OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: February 2019

DFI No. D00782

Figure 1: DFI No. D00782, looking southwest

Identification

Drainage Facility ID (DFI):	D00782
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 42V-31 (2009) & 47V-002 (2013)
Location:	District: 2B
	Highway No.: 001
	Mile Post: 289.80-289.82 (Left side)

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. **NOTE: Mile posts are NOT based off of the V-File for this manual, and but are based off the TransGIS mile posts, due to their placement near the Tualatin River.**

Facility location type: Roadway shoulder

Flow direction: North

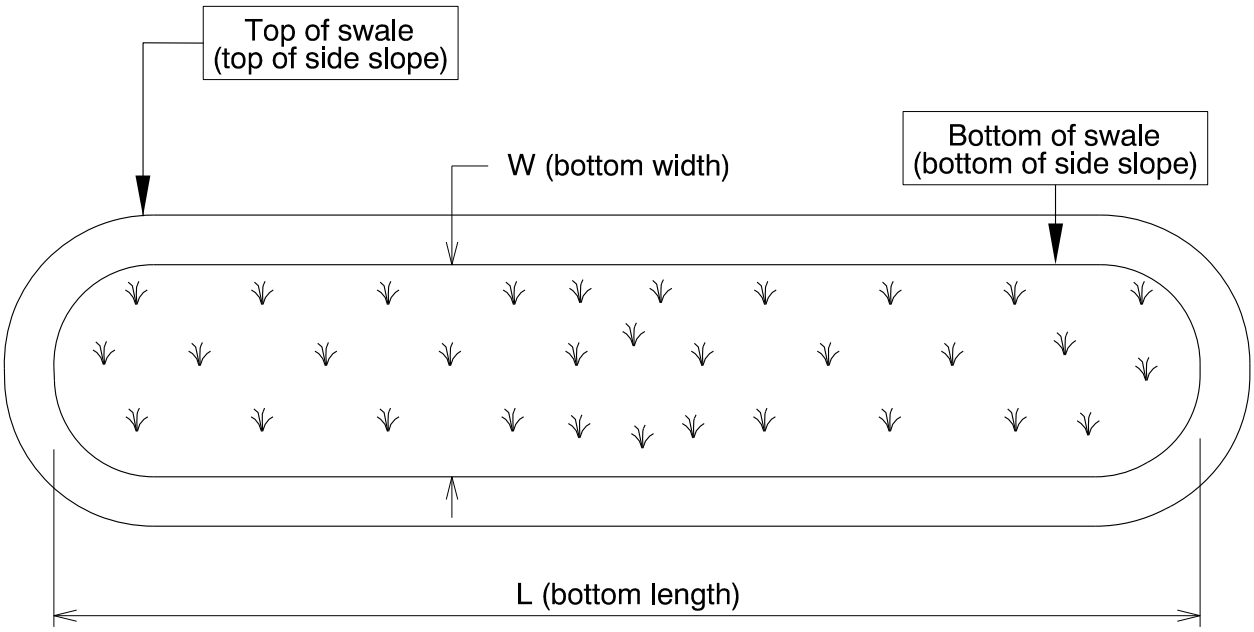
Figure 2: Facility location map

3. Facility Summary

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

The bottom length and bottom width of the swale is:

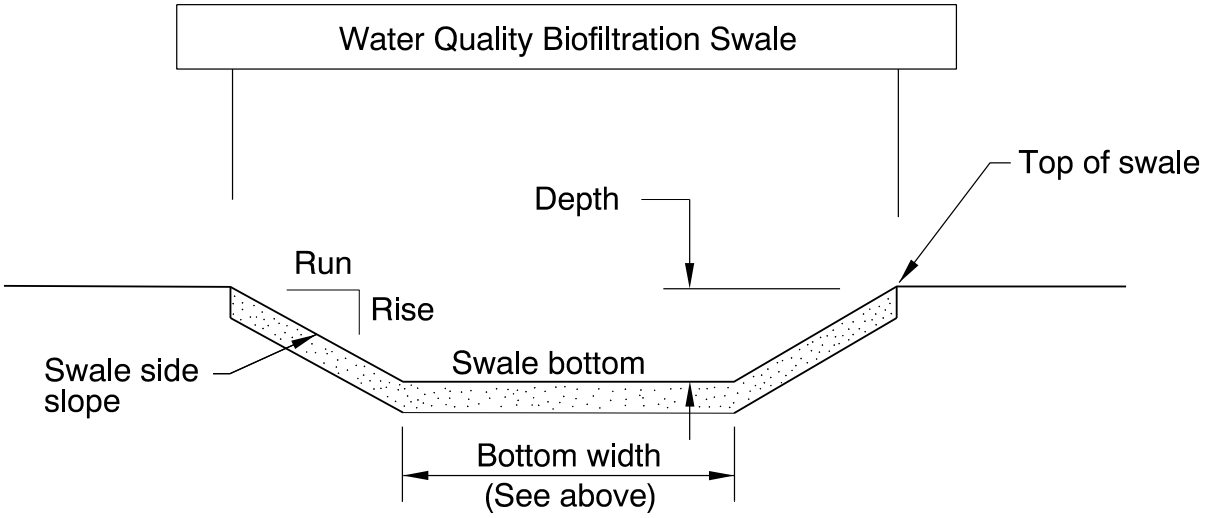
Bottom Length (feet)	Bottom Width (feet)
100	12



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)
1.5	1	4



Site Specific Information: Direct access to the site is limited. There is a concrete barrier that blocks vehicle access to the water quality facility on SB I-5. The Tualatin River Greenway does not provide access due to a barbed wire fence around the facility. Maintenance trucks can park on the highway shoulder, but no heavy equipment can be used for the swale.

This maintenance manual replaces D00073, which was for a detention pond originally built in 2003. The pond was reconstructed into the existing swale in 2009 (42V-31). The existing swale was then reconstructed again in 2013 (47V-002).

4. Facility Access

Maintenance access to the facility:

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

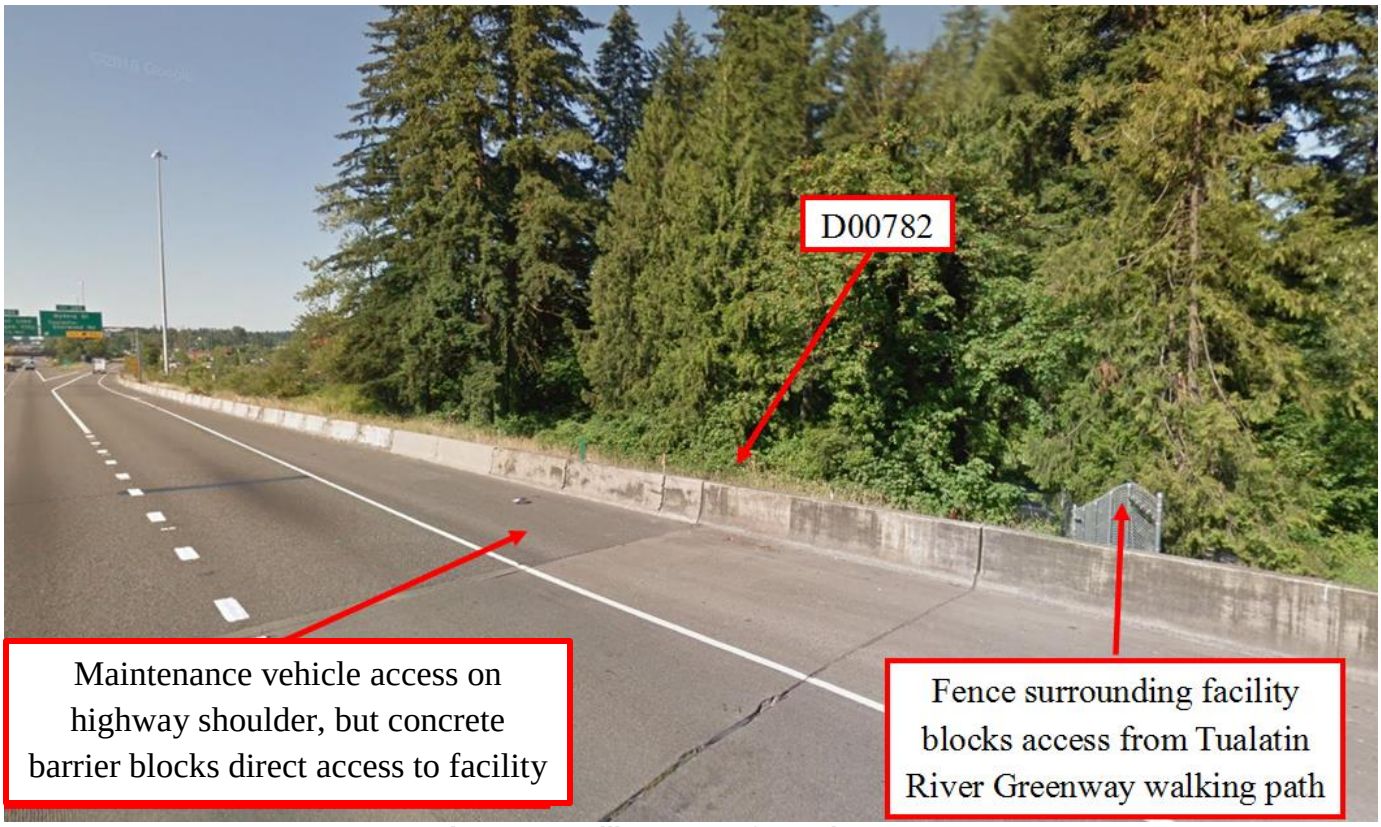


Figure 3: Facility access for maintenance

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: describe type	☐	**S19**
Swale Outlet		
Catch basin with grate	☐	**S20**
Outlet Pipe (s)	☒	**S21**
Open channel outlet	☐	**S22**
Auxiliary Outlet: describe type	☐	**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**

