OPERATION & MAINTENANCE MANUAL

Water Quality Filter Strip

Manual prepared: December 2018

DFI No. D00618

Figure 1: DFI No. D00618, looking west

1. Identification

Drainage Facility ID (DFI):	D00618
Facility Type:	Water Quality Filter Strip
Construction Drawings:	(V-File Numbers) 45V-073
Location:	District: 3
	Highway No.: 162
	Mile Post: 9.78 to 9.93, right

2. Manual Purpose

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

3. 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. **NOTE: Mile posts are based off of the V-File, and may vary from TransGIS mile posts.**

Facility location type: **Roadway shoulder**

Flow direction: south

Figure 2: Facility Location Map

4. Facility Summary

The width is measured perpendicular to the edge of pavement and is equivalent to the flow length. The length is measured parallel to the edge of pavement and is equivalent to the length of the contributing impervious area.

The length and width of the applicable facility components are:

Component	Length (feet)	Width (feet)
Filter Strip	**770**	**10**

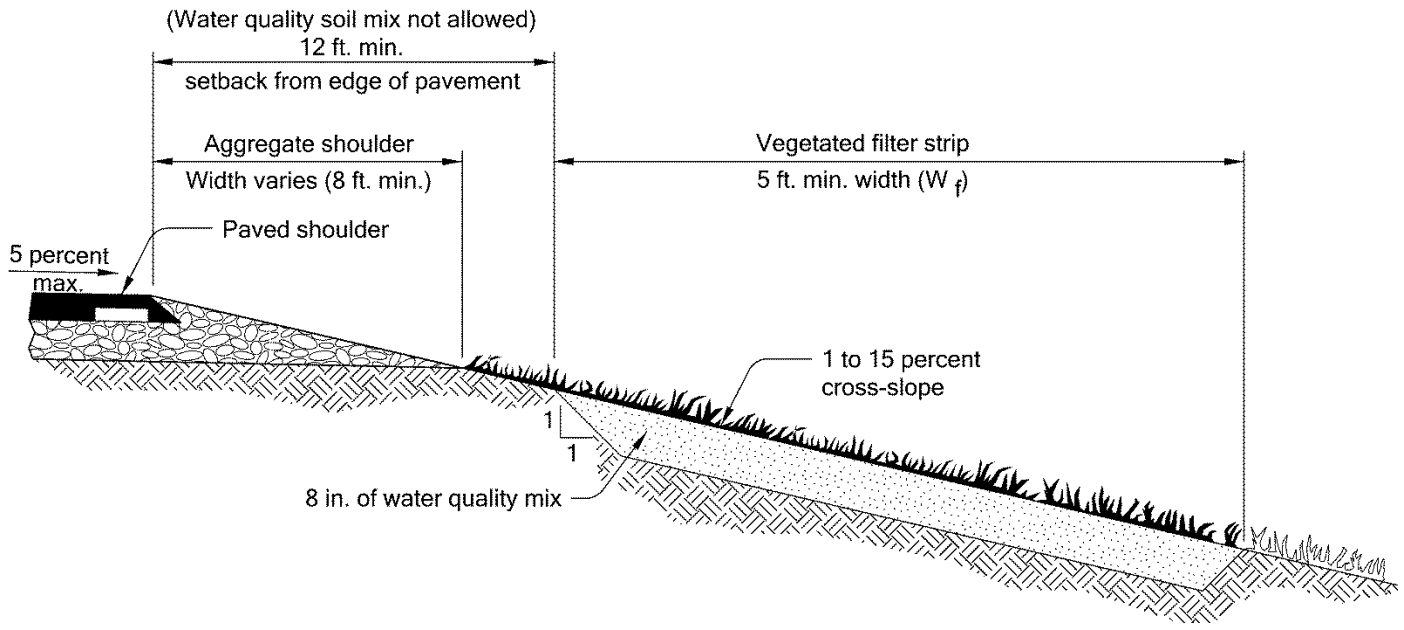


Figure 3: Filter Strip Section

The slope of the facility is presented by a vertical distance (rise) followed by the horizontal distance (run).

Side Slope	Rise (feet)	Run (feet)
Filter Strip	**1**	**4**

Site Specific Information: A water quality filter strip is a grassed sloped area located between pavement and a downslope conveyance system designed to treat stormwater runoff from highway pavement areas. It relies on maintaining sheet flow across vegetated and permeable ground which maximizes stormwater contact with soil and vegetation. The filter strip is designed to treat runoff from the water quality design storm for an area along North Santiam Highway. It is located on the southside of the highway, starting at mile point 9.63 and ending at 9.78. The filter strip has a geocell grid system with a water quality mix.

5. Facility Access

Maintenance access to the facility:

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

Figure 4: Facility Access along Shoulder

6. Operational Components / Maintenance Items

Classification and Standard Operational (Op) Plan:

This facility is classified as a:

☒ **Filter Strip (Op Plan A)**	☐ **Bioslope (Op Plan B)**
A filter strip consists of a vegetated or media slope located parallel to the edge of pavement. It maintains sheet flow of stormwater runoff over the width of the strip.	A bioslope consists of a filter strip and treatment zone. It is a flow-through stormwater treatment facility located along roadside embankments.
A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A, B) are provided in the Standard Operation Manual.	

