OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: December 2018

DFI No. D00605

Figure 1: DFI No. D00605, looking [west]

Identification

Drainage Facility ID (DFI):	D00605
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 45v-029
Location:	District: 01
	Highway No.: 047
	Mile Post: 57.20 to 57.26, [left]

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: [west]

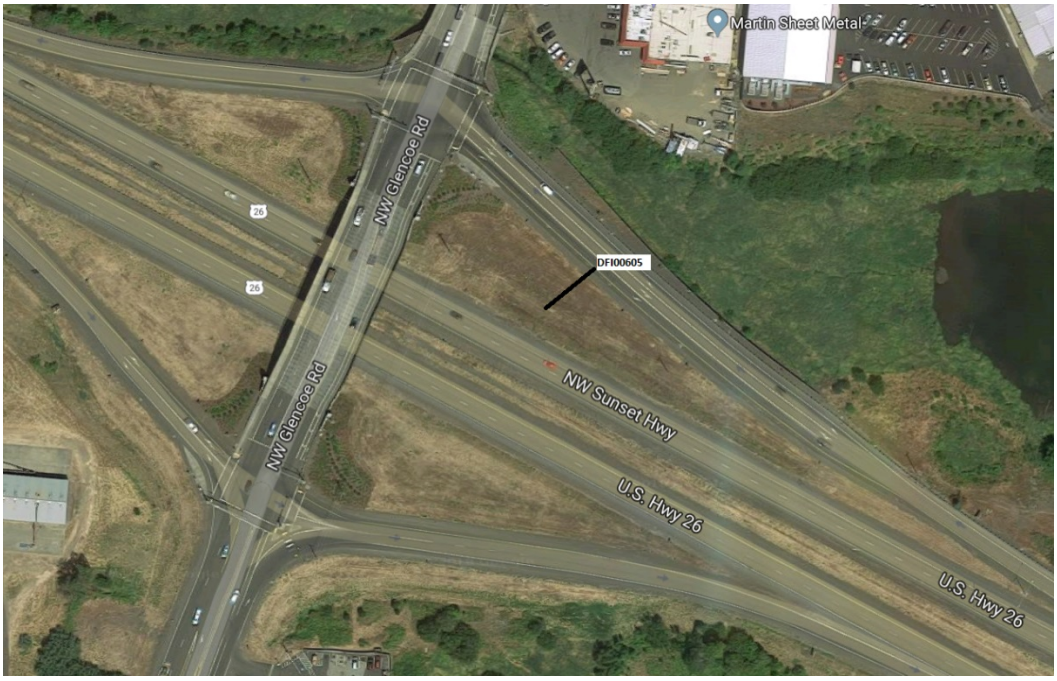


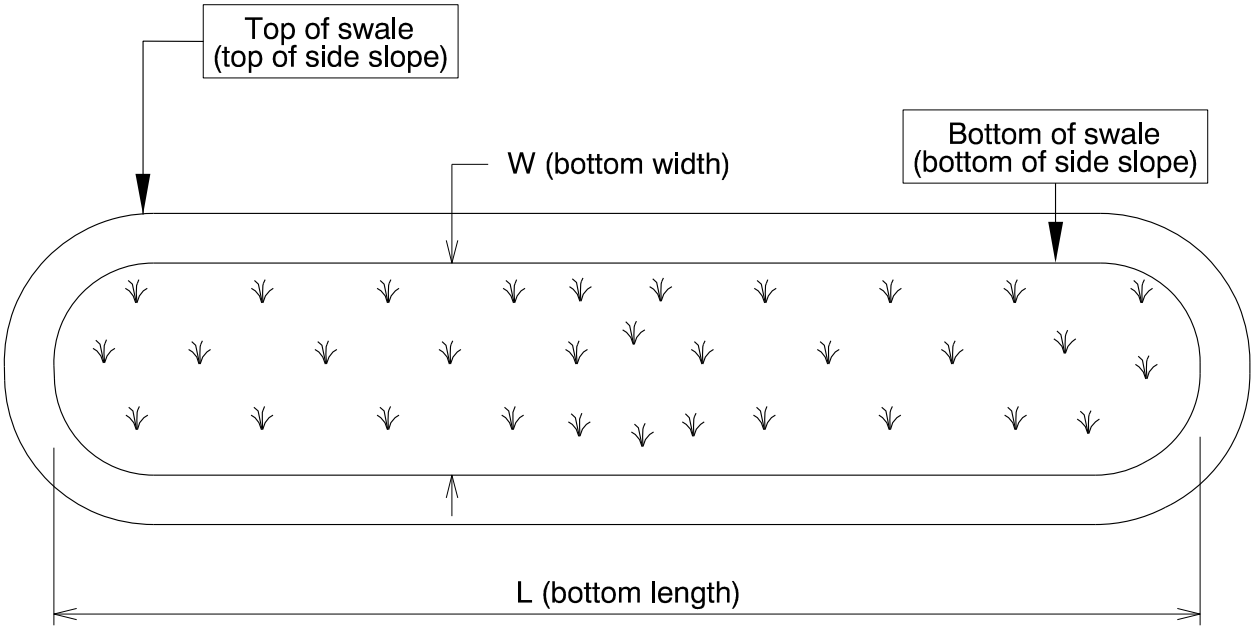
Figure 2: Facility location map

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:

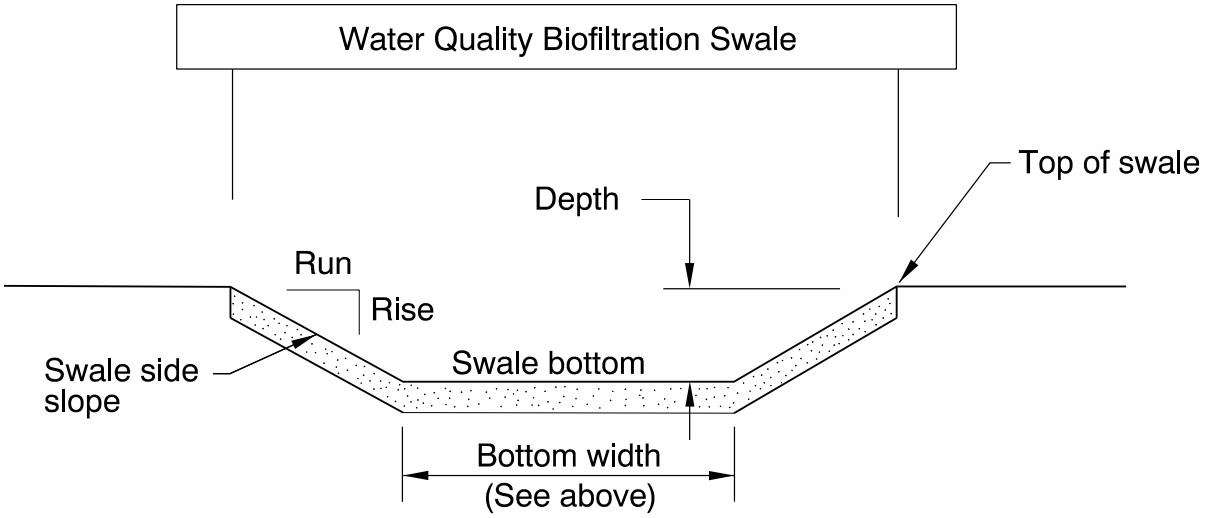
Bottom Length (feet)	Bottom Width (feet)
440	4



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)
Unknown	**1**	**4**



Site Specific Information: Water enters this facility from the north via a 12" pipe underneath the off ramp. It flows west for 440 feet before exiting through a type D inlet and out an east flowing 15" pipe which is diverted north via a manhole. Water is conveyed underneath the off ramp and into a creek immediately north of the interchange.

