OPERATION & MAINTENANCE MANUAL

Water Quality Filter Strip

Manual prepared: February 2019

DFI No. D00783

Figure 1: DFI No. D00783, looking southwest

Identification

Drainage Facility ID (DFI):	D00783
Facility Type:	Water Quality Filter Strip
Construction Drawings:	(V-File Numbers) 47V-002
Location:	District: 2B
	Highway No.: 001
	Mile Post: 289.83 [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.**

Facility location type: **Roadway shoulder**

Flow direction: Southwest

Figure 2: Facility Map

3. 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	20	10

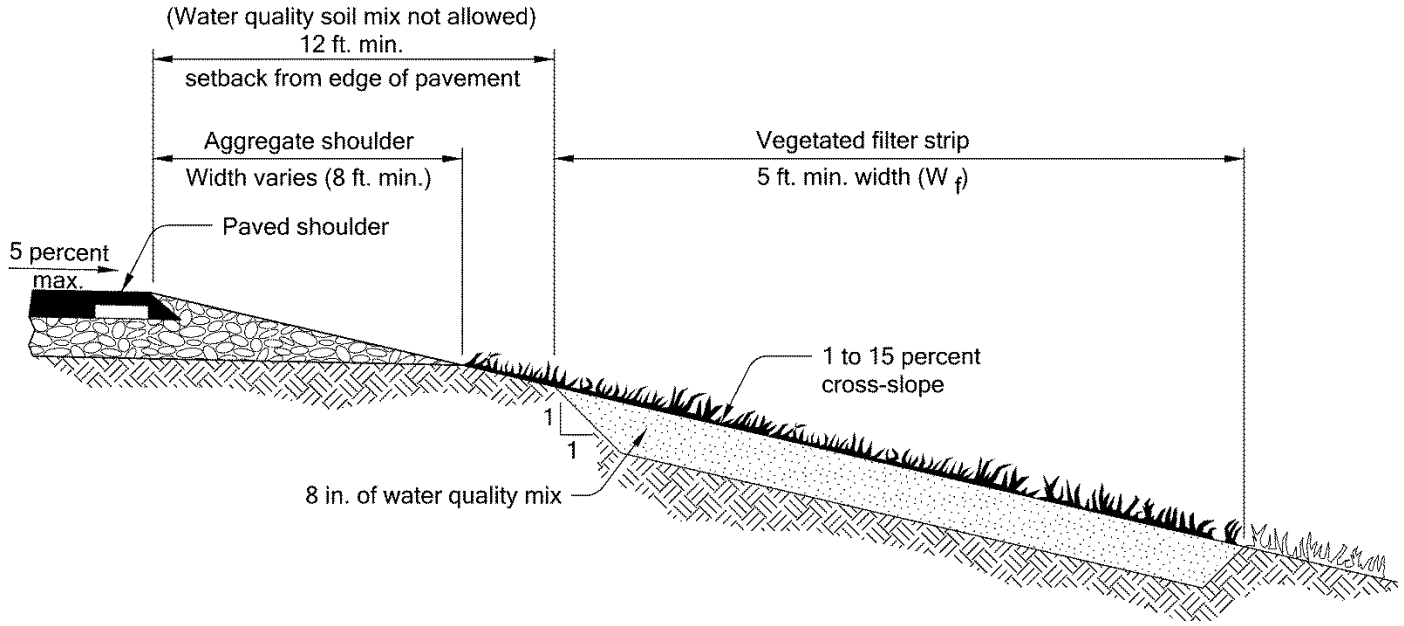


Figure 2: Filter Strip Section

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	Varies	Varies

Site Specific Information: The water quality facility cannot be accessed from the highway. Maintenance trucks must park in the nearby outlet parking lot off of SW Nyberg St. The Tualatin River Greenway Trail runs alongside the Tualatin River and allows access to D00783 as well. See Figure 4 for maintenance access.

4. Facility Access

Maintenance access to the facility:

☐Roadside pad	☒Roadside shoulder
☐Access road with Gate	☐Access road without Gate
☒Other: See below	

