OPERATION & MAINTENANCE MANUAL

Water Quality Filter Strip

Manual prepared: October 2018

DFI No. D00601, D00602, D00603

Figure 1: DFI No. D00601, looking southeast

Figure 2: DFI No. D00602 looking southeast

Figure 3: DFI No. D00603, looking northwest

1. Identification

Drainage Facility ID (DFI):	D00601
Facility Type:	Water Quality Filter Strip
Construction Drawings:	(V-File Numbers) 45V-053
Location:	District: 01
	Highway No.: 047
	Mile Post: 46.23-46.27 (beginning to end)

Drainage Facility ID (DFI):	D00602
Facility Type:	Water Quality Filter Strip
Construction Drawings:	(V-File Numbers) 45V-053
Location:	District: 01
	Highway No.: 047
	Mile Post: 46.32-46.38 (beginning to end)

Drainage Facility ID (DFI):	D00603
Facility Type:	Water Quality Filter Strip
Construction Drawings:	(V-File Numbers) 45V-053
Location:	District: 01
	Highway No.: 047
	Mile Post: 46.32-46.37 (beginning to end)

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.

Facility location type: Roadway shoulder

Flow direction: North (D00601), South (D00602 & D00603)

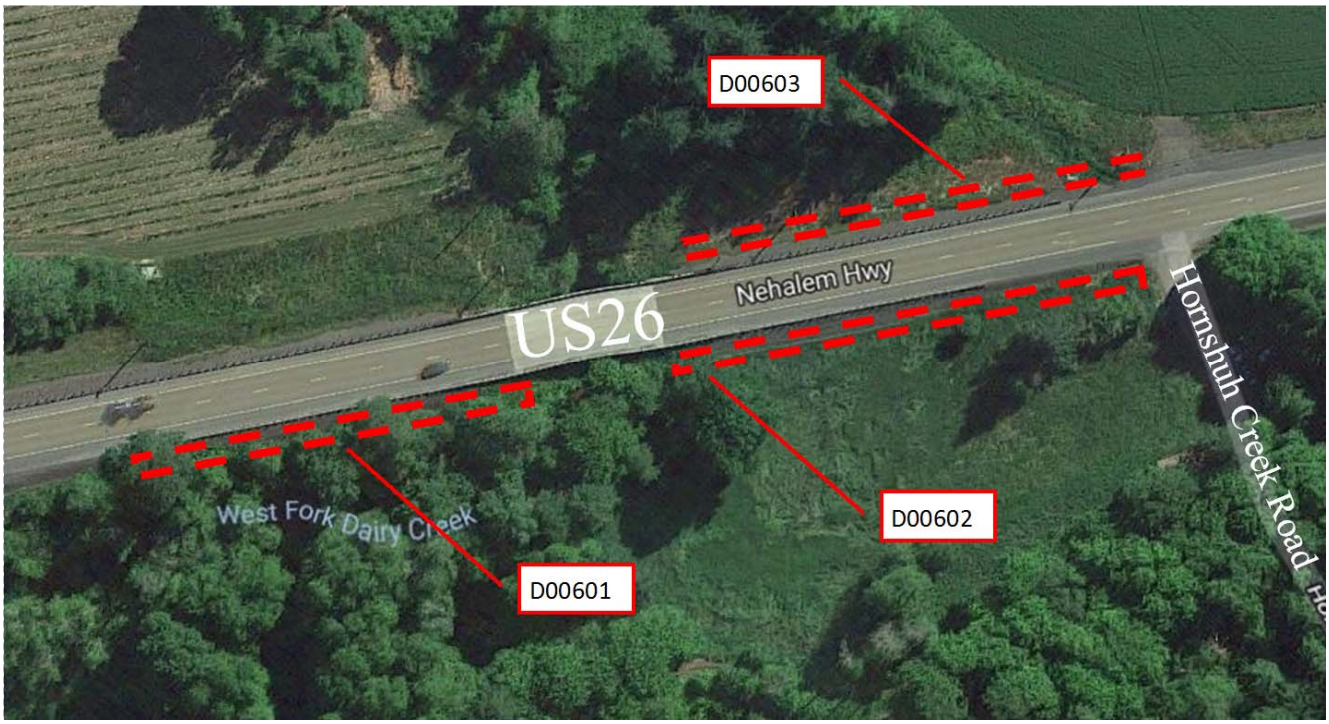


Figure 4: Facility location map

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)
D00601	250	5
D00602	320	5
D00603	250	5

The stormwater runoff sheet flows from paved areas along US 26, through the aggregate shoulder to the water quality filter strip. This flow will continue downhill to the north (for D00603) and to the south (for D00602 and D00601).