4. Facility Access

Maintenance access to the facility:

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

Figure 3: [looking west]

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: None	☐	**S19**
Swale Outlet		
Catch basin with grate	☒	**S20**
Outlet Pipe (s)	☒	**S21**
Open channel outlet	☐	**S22**
Auxiliary Outlet: None	☐	**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**

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:

☒ 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.

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

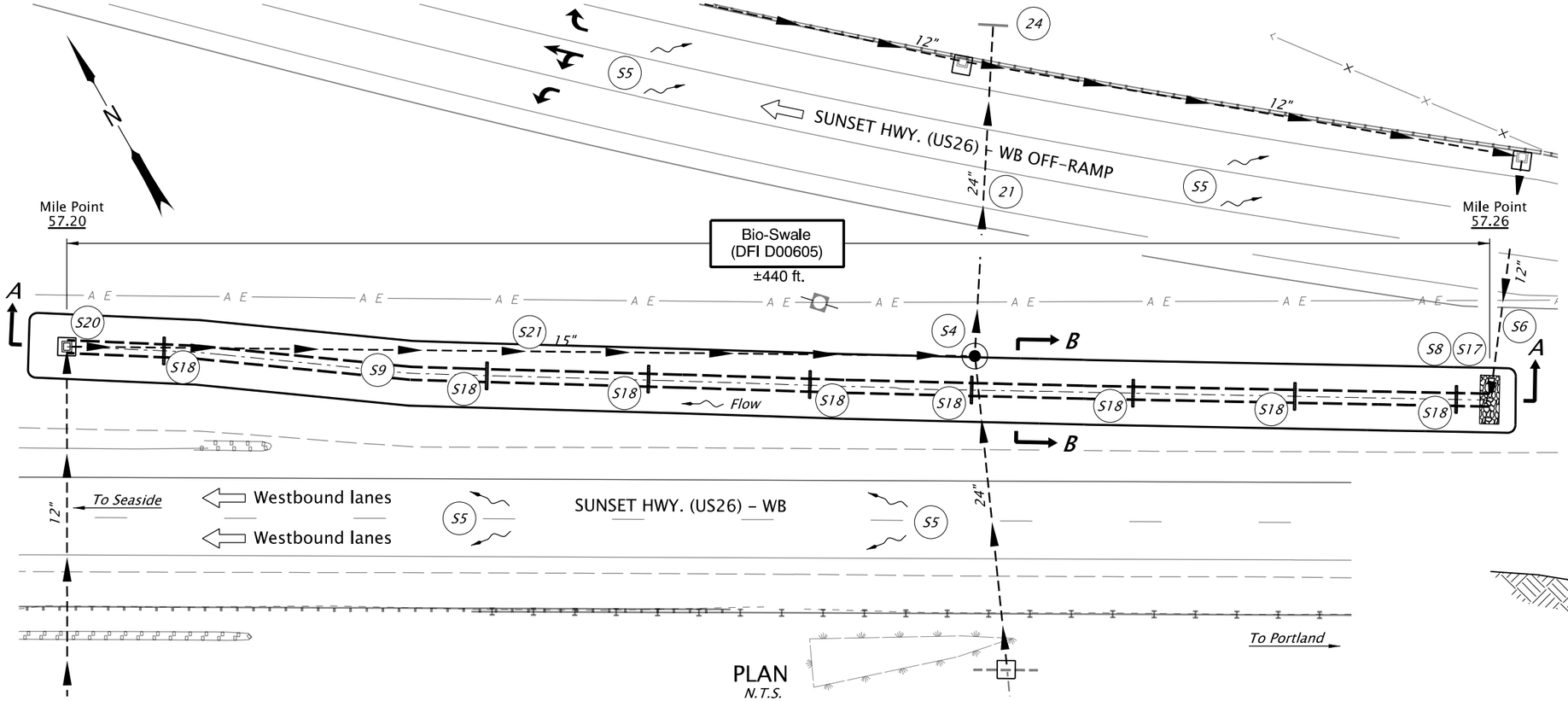
Contact any of the following for more detailed information about management of waste materials found on site:

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:

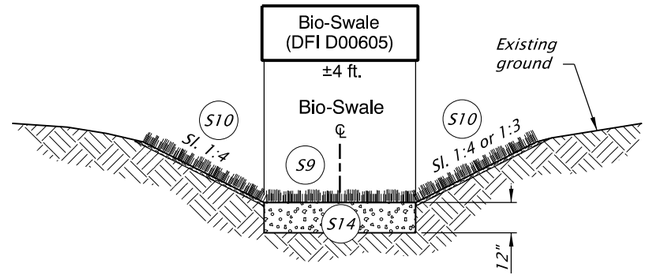
Operational Plan: DFI D00605



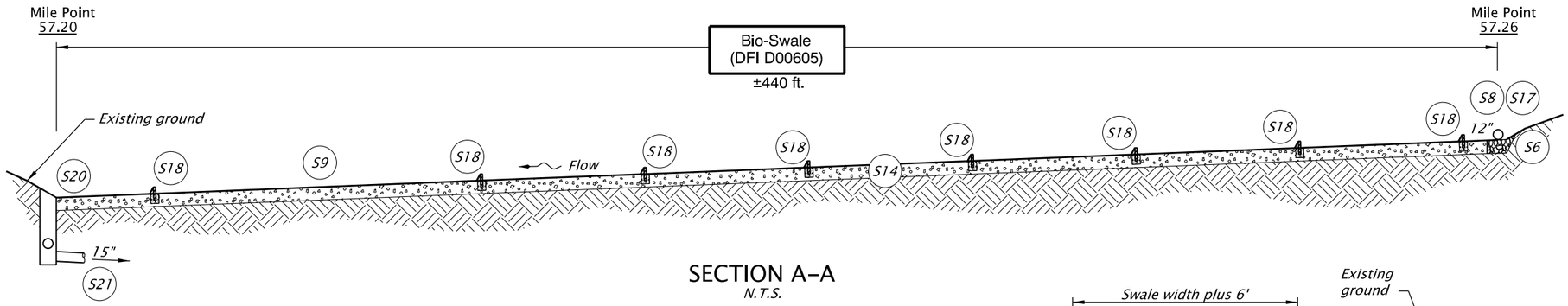
PLAN
N.T.S.