See Appendix A for the site specific operational plan.

Operational Components

Filter strips have many components that assist with treatment, conveyance, and infiltration of stormwater runoff. The components in use can vary depending on the facility design. 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 Filter Strips and Bioslopes 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/

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: Bioslope/Filter Strip Components		ID #
Facility Inlet		
Pavement Sheet Flow	☒	**B1**
Flow Spreader	☐	**B2**
Ground Cover		
Vegetated Slope	☒	**B3**
Aggregate Media Slope	☐	**B4**
Underground Components		
Water Quality Mix	☒	**B5**
Ecology Mix	☐	**B6**
Granular Drain Backfill Material	☐	**B7**
Geotextile Fabric	☐	**B8**
Geocell Grid	☒	**B9**
Structures		
Curb/Berm	☐	**B10**
Check Dam	☐	**B11**
Cleanout	☐	**B12**
Facility Outlet		
Perforated Drain Pipe	☐	**B13**
Open Slope Outlet	☒	**B14**
Open Channel Outlet	☐	**B15**
Storm Drain Outlet Pipe	☐	**B16**
Outfall Type		
Waterbody (**C**reek/**L**ake/**O**cean)	☐ **C** ☐ **L** ☐ **O**	**B17**
Outfall Channel	☐	**B18**
Storm Drain System	☐	**B19**
Outfall Components		
Pervious Berm	☐	**B20**
Riprap Pad	☐	**B21**

7. 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 filter strips and bioslopes:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities
- Table 4 (Water Quality Filter Strips)
- Table 5 (Water Quality Bioslopes)

The ODOT Maintenance Guide can be viewed at the following website:
http://www.oregon.gov/ODOT/HWY/OOM/pages/mguide.aspx

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

8. Limitations

Filter strips are NOT designed to allow the use of heavy equipment. Vehicles entering the facility 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.

9. Waste Material Handling

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

http://www.oregon.gov/ODOT/HWY/OOM/pages/ems.aspx

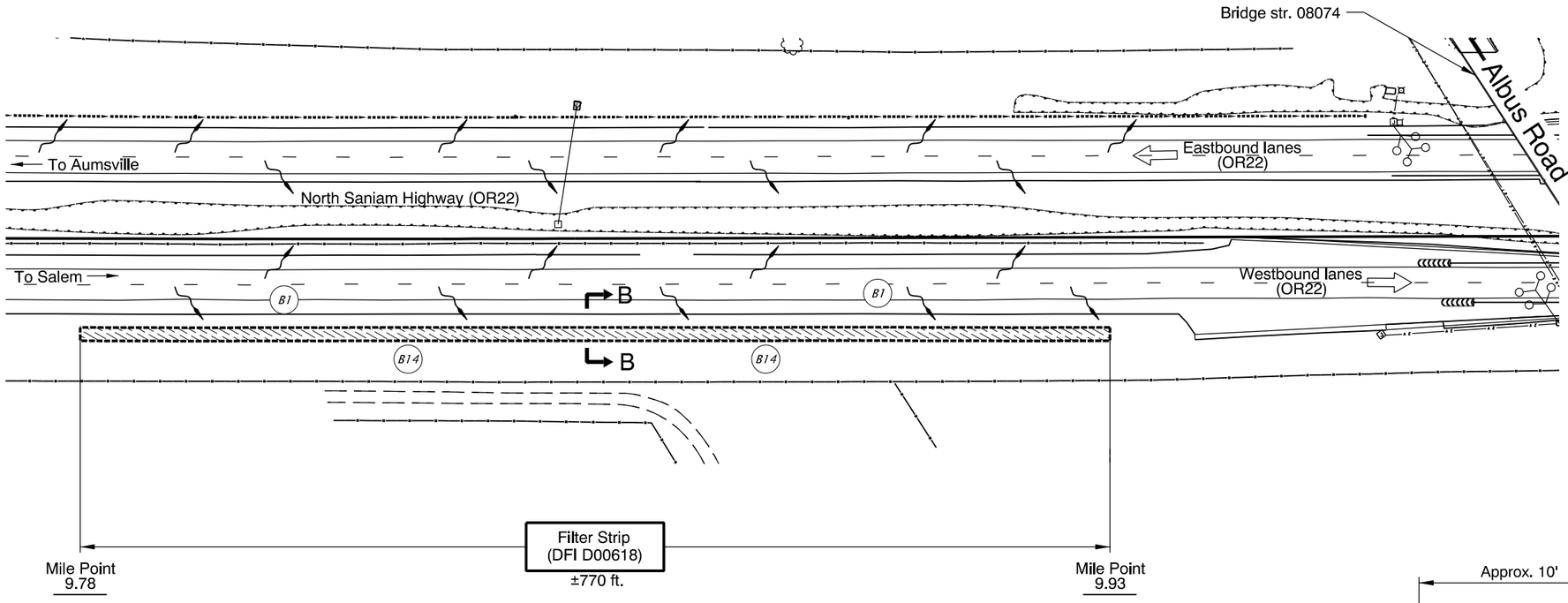
Contact any of the following for more detailed information about management of waste materials found on site:

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

Appendix A – Site Specific Operational Plan

Contents:

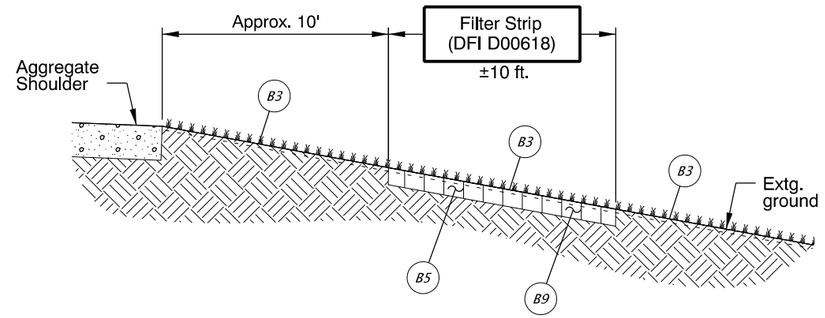
Operational Plan: DFI D00618



PLAN
N.T.S.

LEGEND:

- Photo Location / Direction
- B# Facility Component (see table 1 in O&M Manual)
- Vegetated Filter Strip Boundary
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path



SECTION B-B
N.T.S.

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By:
Consultant

Drafted By:
Michael Skelton

DFI D00618
MAINTENANCE DISTRICT 3 OR22
WATER QUALITY FILTER STRIP
NORTH SANTIAM HIGHWAY MP 9.78
MARION COUNTY

DFI_D00618.dgn :: DFI_D00618 12/28/2018 9:25:18 AM hwye31g

Rotation: 324.6207° Scale: 1"=60'

Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 45V-073

45V-073

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets
1A-2	Std. Drg. Nos.

STATE OF OREGON

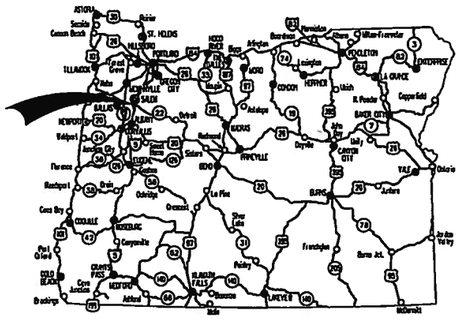
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS & ROADSIDE DEVELOPMENT

OR 22 BRIDGE VERTICAL CLEARANCE BRIDGE PROJECTS

NORTH SANTIAM HIGHWAY
MARION COUNTY
JULY 2012



Overall Length Of Project - 8.37 Miles

BEGINNING OF CONTRACT
NH-S162(050)
STA. "NS" 174+44 (M.P. 1.67)

CORDON ROAD O'XING
BRIDGE NO. 08473 (M.P. 2.82)

