout, see sheet 2B-5.

4. Facility Access

Maintenance access to the facility:

<input type="checkbox"/> Roadside pad	<input checked="" type="checkbox"/> Roadside shoulder
<input type="checkbox"/> Access road with Gate	<input type="checkbox"/> Access road without Gate



Figure 3: [looking south]

5. Operational Components / Maintenance Items

Classification

This facility is classified as an:

<input checked="" type="checkbox"/> On-line Swale	<input type="checkbox"/> 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:

<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
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There is no bypass component. High flows drain 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
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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:

<input checked="" type="checkbox"/> Operational Plan A <input type="checkbox"/> Operational Plan B <input type="checkbox"/> Operational Plan C
<p>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.</p>

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	<input type="checkbox"/>	S1
Weir type flow splitter/flow splitter manhole	<input type="checkbox"/>	S2
Orifice type flow splitter/flow splitter manhole	<input type="checkbox"/>	S3

Standard manhole	<input type="checkbox"/>	S4
Swale Inlet		
Pavement sheet flow	<input checked="" type="checkbox"/>	S5
Inlet Pipe (s)	<input type="checkbox"/>	S6
Open channel inlet	<input type="checkbox"/>	S7
Riprap pad	<input type="checkbox"/>	S8
Ground Cover		
Grass bottom	<input checked="" type="checkbox"/>	S9
Grass side slopes	<input checked="" type="checkbox"/>	S10
Granular drain rock	<input type="checkbox"/>	S11
Plantings	<input type="checkbox"/>	S12
Underground Components		
Geotextile fabric	<input type="checkbox"/>	S13
Water quality mix	<input checked="" type="checkbox"/>	S14
Perforated pipe	<input checked="" type="checkbox"/>	S15
Porous pavers (access grid)	<input type="checkbox"/>	S16
Flow Spreader		
Rock basin (used at inlet)	<input type="checkbox"/>	S17
Anchored board (midpoint of swale or every 50 feet along swale bottom)	<input type="checkbox"/>	S18
Other: N/A	<input type="checkbox"/>	S19
Swale Outlet		
Catch basin with grate	<input checked="" type="checkbox"/>	S20
Outlet Pipe (s)	<input checked="" type="checkbox"/>	S21
Open channel outlet	<input type="checkbox"/>	S22
Auxiliary Outlet: N/A	<input type="checkbox"/>	S23
Outfall Type		
Waterbody (Creek/Lake/Ocean)	<input type="checkbox"/> C	S24
	<input type="checkbox"/> L	
	<input type="checkbox"/> O	
Ditch	<input checked="" type="checkbox"/>	S25
Storm drain system	<input type="checkbox"/>	S26
Outfall Components		
Riprap pad	<input type="checkbox"/>	S27
Riprap bank protection	<input type="checkbox"/>	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:

<input checked="" type="checkbox"/> No	<input type="checkbox"/> 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