LEGEND:

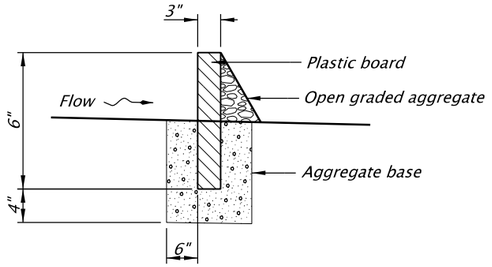
- X# — *Facility Component (see table 1 in O&M Manual)*
- *Manhole*
- *Inlet*
- *Storm Pipe (Facility)*
- *Storm Pipe*
- *Ditch Line*
- *Swale Boundary*
- *Conveyance Direction*
- *Pavement / Facility Flow Path*
- *Traffic Flow Direction*



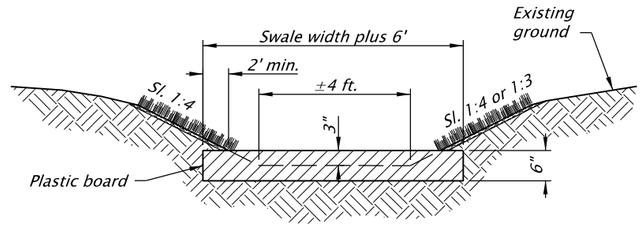
SECTION B–B
N.T.S.



SECTION A–A
N.T.S.



DETAIL – FLOW SPREADER
N.T.S.



SECTION – FLOW SPREADER
N.T.S.

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Christopher Carman

Drafted By: Jeff Coon

DFI D00605
MAINTENANCE DISTRICT 1 HWY 47
WATER QUALITY BIOFILTRATION SWALE
SUNSET HIGHWAY MP 57.20 LT.
WASHINGTON COUNTY

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 45v-029

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd.
1A-2	Standard Drg. nos.
1B	Sheet Layout

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

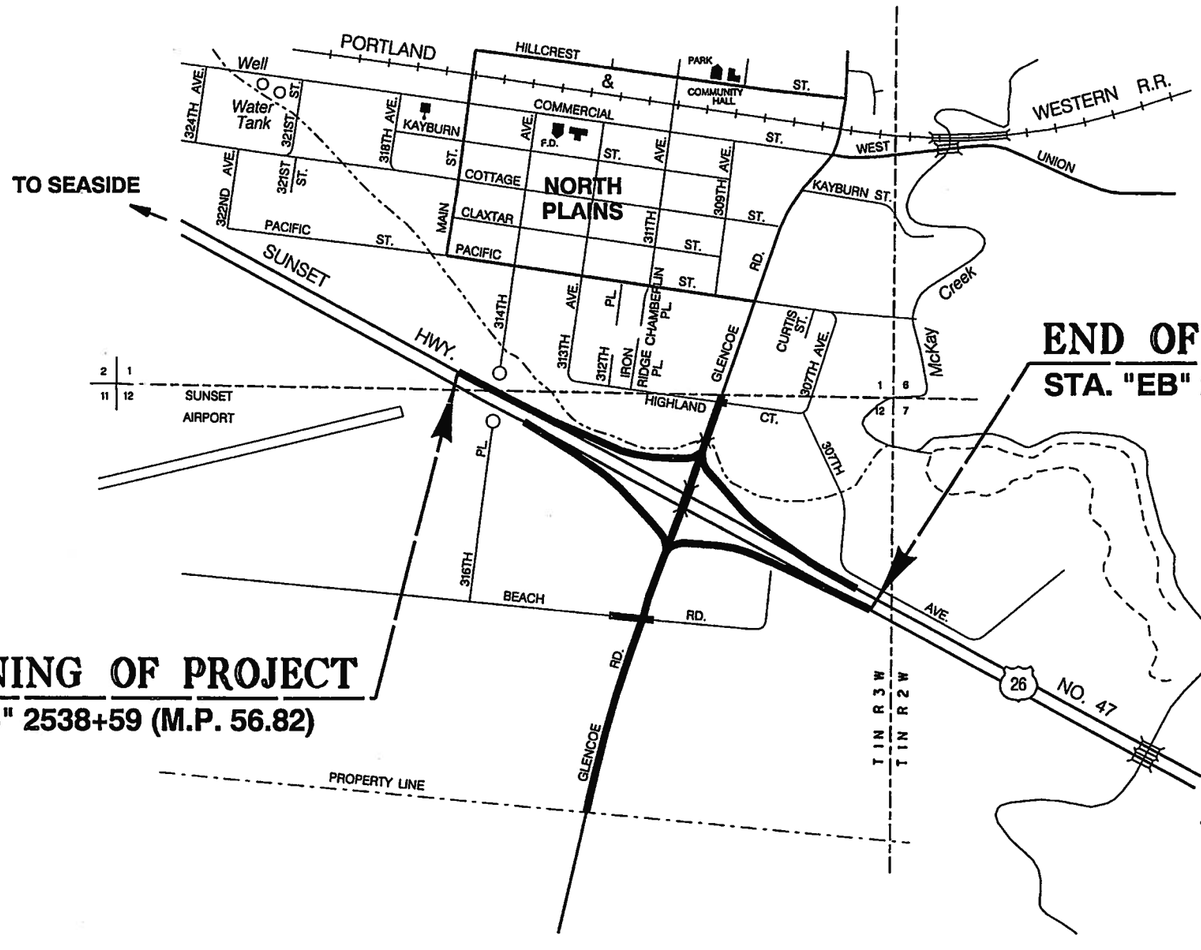
PLANS FOR PROPOSED PROJECT

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

US 26: SUNSET HWY @ GLENCOE ROAD PROJECT

SUNSET HIGHWAY

WASHINGTON COUNTY
MAY 2012

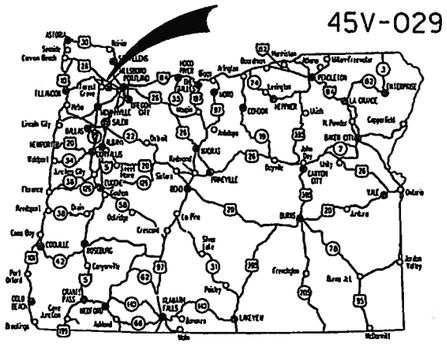


BEGINNING OF PROJECT
STA. "WB" 2538+59 (M.P. 56.82)