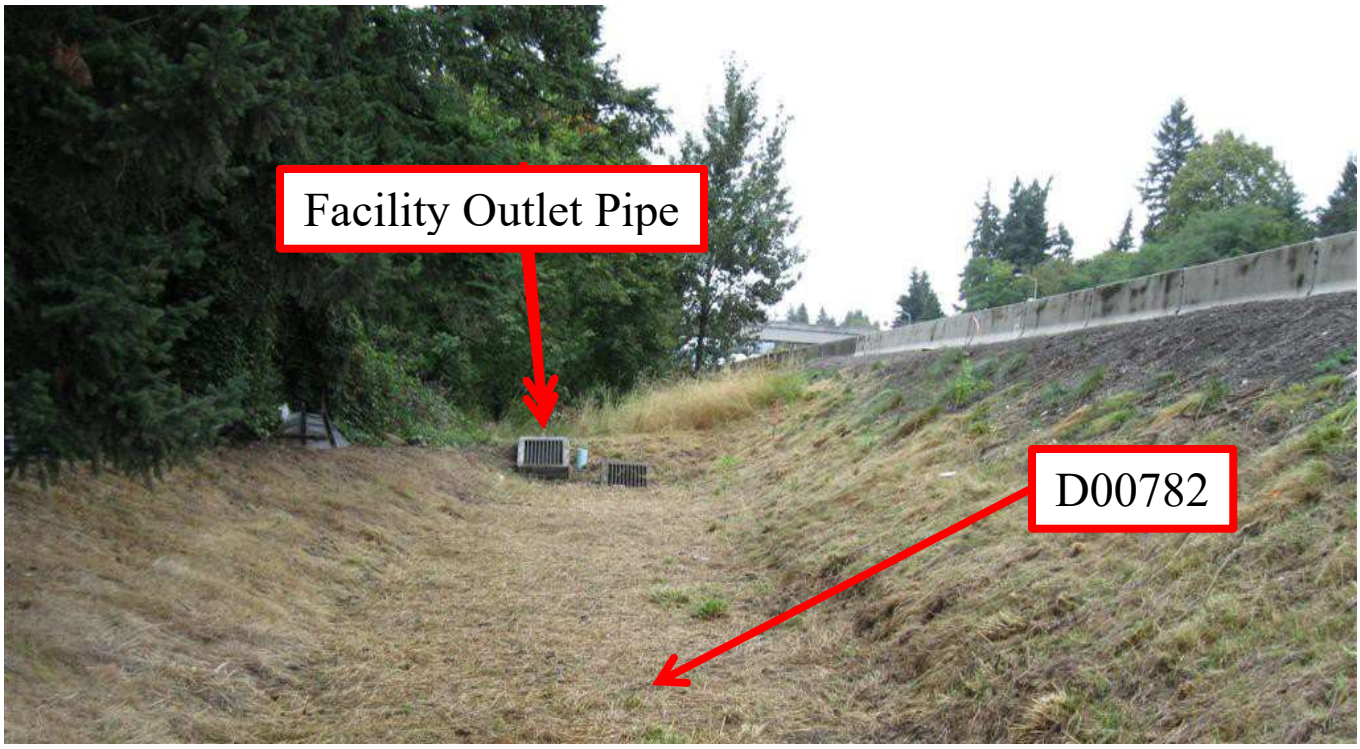


Figure 4: Facility Outlet

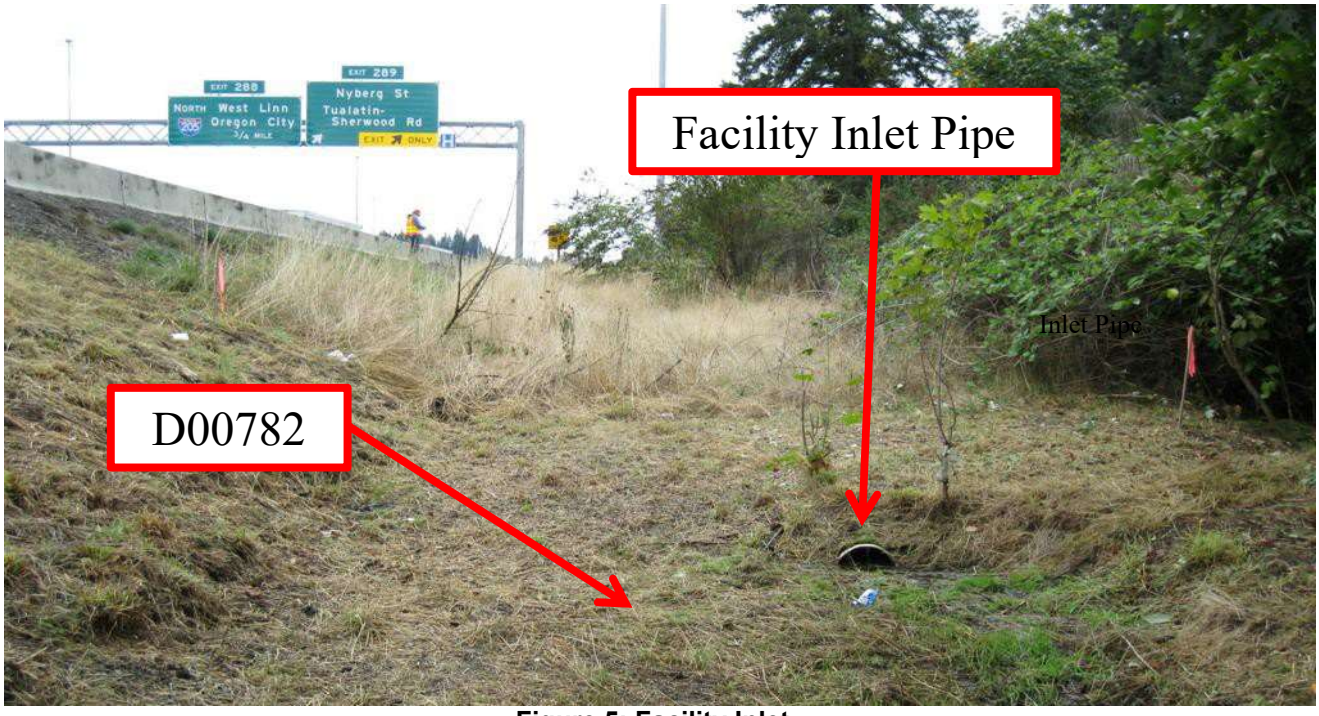


Figure 5: Facility Inlet

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

6. Limitations

Access grid installed:

☒ No	☐ Yes
There are no 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.

7. 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 D00782

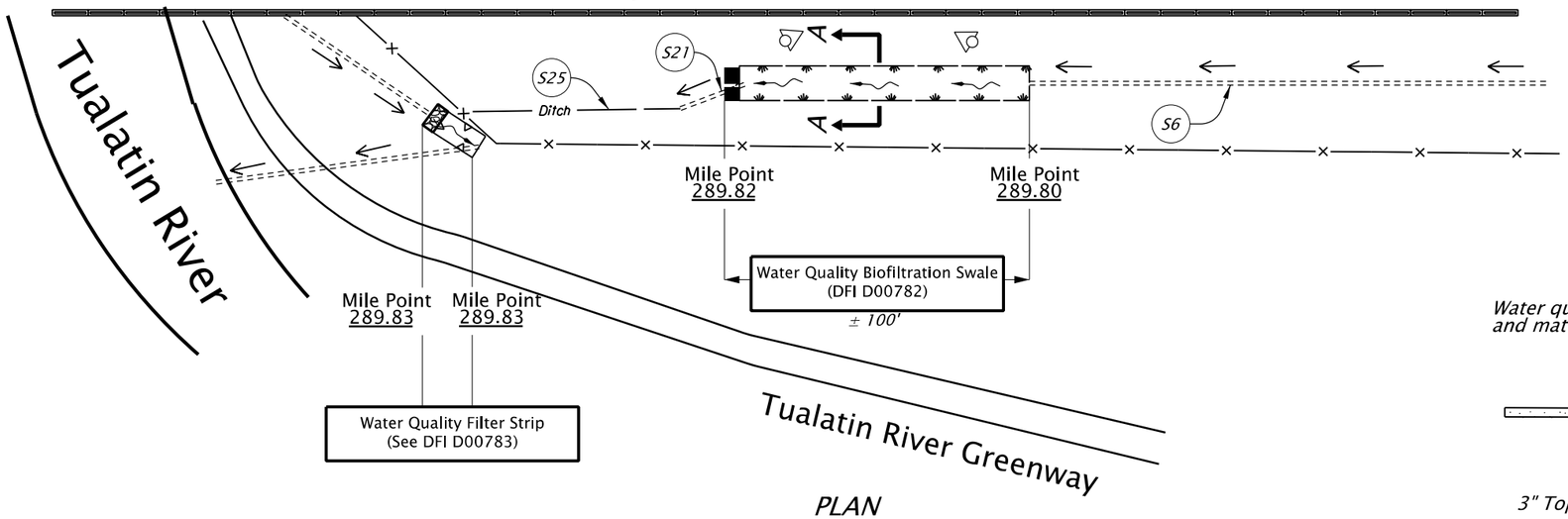
I-5

Northbound Traffic

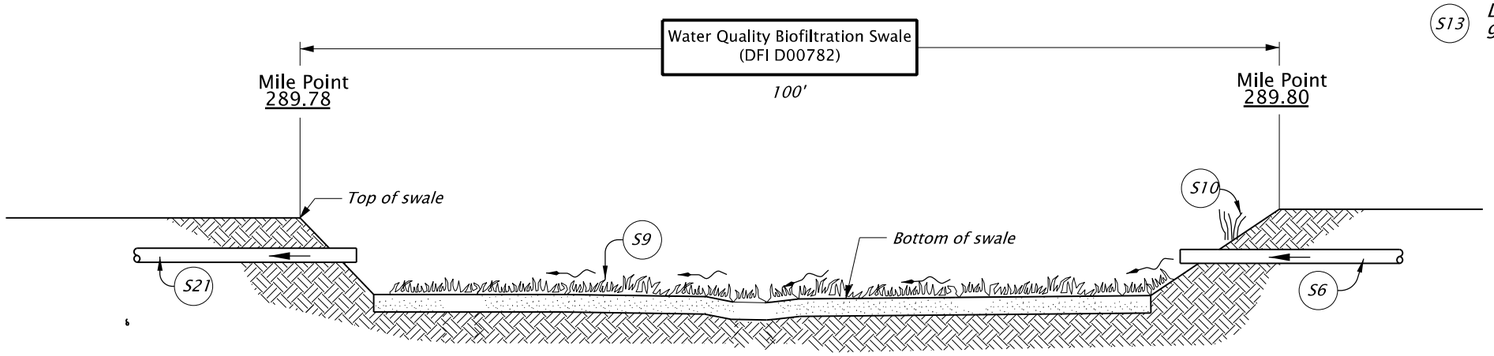
N

Legend:
- Pipe (Facility)
- Inlet Protection
- Traffic Flow Direction
- Conveyence Direction
- Photo Location/Direction

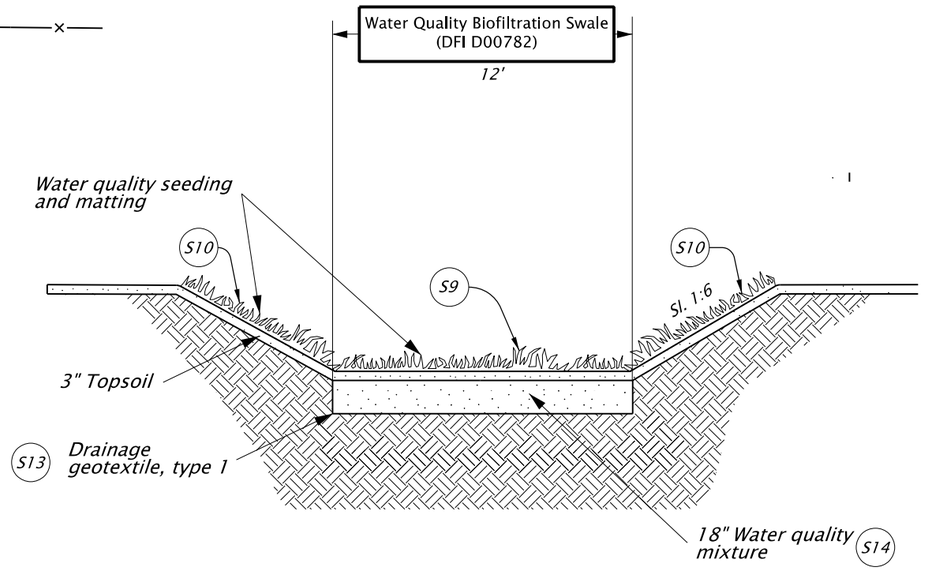
Southbound Traffic



PLAN
N.T.S.