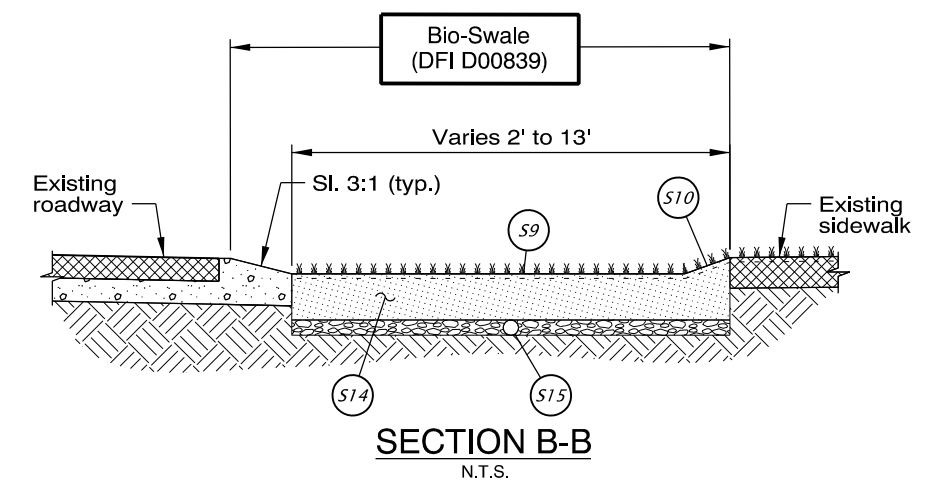
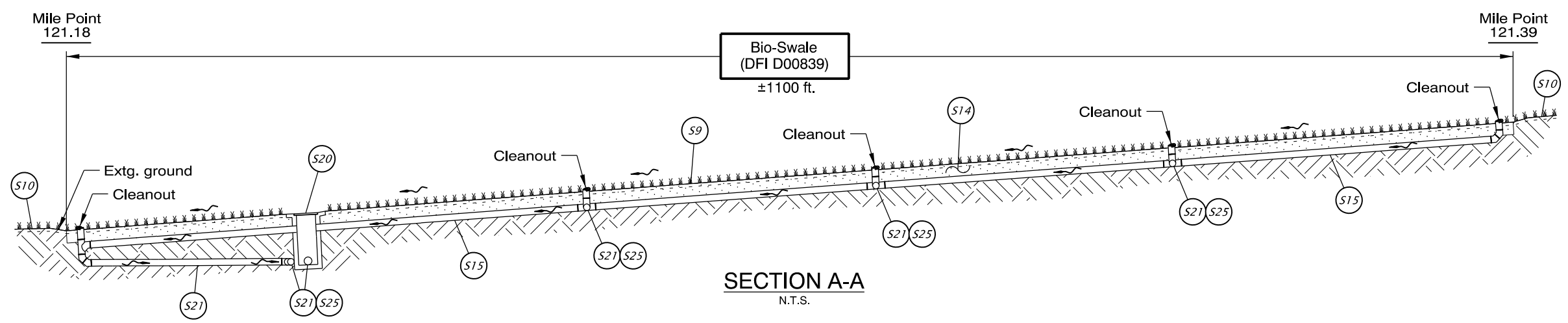
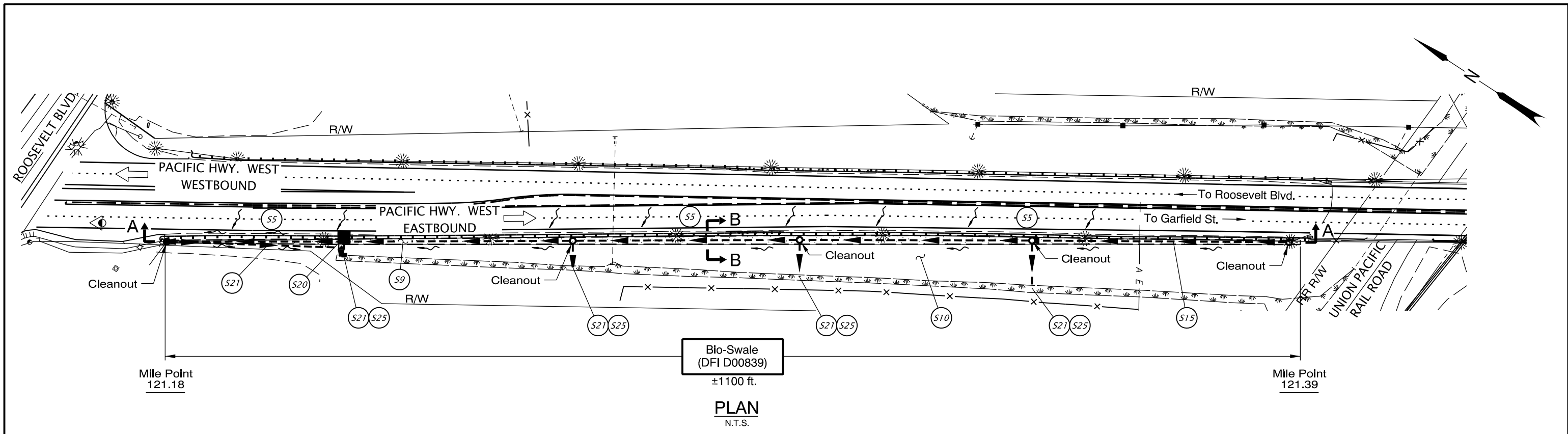
Contact any of the following for more detailed information about management of waste materials found on site:

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 D00839



- LEGEND:**
- Photo Location / Direction
 - Facility Component (see table 1 in O&M Manual)
 - Cleanout
 - Inlet
 - Storm Pipe (Facility)
 - Conveyance Direction
 - Pavement / Facility Flow Path

Prepared By: Chris Carman	OREGON DEPARTMENT OF TRANSPORTATION
Drafted By: Michael Skelton	

Appendix B – Project Contract Plans

Contents:

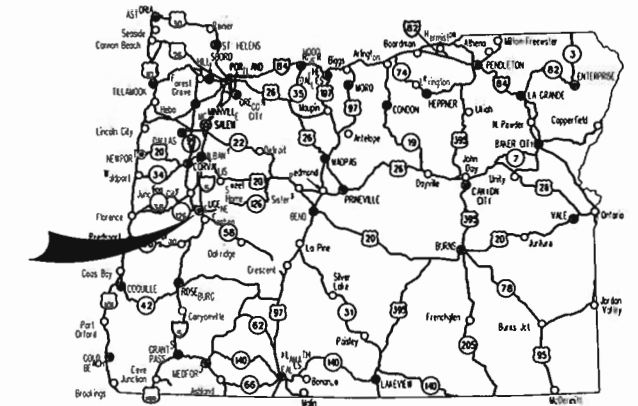
Site Specific Subset of Project Contract Plan 47V-086

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, STRUCTURES, PAVING, & SIGNALS
OR99: ROOSEVELT BLVD - GARFIELD ST
BIKE / PED (EUGENE) SEC.

PACIFIC HIGHWAY WEST
LANE COUNTY
OCTOBER 2014



Overall Length Of Project - 1.11 Miles

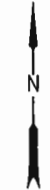
ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)



INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd. & Std. Drg. Nos.

BEGINNING OF PROJECT

STA. "L" 616+20 (M.P. 121.14)
STA. "P" 616+20



T. 17 S., R. 4 W., W.M.

REVISED AS CONSTRUCTED
10-15-16 CONTRACT 14706
PROJ. MGR. Steve Templeton, P.E.