Figure 3: Maintenance vehicle access

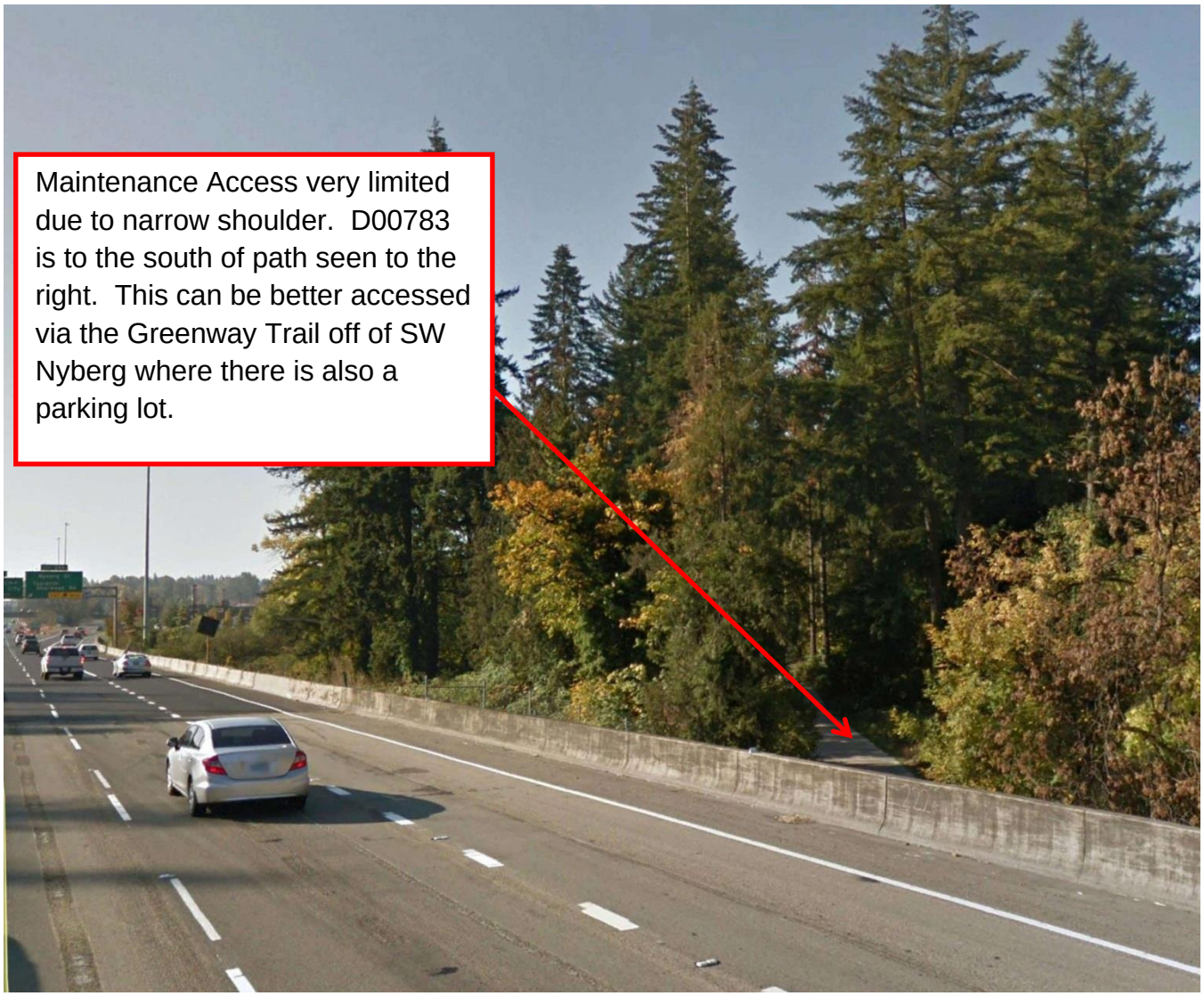


Figure 4: Maintenance vehicle access

Figure 5: Maintenance vehicle access

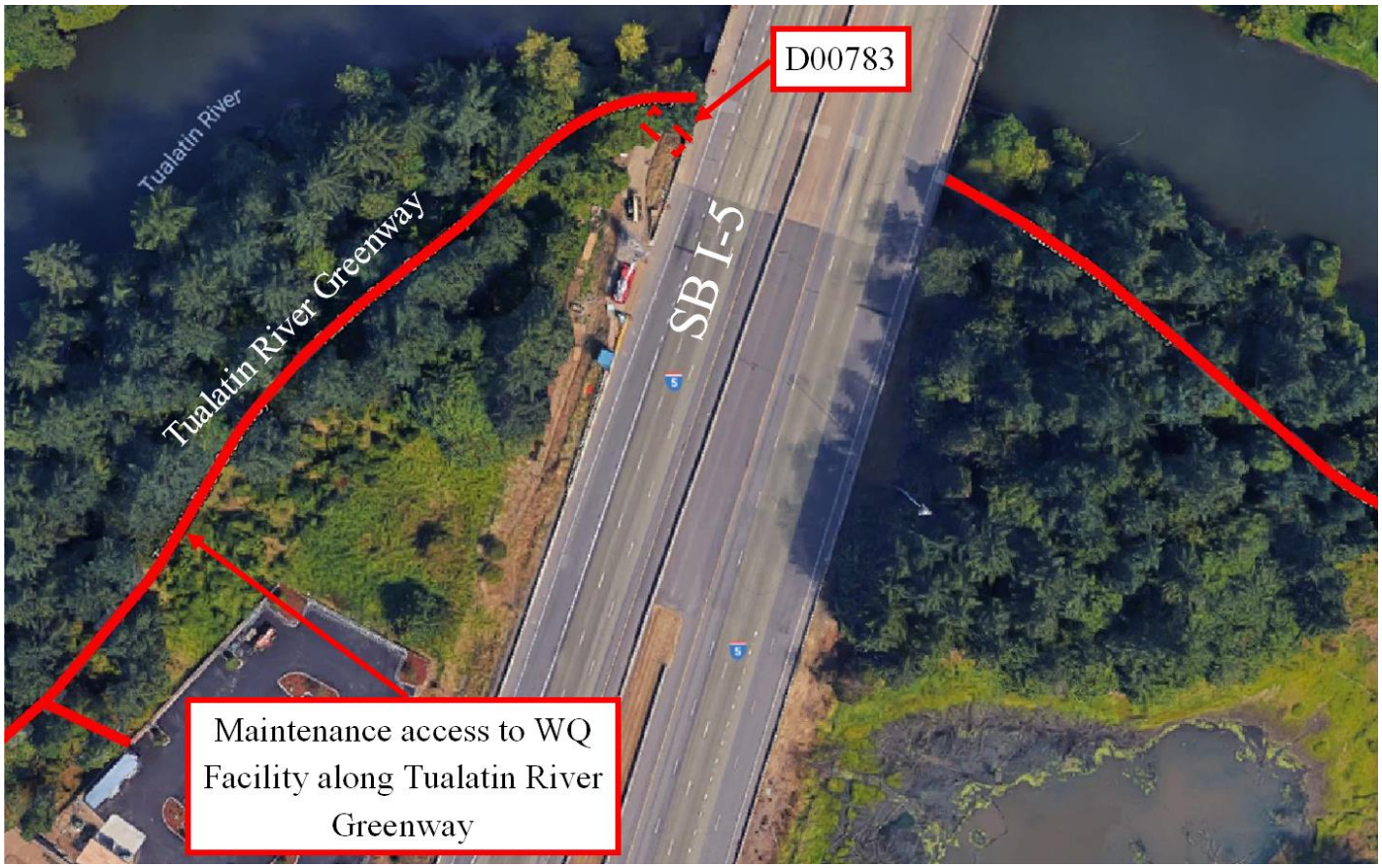


Figure 6: Maintenance access to WQ Facility

The Tualatin River Greenway is a multiuse path that is only accessible on foot. There is no access from the highway.

5. 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 and bioslopes 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 (implemented February 2019) 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: Facility 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 (**River**/**L**ake/**O**cean)	☒ **R** ☐ **L** ☐ **O**	**B17**
Outfall Channel	☐	**B18**
Storm Drain System	☐	**B19**
Outfall Components		
Pervious Berm	☐	**B20**
Riprap Pad	☐	**B21**

Figure 7: Facility Components

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 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

7. Limitations

Filter strips and bioslopes 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.