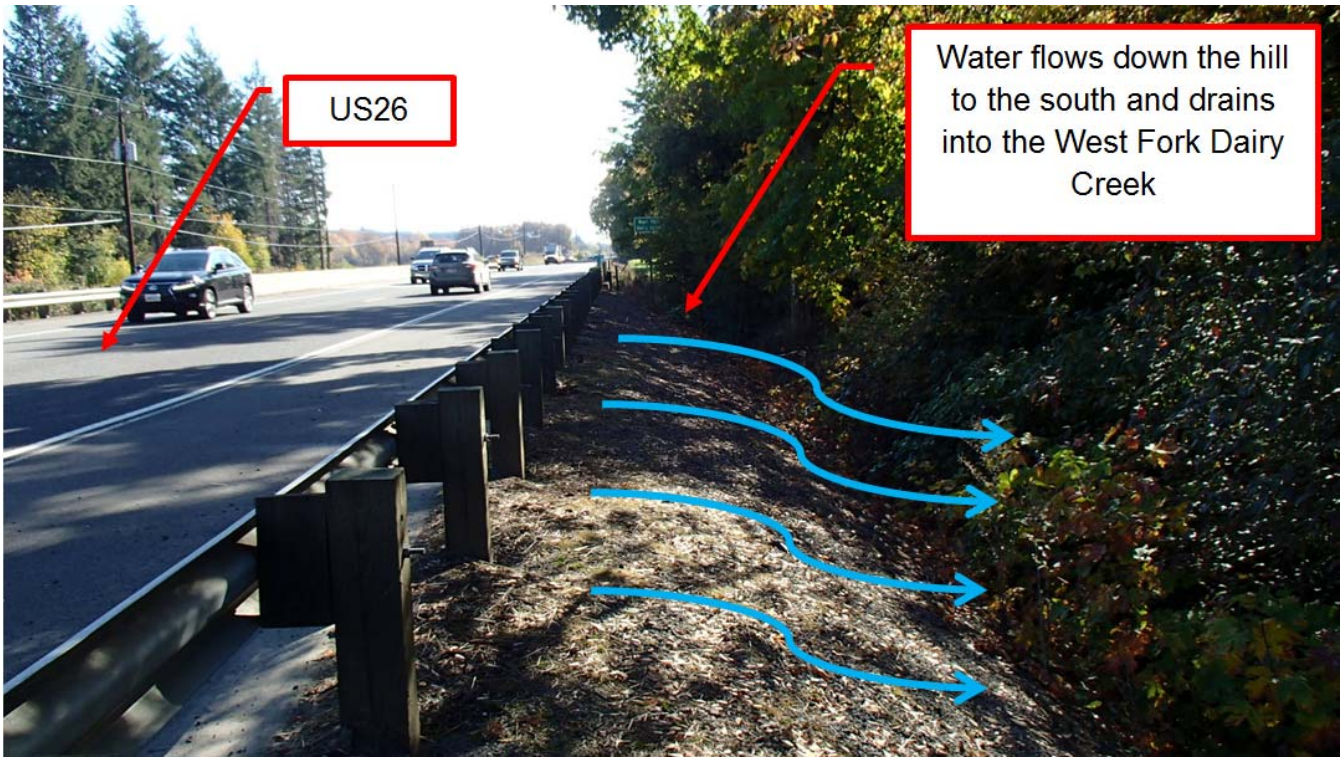


Figure 5: D00601 looking southeast

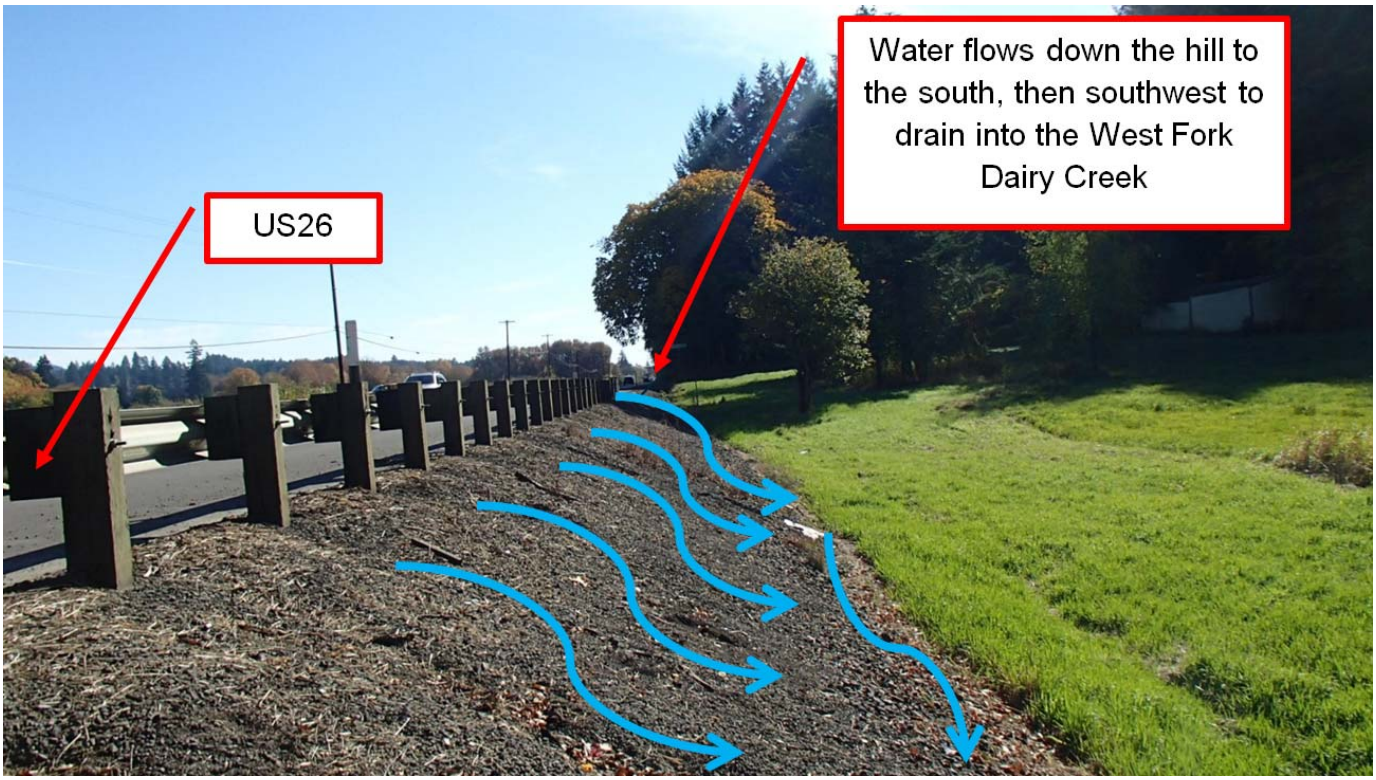


Figure 6: D00602 looking southeast

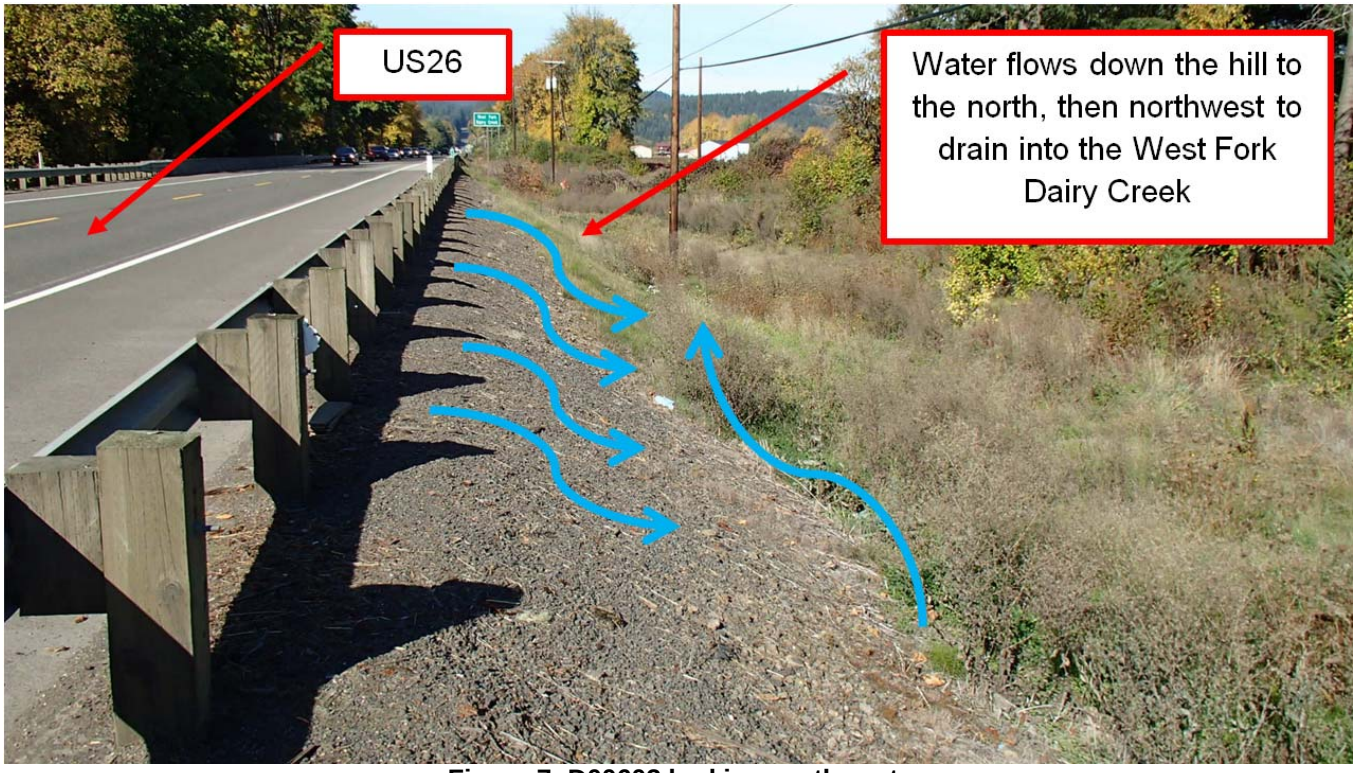


Figure 7: D00603 looking northwest

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

Side Slope	Rise (feet)	Run (feet)
D00601	**1**	**2**
D00602	**1**	**2**
D00603	**1**	**2**

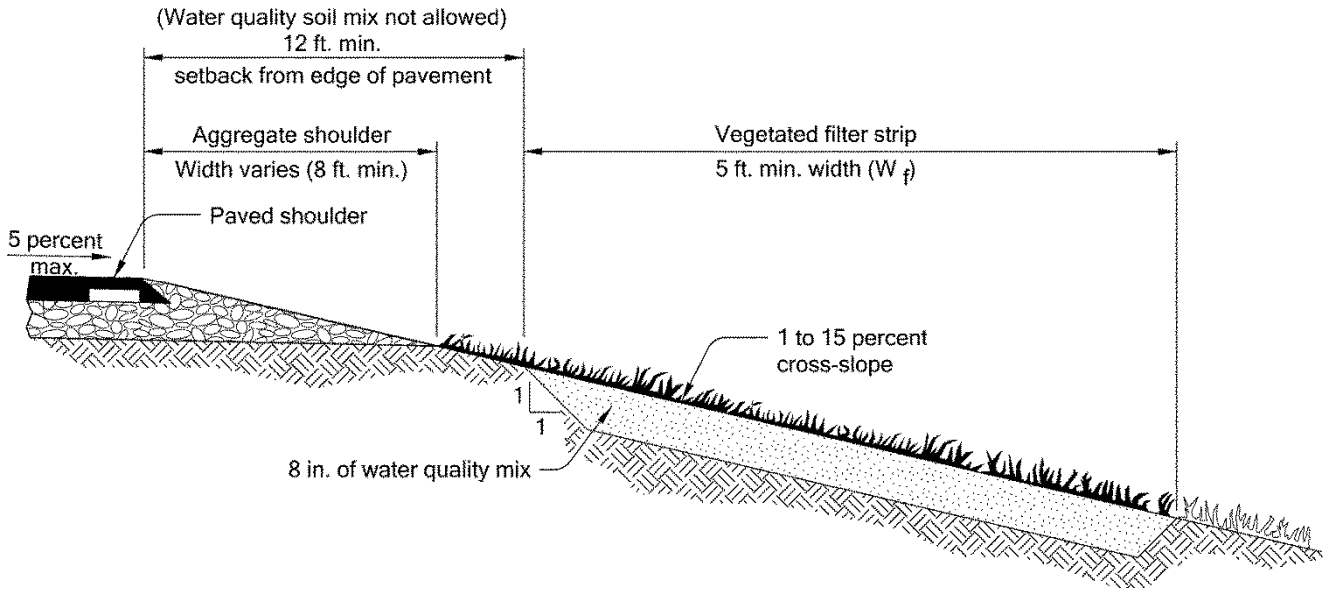


Figure 8: Filter Strip section

5. **Facility Access**

Maintenance access to the facility:

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

Figure 9: Access for D00601 looking southeast

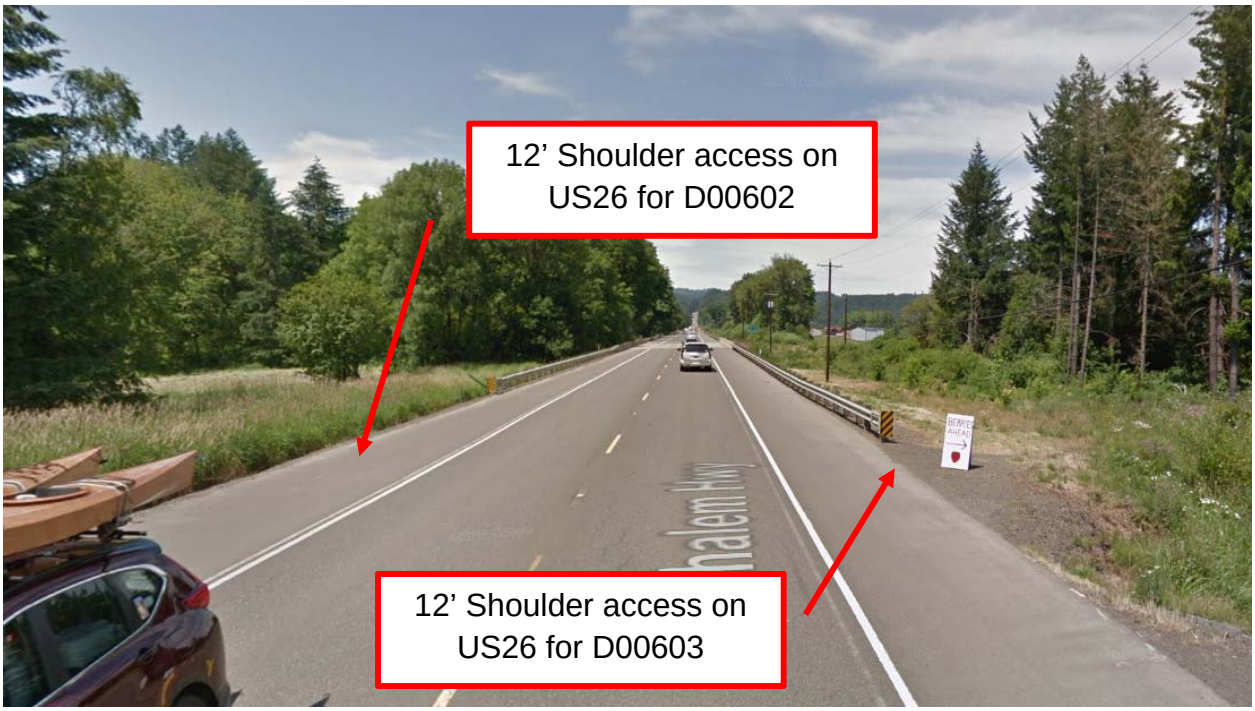


Figure 10: Access for D00602 and D00603 looking northwest

6. 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/

Special Feature of Filter Strip:

The filter strip has a cellular confinement system with an ecology mix. There is a compost erosion blanket with seed and matting on top of the confinement system.

Figure 11: Cellular strip confinement system used for all three filter strips

Figure 12: Cellular Confinement System

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**
Cellular Confinement	☒	**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)

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

1. 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.

2. 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

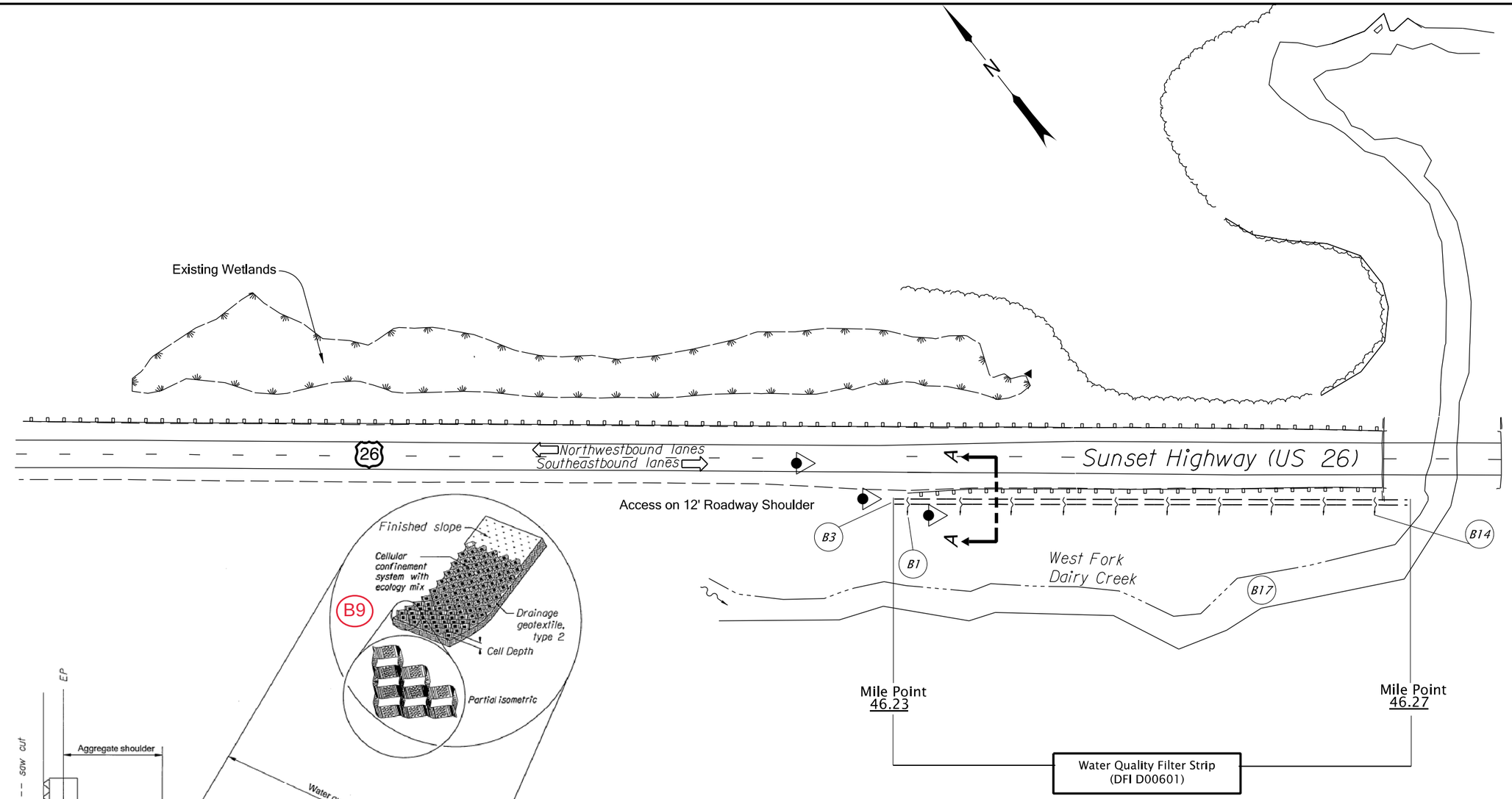
Contact any of the following for more detailed information about management of waste materials found on site:

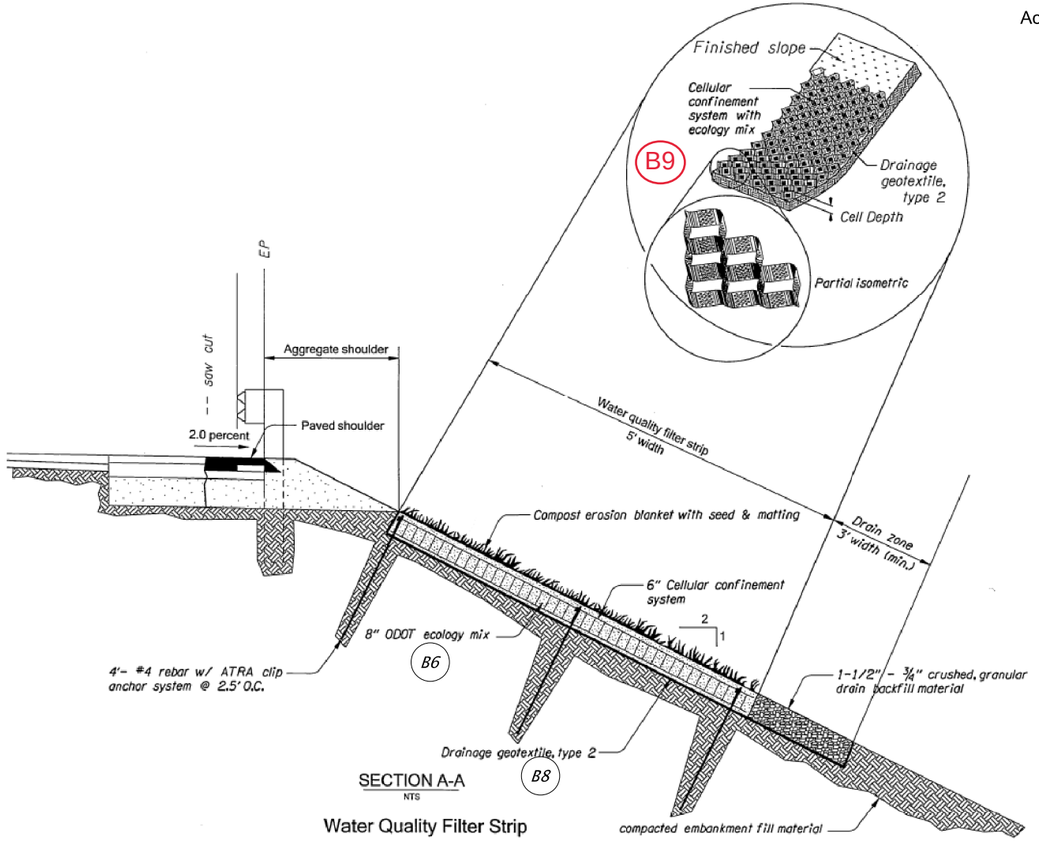
ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647
ODOT Region 3 Hazmat Coordinator	(541) 957-3594
ODOT Region 4 Hazmat Coordinator	(541) 388-6186
ODOT Region 5 Hazmat Coordinator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