END OF PROJECT

STA. "SB" 674+96.80 (M.P. 122.25)

STA. "L" 642+00 P.O.T.
STA. "SB" 641+99.98, (26' LT.) P.O.B.
STA. "P" 642+05.05, (62.40' LT.) P.O.T.

OREGON TRANSPORTATION COMMISSION
David Lohman ACTING CHAIR
Tammy Boney COMMISSIONER
Mark Frohnmayer COMMISSIONER
Susan Morgan COMMISSIONER
Matthew L. Garrett DIRECTOR OF TRANSPORTATION

PLANS PREPARED FOR
OREGON DEPARTMENT 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.

Approving Authority: _____
Signature & date
Jeff W. Olson, Principal Engineer
Print name and title

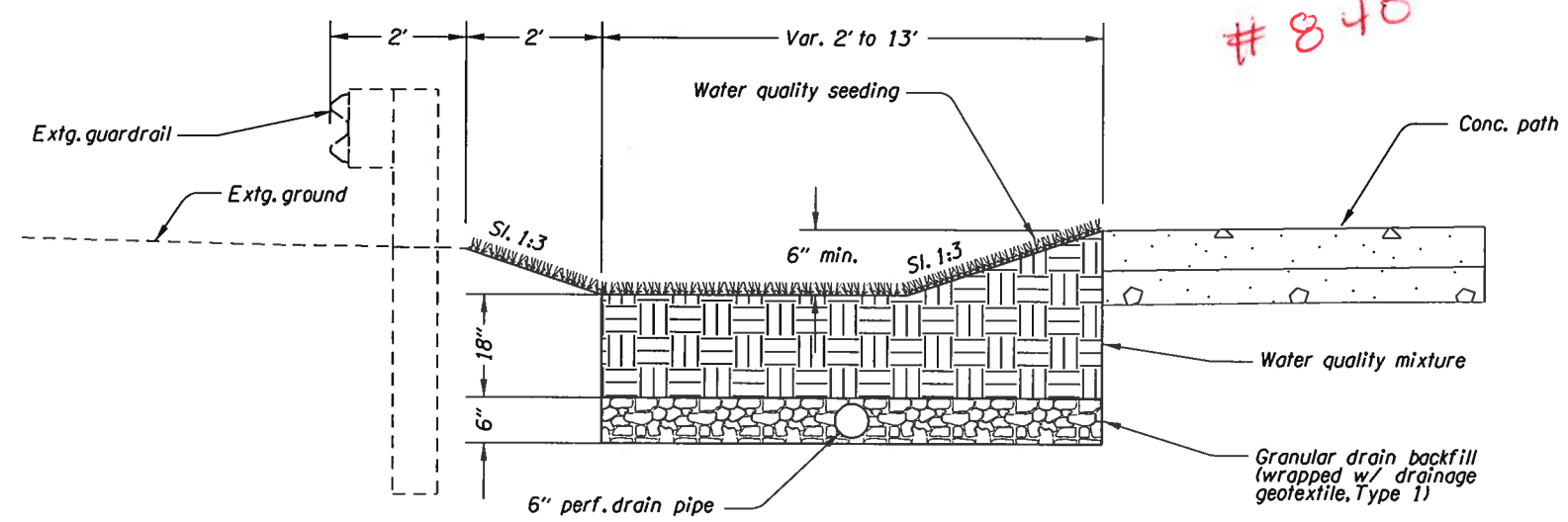
Concurrence by ODOT Chief Engineer

OR99: ROOSEVELT BLVD - GARFIELD ST
BIKE/PED (EUGENE) SEC.
PACIFIC HWY WEST
LANE COUNTY

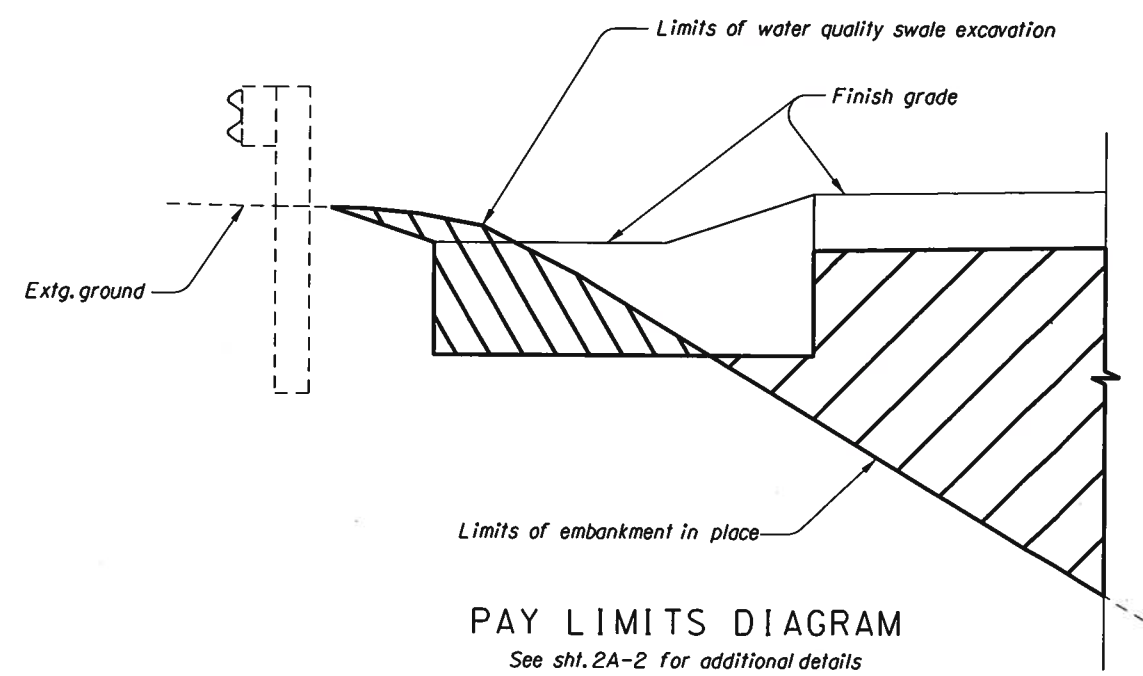
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STP-S091(070)	1



