

OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: November 2018

DFI No. D00774



Figure 1: DFI No. D00774, looking southwest

Identification

Drainage Facility ID (DFI): D00774
Facility Type: Water Quality Biofiltration Swale
Construction Drawings: (V-File Numbers) 46V-108
Location: District: 2C
Highway No.: 172
Mile Post: 5.39-5.50, [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.

Facility location type: Roadway shoulder

Flow direction: south

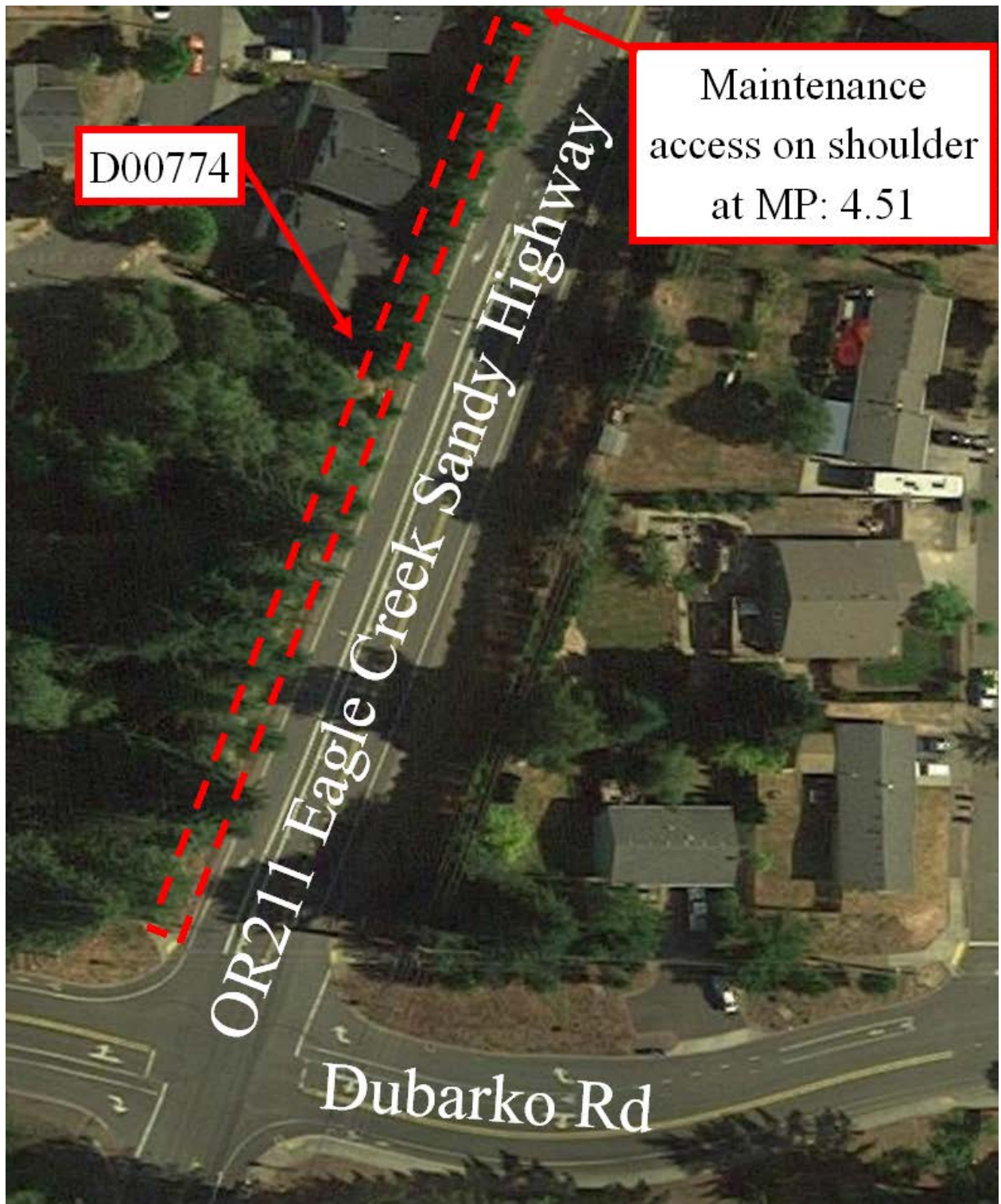


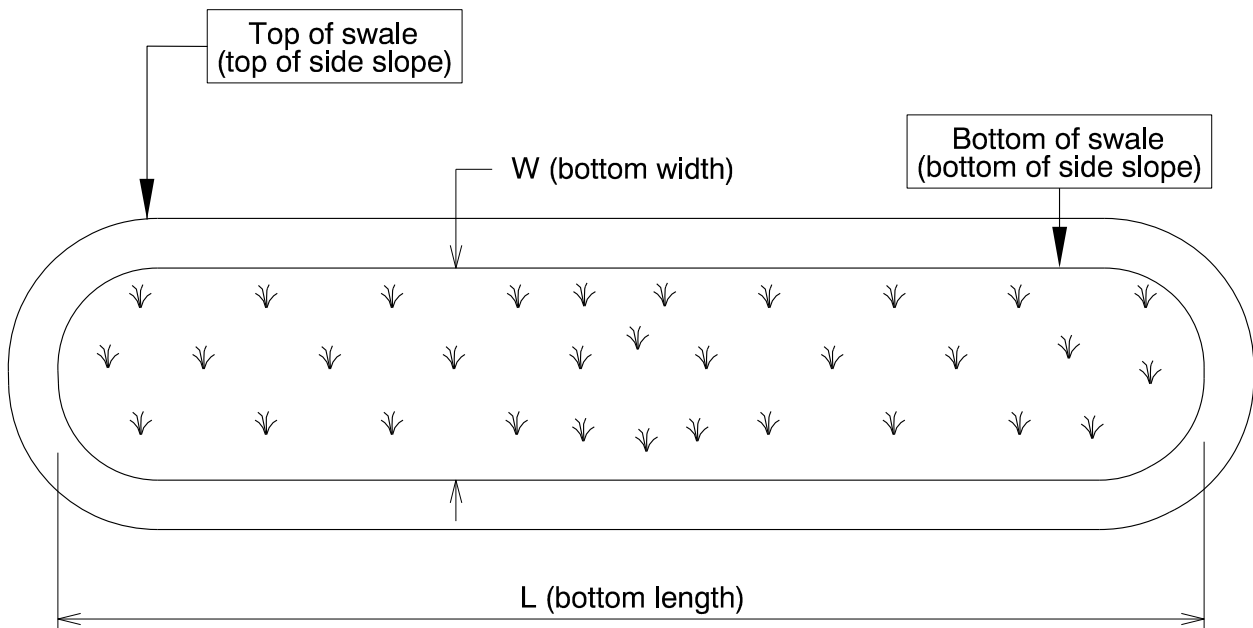
Figure 2: Facility location map

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:

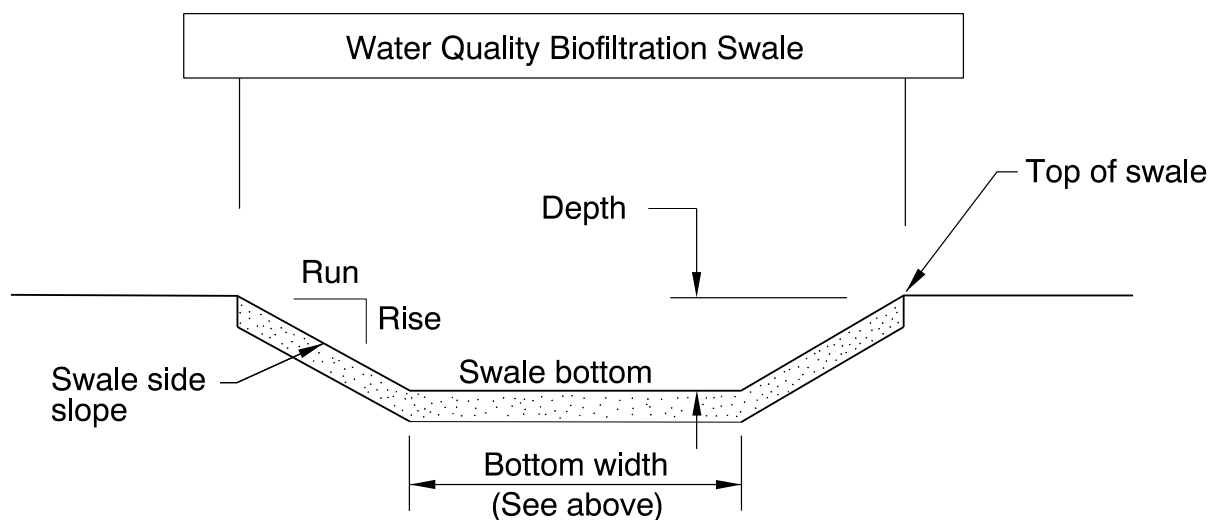
Bottom Length (feet)	Bottom Width (feet)
465	5.4 - 8 (Varies)



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	3



Site Specific Information: The beginning of the swale (MP: 5.50) has an inlet pipe. The pipe drains into a riprap pad (energy dissipater) and through the swale. Approximately two hundred feet to the south (MP: 5.46), there is another piped inlet into the swale. This inlet also empties into a riprap pad, then flows through the swale. The water flows through the swale to the south and empties into a type "D" outlet and into a stormwater sewer pipe.