A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D00601, D00602, D00603





Water Quality Filter Strip

Legend

- Water Quality Filter Strip
- Water Flow Direction
- Traffic Flow Direction
- Picture Location/Direction

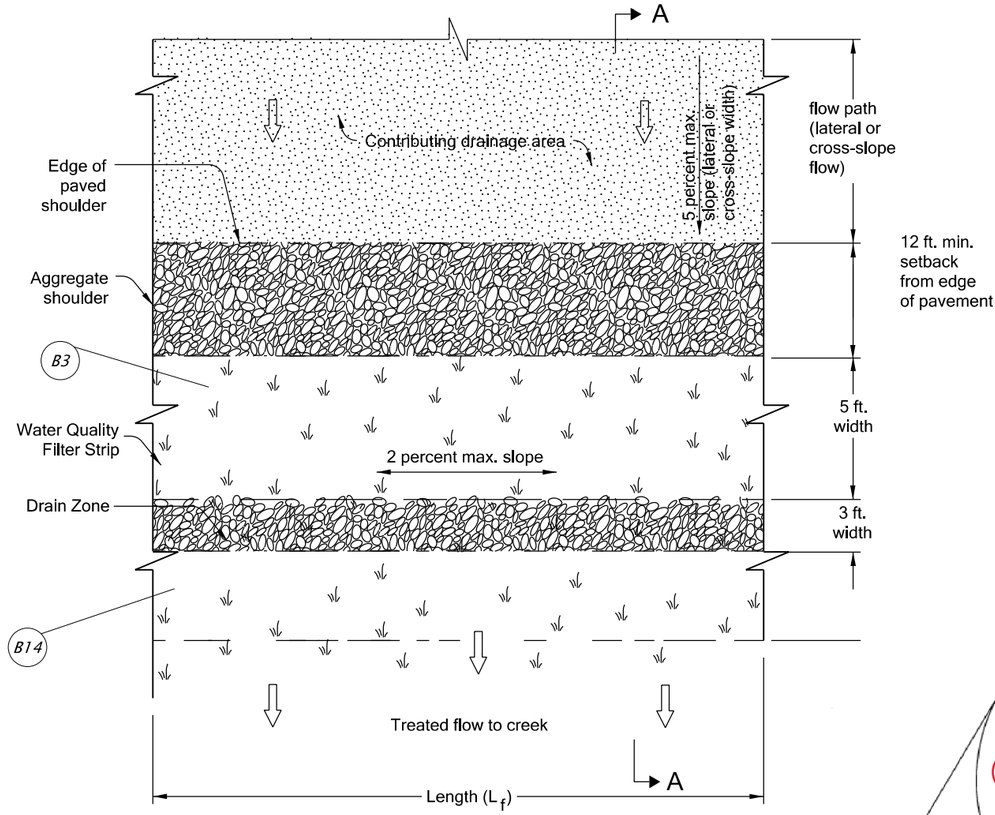
OREGON DEPARTMENT OF TRANSPORTATION

Sht. 01 of 02

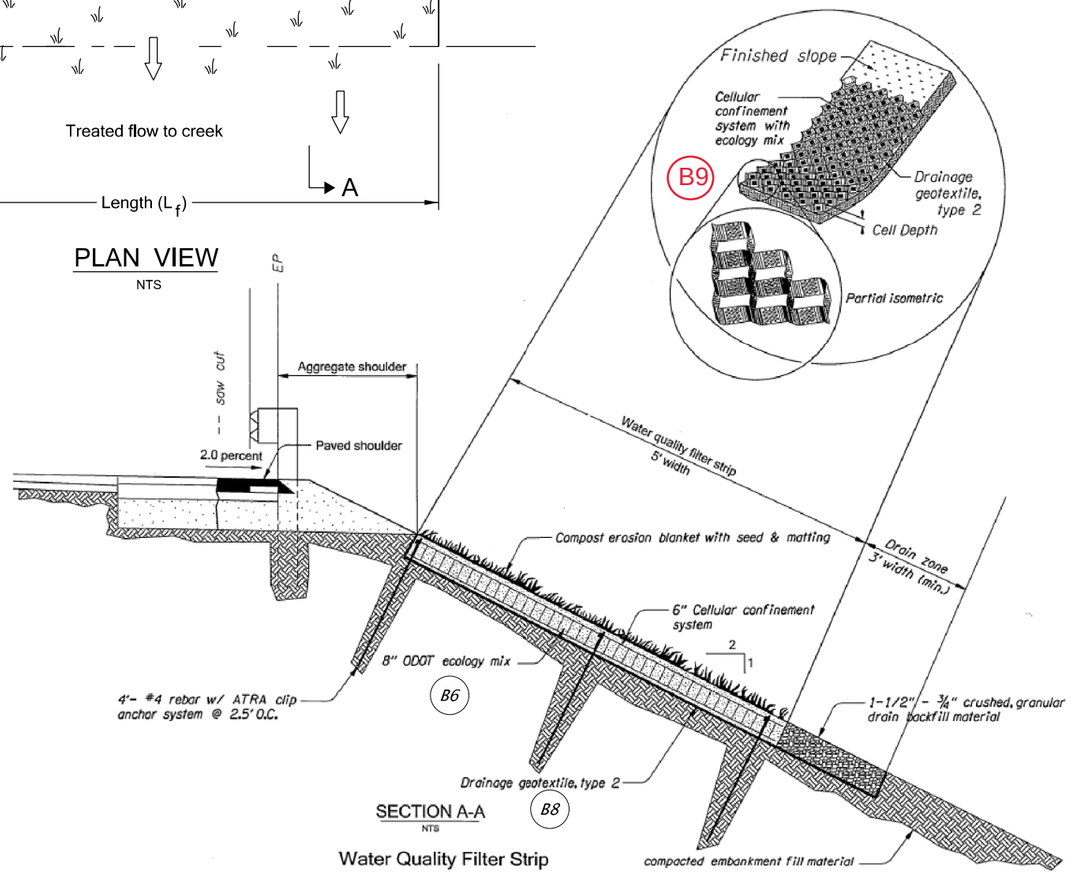
Prepared By: Katrina Sepulveda

Drafted By: Katrina Sepulveda

DFI D00601
MAINTENANCE DISTRICT 1 HWY 047
Water Quality Filter Strip
Sunset Highway MP 46.17-46.26
Banks County