PROFILE
N.T.S.



SECTION A-A
N.T.S.

OREGON DEPARTMENT OF TRANSPORTATION

Sht. 01 of 01

Prepared By: Katrina Sepulveda

Drafted By: Katrina Sepulveda

DFI D00782
MAINTENANCE DISTRICT 2B HWY 001
Water Quality Biofiltration Swale
Highway MP 289.80 - 289.82
Washington County

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plans 42V-31 (2009) & 47V-002 (2013)

42V-31

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

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING & SIGNALS

I-5: TUALATIN RIVER - WILLAMETTE RIVER BRIDGE SEC.

PACIFIC HIGHWAY

MULTNOMAH, WASHINGTON & CLACKAMAS COUNTIES

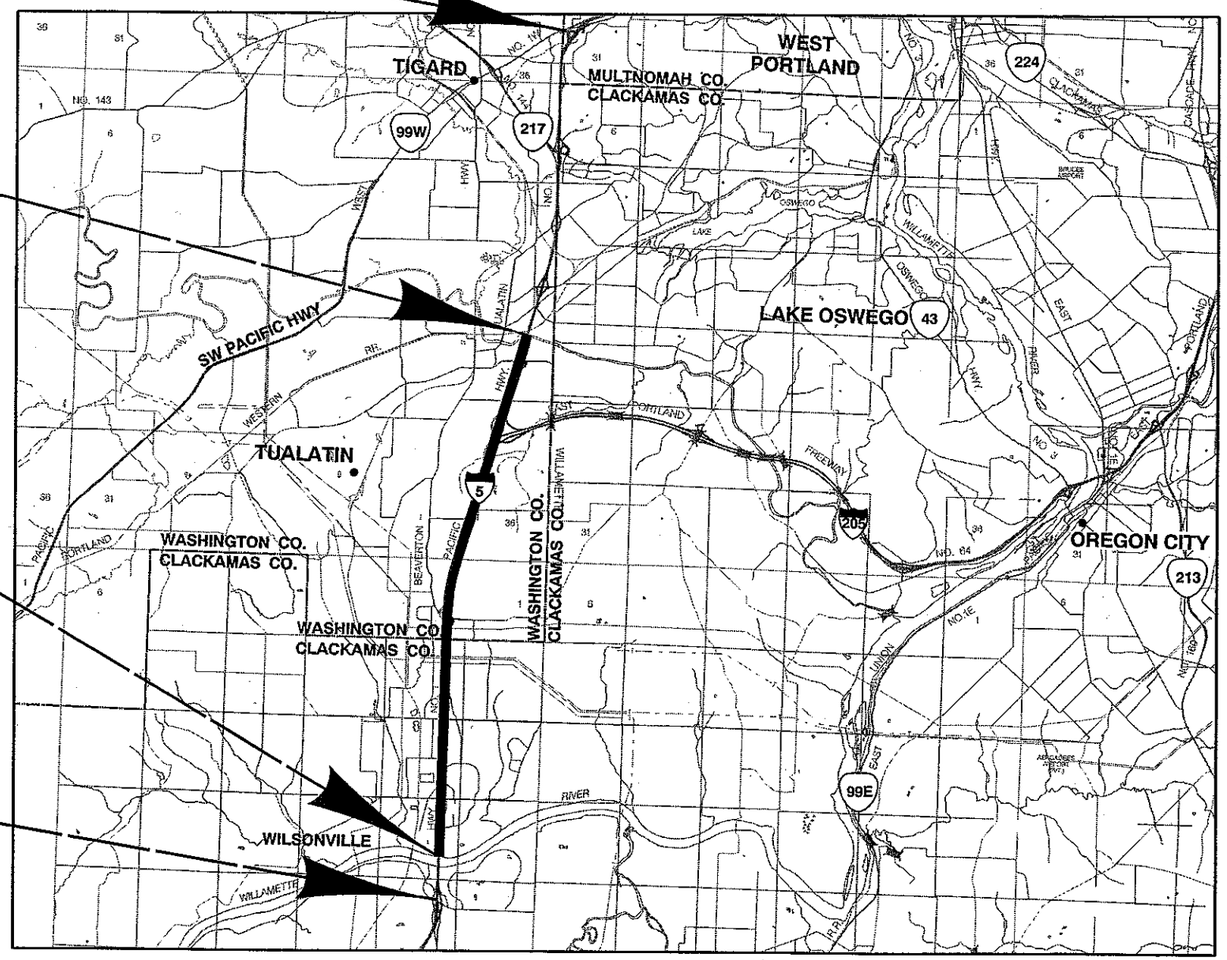
APRIL 2009

IM-S001 (323)
BEGINNING OF CONTRACT
STA. "L2" 995+00 (M.P. 294.15)

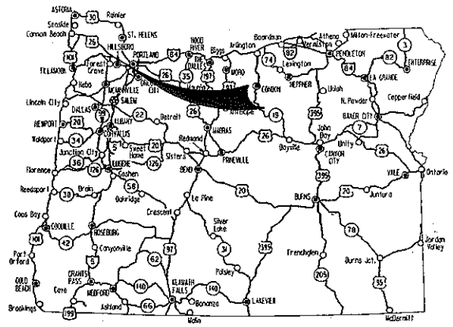
IM-S001 (323)
BEGINNING OF PAVING
STA. "LN2" 1226+00 (M.P. 289.74)
STA. "LS2" 1226+00

IM-S001 (323)
END OF PAVING
STA. "LN2" 1571+80 (M.P. 283.21)
STA. "LS2" 1572+04

IM-S001 (323)
END OF CONTRACT
STA. "LN2" 1596+40 (M.P. 282.74)
STA. "LS2" 1596+64



T. 2S., T. 3S., R. 1E., R 1W., W.M.



Overall Length Of Project - 11.41 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.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

OREGON TRANSPORTATION COMMISSION

Gail L. Achterman	CHAIR
Mike Nelson	VICE CHAIR
Janice J. Wilson	COMMISSIONER
Alan Brown	COMMISSIONER
David Lohman	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

PLANS PREPARED FOR
OREGON DEPARTMENT OF TRANSPORTATION
BY:
MURRAY, SMITH & ASSOC., INC.