8. 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

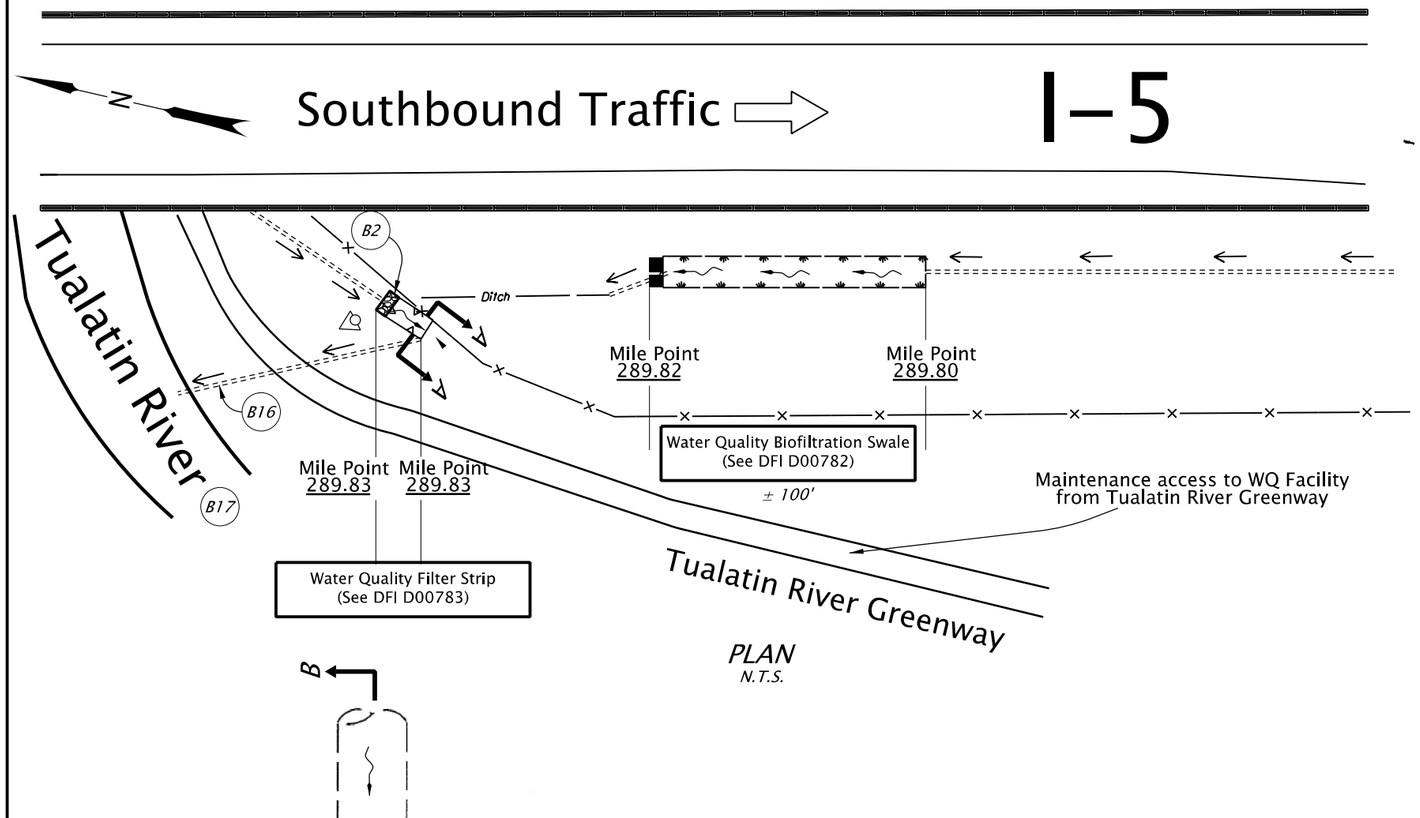
Contact any of the following for more detailed information about management of waste materials found on site:

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

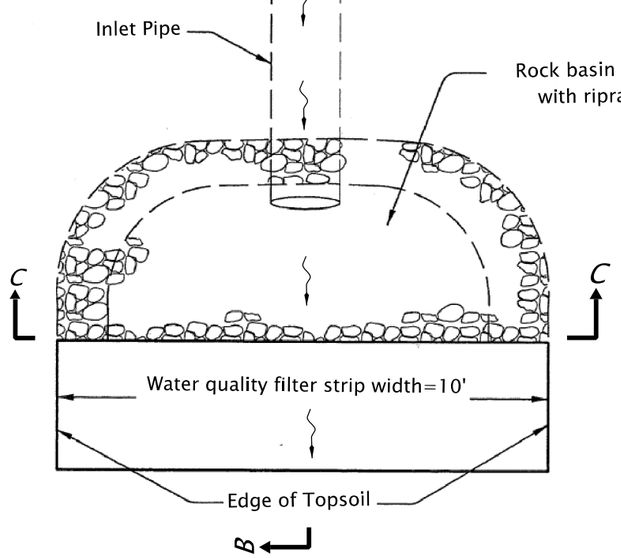
A Appendix A – Site Specific Operational Plan

Contents:

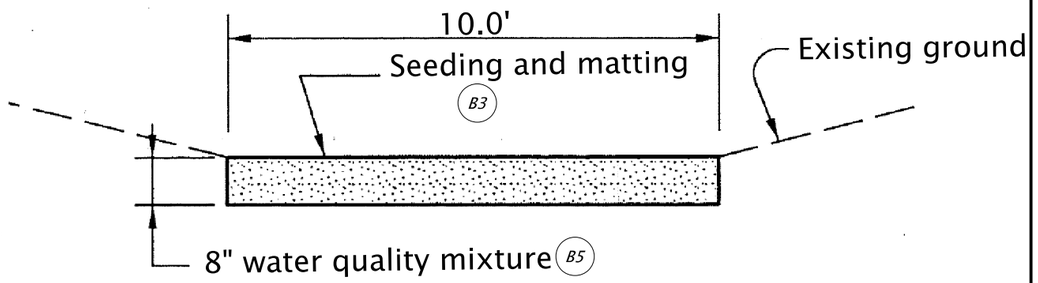
Operational Plan: DFI D00783



PLAN
N.T.S.