4. Facility Access

Maintenance access to the facility:

<input type="checkbox"/> Roadside pad	<input checked="" type="checkbox"/> Roadside shoulder
<input type="checkbox"/> Access road with Gate	<input type="checkbox"/> Access road without Gate

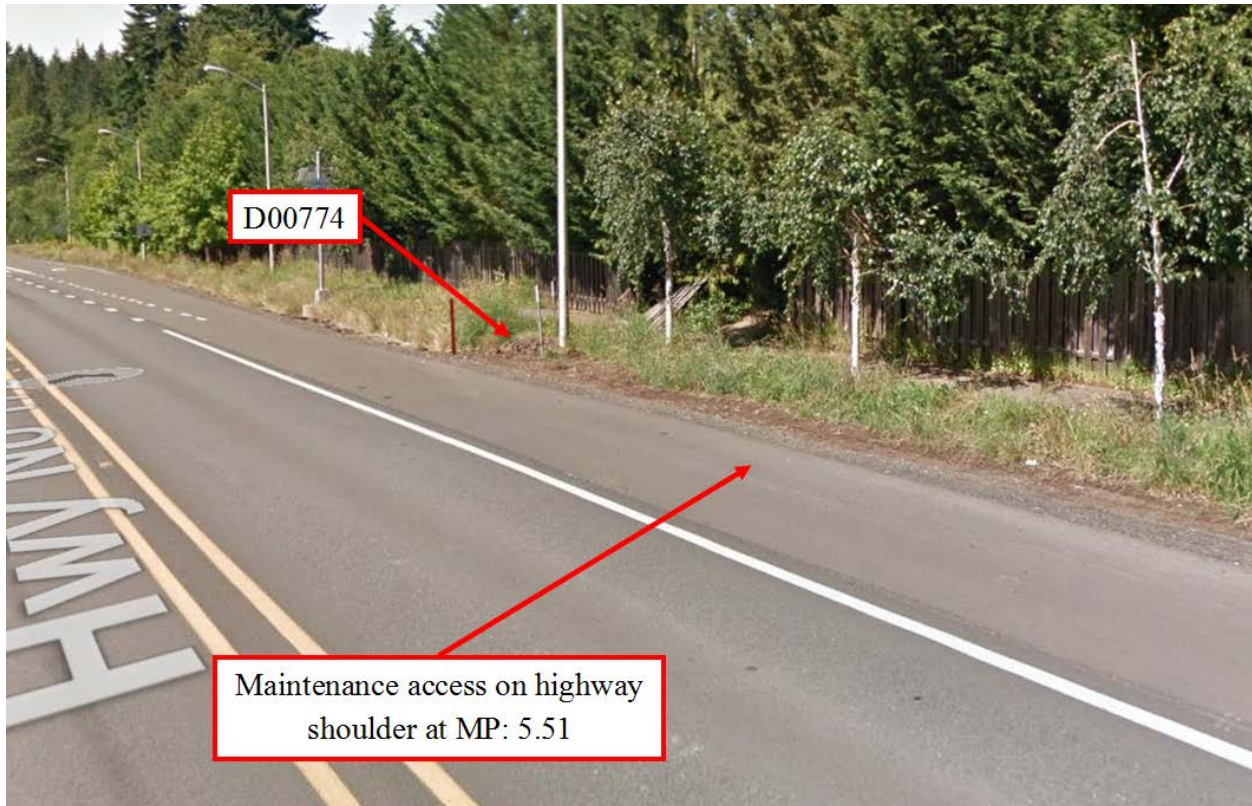


Figure 3: Maintenance access, looking southwest

5. Operational Components / Maintenance Items

Classification

This facility is classified as an:

<input checked="" type="checkbox"/> On-line Swale	<input type="checkbox"/> 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:

<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
There is no bypass component. High flows drain 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:

<input type="checkbox"/> Operational Plan A	<input checked="" type="checkbox"/> Operational Plan B	<input type="checkbox"/> 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	<input type="checkbox"/>	S1
Weir type flow splitter/flow splitter manhole	<input type="checkbox"/>	S2
Orifice type flow splitter/flow splitter manhole	<input type="checkbox"/>	S3
Standard manhole	<input checked="" type="checkbox"/>	S4
Swale Inlet		
Pavement sheet flow	<input type="checkbox"/>	S5
Inlet Pipe (s)	<input checked="" type="checkbox"/>	S6
Open channel inlet	<input type="checkbox"/>	S7
Riprap pad	<input checked="" type="checkbox"/>	S8
Ground Cover		
Grass bottom	<input checked="" type="checkbox"/>	S9
Grass side slopes	<input checked="" type="checkbox"/>	S10
Granular drain rock	<input type="checkbox"/>	S11
Plantings	<input type="checkbox"/>	S12
Underground Components		
Geotextile fabric	<input type="checkbox"/>	S13
Water quality mix	<input checked="" type="checkbox"/>	S14
Perforated pipe	<input type="checkbox"/>	S15
Porous pavers (access grid)	<input type="checkbox"/>	S16
Flow Spreader		
Rock basin (used at inlet)	<input type="checkbox"/>	S17
Anchored board (midpoint of swale or every 50 feet along swale bottom)	<input type="checkbox"/>	S18
Other: describe type	<input type="checkbox"/>	S19
Swale Outlet		
Catch basin with grate	<input type="checkbox"/>	S20
Outlet Pipe (s)	<input checked="" type="checkbox"/>	S21
Open channel outlet	<input type="checkbox"/>	S22
Auxiliary Outlet: describe type	<input type="checkbox"/>	S23
Outfall Type		
Waterbody (Creek/Lake/Ocean)	<input type="checkbox"/> C	S24
	<input type="checkbox"/> L	
	<input type="checkbox"/> O	
Ditch	<input type="checkbox"/>	S25
Storm drain system	<input checked="" type="checkbox"/>	S26
Outfall Components		
Riprap pad	<input type="checkbox"/>	S27
Riprap bank protection	<input type="checkbox"/>	S28