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

Approving Authority: Kevin W. Thelin 8/18/09
Signature & date
KEVIN THELIN, PROJ. MGR.
Print name and title

Concurrence by ODOT Chief Engineer

I-5: TUALATIN RIVER - WILLAMETTE RIVER BRIDGE SEC.
PACIFIC HIGHWAY
MULTNOMAH, WASHINGTON & CLACKAMAS COUNTIES

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	IM-S001 (323)	1

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2, 2A Thru 2A-37 Incl.	Typical Sections
2B Thru 2B-25 Incl.	Details
2C Thru 2C-47 Incl.	Traffic Control Plans
2D Thru 2D-3	Pipe Data Sheet
3 Thru 48 Incl.	Alignment & General Construction And Profile
PERMANENT PAVEMENT MARKINGS	
ST Thru ST-37 Incl.	Striping Plans
GEO/HYDRO	
GA Thru GA-31 Incl.	Erosion Control Plans
GD-1 Thru GD-5 Incl.	Soundwall Plans
GD-6 Thru GD-10	Soundwall Details
GJ Thru GJ-6 Incl.	Water Quality Details
GJ-7 Thru GJ-12	Water Quality Plans & Profiles
ROADSIDE DEVELOPMENT	
GN	Roadside Development Plan & Details
BRIDGE NO. 17995 & 17996 (Hwy 1, M.P. 283.88N & 283.88S)	
80809	Plan & General Notes
80810	Construction Sequence
BRIDGE NO. 07695A (Hwy 1, M.P. 284.89N)	
81569	Plan & Elevation
81570	Structure Mount Details
BRIDGE NO. 07575A (Hwy 1, M.P. 287.42N & 287.42S)	
81574	Plan & Elevation
81575	Structure Mount Details - 1
81576	Structure Mount Details - 2
BRIDGE NO. 09743A (Hwy 1, M.P. 288.51S)	
80805	Plan & General Notes
80806	Construction Sequence
BRIDGE NO. 09743 (Hwy 1, M.P. 288.51N)	
80807	Plan & General Notes
80808	Construction Sequence
BRIDGE NO. 07586A (Hwy 1, M.P. 288.98N)	
81579	Plan & Elevation
BRIDGE NO. 07727A (Hwy 1, M.P. 291.81N)	
81776	Plan & Elevation
VARIOUS BRIDGE NOS.	
82354	Street Sign Attachment Details
82355	Structure Information And Notes

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PERMANENT SIGNING	
S-10737 Thru S-10758 S-11181 Thru S-11214 S-11473 Thru S-11475 Incl.	Signing Plans
S-11168	Monotube Cantilever Sign Support Structure No. 21133 At M.P. 282.93 - Elevation
S-10759	Monotube Cantilever Sign Support Structure No. 20983 At M.P. 283.23 - Elevation
S-10760	Monotube Cantilever Sign Support Structure No. 09830 At M.P. 283.73 - Elevation
S-11169	Monotube Cantilever Sign Support Structure No. 21134 At M.P. 285.44 - Elevation
S-11170	Sign Bridges Structure Nos. 16037D, 18956, 17128 And 18000 At M.P. 290.69, 289.75, 289.29 And 285.88 - Elevation
S-11171	Sign Bridges Structure Nos. 16037D, 18956, 17128 And 18000 At M.P. 290.69, 289.75, 289.29 And 285.88 - Sign Attachment Detail
S-11172	Monotube Cantilever Sign Support Structure No. 19319 At M.P. 286.45 - Elevation
S-11173	Monotube Cantilever Sign Support Structure No. 19319 At M.P. 286.45 - Detail
S-11174	Monotube Cantilever Sign Support Structure No. 21137 At M.P. 286.95 - Elevation
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S-11177	Monotube Cantilever Sign Support Structure No. 21136 At M.P. 288.44 - Elevation
S-11178	Monotube Cantilever Sign Support Structure No. 21138 At M.P. 290.21 - Elevation
S-11179	Monotube Cantilever Sign Support Structure No. 19324 At M.P. 290.46 - Elevation
S-11363	Sign Bridges Structure Nos. 17128, 16037C, 17128 And 16037B At M.P. 289.89, 290.31, 290.76 And 291.11 - Elevation
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TRAFFIC SIGNALS	
15193 Thru 15205	Ramp Meter Plans
15206 Thru 15209	Detector Modification Plans
15210	Electrical Conduit Plan
ITS-808	Communications Plan
FOR INFORMATION ONLY	
	Wilsonville Intchge. Unit 1 Sec. (V-File 28V-47), Contract #11852
2B	Joint Details
	Standard Drawings - 1968
2070A	Portland Cement Concrete Pavement
	Wilsonville Int. - Hubbard Int. Sec. (V-File 9V-294)
2, 5 & 6	Typical Section & Roadway Plans
	East Portland Frwy. - Wilsonville Int. (V-File 9V-387)
2 Thru 5	Typical Section & Roadway Plans

"AS CONSTRUCTED"
Wayne A. Stetler
PROJECT MANAGER
4 MAR 2011
DATE

I-5: TUALATIN RIVER - WILLAMETTE RIVER BRIDGE SEC.
PACIFIC HIGHWAY
MULTNOMAH, WASHINGTON & CLACKAMAS COU

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	
OREGON DIVISION	IM-S001 (323)	1A

(1) Weed Control Area - 0.39 Ac.
Permanent Seeding - 0.39 Ac.

(2) Construct Water Quality Swale Enhancement
(For Details, See Sht. GJ-6)

N

"L2" 1212+62.91 P.T.

"L2" 1215+00

"LN2" 1217+11.86 P.T.

"LN2" 1217+11.86 P.T. (24' Rt.)

"LN2" 0°30'00" C.L.
Δ 1°34'13"
T 157.04

"LN2" 1218+69.90 P.C.

"LN2" 1220+25.94 P.T.

"LN2" LINE

TUALATIN RIVER

"LN2" 1225+00

U T FO

U E

Ditch

"L2" LINE

S.16°56'51"W.

S.15°22'38"W.

BRIDGE # 023768

"LS2" 1217+11.86 P.T.

"LS2" 1217+11.86 P.T. (24' Rt.)

W A E

"LS2" 1220+00

PORTLAND & WESTERN RAILROAD

"LS2" LINE

TUALATIN RIVER

"LS2" 1225+00

Sec. 24, T.2S, R.1W, W.M.
Sec. 13, T.2S, R.1W, W.M.

"AS CONSTRUCTED"
Wayne A Stalter
PROJECT MANAGER
4 MAR 2011
DATE

Weed Control Area Shown Thus:

REGISTERED PROFESSIONAL ENGINEER
70713
OREGON
JULY 11, 2006
GABRIEL E. CROP

RENEWAL DATE: 12-31-2009

OREGON DEPARTMENT OF TRANSPORTATION

Murray, Smith & Associates, Inc.
121 S.W. Salmon, Suite 900, Portland, Oregon 97204-2919
503.225.9010

MSA

I-5: TUALATIN RIVER -
WILLAMETTE RIVER BRIDGE SEC.

PACIFIC HIGHWAY
MULTNOMAH, WASHINGTON & CLACKAMAS COUNTIES

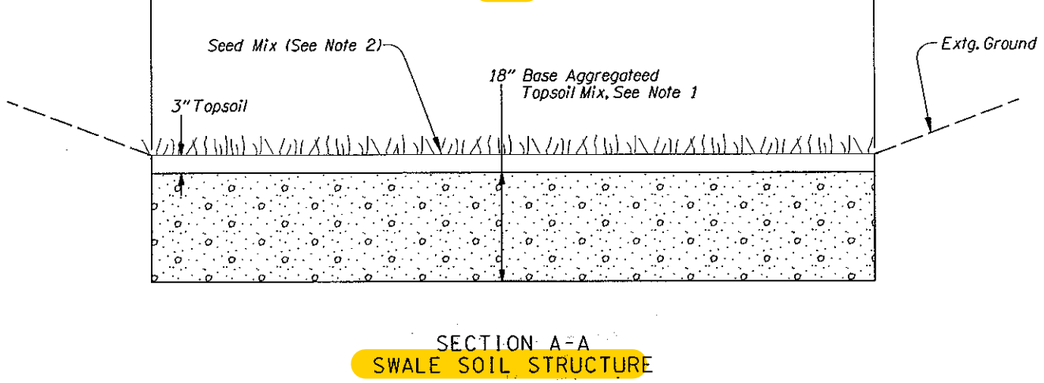
Reviewed By - Gabriel E. Crop
Designed By - Gwenyth N. Linscheid
Drafted By - Susan K. Wentz