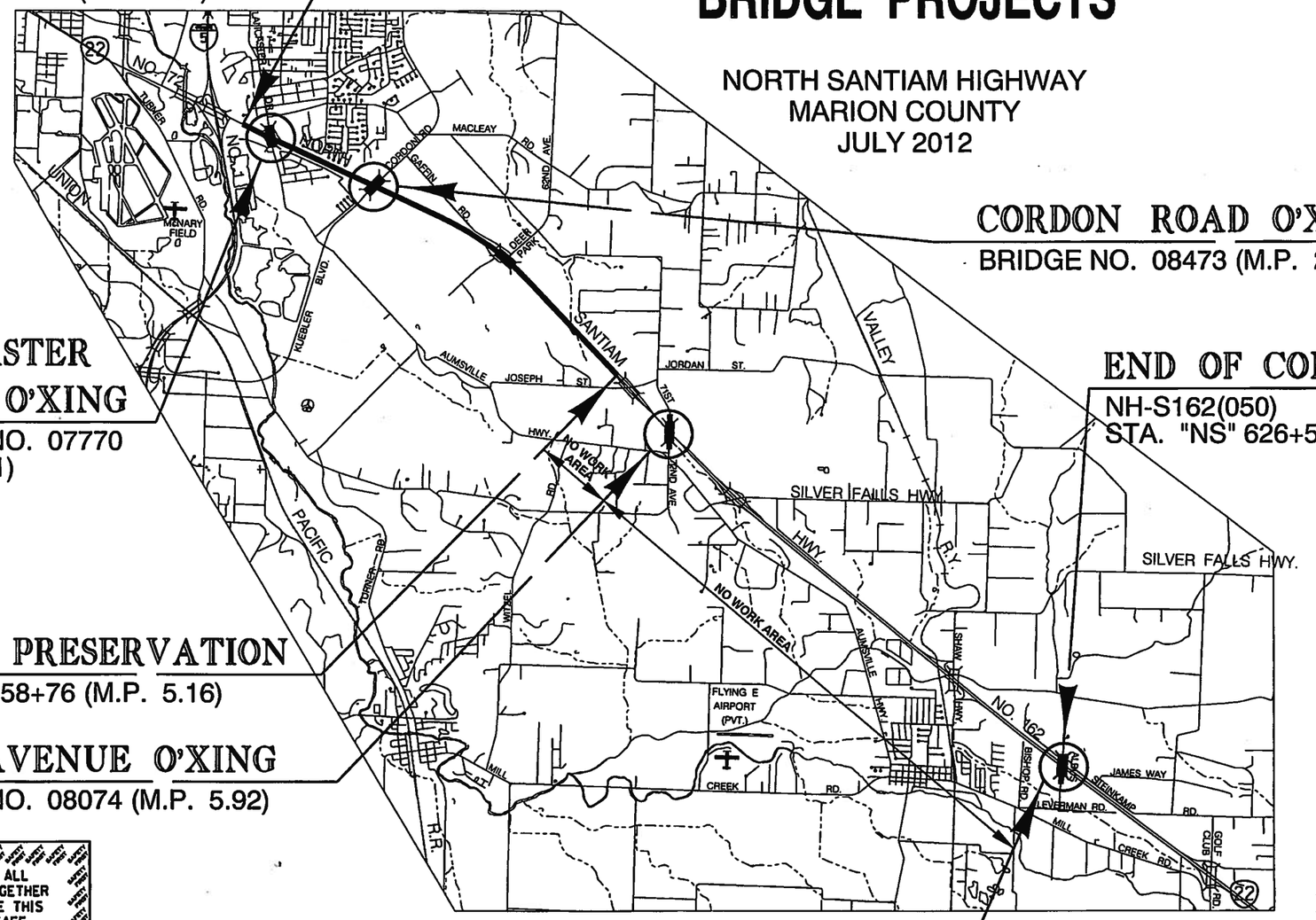
LANCASTER DRIVE O'XING
BRIDGE NO. 07770
(M.P. 1.91)

END OF CONTRACT
NH-S162(050)
STA. "NS" 626+50 (M.P. 10.04)

END OF PRESERVATION
STA. "NS" 358+76 (M.P. 5.16)

72ND AVENUE O'XING
BRIDGE NO. 08074 (M.P. 5.92)

ALBUS ROAD O'XING
BRIDGE NO. 08077 (M.P. 10.04)



T. 7 S., R. 2 W., W.M.
T. 8 S., R. 2 W., W.M.
T. 8 S., R. 1 W., W.M.

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.)

PLANS PREPARED FOR
OREGON DEPARTMENT OF TRANSPORTATION
BY:

WHPacific
3470 Pipebend Place
Suite 170
Salem, OR 97301
t: 503.362.4675 f: 503.362.5078

OREGON TRANSPORTATION COMMISSION

Pat Egan	CHAIR
Mary F. Olson	COMMISSIONER
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.