#839
 #840



TYPICAL SECTION

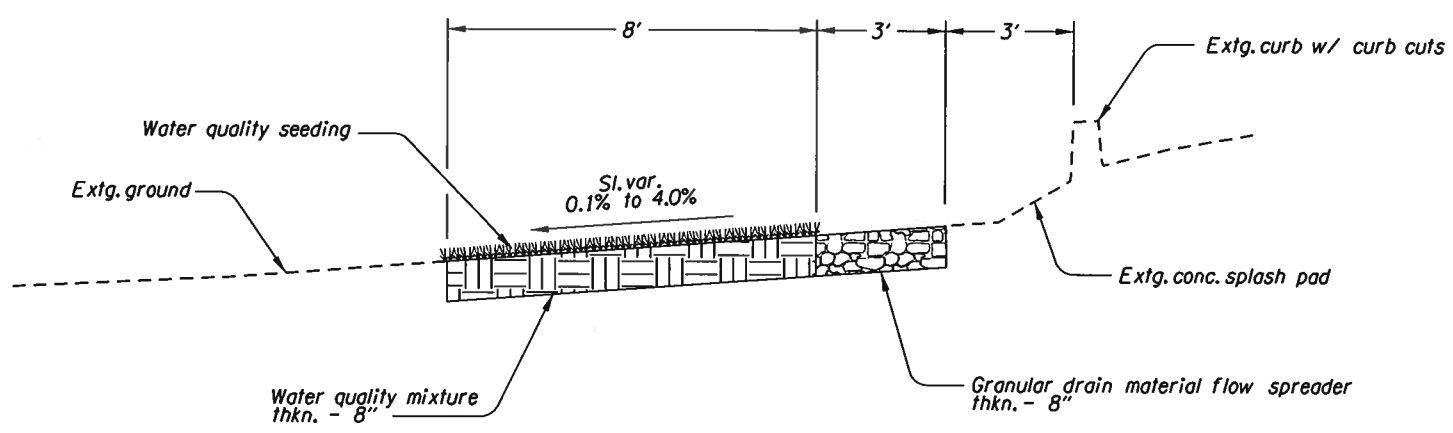


PAY LIMITS DIAGRAM

NOTES:
 1. See Section 01012 for additional details and requirements.

WATER QUALITY SWALE
 See sht. 3B, Note 1 and sht. 6B, Note 1
 (Not to Scale)

See sht. 2A-2 for additional details
 (Not to Scale)