ALIGNMENT & GENERAL CONSTRUCTION

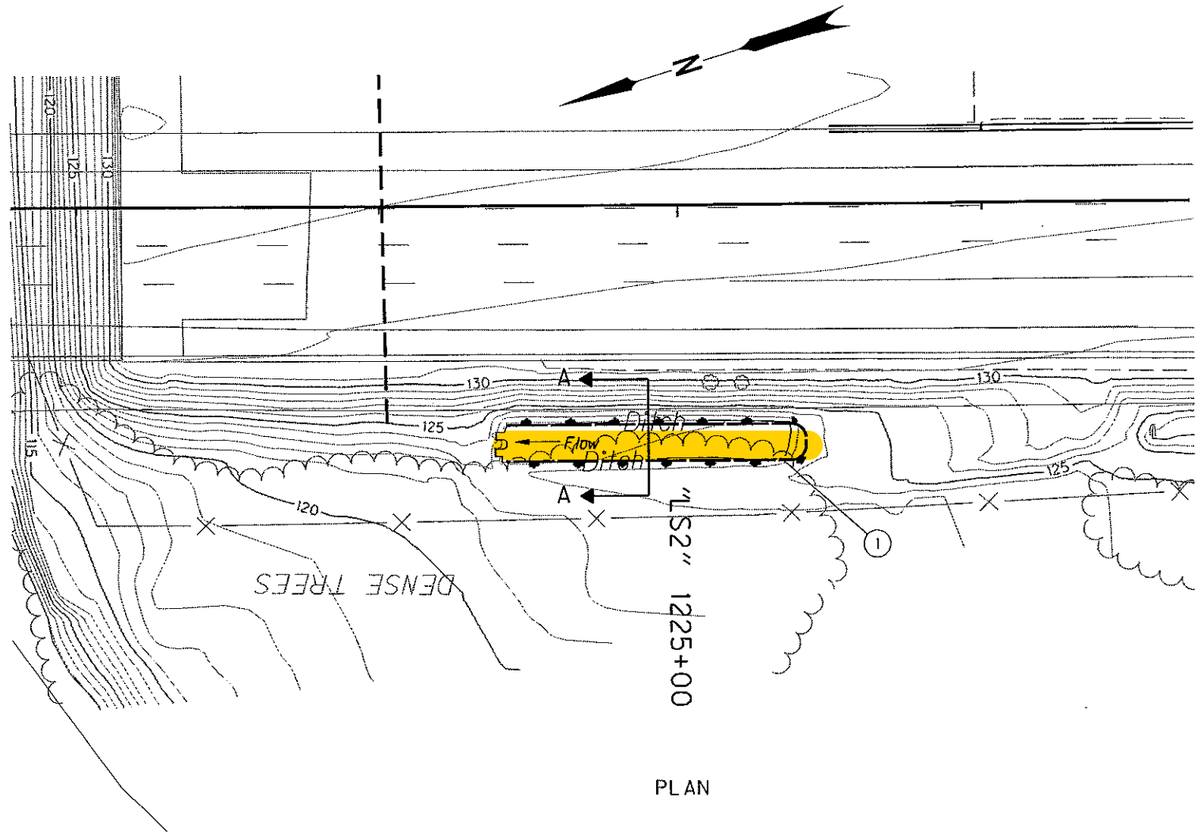
SHEET NO. 20

WATER QUALITY SWALE ENHANCEMENT

"AS CONSTRUCTED"
Wayne A. Statler
PROJECT MANAGER
4 MAR 2011
DATE



SECTION A-A
SWALE SOIL STRUCTURE



PLAN

(1) *Sta. "LS2" 1224+42 - 78' Rt. To Sta "LS2" 1225+42 - 78' Rt.*
Const. Water Quality Swale Enhancement - 100'
Exc. 21" Of Extg. Topsoil - 78 Cu. Yd.
Base Aggregate - 60 Tons
Topsoil - 49 Cu. Yd.
(For Details, See Sht. GA)

Notes:

1. For Base Aggregate/Topsoil Mix Use Base Aggregate, ¾"-0 Per Sec. 00641. & Mix Approx. 50%/50% By Volume With Topsoil Before Placing.

2. Provide Erosion Control Matting And Water Quality Seeding, See Sht. GA. Provide Erosion Control Matting, Type E. Extend matting Up Slopes Or Disturbed Soil. Use Water Quality Seed Mix No. 1.

REGISTERED PROFESSIONAL ENGINEER
70713
OREGON
JULY 11, 2006
GABRIEL E. CROP
RENEWAL DATE: 12-31-2009

OREGON DEPARTMENT OF TRANSPORTATION

Murray, Smith & Associates, Inc.
121 S.W. Salmon, Suite 900, Portland, Oregon 97204-2919
503.225.9010

MSA

I-5: TUALATIN RIVER - WILLAMETTE RIVER BRIDGE SEC.
PACIFIC HIGHWAY
MULTNOMAH, WASHINGTON & CLACKAMAS COUNTIES

Reviewed By - Gabriel E. Crop
Designed By - Brendan V. O'Sullivan
Drafted By - Susan K. Wentz

WATER QUALITY DETAILS

SHEET NO. GJ-6

47V-002

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

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

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

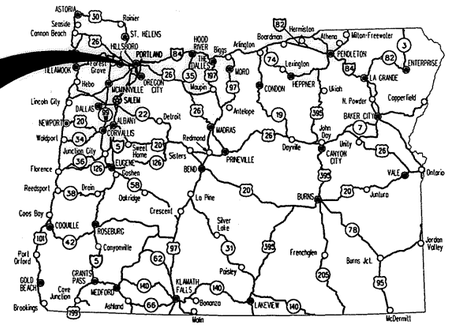
FFO - I-5: HOOD AVE-TUALATIN RVR SEISMIC RETROFIT

PACIFIC HIGHWAY

MULTNOMAH AND WASHINGTON COUNTIES

NOVEMBER 2013

PROJECT SITE



Overall Length Of Project - 9.38 Miles

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LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

BEGINNING OF PROJECT
STA. "L" 120+00 (M.P. 299.23)