Approving Authority: 5/14/12
Signature & date

Ed Chamberland, Sr. P.M.
Print name and title

Concurrence by ODOT Chief Engineer

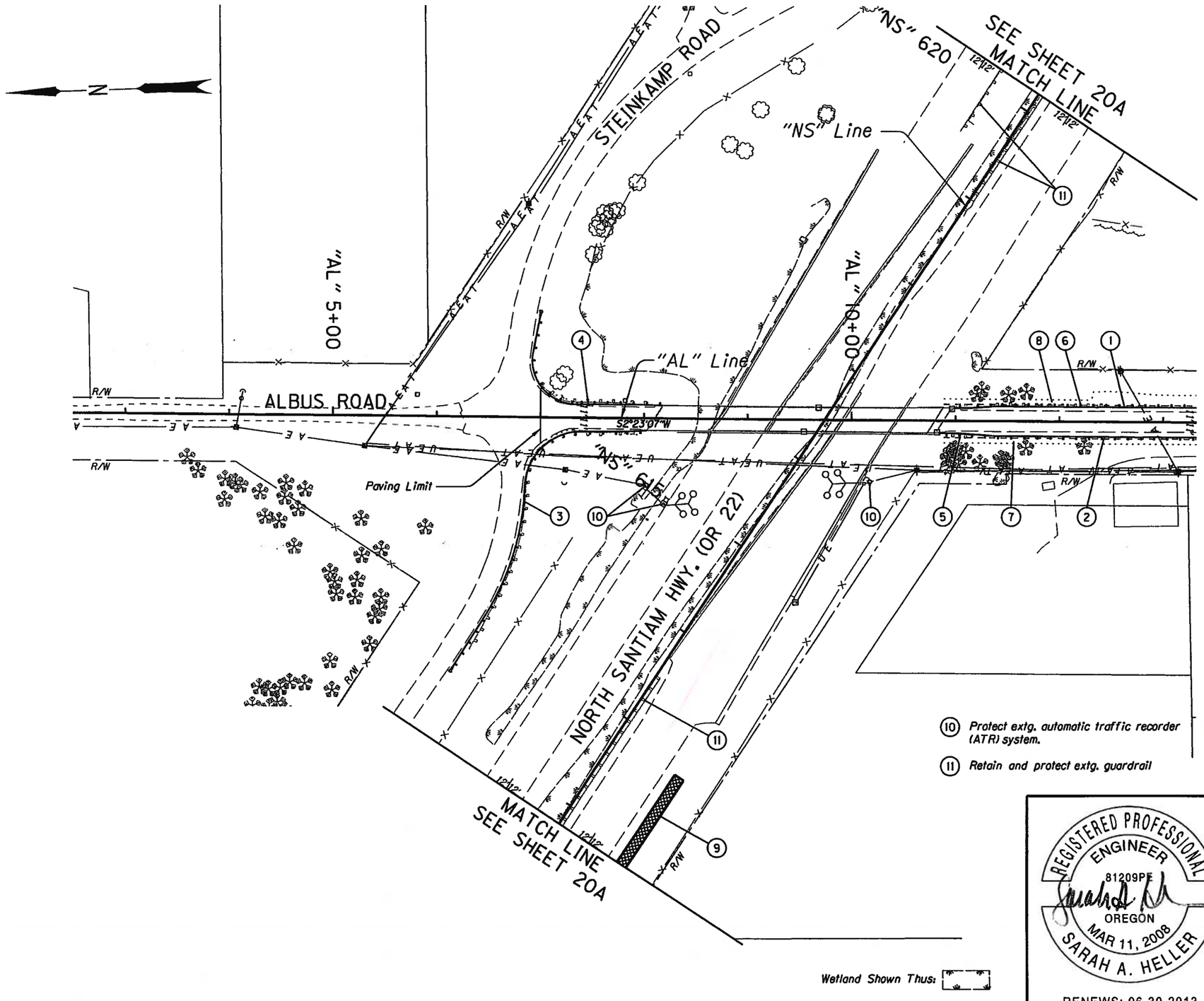
OR22 BRIDGE VERTICAL CLEARANCE BRIDGE PROJECTS

NORTH SANTIAM HIGHWAY
MARION COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	NH-S162(050)	1

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

45V-073



Wetland Shown Thus:

(1) Sta. "AL" 10+84 to Sta. "AL" 14+92, Rt.
Const. asph. conc. drainage curb

(2) Sta. "AL" 10+98 to Sta. "AL" 15+15, Lt.
Const. asph. conc. drainage curb

(3) Sta. "AL" 6+14.72, 246.2' Rt. to
Sta. "AL" 7+99, 11.7' Rt.
Remove extg. guardrail - 307'
Const. guardrail - 225' (Type 2A)
Const. guardrail - 75' (Type 3)
R = 250' & 55'
W=1', E=2', FL=0
Const. guardrail transition to bridge rail
Const. guardrail terminal, non-flared
Test level 2

(4) Sta. "AL" 6+99.80, 102.6' Lt. to
Sta. "AL" 8+17.30, 11' Lt.
Remove extg. guardrail - 119'
Const. guardrail - 62.5' (Type 2A)
Const. guardrail - 75' (Type 3)
R = 42'
W=1', E=2', FL=0
Const. guardrail transition to bridge rail
Const. guardrail terminal, non-flared
Test level 3

(5) Sta. "AL" 10+84 to Sta. "AL" 15+15, Rt.
Remove extg. guardrail - 30'
Const. guardrail - 362.5' (Type 2A)
Const. guardrail - 12.5' (Type 3)
W=1', E=2', FL=0
Const. guardrail transition to bridge rail

(6) Sta. "AL" 10+98 to Sta. "AL" 15+35, Lt.
Remove extg. guardrail - 155'
Const. guardrail - 412.5' (Type 2A)
Const. guardrail - 12.5' (Type 3)
W=1', E=2', FL=0
Const. guardrail transition to bridge rail
(For details, see Sht. 2B-2)

(7) Sta. "AL" 10+80 to Sta. "AL" 14+67.33, Rt.
Const. retaining wall
(For drg. nos., see Sht. 1A)

(8) Sta. "AL" 10+96 to Sta. "AL" 12+35.33, Lt.
Const. retaining wall
(For drg. nos., see Sht. 1A)

(9) See Sht. 20A, Note 1
Const. water quality filter strip

DFI D00618

(10) Protect extg. automatic traffic recorder (ATR) system.