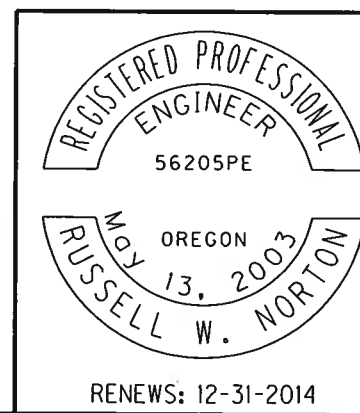


WATER QUALITY FILTER STRIP

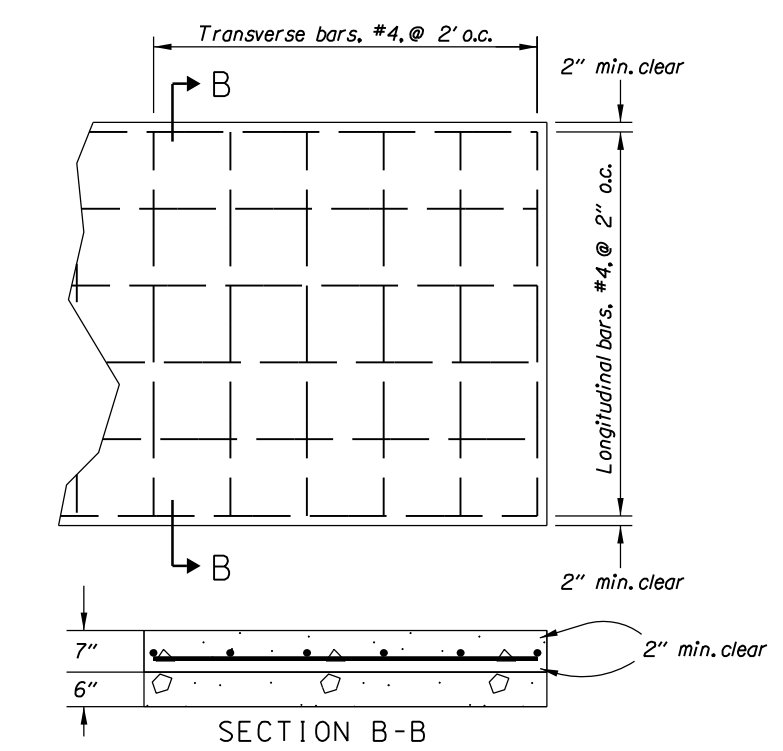
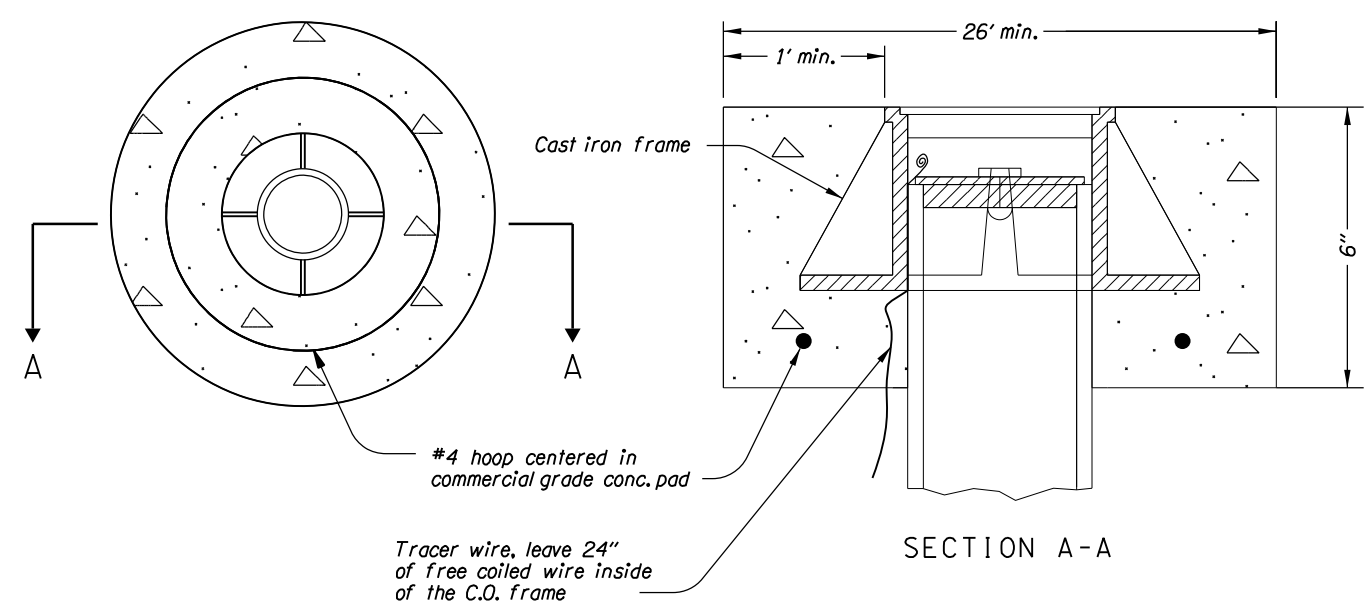
See sht. 9B, Note 7
 (Not to Scale)