END OF PROJECT
STA. "EB" 2575+87 (M.P. 57.52)

N

T. 1 N., R. 3 W., W.M.
T. 1 N., R. 2 W., W.M.



45V-029

Overall Length Of Project - 0.70 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

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: Naveen G. Chandra
Naveen G. Chandra, P.E.
Project Delivery Manager, Region 1

Concurrence by ODOT Chief Engineer

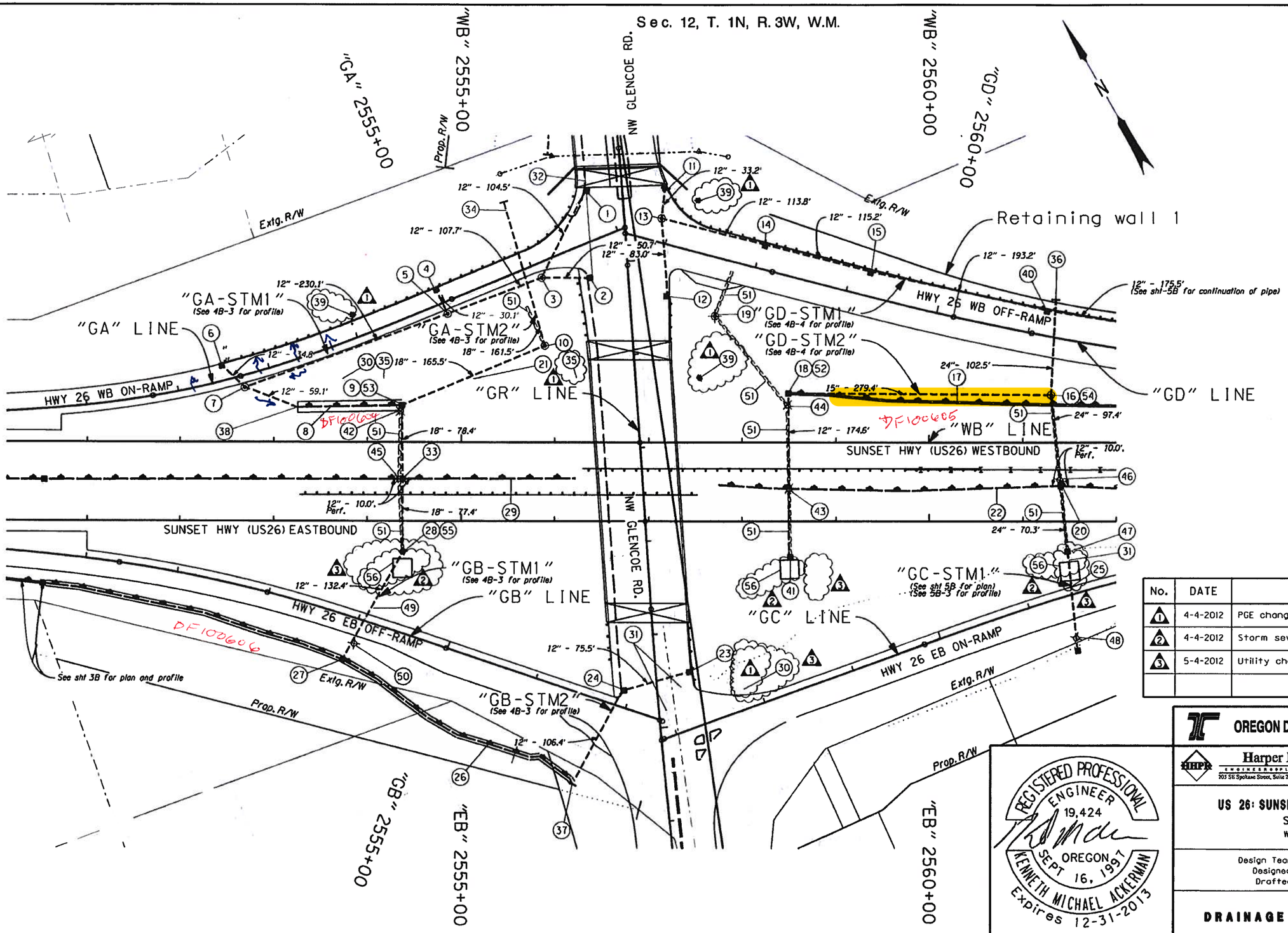
US 26: SUNSET HWY @ GLENCOE ROAD PROJECT
SUNSET HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STATE	1

PE001028-020

G:\12885_US26_Glencoe_Rd_Interchange\Final\12885R1.TS1 :: Default 3/12/2012 12:56:10 PM hwye19g

Sec. 12, T. 1N, R. 3W, W.M.



No.	DATE	REVISIONS	BY
1	4-4-2012	PGE change	K.M.A.
2	4-4-2012	Storm sew. information added	K.M.A.
3	5-4-2012	Utility change	K.M.A.

REGISTERED PROFESSIONAL ENGINEER
19,424
OREGON
SEPT 16, 1997
KENNETH MICHAEL ACKERMAN
Expires 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

Harper Houf Peterson Righellis Inc.
ENGINEERS • PLANNERS • LANDSCAPE ARCHITECTS • SURVEYORS
205 SE Spokane Street, Suite 200 Portland, OR 97202 phone: 503 221 1131 www.hhpr.com fax: 503 221 1171

US 26: SUNSET HWY @ GLENCOE ROAD
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Ken M. Ackerman
Designed By - Jeff R. Torgerson
Drafted By - Peter G. Coffman

DRAINAGE & UTILITIES

SHEET NO. 4B

P:\ODT-12 (US 26 & Glencoe Interchange)\ODT12-DGN\SHEETS\12885F.dri 5/4/2012 9:06:39 AM jefft

(1) Sta. "GA-STM1" 6+01.43 =
Sta. "GR" 134+21.15, 38.62' Rt.
Const. type "CG-2" inlet w/ 1' sump
(For pipe profile, see sht. 4B-3)
(For detail, see drg. no. RD366)

(2) Sta. "GR" 135+15.21, 41.63' Rt. =
Const. type "CG-2" inlet w/ 1' sump
Rim = 190.96
F.L. out = 185.04
Pipe slope = 0.0744 ft/ft

(3) Sta. "GA-STM1" 4+96.86 =
Sta. "GR" 135+11.66, 92.04' Rt.
Const. manhole
Inst. 12" storm sew. pipe - 155.2'
10' depth
(For pipe profile, see sht. 4B-3)
(For detail, see drg. no. RD336)

(4) Sta. "GA-STM1" 3+85.95, 29.02' Lt. =
Sta. "GA" 2554+96.44, 16.38' Lt.
Const. "G-2" inlet w/ 1' sump
Rim = 184.53
F.L. out = 177.28
Pipe slope = 0.0203 ft/ft