(11) Retain and protect extg. guardrail

REGISTERED PROFESSIONAL ENGINEER
81209PE
OREGON
MAR 11, 2008
SARAH A. HELLER
RENEWS: 06-30-2013

OREGON DEPARTMENT OF TRANSPORTATION

WHPacific
3470 Pipebend Place NE Ste 170
Salem, OR 97301
t: 503.362.4675 f: 503.362.5078

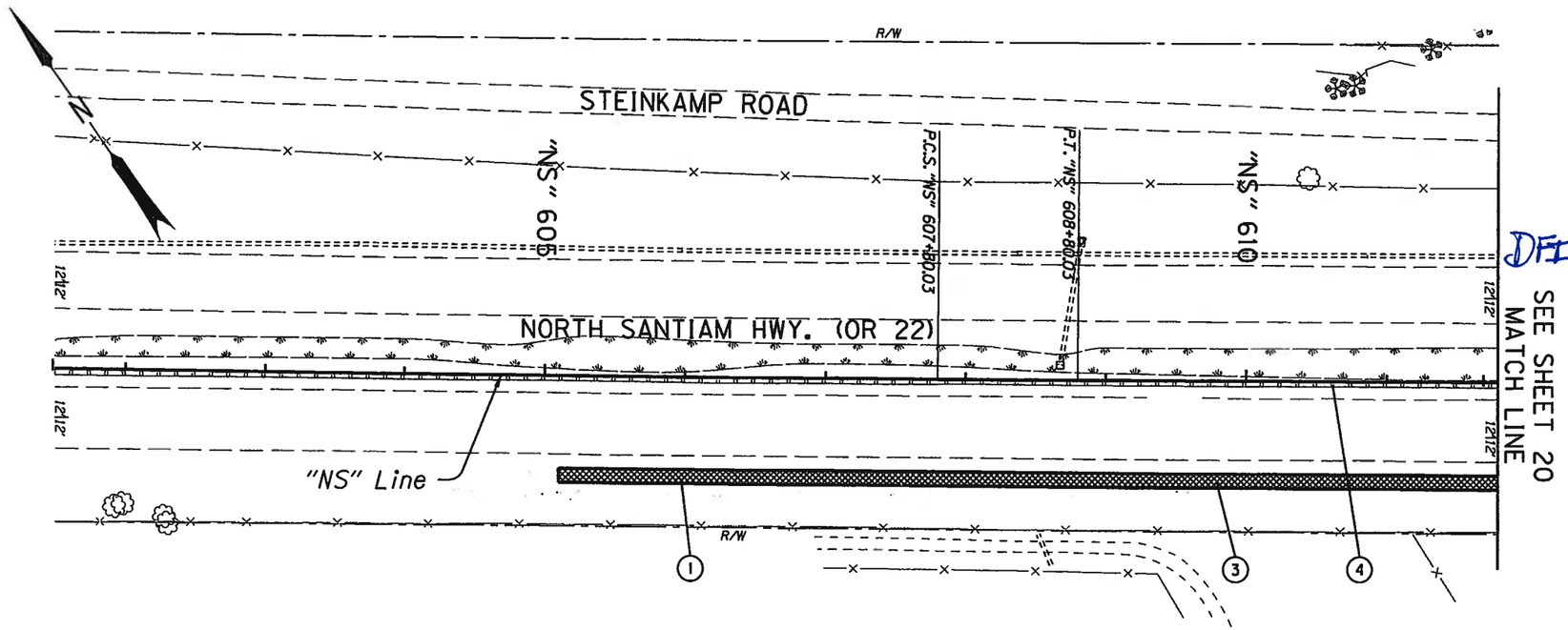
OR22 BRIDGE VERTICAL CLEARANCE BRIDGE PROJECTS

NORTH SANTIAM HIGHWAY
MARION COUNTY

Design Team Leader - Sarah Heller
Designed By - Devin Doring, Travis Sater
Drafted By - Linda Foote