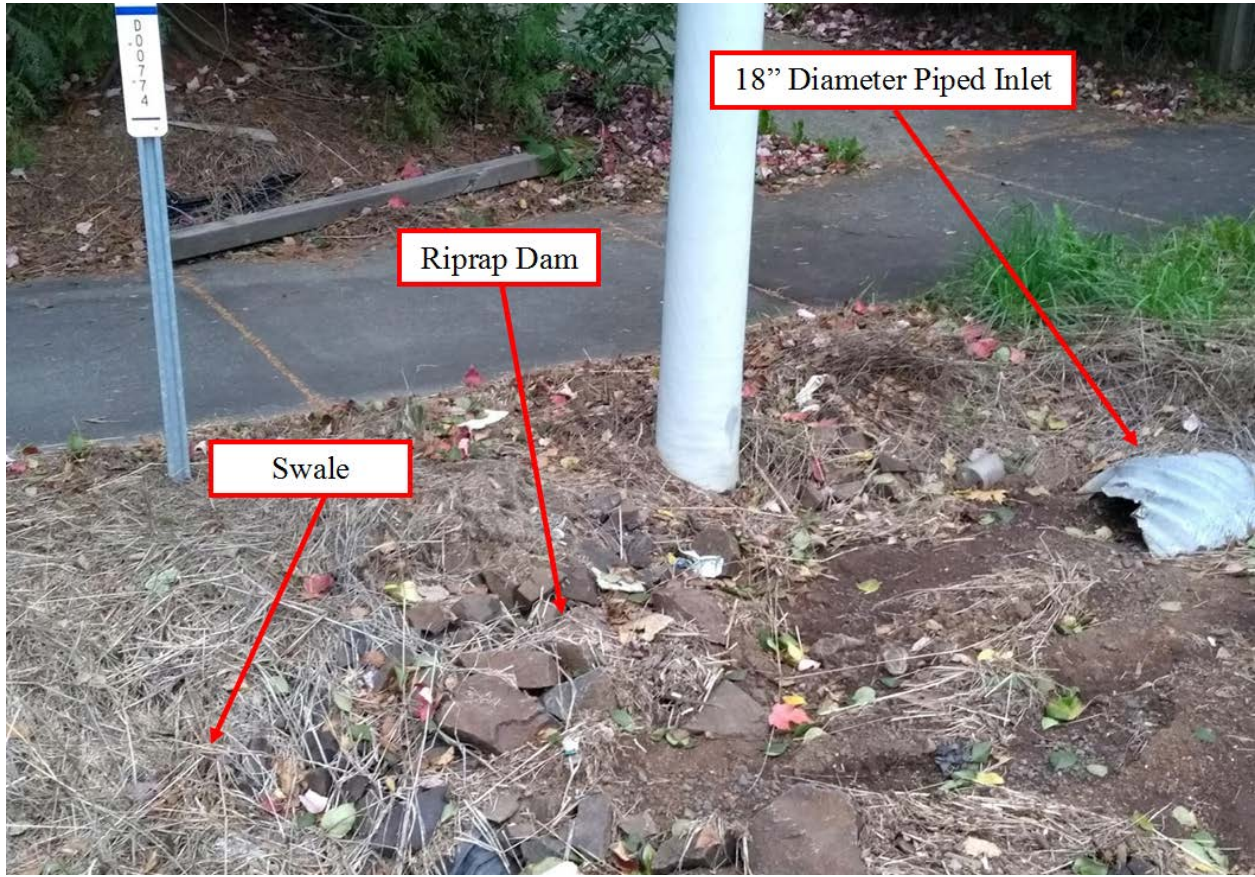


Figure 4: Swale Inlet



Figure 5: Piped Inlet in middle of swale



Figure 6: Swale Outlet

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:

<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
There are (Choose applicable weight: no, light, med., heavy) duty 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:

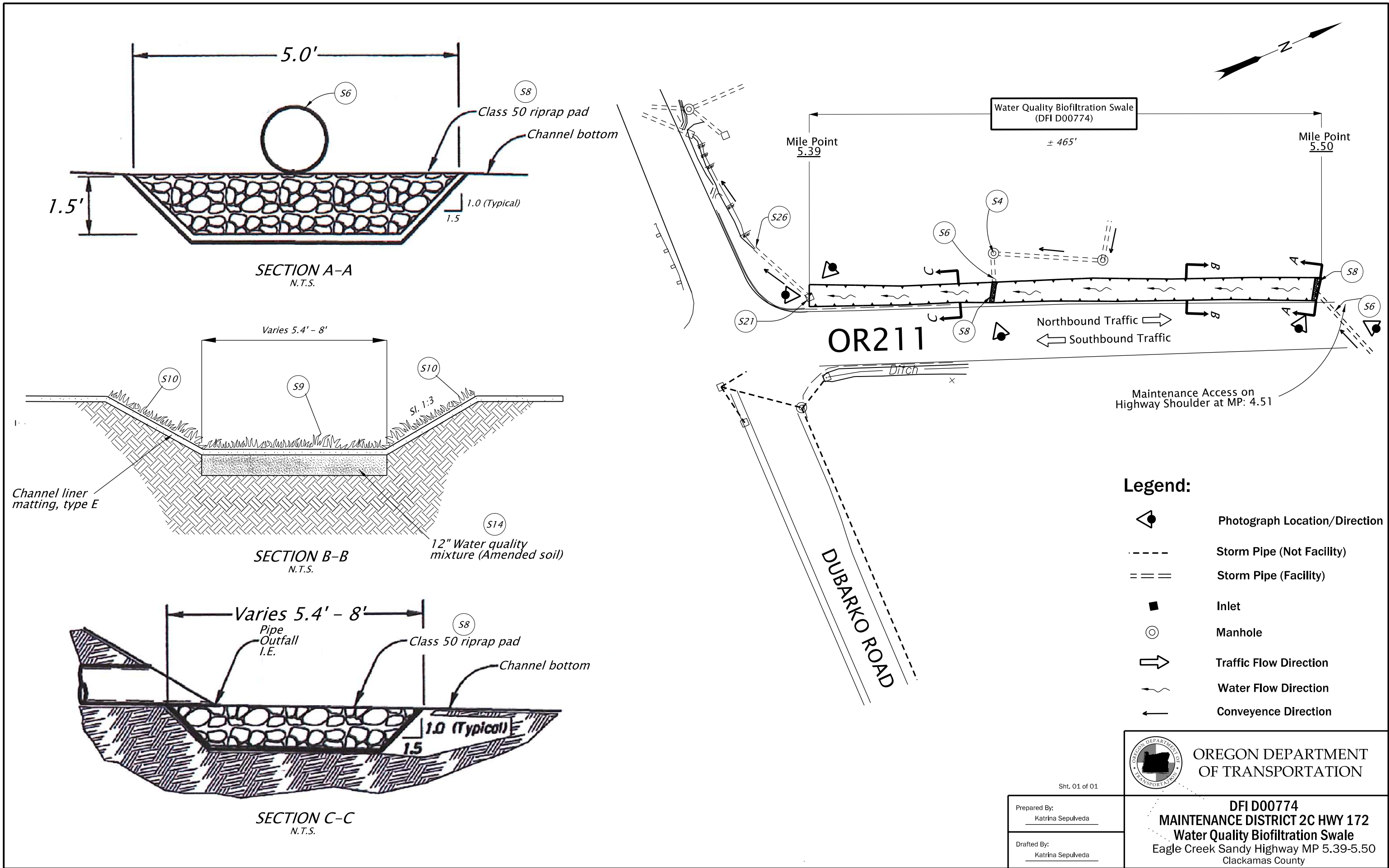
ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647