(5) Sta. "GA-STM1" 3+89.15 =
Sta. "GA" 2554+98.17, 12.73' Rt.
Const. manhole
Inst. 12" storm sew. pipe - 137.8'
10' depth
(For pipe profile, see sht. 4B-3)

pre-treatment? ←

(6) Sta. "GA-STM1" 1+24.74, 29.50 Lt. =
Sta. "GA" 2552+51.28, 16.43' Lt.
Const. type "G-2" inlet w/ 1' sump
Rim = 173.10
F.L. out = 170.23
Pipe slope = 0.0050 ft/ft

(7) Sta. "GA-STM1" 1+59.10 =
Sta. "GA" 2552+69.53, 12.43' Lt.
Const. manhole
Inst. 12" ductile iron pipe - 34.8'
5' depth
Inst. 12" storm sew. pipe - 230.1'
10' depth
Trench resurfacing, 20 sq. yd.
(For details, see drg. no. RD302)
(For pipe profile, see sht. 4B-3)

(8) Sta. "WB" 2553+25.16, 37.11' Lt. to
Sta. "WB" 2554+36.76, 39.36' Lt.
Const. water quality swale
(For plan, see sht. GJ-5)
(For profile, see sht. GJ-5)
(For detail, see sht. GJ-9)

(9) Sta. "GA-STM2" 4+27.00 =
Sta. "WB" 2554+36.76, 39.36' Lt. =
Sta. "GB-STM1" 1+00
Const. type "D" inlet w/ 2' sump
Inst. 18" storm sew. pipe -78.4'
10' depth
(For pipe profile, see sht. 4B-3)
(For detail, see drg. no RD370)

(10) Sta. "GA-STM2" 2+61.50=
Sta. "GA" 2555+81.19, 84.21' Rt.
Remove manhole
Const. manhole
Inst. 18" storm sew. pipe - 165.5'
20' depth
(For pipe profile, see sht. 4B-3)

(11) "GD-STM1" 8+04.60=
Sta. "GR" 134+24.67, 45.98' Lt.
Const. type "G-2" inlet w/ 1' sump
(For pipe profile, see sht. 4B-4)

(12) Sta. "GR" 135+39.95, 40.61' Lt.
Const. type "G-2" inlet w/ 1' sump
Rim = 191.71
F.L. out = 187.24
Pipe slope = 0.0500 ft/ft

(13) Sta. "GD-STM1" 7+71.40=
Sta. "GR" 134+57.28, 39.89' Lt.
Const. manhole
Inst. 12" storm sew. pipe - 116.2'
5' depth
(For pipe profile, see sht. 4B-4)

(14) Sta. "GD-STM1" 6+57.60=
Sta. "GD" 2558+04.10, 26.25' Lt.
Const. type "G-2" inlet w/ 1' sump
Inst. 12" storm sew. pipe - 113.8'
5' depth
(See sht. 4B-4 for profile)

(15) Sta. "GD-STM1" 5+42.40=
Sta. "GD" 2559+20.79, 26.54' Lt.
Const. type "G-2" inlet w/ 1' sump
Inst. 12" storm sew. pipe - 115.2'
5' depth
(See sht. 4B-4 for profile)

(16) Sta. "GC-STM1" 0+00 =
Sta. "GD-STM2" 2+02.51 =
Sta. "GD" 2561+36.03, 61.59' Rt.
Const. manhole - 60" dia.
Inst. 15" storm sew. pipe - 279.4'
10' depth
Inst. 24" storm sew. pipe - 97.4'
10' depth
(For pipe profile, see sht. 4B-4)
(For detail, see drg. no. RD346)

(17) Sta. "WB" 2558+49.52, 52.43' Lt. to
Sta. "WB" 2562+89.77, 37.65' Lt.
Const. water quality swale
(For plan, see sht. GJ-4)
(For profile, see sht. GJ-4)
(For detail, see sht. GJ-9)

(18) Sta. "GD-STM2" 3+81.90 =
Sta. "WB" 2558+49.52, 52.43' Lt.
Const. type "D" inlet w/ 2' sump
Inst. 12" storm sew. pipe - 174.6'
10' depth
(For pipe profile, see sht. 4B-4)

(19) Abandon extg. manhole in-place per spec. section 00490.44

(20) Sta. "GC-STM1" 0+97.00 =
Sta. "WB" 2561+39.79, 39.85' Rt.
Const. type "G-2" inlet w/ 2' sump
Cut casing as necessary
Inst. 12" drain pipe - 20'
5' depth
Inst. 24" storm sew. pipe - 70.3'
20' depth
(For pipe detail, see sht. GJ-9)
(For pipe profile, see sht. 5B-3)

(21) Remove extg. CSP - 169.4'

(22) Sta. "WB" 2557+75.10, 43.30' Rt. to
Sta. "WB" 2575+00.26, 49.00' Rt.
Const. MFD ditch
(For plan, see sht. GJ-2)
(For profile, see sht. GJ-3)
(For detail, see sht. GJ-9)

(23) Sta. "GB-STM2" 2+81.90 =
Sta. "GR" 139+42.93, 36.26' Lt.
Const. type "G-2" inlet w/ 1' sump
(For pipe profile, see sht. 4B-3)

(24) Sta. "GB-STM2" 2+06.40 =
Sta. "GR" 139+57.04, 36.35' Rt.
Const. type "CG-2" inlet w/ 1' sump
Inst. 12" storm sewer pipe - 75.5'
10' depth
(For pipe profile, see sht. 4B-3)

(25) Remove extg. CSP - 93'

(26) Sta. "GB" 2548+50.03, 27.61' Rt. to
Sta. "GB" 2556+72.68, 93.01' Rt.
Const. water quality swale
(For plan, see sht. GJ-6)
(For profile, see sht. GJ-6)
(For detail, see sht. GJ-9)

(27) Sta. "GB-STM1" 3+88.20 =
Sta. "GB" 2553+95.68, 46.29' Rt.
Const. type "D" inlet w/ 2' sump

(28) Sta. "GB-STM1" 2+55.80 =
Sta. "EB" 2554+38.32, 32.46' Rt.
Const. type "G-2" inlet w/ 2' sump
Inst. 12" storm sew. pipe - 132.4'
5' depth
(For pipe profile, see sht. 4B-3)

(29) Sta. "WB" Line 2545+86.46, 41.44 Rt. to
Sta. "WB" Line 2556+22.77, 38.50 Rt.
Const. MFD ditch
(For plan, see sht. GJ)
(For profile, see sht. GJ)
(For detail, see sht. GJ-9)

(30) Relocate power poles
(By others)

(31) Relocate telephone line
(By others)

(32) Relocate power line
(By others)