B2 *Rock Basin Flow Spreader*



SECTION A-A
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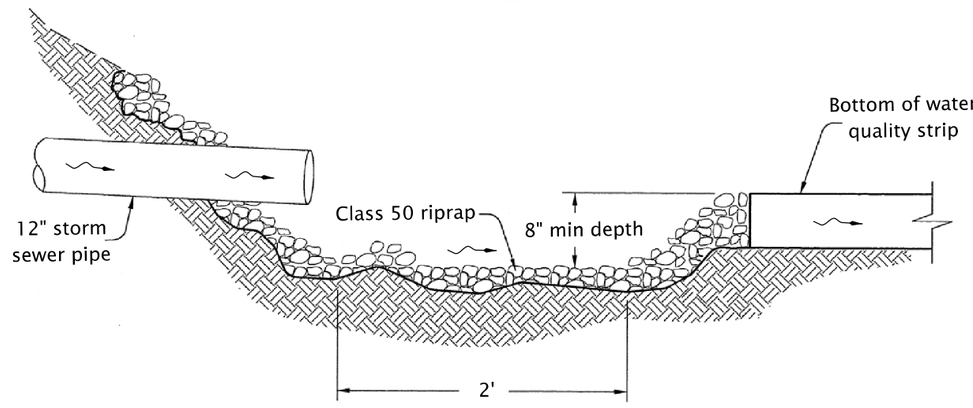
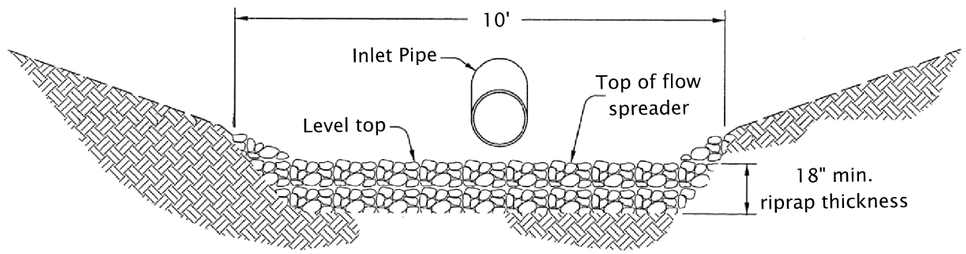


SECTION B-B
N.T.S.



SECTION C-C
N.T.S.

Legend:

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

OREGON DEPARTMENT OF TRANSPORTATION

Sht. 01 of 01

Prepared By: *Katrina Sepulveda*

Drafted By: *Katrina Sepulveda*

DFI D00783
MAINTENANCE DISTRICT 2B HWY 001
Water Quality Biofiltration Swale
Highway MP 289.83
Washington County

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 47V-002

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

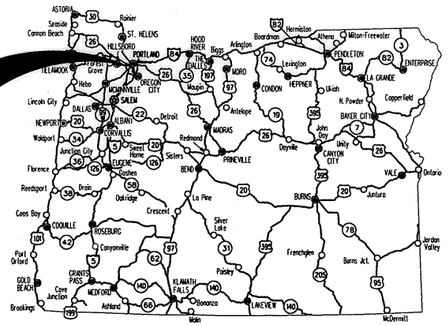
FFO - I-5: HOOD AVE-TUALATIN RVR SEISMIC RETROFIT