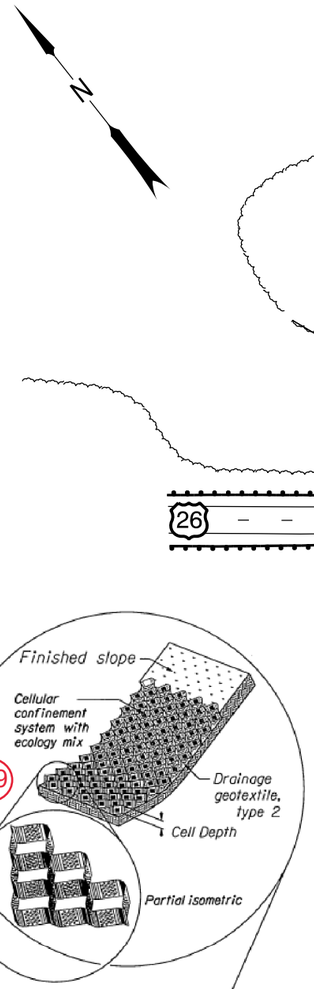


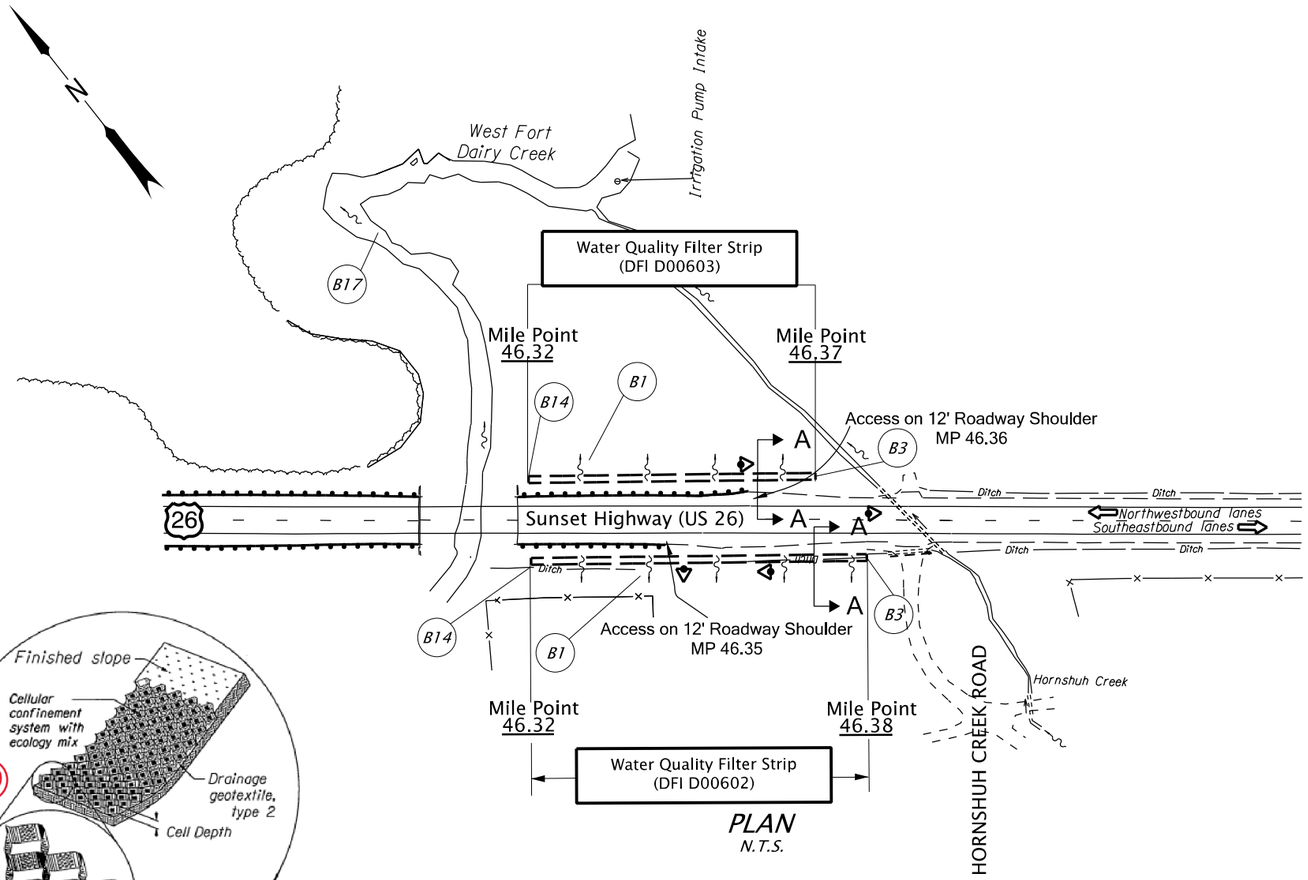
PLAN VIEW
NTS



SECTION A-A
NTS

Water Quality Filter Strip





PLAN
N.T.S.

Legend:

- Water Quality Filter Strip
- Traffic Flow Direction
- Water Flow Direction
- Photo Location/Direction

OREGON DEPARTMENT OF TRANSPORTATION

Sht. 02 of 02

Prepared By: Katrina Sepulveda

Drafted By: Katrina Sepulveda

DFI D00602, D00603
MAINTENANCE DISTRICT 1 HWY 047
Water Quality Filter Strip
Sunset Highway MP 46.32 -46.38
Banks County

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 45V-053

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

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

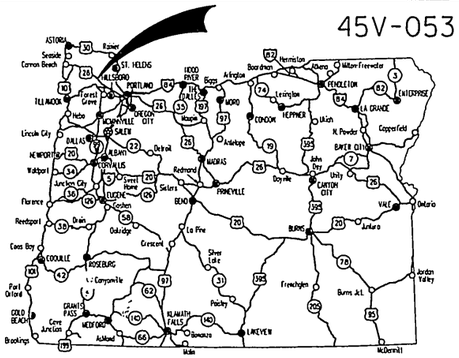
GRADING, DRAINAGE, STRUCTURE, PAVING & SIGNING

US26: WEST FORK DAIRY CREEK BRIDGE @ MP 46.30 SEC.

SUNSET HIGHWAY

WASHINGTON COUNTY
MAY 2012

45V-053



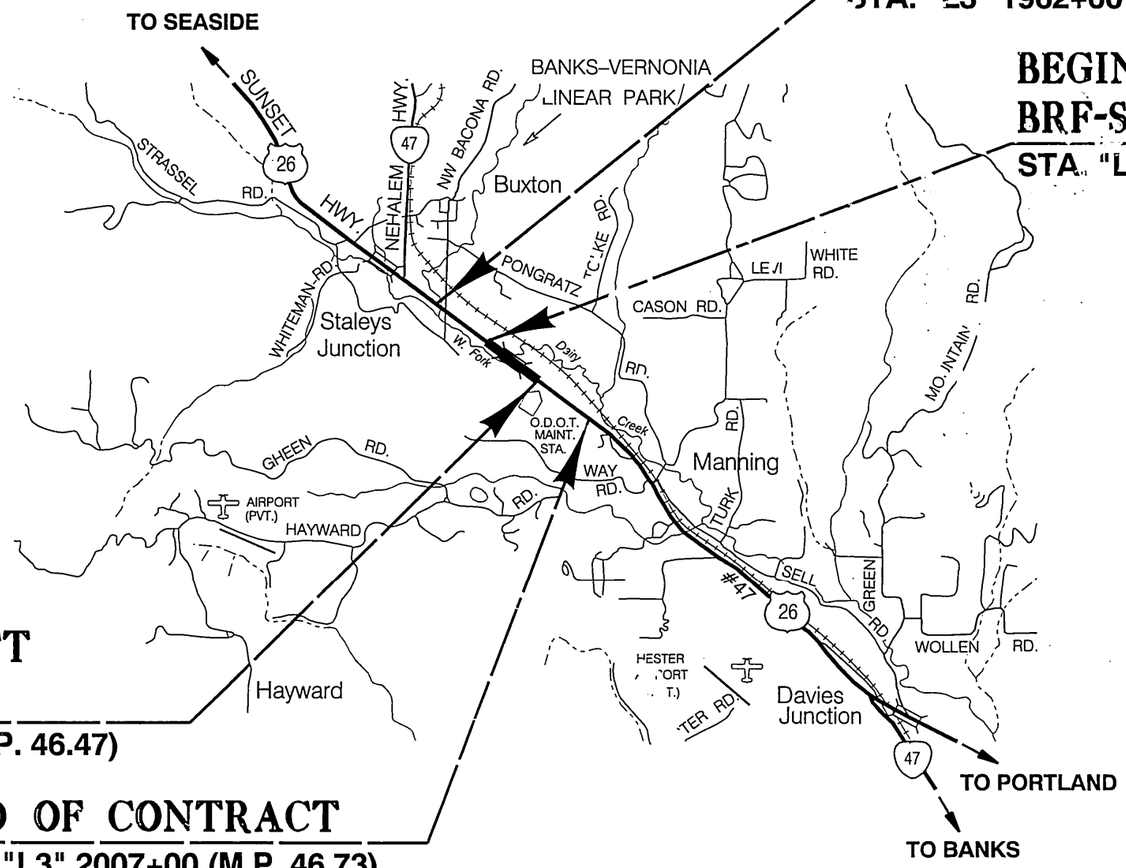
Overall Length Of Project - 0.28 Miles

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 CONTRACT
STA. "L3" 1962+00 (M.P. 45.89)

BEGINNING OF PROJECT
BRF-S047(101)
STA. "L3" 1977+00 (M.P. 46.17)



END OF PROJECT
BRF-S047(101)
STA. "L3" 1993+00 (M.P. 46.47)

END OF CONTRACT
STA. "L3" 2007+00 (M.P. 46.73)

N

T. 2 N., R. 4 W., W.M.

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 develop[illegible] 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: Naveen Chandra
Naveen G. Chandra, P.E.
Project Delivery Manager, Region 1

Concurrence by ODOT Chief Engineer

US26: WEST FORK DAIRY CREEK BRIDGE @ MP 46.30
SUNSET HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	BRF-S047(101)	1

PE001342 000

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INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
2	Typical Sections
2B & 2B-2	Details
2C Thru 2C-3	Traffic Control Plan
2D	Pipe Data Sheet
3	Alignment & General Construction
3A	Drainage & Utilities
3B	Profile
4	Alignment & General Construction
4A	Drainage & Utilities
4B	Profile
	GEO/HYDRO
GA & GA-4	Erosion Control Plan
GA-5 Thru GA-9	Erosion Control Details
GB	Hornshuh Creek Geotechnical Data
GG	Temporary Water Management
GH & GH-2	Scour Protection
GJ Thru GJ-3	Water Quality Details
	BRIDGE (Structure 20945)
88195	Plan & Elevation
88196	General Notes
88197	Geotechnical Data
88198	Footing Plan
88199	Deck Plan
88200	Deck Section
88201	Bulb-1 Beam Schedule & Misc. details
88202	Bent-2 (Bent-1 Similar)
88203	Wingwalls & Misc. Details
	PERMANENT PAVEMENT MARKINGS
ST	Striping Plan
	PERMANENT SIGNING
S-12951 Thru S-12953	Permanent Signing

Standard Drg. Nos.