(33) Sta. "GB-STM1" 1+78.40 =
Sta. "WB" 2554+37.73, 39.04' Rt.
Cut casing as necessary
Const. type "G-2" inlet w/ 2' sump
Inst. 12" drain pipe - 20'
5' depth
Inst. 18" storm sew. pipe - 77.4'
10' depth
(For pipe detail, see sht. GJ-9)
(For pipe profile, see sht. 4B-3)

(34) Sta. "GA-STM2" 1+00.00 =
Sta. "GA" 2555+97.89, 65.42' Lt.
Const. culv. end protection- class 50 rip rap
rip rap protection to elev.- 162.50
Inst. 18" storm sew. pipe - 161.5'
20' depth
(For profile, see sht. 4B-3)
(For details, see drg. no RD316 & RD317)

(35) Remove powerlines
(By others)

(36) Sta. "GD-STM2" 1+00.00 =
Sta. "GD" 2561+22.79, 39.98' Lt.
Inst. 24" ductile iron pipe - 102.5'
20' depth
(For profile, see sht. 4B-4)

(37) Sta. "GB-STM2" 1+00.00 =
Sta. "GB" 2556+73.24, 94.26' Lt.
Const. storm sew. outfall with protection
Inst. 12" storm sew. pipe - 106.4'
5' depth
(For profile, see sht. 4B-3)
(For outfall protection detail, see sht. GJ-10)

(38) Sta. "GA-STM1" 1+00.00 =
Sta. "WB" 2553+25.16, 37.11' Lt.
Const. storm sew. outfall with protection
Inst. 12" storm sew. pipe - 59.1'
5' depth
(For profile, see sht. 4B-3)
(For outfall protection detail, see sht. GJ-10)

(39) Install power pole
(By others)

(40) Sta. "GD-STM1" 3+49.20 =
Sta. "GD" 2561+15.62, 27.22' Lt.
Const. type "G-2" inlet w/ 1' sump
Inst. 12" storm sew. pipe - 193.2'
5' depth
(See sht. 4B-4 for profile)

(41) Sta. "GD-STM2" 6+56.50 =
Sta. "EB" 2558+51.68, 38.16' Rt.
Const. type "G-2" inlet w/ 2' sump
(For pipe profile, see sht. 4B-4)

(42) Sta. "WB" 2554+35.14, 32.97' Lt.
Remove inlet

(43) Sta. "WB" 2558+50.12, 49.05' Rt.
Remove inlet

(44) Sta. "WB" 2558+48.32, 39.96' Lt.
Remove inlet

(45) Sta. "WB" 2554+33.92, 39.25' Rt.
Remove inlet

(46) Sta. "WB" 2561+39.86, 40.00' Rt.
Remove inlet

(47) Sta. "GC-STM1" 2+67.70 =
Sta. "EB" 2561+47.91, 32.15' Rt.
Const. type "G-2" inlet w/ 2' sump
Inst. 24" storm sew. pipe - 106.7'
20' depth
(For pipe profile, see sht. 5B-3)

(48) Sta. "GC" 2561+38.88, 46.00' Rt.
Remove inlet

(49) Remove extg. CSP - 109.8'

(50) Sta. "GB" 2554+03.55, 26.31' Rt.
Remove inlet

(51) Abandon pipe in-place per spec. section 00490.43

(52) Inst. bored and jacked 18" steel casing - 174.6'
Casing shall be minimum thickness of 0.3780"
and a minimum yield strength of 35,000 psi
Casing to be filled with grout per section
00406.13 of the specifications
Inst. piping inside conduit per section 00445 of
the specifications
(For bore detail, see sht. 2B-7)

(53) Inst. bored and jacked 24" steel casing - 155.8'
Casing shall be minimum thickness of 0.5000"
and a minimum yield strength of 35,000 psi
Casing to be filled with grout per section
00406.13 of the specifications
Inst. piping inside conduit per section 00445 of
the specifications
(For bore detail, see sht. 2B-7)

(54) Inst. bored and jacked 30" steel casing - 167.7'
Casing shall be minimum thickness of 0.5000"
and a minimum yield strength of 35,000 psi
Casing to be filled with grout per section
00406.13 of the specifications
Inst. piping inside conduit per section 00445 of
the specifications
(For bore detail, see sht. 2B-7)

(55) Sta. "EB" 2554+38.32, 32.46' Rt.
Remove inlet

(2) (56) Location of jacking pits
(See notes 52, 53, & 54 for construction notes)

No.	DATE	REVISIONS	BY
1	4-4-2012	PGE note change	K.M.A.
2	4-4-2012	Storm sew. note added	K.M.A.
3	4-26-2012	Storm sew. note change	K.M.A.

REGISTERED PROFESSIONAL ENGINEER
19,424
OREGON
SEPT 16, 1997
KENNETH MICHAEL ACKERMAN
Expires 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

Harper Houf Peterson Righellis Inc.
ENGINEERS • PLANNERS • LANDSCAPE ARCHITECTS • SURVEYORS
205 SE Spokane Street, Suite 200 Portland, OR 97202 phone: 503.221.1131 www.hhpr.com fax: 503.221.1171

US 26: SUNSET HWY @ GLENCOE ROAD
SUNSET HIGHWAY
WASHINGTON COUNTY

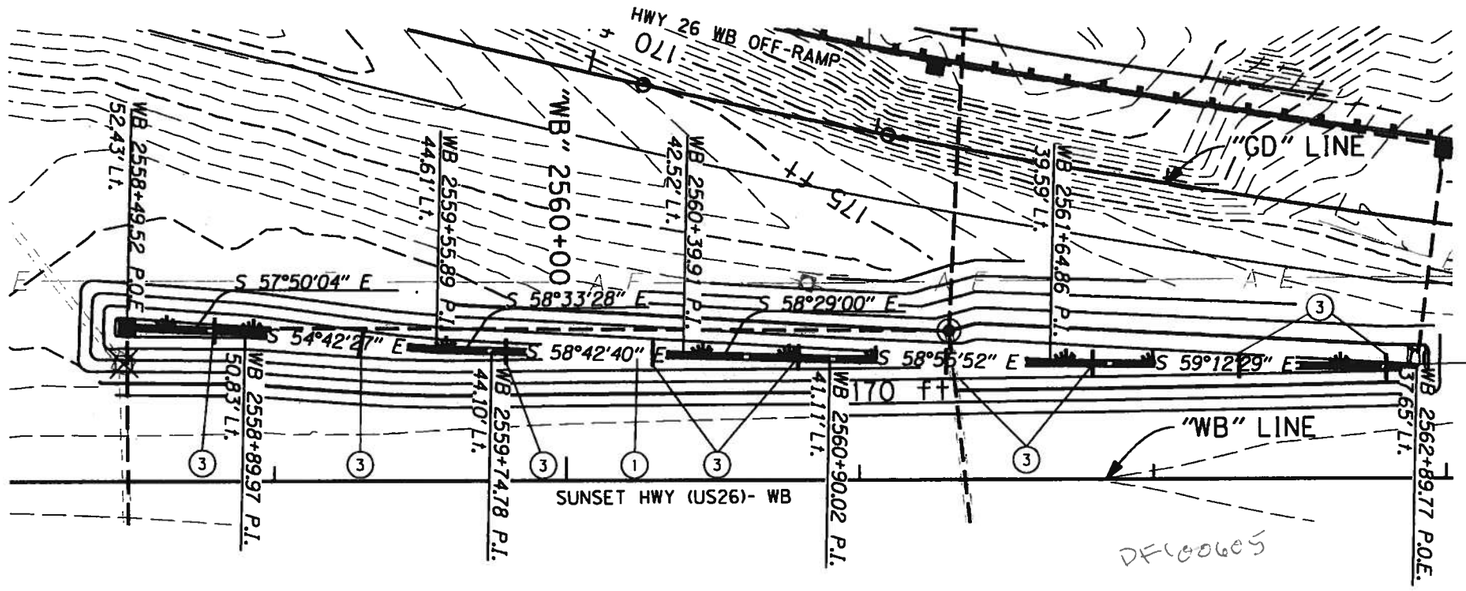
Design Team Leader - Ken M. Ackerman
Designed By - Jeff R. Torgerson
Drafted By - Peter G. Coffman