DFI #841

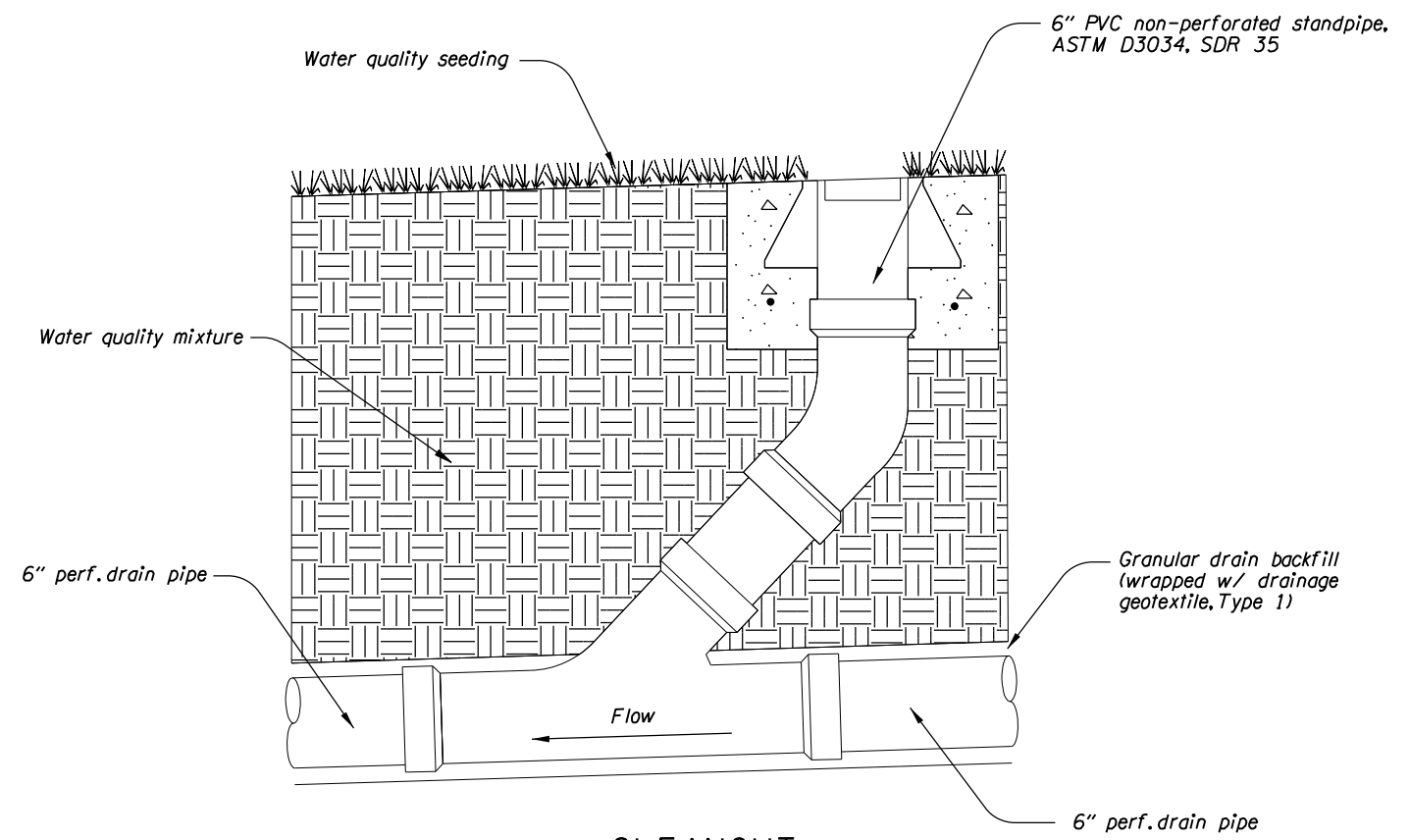
NOTES:
 1. See Section 01014 for additional details and requirements.



OR99: ROOSEVELT BLVD - GARFIELD ST BIKE/PED (EUGENE) SEC. PACIFIC HWY WEST LANE COUNTY	
Design Team Leader - Russell W. Norton Designed By - Scott D. Robinson-Tscheu Drafted By - RWN / SDRT	
DETAILS	SHEET NO. 2B-2

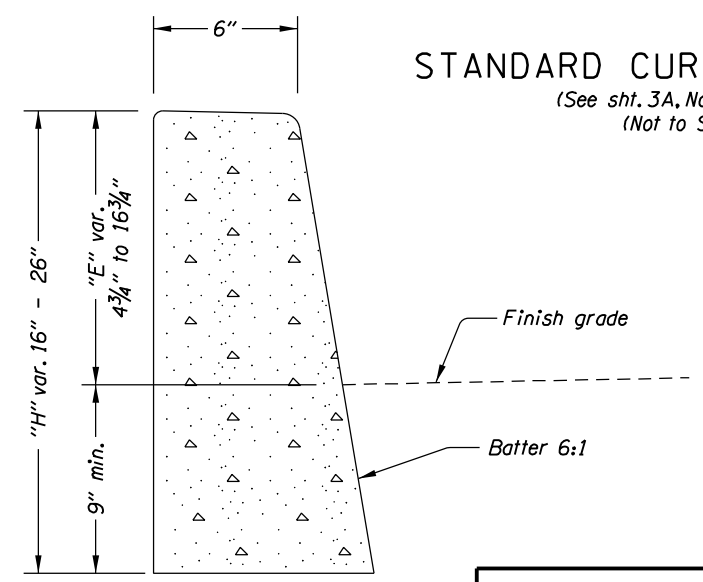


PCC CONC. WALK, REINFORCED, 7"
 (See sht. 4A, Note 2; and sht. 5A, Note 3)
 (Not to Scale)

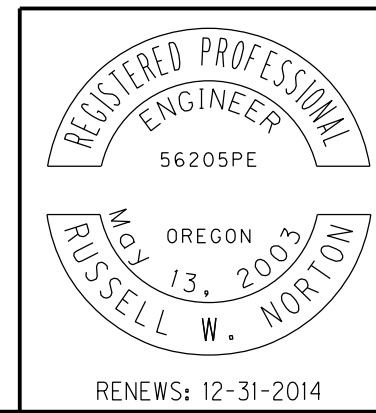


CLEANOUT
 (See sht. 4B, Notes 2 & 4; sht. 5B, Note 2; sht. 6B, Notes 3 & 4; and sht. 7B, Note 2)
 (Not to Scale)

- NOTES:
1. For Water Quality Swale details, see sht. 2B-2.
 2. Etch a "V" into the conc. path pointing toward the cleanout in all locations



- NOTES:
1. For details not shown, see Typical Sections and drg. no. RD700.