RD300	- Trench Backfill, Bedding, Pipe Zone And Mult. Installations
RD318	- Sloped Ends For Concrete Pipe
RD386	- Pipe Fill Height Tables
RD400, RD405, RD410, RD415, RD420, RD425, RD440, RD450, RD470	- Guardrail
RD500	- Precast Concrete Barrier Pin And Loop Assembly
RD530	- Guardrail Transition To Concrete Barrier
RD610	- Asphalt Pavement Details
RD715	- Approaches And Non-Sidewalk Driveways
RD1000	- Construction Entrances
RD1005	- Check Dams
RD1010, RD1015, RD1020	- Inlet Protection
RD1025, RD1030, RD1035	- Sediment Barrier
RD1040	- Sediment Fence
RD1045	- Temporary Slope Drains
RD1055	- Matting

BR165	- Bridge End Panel Details
BR200	- Conc. Bridge Rail Type F
BR203	- Transition Conc. Br. Rail To Guard Rail
BR300	- Bulb-I Girders
BR350	- Temp. Diaphragm Beam For Prestressed Conc. Girders
TM200	- Sign Installation Details
TM201	- Miscellaneous Sign Placement Details
TM223	- Directional Sign Layout
TM500, TM502	- Pavement Marking Standard Details
TM515	- Raised Pavement Markers
TM517	- Recessed Pavement Markers
TM522	- Durable Pavement Markings
TM560	- Alignment Layout
TM570	- Traffic Delineators
TM571	- Traffic Delineators Steel Post Details
TM576	- Traffic Delineator Installation
TM635	- Breakaway Sign & Luminaire Supports
TM670	- Wood Post Sign Supports
TM671	- 3 Second Gust Wind Speed Isotach
TM676	- Sign Attachments
TM677	- Sign Mounts
TM681, TM687, TM688	- Square Tube Sign Supports
TM800	- Tables, Abrupt Edge And PCMS Details
TM810	- Temporary Reflective Pavement Markers
TM820	- Temporary Barricades
TM821	- Temporary Sign Supports
TM830	- Temporary Concrete Barrier And Rumble Strips
TM831, TM832	- Temporary Impact Attenuators
TM850	- 2-Lane, 2 Way Roadways
TM870	- Bridge Construction

R/W Map Nos. 5B-9-3 and 4B-23-5

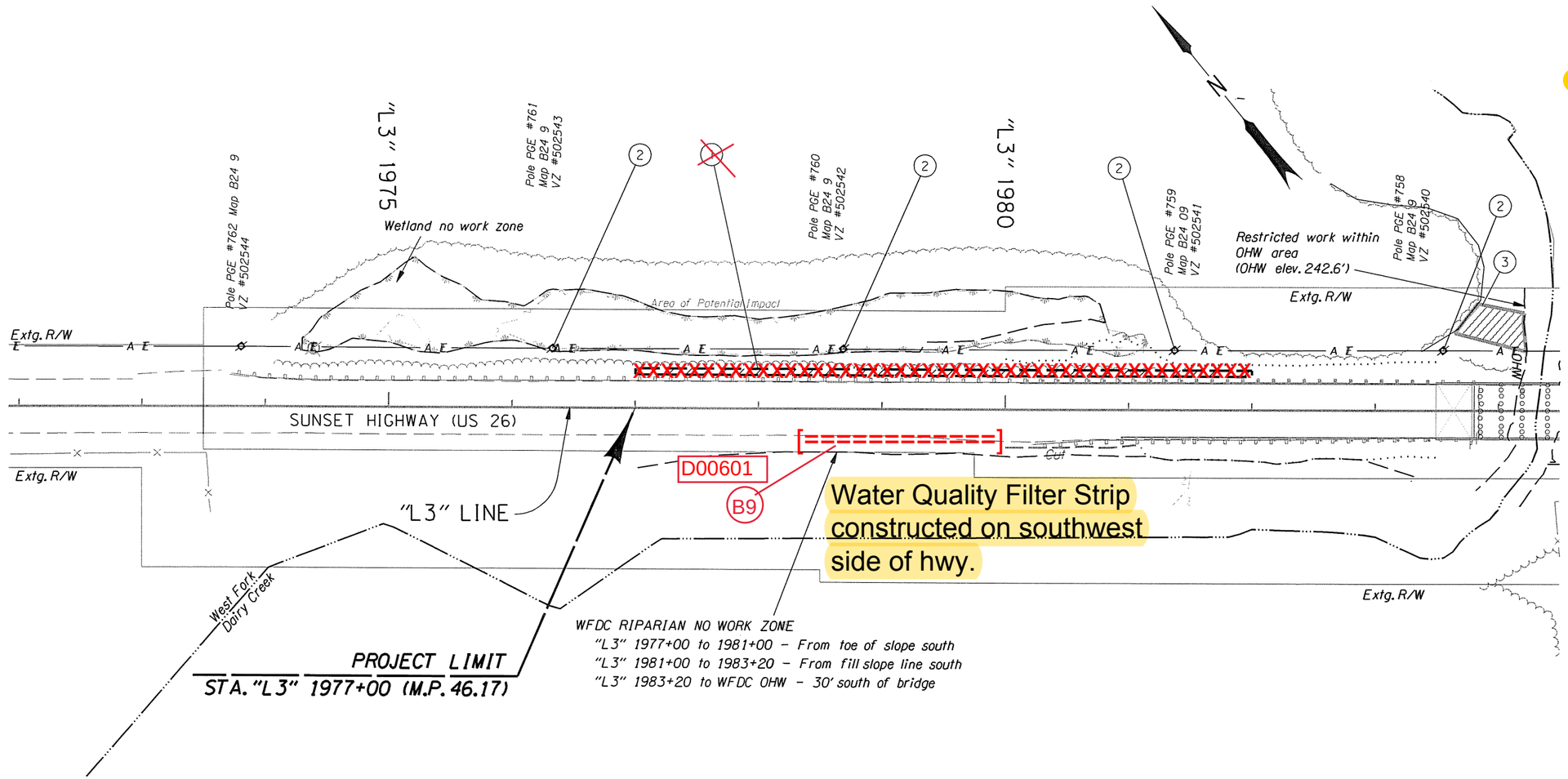
Standard Drawings located on the web at:
http://www.oregon.gov/ODOT/HWY/ENGSERVICES/standard drawings home.shtml

US26: WEST FORK DAIRY CREEK
BRIDGE @ MP 46.30 SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	BRF-S047(101)	1A

Sec. 9, T. 2 N., R. 4 W., W.M.

45V-053



REGISTERED PROFESSIONAL ENGINEER
17,577
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER
RENEWAL DATE: 6-30-2013

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - GEO/HYDRO UNIT

US26: WEST FORK DAIRY CREEK BRIDGE @ MP 46.30 SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Reviewed By - Bruce Council
Designed By - Dan Gunther
Drafted By - Dan Gunther

DRAINAGE & UTILITIES

SHEET NO. 3A

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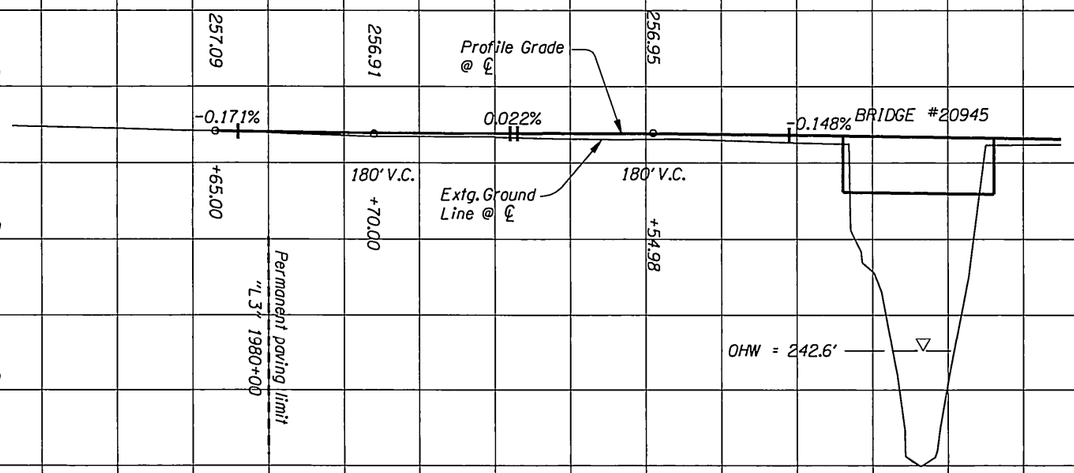
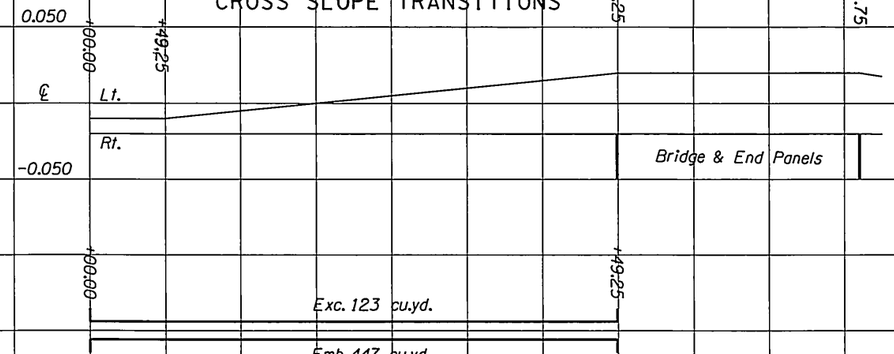
45V-053