PACIFIC HIGHWAY

MULTNOMAH AND WASHINGTON COUNTIES

NOVEMBER 2013

PROJECT SITE



Overall Length Of Project - 9.38 Miles

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

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

BRIDGE NO. 08195
M.P. 299.23

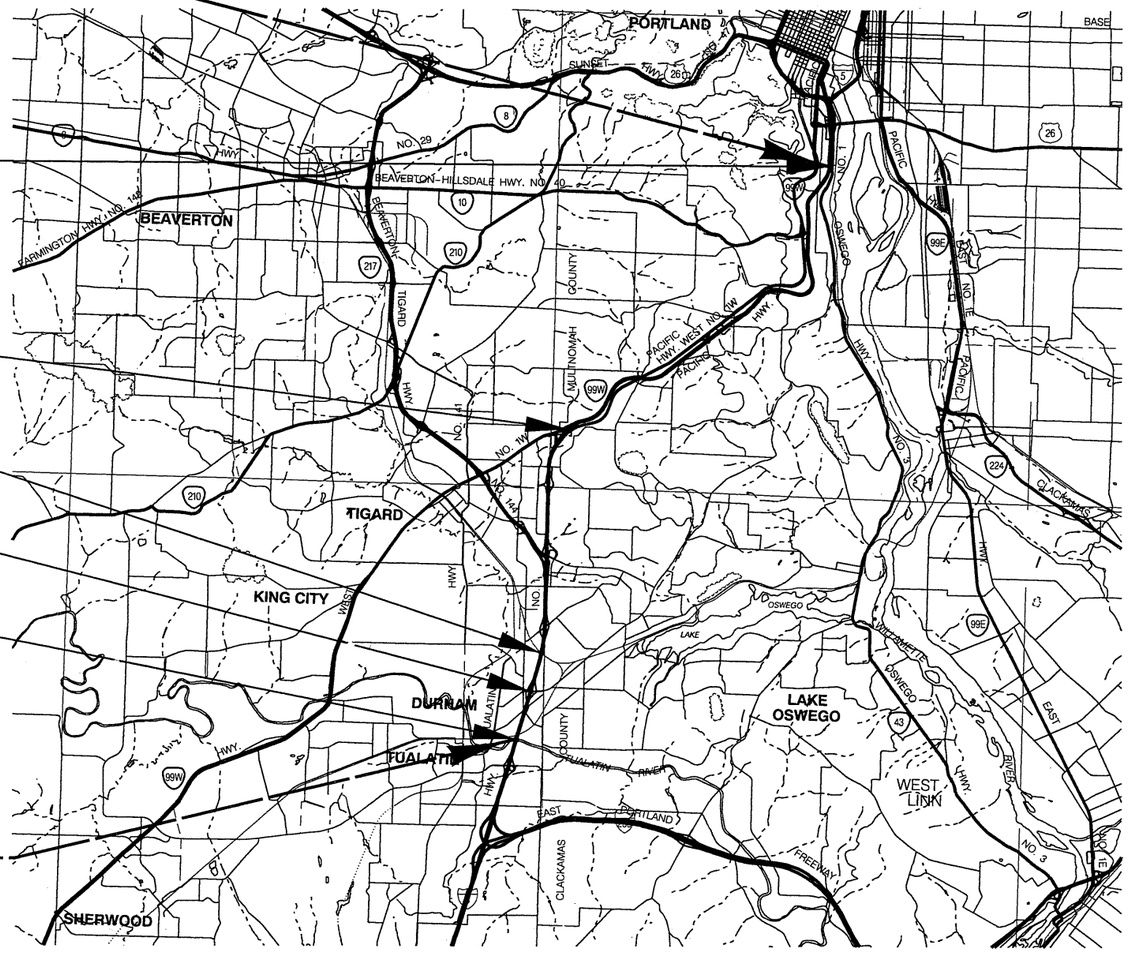
BRIDGE NO. 07758C
M.P. 293.82

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

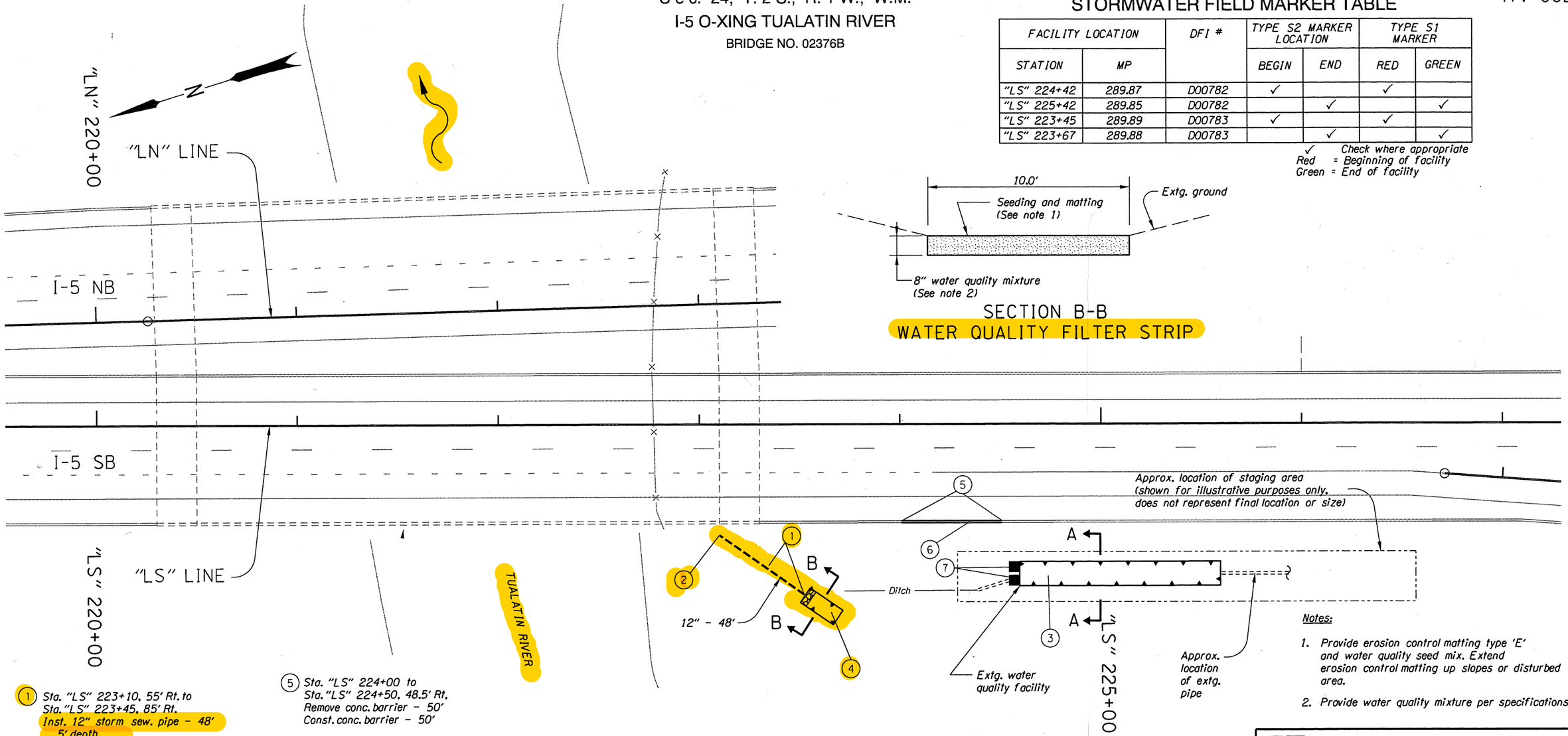
DRAWING NO.	DESCRIPTION
BRIDGE NO. 07729A (LOWER BOONES FERRY RD.)	
92177	Plan and Elevation
92178	General Notes
92179	Foundation Data
92180	Geotechnical Data - 1
92181	Geotechnical Data - 2
92182 thru 92190	Construction Staging
92191	Span 2 Lifting Details
92192	Footing Plan
92193	Deck Plan - 1