DRAINAGE & UTILITY NOTES

SHEET NO. 4B-2

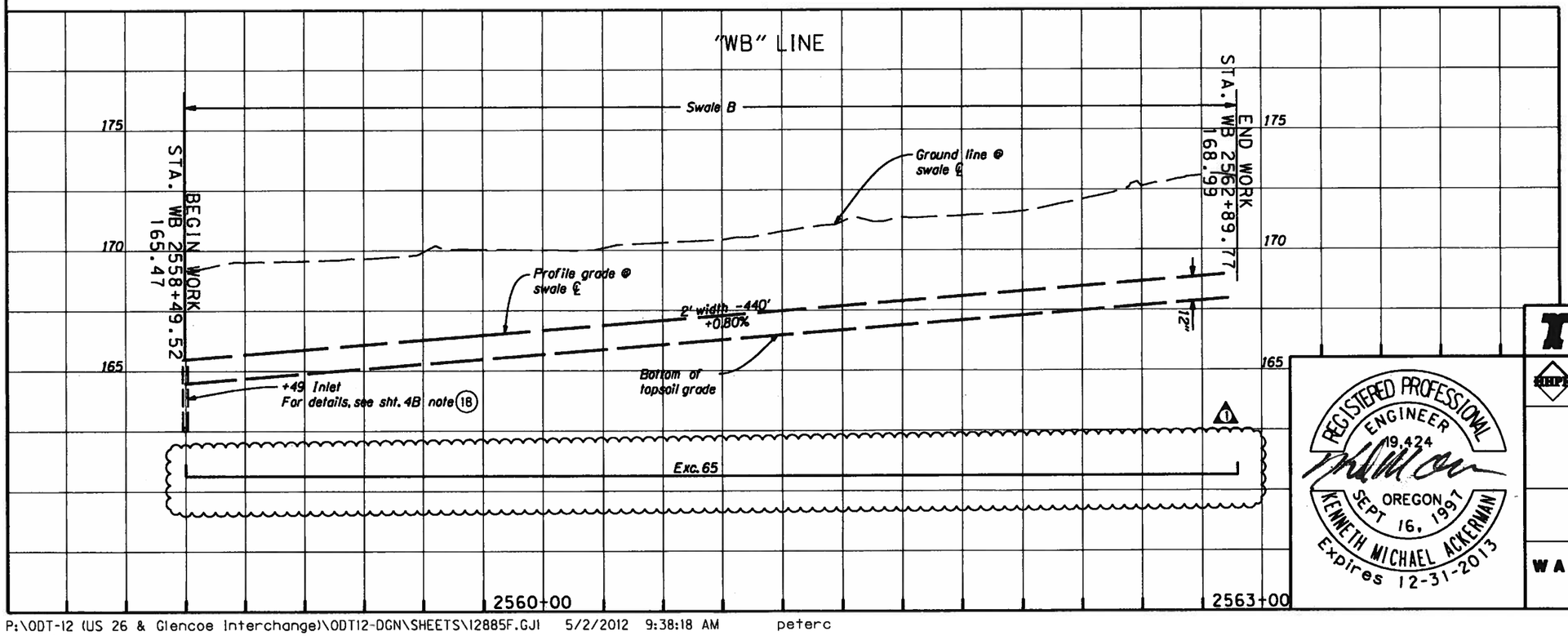
Sec. 1 & 12, T. 1N, R. 3W, W.M.

45V-029



1. Sta. "WB" 2558+49.52, 52.43' Lt to Sta. "WB" 2562+89.77, 37.65' Lt Const. 4' wide water quality swale (For details, see sht. GJ-9)
2. Const. outfall protection (For details, see sht. GJ-10)
3. Const. flow spreading check dam (For details, see sht. GJ-9)

No.	DATE	REVISIONS	BY
1	05-02-12	Exc. quantity added	K.M.A.



LEGEND

- Major contour-5' / Minor contour-1' — Exist. contours
- Major contour-5' / Minor contour-1' — Proposed stormwater contours

OREGON DEPARTMENT OF TRANSPORTATION

Harper Houf Peterson Righellis Inc.
ENGINEERS • PLANNERS • LANDSCAPE ARCHITECTS • SURVEYORS
205 SE Spokane Street, Suite 200 Portland, OR 97202 phone: 503.221.1131 www.hhpr.com fax: 503.221.1171

REGISTERED PROFESSIONAL ENGINEER
19,424
OREGON
SEPT 16, 1997
KENNETH MICHAEL ACKERMAN
Expires 12-31-2013

US 26: SUNSET HWY @ GLENCOE ROAD
SUNSET HIGHWAY
WASHINGTON COUNTY

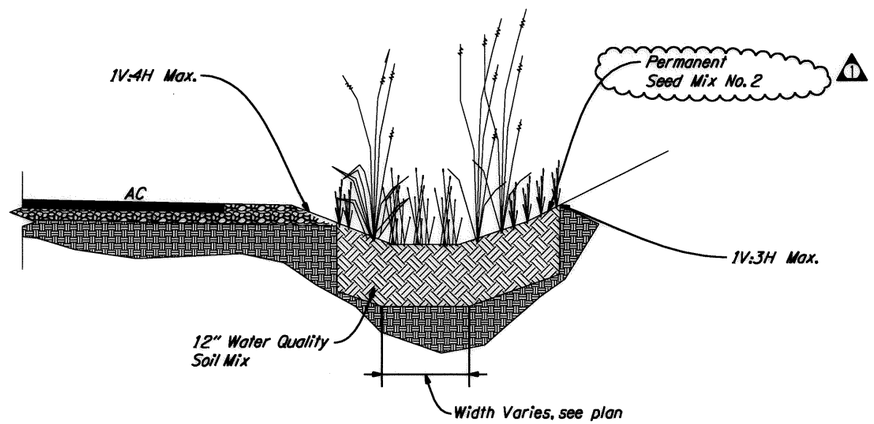
Design Team Leader - Ken M. Ackerman
Designed By - Jeff R. Torgerson
Drafted By - Peter G. Coffman