"L3" LINE



PAVEMENT
CROSS SLOPE TRANSITIONS



STRUCTURAL DETAILS CHECKED

REGISTERED PROFESSIONAL ENGINEER
17,292
OREGON
JULY 19, 1994
STEPHEN G. SKEELS
RENEWAL DATE: 6-30-2012

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - ROADWAY ENGINEERING SECTION

US26: WEST FORK DAIRY CREEK
BRIDGE @ MP 46.30 SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Lawerence Krettler
Designed By - Stephen Skeels
Drafted By - Jalal Heydarpour

PROFILE

SHEET NO. 3B

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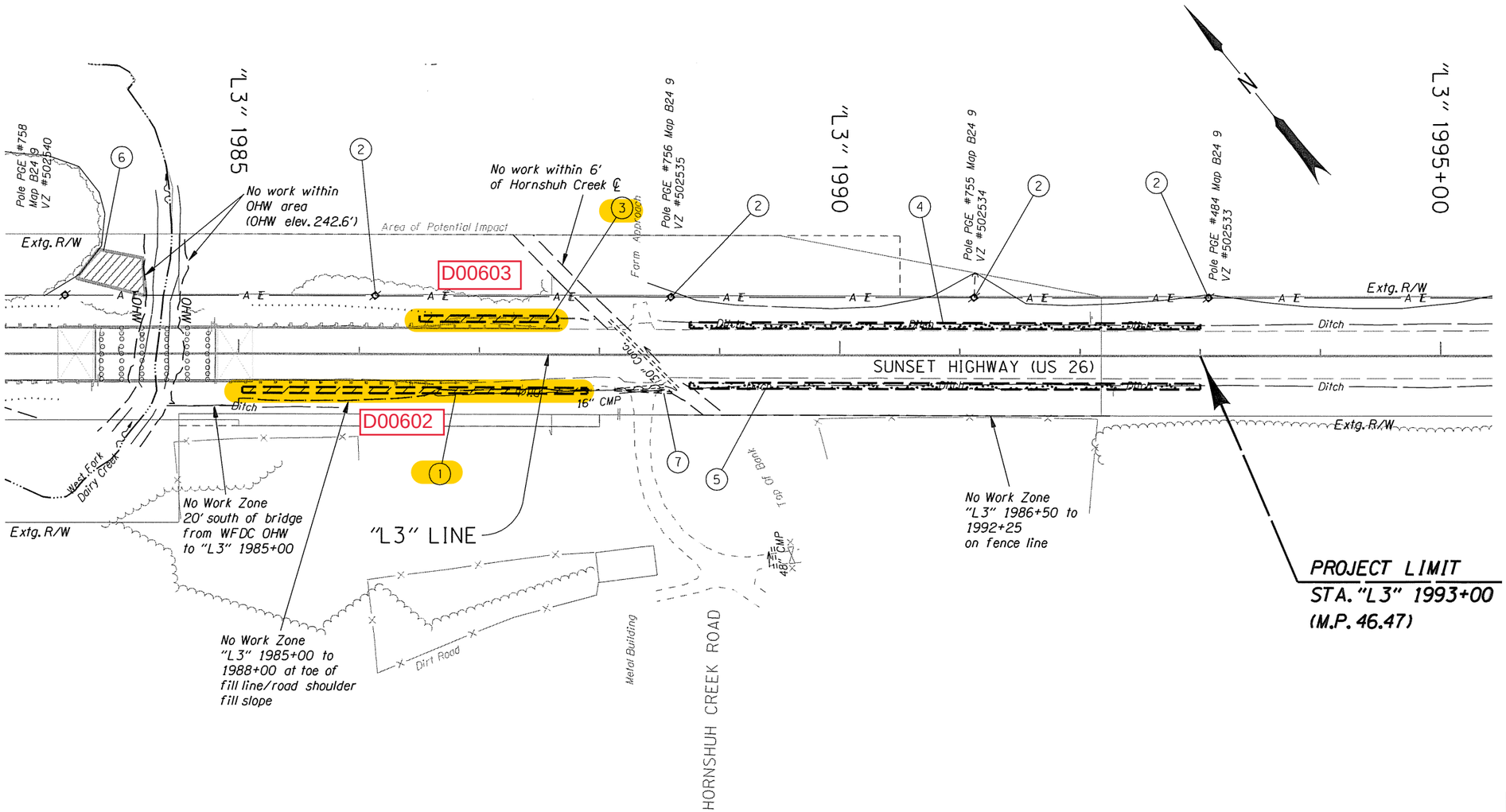
Sec. 9, T. 2 N., R. 4 W., W.M.

45V-053



D00602

(1) Sta. "L3" 1985+03.00 to Sta. "L3" 1987+90.00, Rt
Construct water quality filter strip
(For details see sht. GJ-2)

(2) Relocate utility pole - 4
(By others)

D00603

(3) Sta. "L3" 1986+50.00 to Sta. "L3" 1987+65.00, Lt.
Construct water quality filter strip
(For details see sht. GJ-2)

(4) Sta. "L3" 1988+75.00 to Sta. "L3" 1993+00.00, Lt.
Restore ditch with compost erosion blanket, seed & matting - 5' wide
(For details see sht. GA-7, detail 5)

(5) Sta. "L3" 1988+75.00 to Sta. "L3" 1993+00.00, Rt
Restore ditch with compost blanket, seed & matting - 5' wide
(For details see sht. GA-7, detail 5)

(6) Sta. "L3" 1983+60.00 to Sta. "L3" 1984+20.00, Lt
Construct fill mitigation site
(For details see sht. GJ)

(7) Sta. "L3" 1988+12.40, 29.00 Rt. to Sta. "L3" 1988+60.53, 31.40 Rt
Remove extg. 16" culvert
Inst. 18" culvert - 50'
5' depth
Inst. sloped ends
(See drg. no. RD318)

Restore ditch with compost blanket, seed & matting
(See sht. GA-7, detail 5)

Water quality filter strip for water quality treatment
(See sht. GJ-2)

REGISTERED PROFESSIONAL ENGINEER
17,577
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER

RENEWAL DATE: 6-30-2013

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - GEO/HYDRO UNIT

US26: WEST FORK DAIRY CREEK BRIDGE @ MP 46.30 SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Reviewed By - Bruce Council
Designed By - Dan Gunther
Drafted By - Dan Gunther

DRAINAGE & UTILITIES

SHEET NO. 4A

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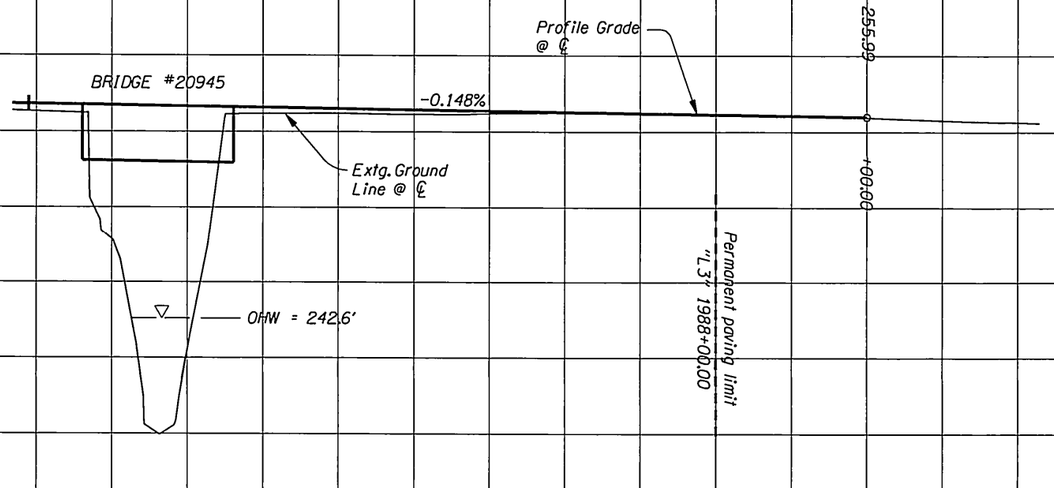
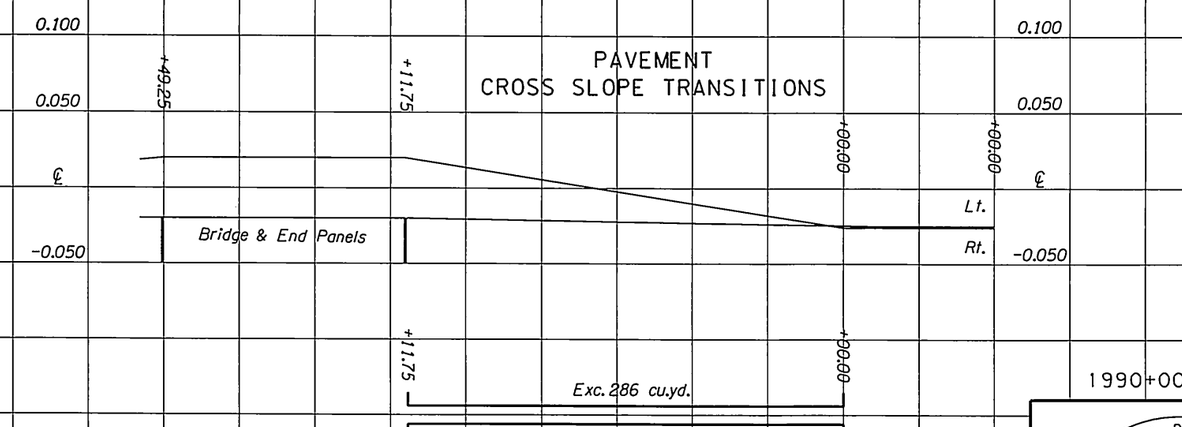
45V-053