OREGON DEPARTMENT OF TRANSPORTATION

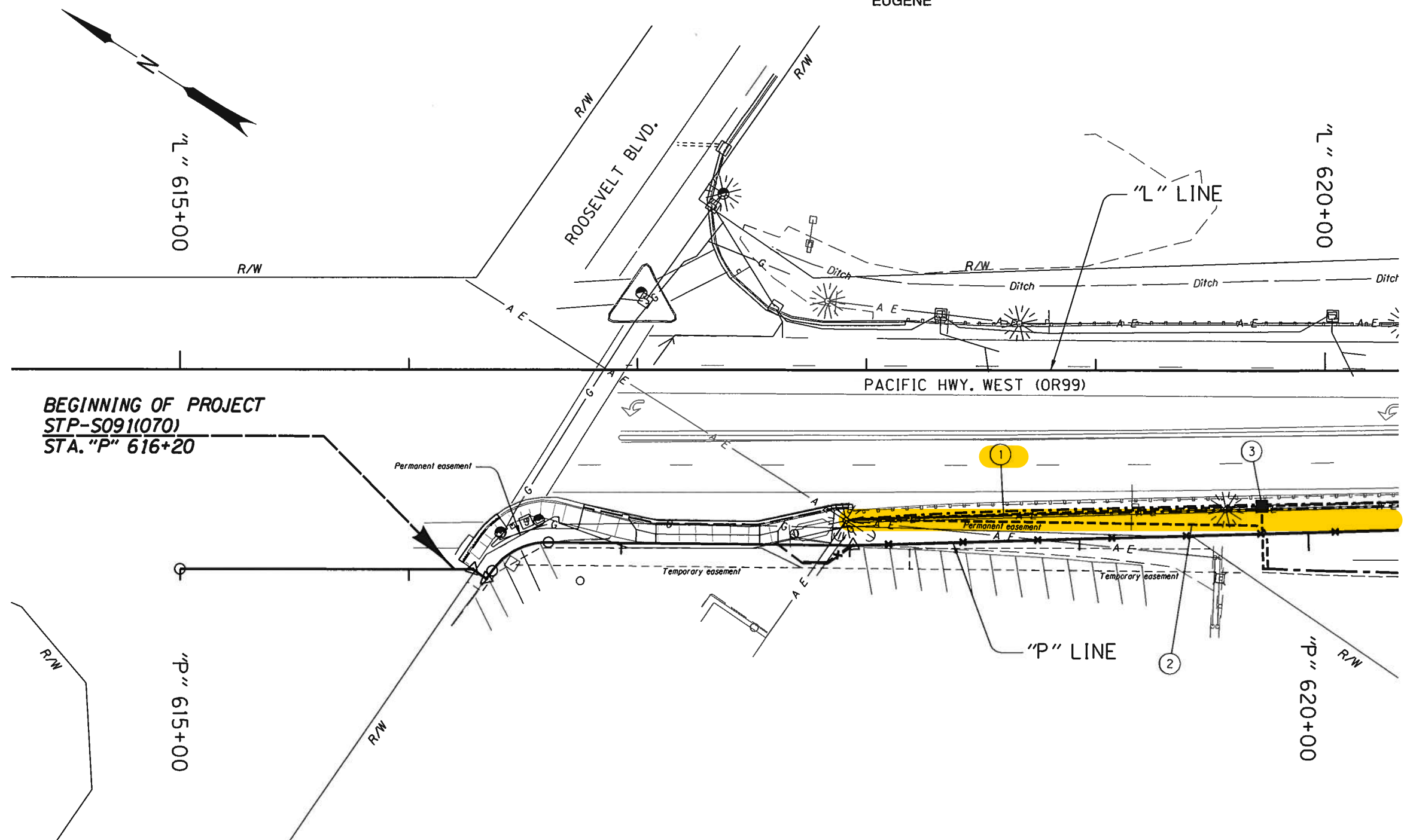
QUINCY ENGINEERING

OR99: ROOSEVELT BLVD - GARFIELD ST
 BIKE/PED (EUGENE) SEC.
 PACIFIC HWY WEST
 LANE COUNTY

Design Team Leader - Russell W. Norton
 Designed By - Scott D. Robinson-Tscheu
 Drafted By - RWN / SDRT

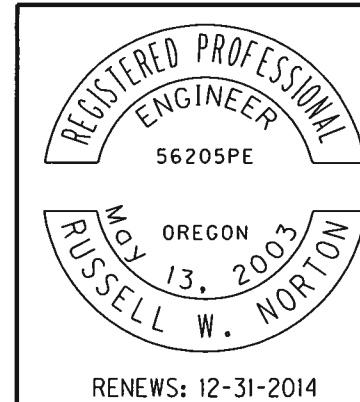
DETAILS

SHEET NO.
 2B-5



- ① Sta. "P" 618+00 to "P" 629+00
Const. water quality swale
DFI No. D00839
Var. width flat bottom, 1:3 slopes
(For details, see sht. 2B-2)
- ② Sta. "P" 618+00 to Sta. "P" 619+80
Inst. 6" drain pipe - 200'
Inst. subsurface drain outlet
(See drg. no. RD312)
- ③ Sta. "P" 619+80
Const. type D inlet
Inst. 12" storm sewer pipe - 28'
10' depth
S = 0.22 ft/ft
I.E. south (6" in) - 408.79±
I.E. west (12" out) - 408.74±

NOTES:
1. Utilities in conflict to be relocated by others prior to construction unless otherwise noted. See Section 00150.50 for details.
2. Field verify elevation call-outs noted with "±".
3. For drainage profile, see sht. 3C.