92194	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

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)

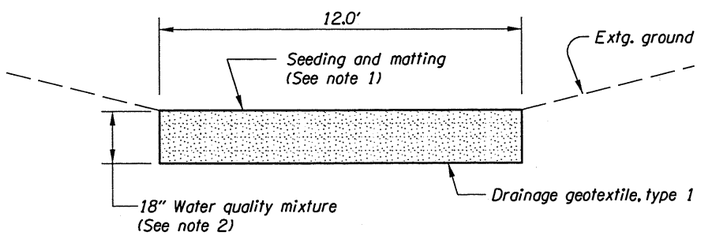
3. Sta. "LS" 224+42, 78' Rt. to Sta. "LS" 225+42, 78' Rt.
Reconst. 12'x100' water quality swale (D00782)
(For details, see drg. no. RD399)

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



SECTION A-A
WATER QUALITY SWALE

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

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

OREGON DEPARTMENT OF TRANSPORTATION

HDR Engineering, Inc.

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

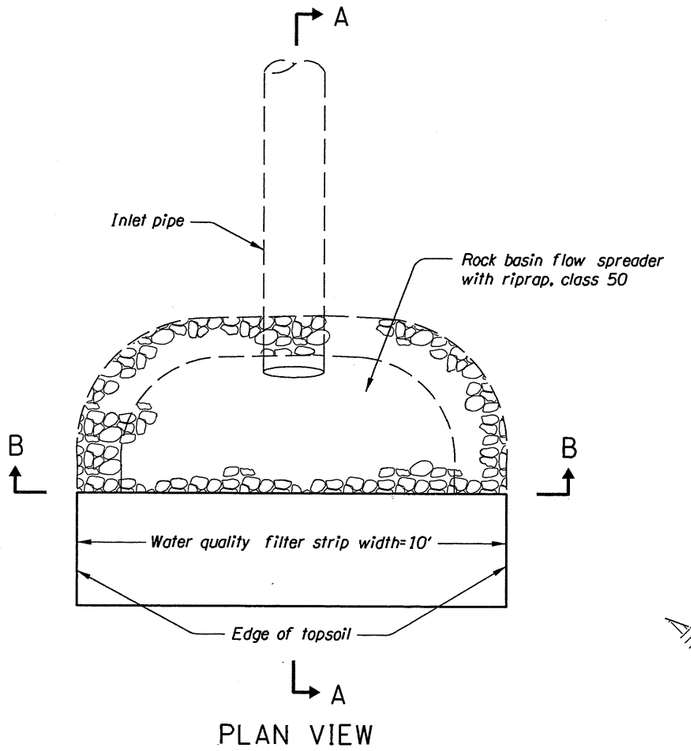
Reviewed By - Brendan LeBlanc
Designed By - Chris Higgins
Drafted By - Heather Consior