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 D00774



B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 46V-108

Partial Plan Set

14616 Contract Plans

46V-108

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

STATE OF OREGON DEPARTMENT OF TRANSPORTATION

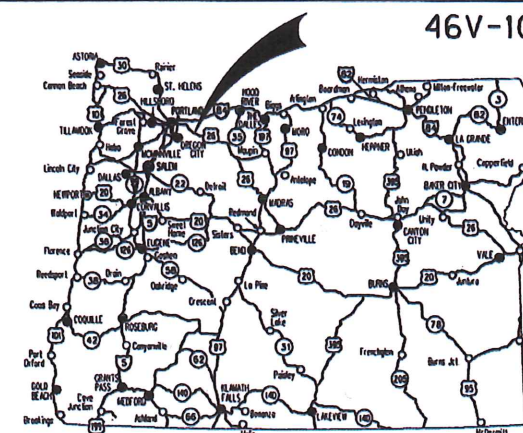
PLANS FOR PROPOSED PROJECT

GRADING, PAVING, DRAINAGE, MUNICIPAL WATER LINE &
ROADSIDE DEVELOPMENT

OR211: EAGLE CR - SANDY HWY AT DUBARKO RD (SANDY) SEC.

EAGLE CREEK-SANDY HIGHWAY

CLACKAMAS COUNTY
SEPTEMBER 2013



Overall Length Of Project - 0.18 Miles

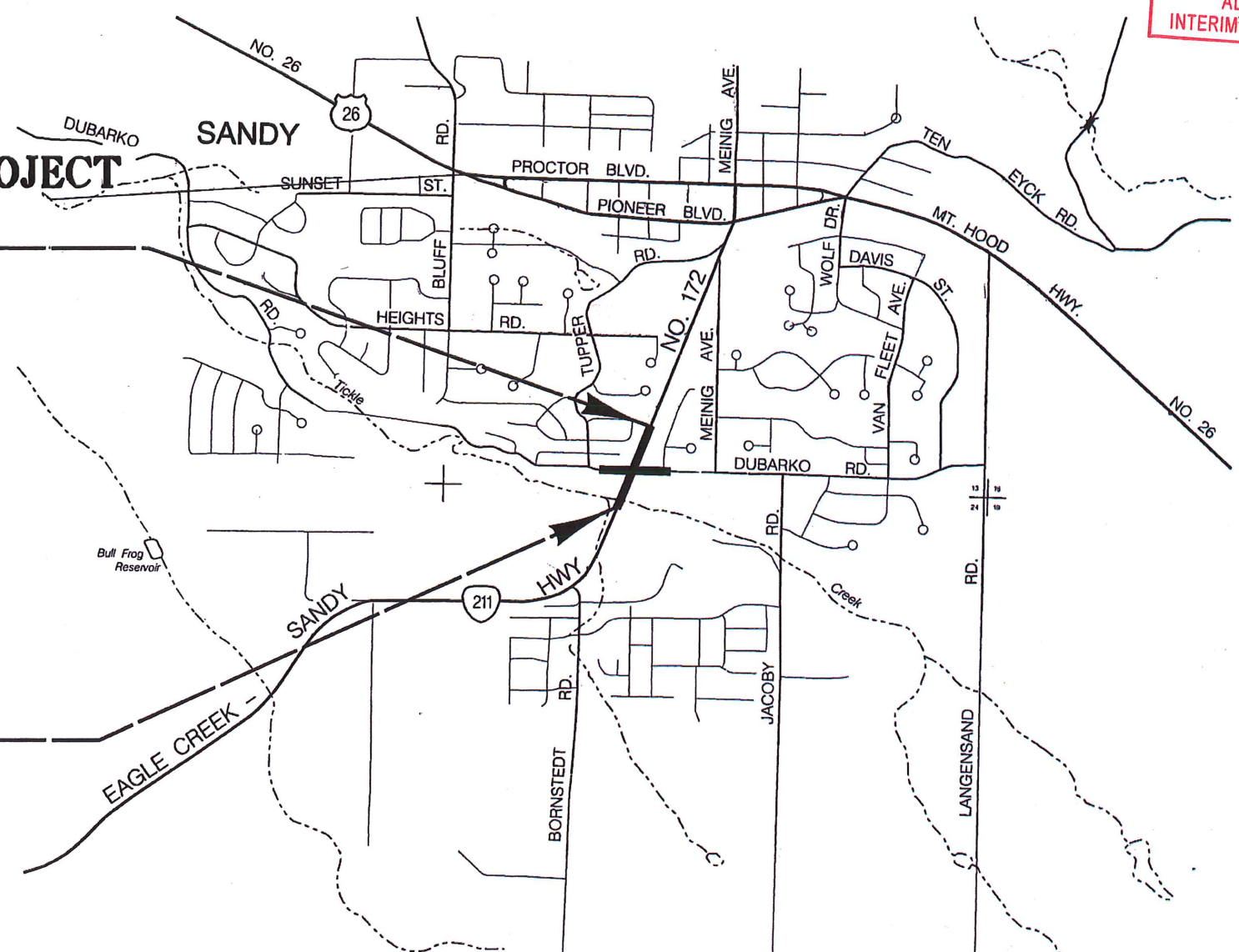
Adam Markell
"AS CONSTRUCTED"
DEC 18 2017
ADAM MARKELL,
INTERIM PROJECT MANAGER