BRIDGE NO. 08195
M.P. 299.23

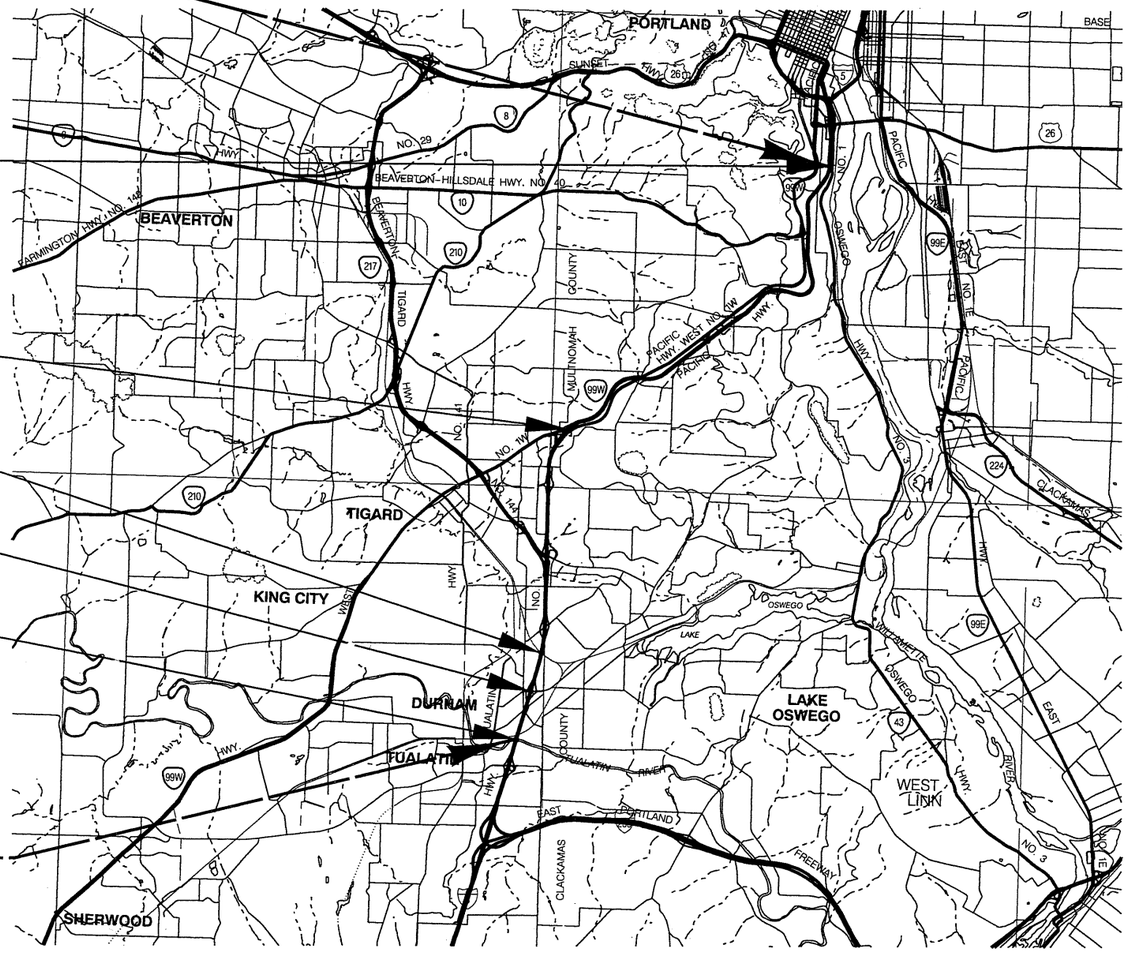
BRIDGE NO. 07758C
M.P. 293.82

BRIDGE NO. 02259C
M.P. 290.97

BRIDGE NO. 07729A
M.P. 290.48

BRIDGE NO. 02376B
M.P. 289.85

END OF PROJECT
STA. "LS" 1225+40 (M.P. 289.85)



T. 1 S., R. 1 E., W.M.
T. 2 S., R. 1 W., W.M.

OREGON TRANSPORTATION COMMISSION

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

PLANS PREPARED FOR
OREGON DEPARTMENT OF TRANSPORTATION

HDR Engineering, Inc.

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: _____ 8/15/13
Signature & date

STEVE DRAHOTA, P.M.
Print name and title

_____
Concurrence by ODOT Chief Engineer

FFO - I-5: HOOD AVE. - TUALATIN RVR. SEISMIC RETROFIT
PACIFIC HIGHWAY
MULTNOMAH AND WASHINGTON COUNTIES

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	DBP-S001(443)	1

INDEX OF SHEETS, CONT.

SHEET NO.	DESCRIPTION
1B thru 1B-5	Control Data Sheets
2 thru 2A-4	Typical Sections
2B thru 2B-2	Details
2C thru 2C-6	Traffic Control Plans (SW Hood Ave.)
2D thru 2D-8	Traffic Control Plans (SW Barbur Blvd.)
2F thru 2F-16	Traffic Control Plans (Lower Boones Ferry Rd.)
2G	Traffic Control Plan (Tualatin River)
2H	Pipe Data Sheet
3	General Construction (SW Hood Ave.)
4	General Construction (Barbur Blvd.)
5, 5A	General Construction (Cook Overcrossing)
6	General Construction (Lower Boones Ferry Rd.)
6A, 6A-2	Drainage & Utilities (Lower Boones Ferry Rd.)
7	General Construction (Tualatin River)
7A	Profile (Tualatin River)
	GEO/HYDRO/ENVIRO
GA thru GA-5	Erosion Control Details
GA-6 thru GA-11	Erosion Control Plans
GC, GC-2	Retaining Wall Plans And Elevations
GJ	Water Quality Details (Tualatin River)
GN, GN-2	Planting Details
GN-3	Site Restoration Plan (Cook Overcrossing)

DRAWING NO.	DESCRIPTION
BRIDGE NO. 08195 (SW HOOD AVE.)	
92229	Plan and Elevation
92230	General Notes
92231	Foundation Data
92232	Footing Plan
92233	Bent 1 Layout
92234	Bent 2 Layout
92235	Bent 3 Layout
92236	Bent 4 Layout
92237	Bents 1 and 4 Details
92238	Bents 2 and 3 Details - 1
92239	Bents 2 and 3 Details - 2
92240	Bents 2 and 3 Details - 3
92241	Bent 4 Details
92242	Ornamental Security Fence Details - 1
92243	Ornamental Security Fence Details - 2
92244	Ornamental Security Fence Details - 3
92245	Ornamental Security Fence Details - 4
BRIDGE NO. 07758C (SW BARBUR BLVD.)	
92161	Plan and Elevation
92162	General Notes
92163	Construction Staging
92164	Bent 1 Layout
92165	Bent 2 Layout
92166	Bent 3 and 4 Layout
92167	Bent 5 Layout
92168	Bent 1 and 5 Details
92169	Bent 2, 3 and 4 Details - 1
92170	Bent 2, 3 and 4 Details - 2
BRIDGE NO. 02259C (COOK OVERCROSSING)	
92246	Plan and Elevation
92247	General Notes
92248	Foundation Data
92249	Footing Plan
92250	Bent 2 - Removal Details
92251	Bent 3 - Removal Details
92252	Bent 2 and 3 - Removal Details
92253	Existing Retaining Wall Removal Details
92254	Bent 2 Layout
92255	Bent 3 Layout
92256	Bent 2 Details - 1
92257	Bent 2 Details - 2
92258	Bent 3 Details - 1
92259	Bent 3 Details - 2
92260	Bent 2 and 3 Details - 1
92261	Bent 2 and 3 Details - 2