STRUCTURAL DETAILS CHECKED

"L3" LINE



PAVEMENT
CROSS SLOPE TRANSITIONS



OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - ROADWAY ENGINEERING SECTION

US26: WEST FORK DAIRY CREEK BRIDGE @ MP 46.30 SEC.

SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Lawerence Krettler
Designed By - Stephen Skeels
Drafted By - Jalal Heydarpour

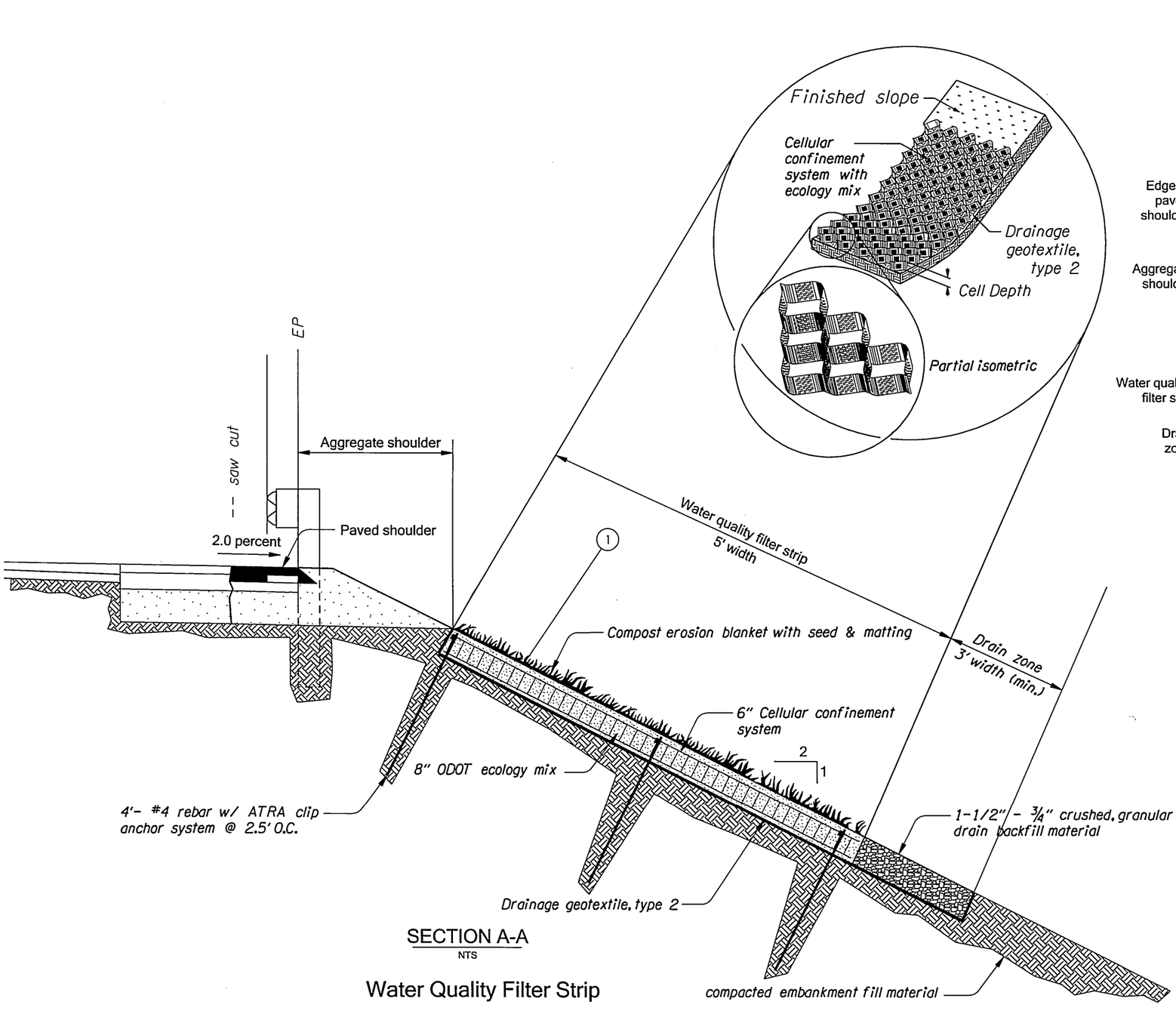
PROFILE

SHEET NO. 4B

REGISTERED PROFESSIONAL ENGINEER
17,292
OREGON
July 19, 1994
STEPHEN G. SKEELS

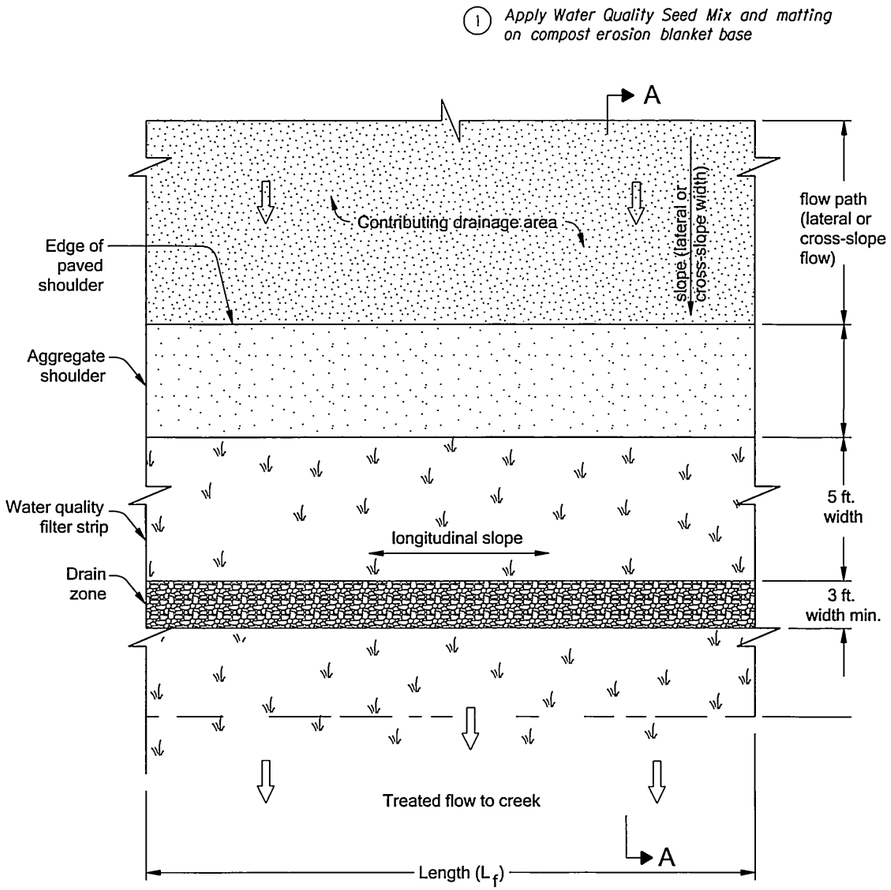
RENEWAL DATE: 6-30-2012

45V-053



SECTION A-A
NTS

Water Quality Filter Strip



PLAN VIEW
NTS

Water Quality Filter Strip

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - GEO/HYDRO UNIT

US26: WEST FORK DAIRY CREEK
BRIDGE @ MP 46.30 SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Reviewed By - Bruce Council
Designed By - Dan Gunther
Drafted By - Dan Gunther

REGISTERED PROFESSIONAL ENGINEER
17,577
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER

RENEWAL DATE: 6-30-2013

WATER QUALITY DETAILS

SHEET NO. GJ-2

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