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
STP-S172(007)
STA. "L" 24+50 (M.P. 5.49)

END OF PROJECT
STP-S172(007)
STA. "L" 32+30 (M.P. 5.31)



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

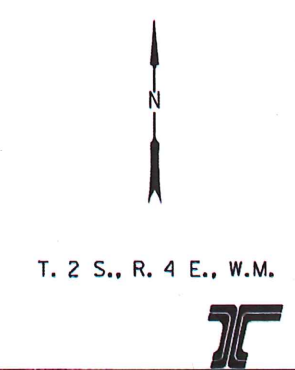
These plans were developed using ODOT design standards. Exceptions to these standards, if any, have been submitted and approved by the ODOT Chief Engineer or their delegated authority.

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

Samuel
Concurrence by ODOT Chief Engineer

**OR211: EAGLE CR - SANDY HWY AT
DUBARKO RD (SANDY) SEC.
EAGLE CREEK-SANDY HIGHWAY
CLACKAMAS COUNTY**

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STP-S172(007)	1



PE001849 000

Standard Drg. Nos.

INDEX OF SHEETS, CONT.	
SHEET NO.	DESCRIPTION
2, 2A, 2A-2 thru 2A-4	Typical Sections
2B, 2B-2 thru 2B-7	Details
2C	Traffic Control Details
2C-2	Detour
2C-3 & 2C-4	Traffic Control Plan
2D	Pipe Data Sheet
3	Alignment
3A & 3A-2	General Construction
3B & 3B-2	Profile
3C	Drainage & Utilities
3C-2	Drainage Notes
3D & 3E	Profile
4	Alignment
4A	General Construction
4C	Drainage & Utilities
4C-2	Drainage Notes
WATERLINE REPLACEMENT	
WA	Waterline Plan
WA-2	Waterline Profile
GEO/HYDRO	
GA-T & GA-T2	Erosion & Sediment Control Cover Sheet
GA, GA-2 & GA-3	Erosion & Sediment Control Plan
GA-4	Erosion Control Details
GJ & GJ-2	Water Quality Details
GJ-3	Water Quality Cross Section
GJ-4	Water Quality Details
ROADSIDE DEVELOPMENT	
GN, GN-2 thru GN-4	Details
GN-5 & GN-6	Planting Plan
GN-7 & GN-8	Details
TRAFFIC	
ST & ST-2	Striping Plan
S-14082 thru S-14087	Permanent Signing

- RD100 - Mailbox Support
- RD101 - Mailbox Installation
- RD140 - Roadway Cross Slopes Superelevated Sections
- RD150 - Slope Rounding