GENERAL CONSTRUCTION

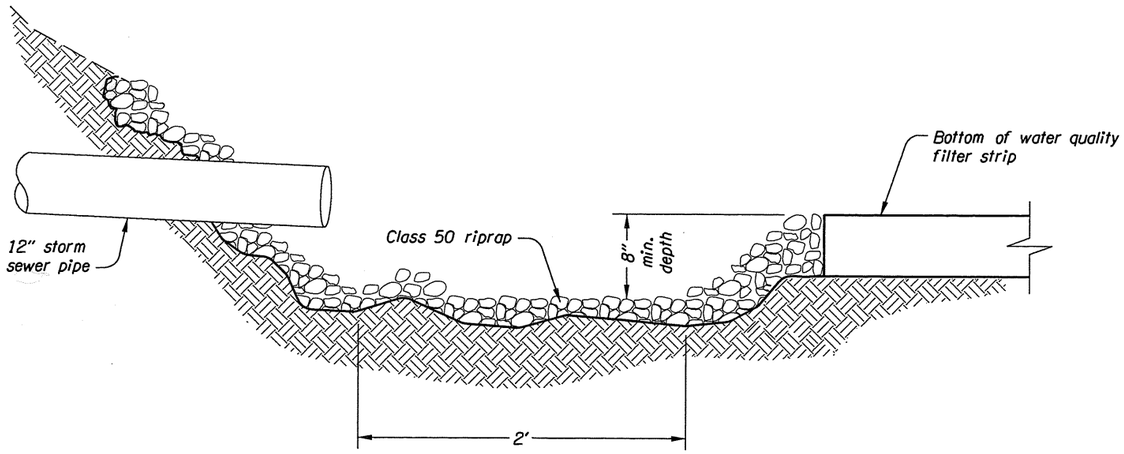
SHEET NO. 7

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

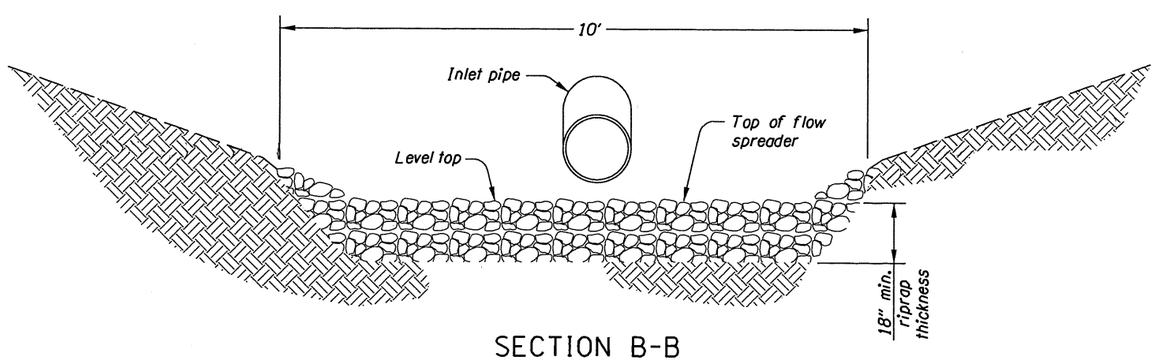
47V-002



PLAN VIEW



SECTION A-A



SECTION B-B

ROCK BASIN FLOW SPREADER WITH RIPRAP, CLASS 50

REGISTERED PROFESSIONAL ENGINEER
58562RE
OREGON
JULY 21, 1998
CHRISTINE J. HIGGINS
EXPIRES: 06-30-15

OREGON DEPARTMENT OF TRANSPORTATION

HDR Engineering, Inc.

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

Reviewed By - Brendan LeBlanc
Designed By - Christine Higgins
Drafted By - Heather Consior

WATER QUALITY DETAILS

SHEET NO. GJ