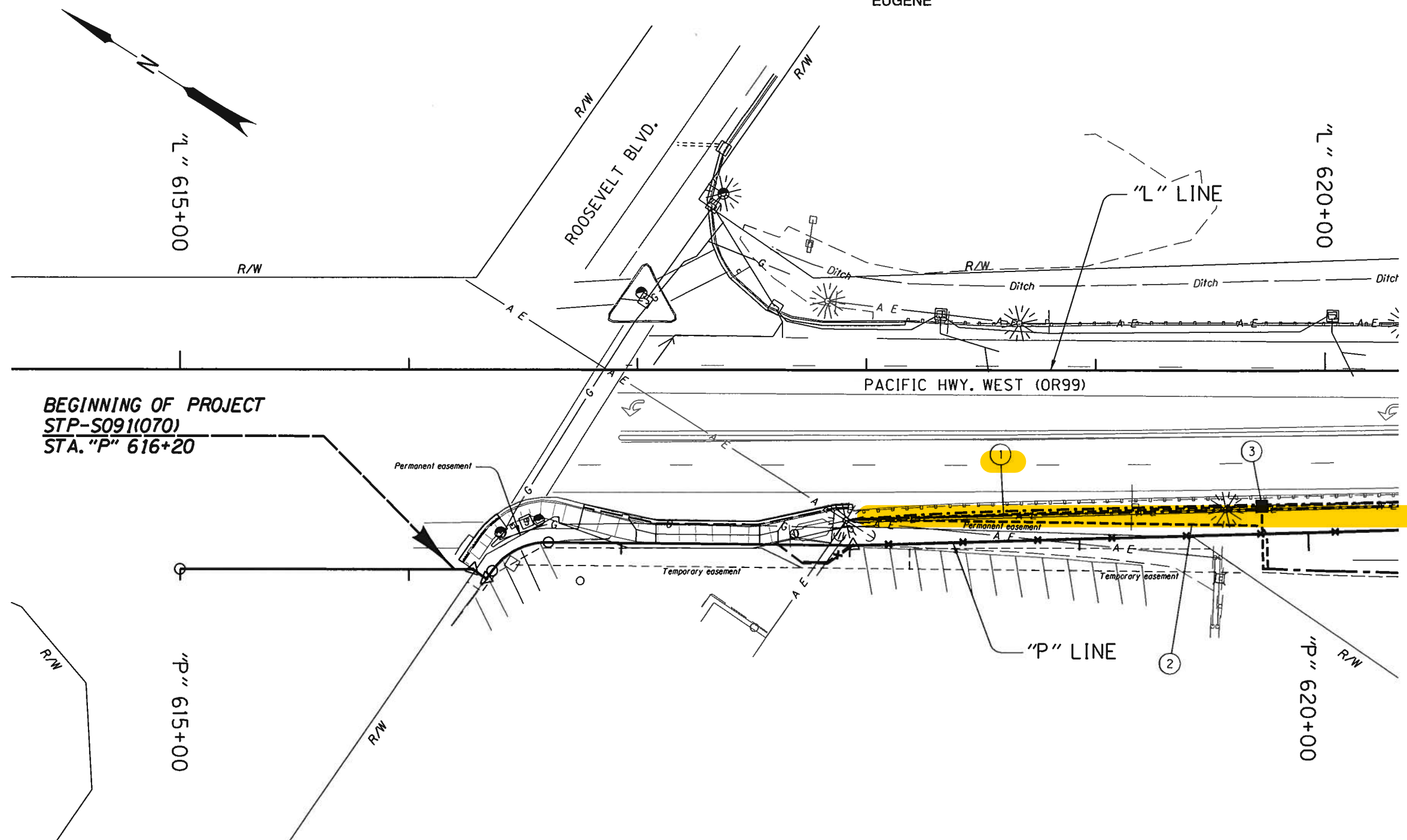
OREGON DEPARTMENT OF TRANSPORTATION	
QUINCY ENGINEERING	
OR99: ROOSEVELT BLVD - GARFIELD ST BIKE/PED (EUGENE) SEC. PACIFIC HWY WEST LANE COUNTY	
Design Team Leader - Russell W. Norton Designed By - Scott D. Robinson-Tscheu Drafted By - RWN / SDRT	
SHEET NO. 3B	DRAINAGE & UTILITIES

Sec. 26, T. 17 S., R. 4 W., W.M.

EUGENE

47V-086

REVISED AS CONSTRUCTED
10-15-16 CONTRACT .14706



- ① Sta. "P" 618+00 to "P" 629+00
Const. water quality swale
DFI No. D00839
Var. width flat bottom, 1:3 slopes
(For details, see sht. 2B-2)
- ② Sta. "P" 618+00 to Sta. "P" 619+80
Inst. 6" drain pipe - 200'
Inst. subsurface drain outlet
(See drg. no. RD312)
- ③ Sta. "P" 619+80
Const. type D inlet
Inst. 12" storm sewer pipe - 28'
10' depth
S = 0.22 ft/ft
I.E. south (6" in) - 408.79±
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Design Team Leader - Russell W. Norton
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Drafted By - RWN / SDRT

REGISTERED PROFESSIONAL
ENGINEER
56205PE
MAY 13, 2003
OREGON
RUSSELL W. NORTON
RENEWS: 12-31-2014

DRAINAGE & UTILITIES
SHEET NO. 3B