WATER QUALITY SWALE PLAN & PROFILE

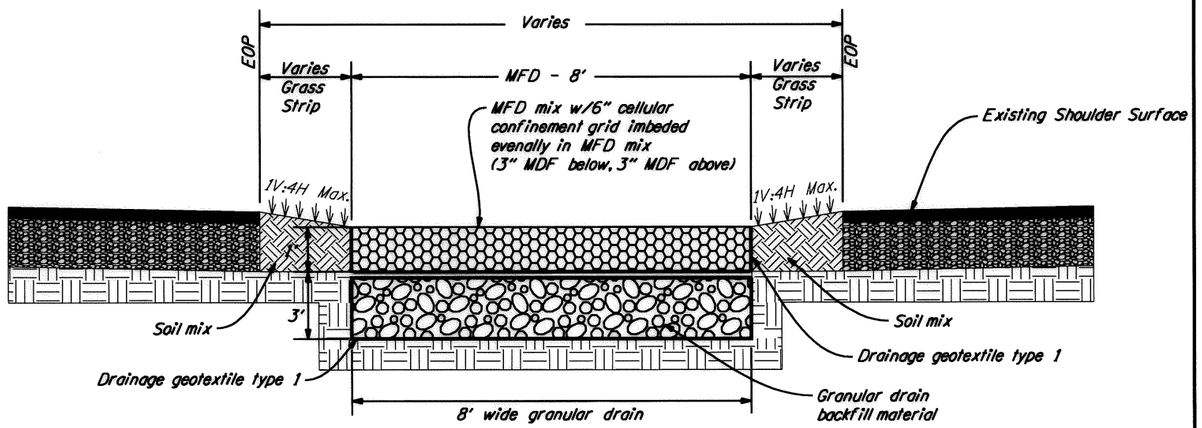
SHEET NO. GJ-4

P:\ODT-12 (US 26 & Glencoe Interchange)\ODT12-DGN\SHEETS\12885F.GJI 5/2/2012 9:38:18 AM peterc

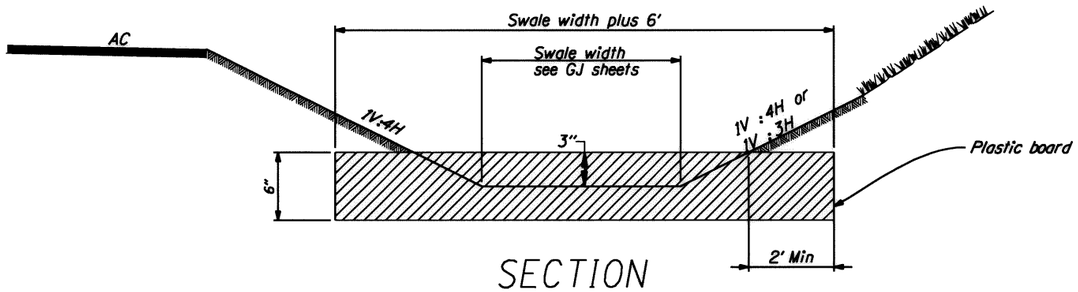
45V-029



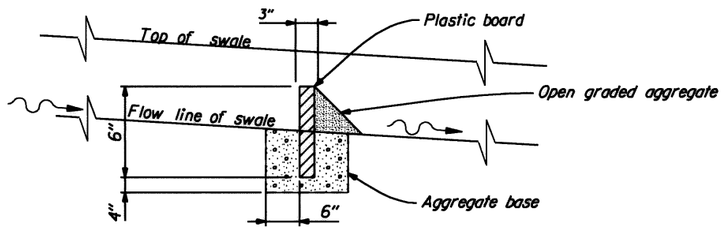
WATER QUALITY SWALE SECTION
N.T.S.



MFD (TYPE 1) SECTION
DITCH CONFIGURATION
N.T.S.



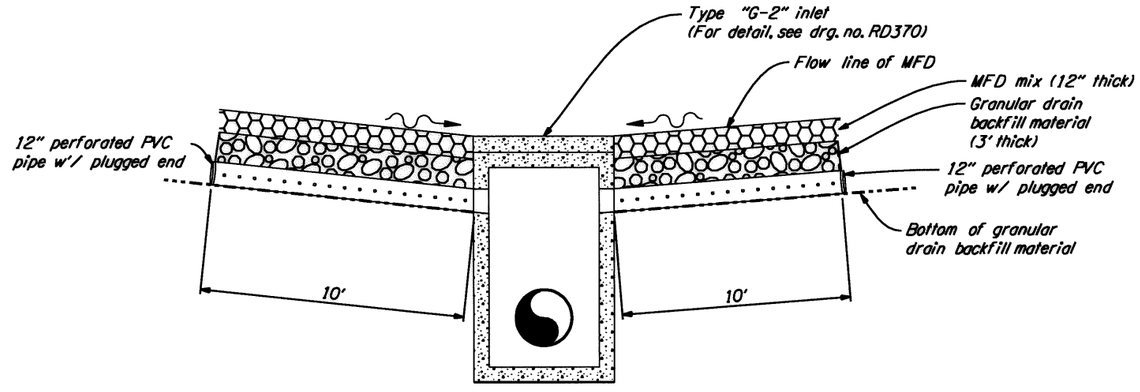
SECTION



ELEVATION

Note:
Space approx. every 50'
from pipe outfall

FLOW SPREADING CHECK DAM
N.T.S.



TYPE "G-2" INLET W/
PERFORATED PIPE IN MFD
N.T.S.

No.	DATE	REVISIONS	BY
1	04-25-2012	Changed Seed Mix Call Out	K.M.A.

REGISTERED PROFESSIONAL ENGINEER
19424
OREGON
SEPT 16, 1997
KENNETH MICHAEL ACKERMAN
Expires 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

Harper Houf Peterson Righellis Inc.
ENGINEERS • PLANNERS • LANDSCAPE ARCHITECTS • SURVEYORS
205 SE Spokane Street, Suite 200 Portland, OR 97202 phone: 503.221.1131 www.hhpr.com fax: 503.221.1171

US 26: SUNSET HWY @ GLENCOE ROAD
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Ken M. Ackerman
Designed By - Jeff R. Torgerson
Drafted By - Peter G. Coffman

DETAILS

SHEET NO. GJ-9