GENERAL CONSTRUCTION

SHEET NO. 20

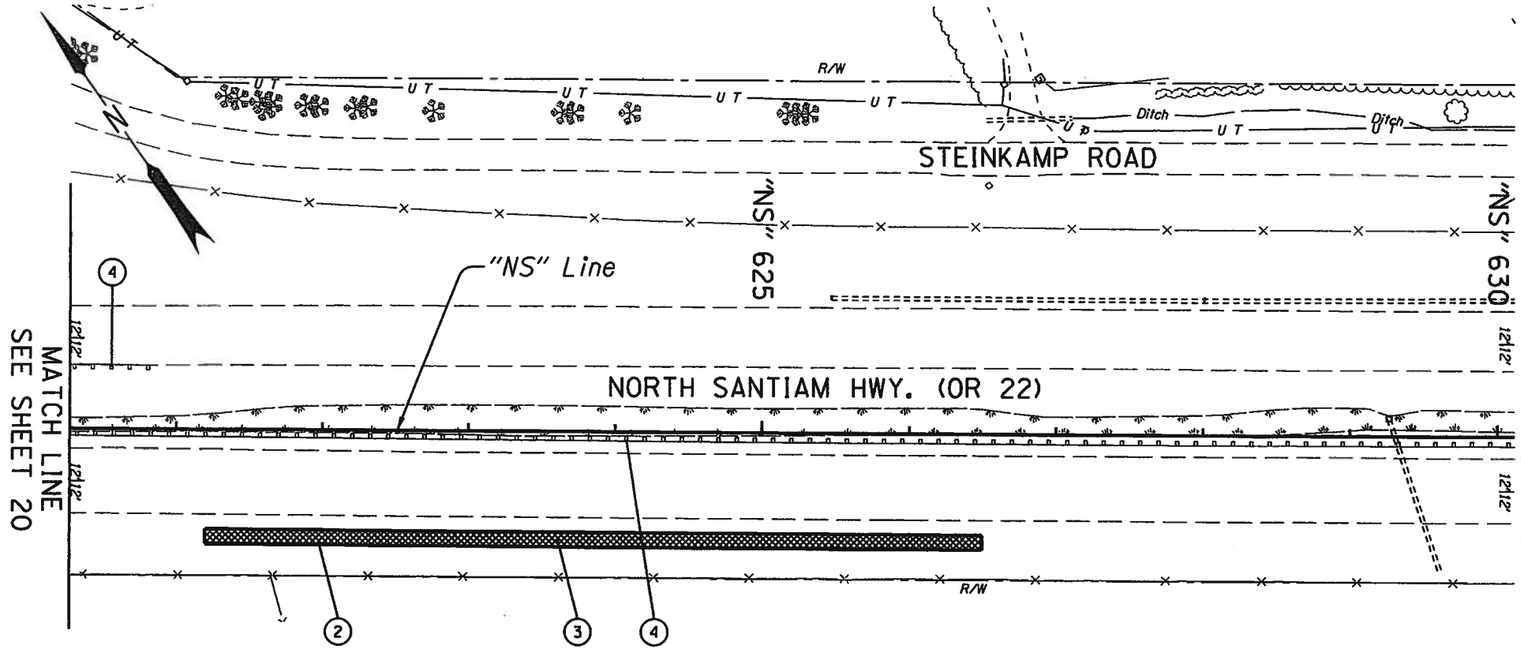


DFI D00618

1. Sta. "NS" 605+10 to Sta. "NS" 612+80, Rt. Const. water quality filter strip, D00618
   10' width
   Inst. stormwater field markers
   (For details, see Sht. GJ)

DFI D00619

2. Sta. "NS" 621+20 to Sta. "NS" 626+50, Rt. Const. water quality filter strip, D00619
   10' width
   Inst. stormwater field markers
   (For details, see Sht. GJ)
3. Seed and mulch water quality filter strip with water quality seeding, mix no. 1 - 0.30 ac.
4. Retain and protect extg. guardrail



Wetland Shown Thus:

REGISTERED PROFESSIONAL ENGINEER
81209PE
OREGON
MAR 11, 2008
SARAH A. HELLER
RENEWS: 06-30-2013

OREGON DEPARTMENT OF TRANSPORTATION

WHPacific
3470 Pipebend Place NE Ste 170
Salem, OR 97301
t: 503.362.4675 f: 503.362.5078

OR22 BRIDGE VERTICAL CLEARANCE BRIDGE PROJECTS

NORTH SANTIAM HIGHWAY
MARION COUNTY

Design Team Leader - Sarah Heller
Designed By - Devin Doring, Travis Sater
Drafted By - Linda Foote

GENERAL CONSTRUCTION

SHEET NO. 20A

45V-073

STORMWATER CONTROL FIELD FACILITY MARKER TABLE

FACILITY LOCATION		DFI #	TYPE S2 MARKER LOCATION		TYPE S1 MARKER	
STATION	MP		BEGIN	END	RED	GREEN
"NS" 170+65, Rt.	1.60	D 00611	✓			
"NS" 236+40, Rt.	2.85	D 00612	✓		✓	
"NS" 236+40, Lt.	2.85	D 00613		✓		✓
"NS" 239+20, Rt.	2.90	D 00612		✓		✓
"NS" 239+50, Lt.	2.90	D 00613	✓		✓	
"NS" 264+67, Lt.	3.38	D 00614		✓		✓
"NS" 265+72, Lt.	3.40	D 00614	✓		✓	
"NS" 288+20, Lt.	3.83	D 00615	✓			
"NS" 400+60, Rt.	5.95	D 00616	✓			
"NS" 395+60, Lt.	5.86	D 00617	✓			
"NS" 605+10, Rt.	9.63	D 00618	✓		✓	
"NS" 612+80, Rt.	9.78	D 00618		✓		✓
"NS" 621+20, Rt.	9.94	D 00619	✓		✓	
"NS" 626+50, Rt.	10.04	D 00619		✓		✓