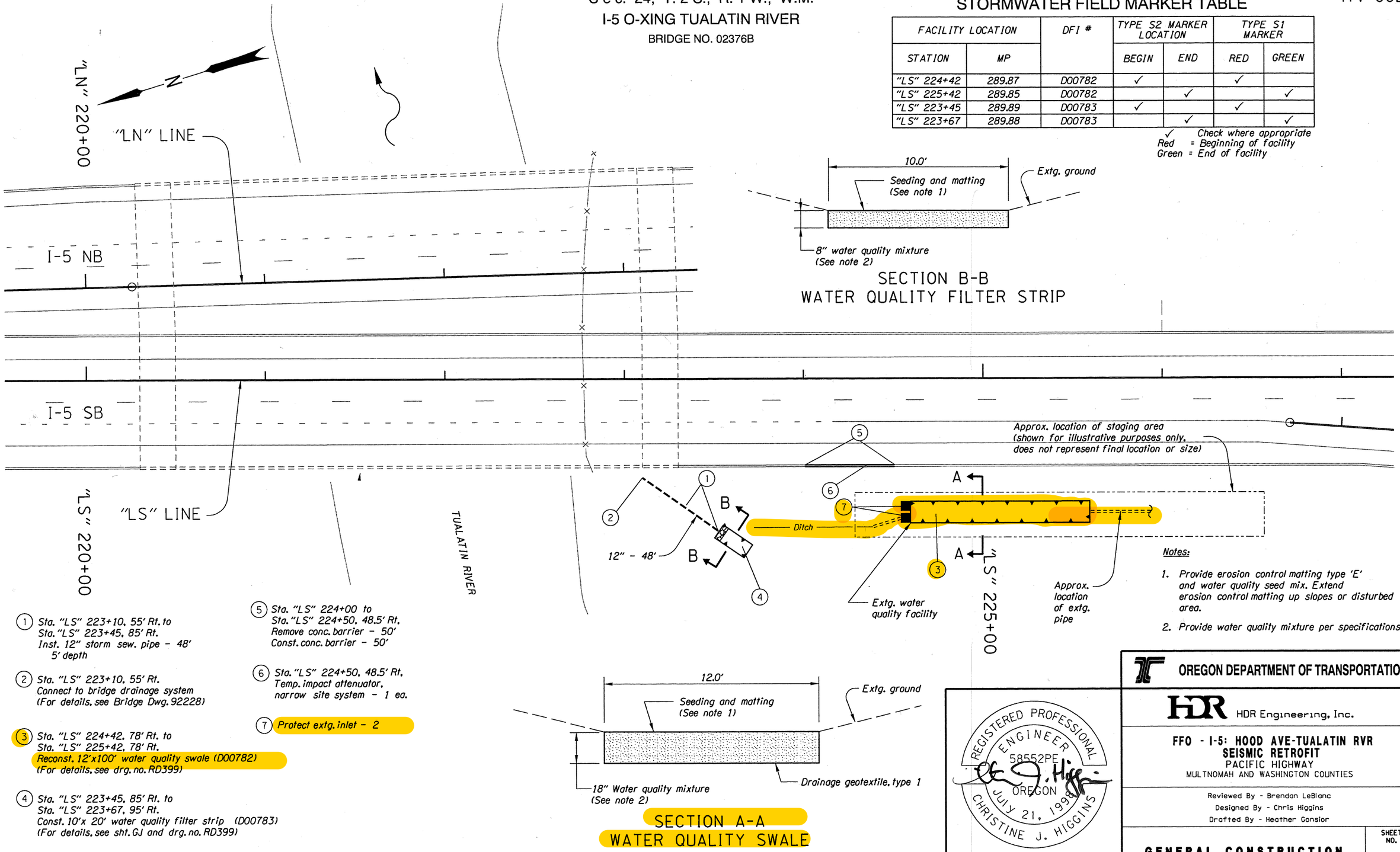
DRAWING NO.	DESCRIPTION
BRIDGE NO. 07729A (LOWER BOONES FERRY RD.)	
92177	Plan and Elevation
92178	General Notes
92179	Foundation Data
92180	Geotechnical Data - 1
92181	Geotechnical Data - 2
92182 thru 92190	Construction Staging
92191	Span 2 Lifting Details
92192	Footing Plan
92193	Deck Plan - 1
92194	Deck Plan - 2
92195	Deck Plan - 3
92196	Deck Details
92197	Typical Section - 1
92198	Typical Section - 2
92199	Typical Section - 3
92200	Girder Details - 1
92201	Girder Details - 2
92202	Girder Details - 3
92203	Girder Details - 4
92204	Girder Details - 5
92205	Girder Details - 6
92206	Bent 1 and 4 Layout
92207	Bent 1 and 4 Details
92208	Bent 2 and 3 Layout - 1
92209	Bent 2 and 3 Layout - 2
92210	Bent 2 and 3 Details - 1
92211	Bent 2 and 3 Details - 2
92212	Bent 2 and 3 Details - 3
92213	Footing Details
92214	Joint and PPC Overlay Details
92215	Retaining Wall Details
92216	Miscellaneous Details
92217	Structure Mount Sign Details
92218	Structure Mount Sign General Notes
92468	Ornamental Security Fence - Layout
92469	Ornamental Security Fence Details - 1
92470	Ornamental Security Fence Details - 2
92471	Ornamental Security Fence Details - 3
92472	Ornamental Security Fence Details - 4
92473	Ornamental Security Fence Details - 5
92474	Ornamental Security Fence Details - 6
BRIDGE NO. 02376B (TUALATIN RIVER)	
92220	Plan and Elevation
92221	General Notes
92222	Foundation Data
92223	Bent 2 and 3 Layout
92224	Bent 2 and 3 Details - 1
92225	Bent 2 and 3 Details - 2
92226	Bent 2 and 3 Details - 3
92227	Bent 2 and 3 Details - 4
92228	Bridge Drain Details

FFO - I-5: HOOD AVE. - TUALATIN RVR.
SEISMIC RETROFIT
PACIFIC HIGHWAY
MULTNOMAH AND WASHINGTON COUNTIES

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	DBP-S001(443)	1A

47V-002

Sec. 24, T. 2 S., R. 1 W., W.M.
I-5 O-XING TUALATIN RIVER
BRIDGE NO. 02376B



STORMWATER FIELD MARKER TABLE

FACILITY LOCATION		DFI #	TYPE S2 MARKER LOCATION		TYPE S1 MARKER	
STATION	MP		BEGIN	END	RED	GREEN
"LS" 224+42	289.87	D00782	✓		✓	
"LS" 225+42	289.85	D00782		✓		✓
"LS" 223+45	289.89	D00783	✓		✓	
"LS" 223+67	289.88	D00783		✓		✓

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

SECTION B-B
WATER QUALITY FILTER STRIP

SECTION A-A
WATER QUALITY SWALE

(1) Sta. "LS" 223+10, 55' Rt. to
Sta. "LS" 223+45, 85' Rt.
Inst. 12" storm sew. pipe - 48'
5' depth

(2) Sta. "LS" 223+10, 55' Rt.
Connect to bridge drainage system
(For details, see Bridge Dwg. 92228)

(3) Sta. "LS" 224+42, 78' Rt. to
Sta. "LS" 225+42, 78' Rt.
Reconst. 12'x100' water quality swale (D00782)
(For details, see drg. no. RD399)

(4) Sta. "LS" 223+45, 85' Rt. to
Sta. "LS" 223+67, 95' Rt.
Const. 10'x 20' water quality filter strip (D00783)
(For details, see sht. GJ and drg. no. RD399)

(5) Sta. "LS" 224+00 to
Sta. "LS" 224+50, 48.5' Rt.
Remove conc. barrier - 50'
Const. conc. barrier - 50'

(6) Sta. "LS" 224+50, 48.5' Rt.
Temp. impact attenuator,
narrow site system - 1 ea.

(7) Protect extg. inlet - 2

Notes:

1. Provide erosion control matting type 'E' and water quality seed mix. Extend erosion control matting up slopes or disturbed area.
2. Provide water quality mixture per specifications

OREGON DEPARTMENT OF TRANSPORTATION

HDR Engineering, Inc.

REGISTERED PROFESSIONAL ENGINEER
58552PE
OREGON
JULY 21, 1999
CHRISTINE J. HIGGINS
EXPIRES: 06-30-15

FFO - I-5: HOOD AVE-TUALATIN RVR
SEISMIC RETROFIT
PACIFIC HIGHWAY
MULTNOMAH AND WASHINGTON COUNTIES

Reviewed By - Brendan LeBlanc
Designed By - Chris Higgins
Drafted By - Heather Gonsior

GENERAL CONSTRUCTION

SHEET NO. 7