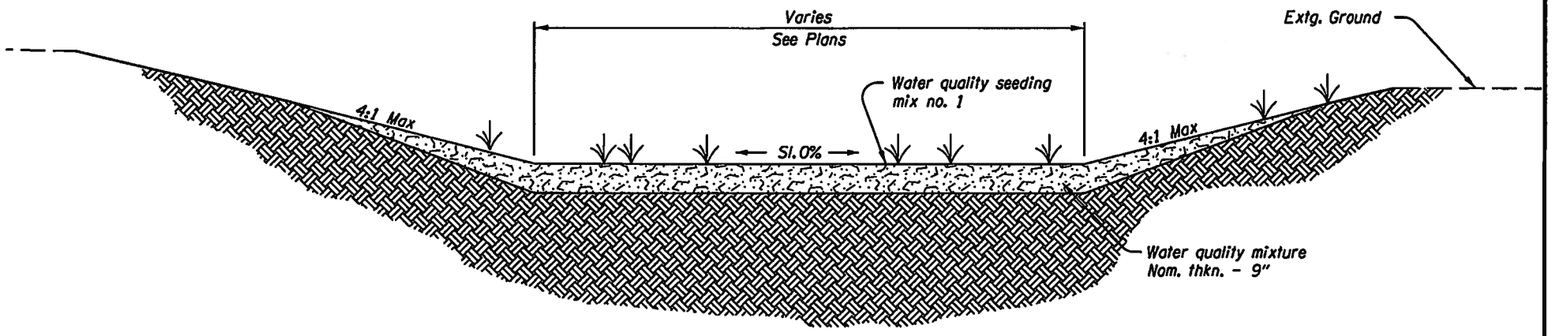
See drg. no. RD399

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

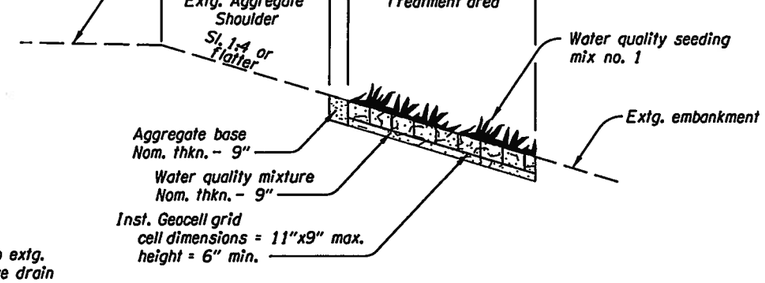
CULVERT DRAINAGE FACILITY MARKER TABLE

FACILITY LOCATION		TYPE 1 MARKER	
STATION	MP	INLET	INLET & OUTLET
"NS" 183+80	1.85	✓	
"B" 189+20	1.96	✓	
"D" 192+20	2.01	✓	
"NS" 237+60	2.87		✓
"NS" 266+50	3.40	✓	
"NS" 288+20	3.82	✓	

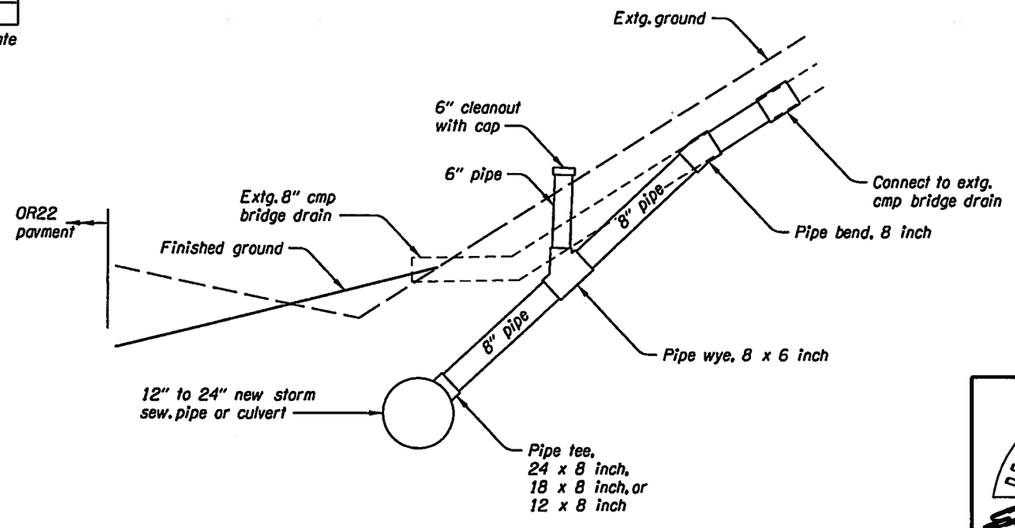
See drg. no. RD398 ✓Check where appropriate



WATER QUALITY BIOFILTRATION SWALE
N.T.S.



WATER QUALITY FILTER STRIP
N.T.S.



TYPICAL BRIDGE DRAIN CONNECTION
N.T.S.

REGISTERED PROFESSIONAL ENGINEER
17810PE
OREGON
JUL 25, 1995
EDWARD J. CHAMBERLAND II
RENEWS: 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

WHPacific
3470 Pipebend Place NE Ste 170
Salem, OR 97301
t: 503.362.4675 f: 503.362.5078

OR22 BRIDGE VERTICAL CLEARANCE BRIDGE PROJECTS

NORTH SANTIAM HIGHWAY
MARION COUNTY

Design Team Leader - Ed Chamberland
Designed By - Travis Sater
Drafted By - Linda Foote

STORMWATER DETAILS

SHEET NO. GJ