- RD300 - Trench Backfill, Bedding, Pipe Zone And Mult. Installations
- RD302 - Street Cut
- RD316 - Sloped Ends For Metal Pipe
- RD318 - Sloped Ends For Concrete Pipe- Miscellaneous Culvert Details
- RD319 - Miscellaneous Culvert Details
- RD335, RD336 - Standard Storm Sewer Manhole
- RD340 - Storm Sewer Pollution Control Manhole
- RD344 - Standard Manhole Base Section
- RD346 - Large Precast Manhole
- RD356 - Manhole Covers And Frames
- RD360 - Manhole Frame Adjustment
- RD364 - Concrete Inlets Type G-1, G-2, G-2M & G-2MA
- RD370 - Ditch Inlet Type D
- RD376 - Miscellaneous Drainage Structures Siphon Box, Inlet Cap & Inlet Adjustment
- RD380 - Fill Height Tables For Aluminum & Steel Corrugated Pipe
- RD384 - Fill Height Tables For Aluminum & Steel Spiral Rib Pipe
- RD386 - Fill Height Tables For Circular Concrete Pipe
- RD388 - Fill Height Tables For PVC Pipe
- RD390 - Fill Height Tables For Corrugated HDPE Pipe
- RD391 - Fill Height Tables For Steel Reinforced HDPE Pipe
- RD393 - Fill Height Tables For Polypropylene Pipe
- RD399 - Stormwater Treatment And Storage Facility Field Markers

- RD400 - Guardrail And Metal Median Barrier
- RD405, RD415 - Guardrail And Metal Median Barrier Parts
- RD420 - Energy Absorbing Terminal
- RD450 - Guardrail Anchors (Steel)

- RD610 - Asphalt Pavement Details

- RD700 - Curbs
- RD715 - Approaches And Non-Sidewalk Driveways
- RD720 - Sidewalks
- RD755 - Sidewalk Ramp Details
- RD756 - Sidewalk Ramp Placement Options Curb Radii ≤ 15'
- RD757 - Sidewalk Ramp Placement Options Curb Radii > 15'
- RD759 - Truncated Dome Detectable Warning Surface Details and Locations

- RD1000 - Construction Entrances
- RD1005 - Check Dams
- RD1010 - Inlet Protection (Type 1, 2 & 3)
- RD1055 - Matting
- RD1035 - Sediment Barrier (Type 3)
- RD1040 - Sediment Fence, Supported Sediment Fence, Unsupported

- TM200 - Sign Installation Details
- TM201 - Miscellaneous Sign Placement Details
- TM211 - Sign Details US & Interstate Route Shields
- TM212 - Signing Details Oregon Route Signs
- TM222 - Installation Details Milepost Markers Posts
- TM223 - Conventional Roads Directional Sign Layout Street Name Signs
- TM233 - Mounting Details For Removable Legend Various Arrow Sizes

- TM457 - Vehicle, Pedestrian Signal And Push Button Mounting Option Details

- TM500, TM501, TM502, TM503 - Pavement Marking Standard Detail Blocks
- TM515 - Pavement Markers
- TM517 - Recessed Pavement Markers
- TM530 - Intersection Pavement Markings (Crosswalk, Stop Bar & Bike Lane Stencil)
- TM531 - Turn Arrow Marking Details
- TM560 - Alignment Layout: General
- TM561 - Alignment Layout: Left Turn Lane, Centerline & Medians
- TM570 - Traffic Delineators
- TM571 - Traffic Delineators Steel Post Details
- TM576 - Traffic Delineator Installation For Non-Freeways

- TM670 - Wood Post Sign Supports
- TM671 - 3 Second Gust Wind Speed Isotach
- TM676 - Sign Attachments
- TM677 - Sign Mounts
- TM681 - Square Tube Sign Supports

- TM800 - Tables, Abrupt Edge And PCMS Details
- TM810 - Temporary Pavement Markings
- TM820 - Temporary Barricades
- TM821 - Temporary Sign Supports
- TM840 - Closure Details
- TM841 - Intersection Work Zone Details
- TM842 - Signalized Intersection Details
- TM844 - Temporary Pedestrian Access Routing
- TM850 - 2-Lane, 2 Way Roadways
- TM851, TM852 - Non-Freeway Multi-Lane Sections

R/W Map No. 118-06-26

Adam Markell

"AS CONSTRUCTED"

DEC 18 2017

ADAM MARKELL,
INTERIM PROJECT MANAGER

**OR211: EAGLE CR - SANDY HWY AT
DUBARKO RD (SANDY) SEC.
EAGLE CREEK-SANDY HIGHWAY
CLACKAMAS COUNTY**

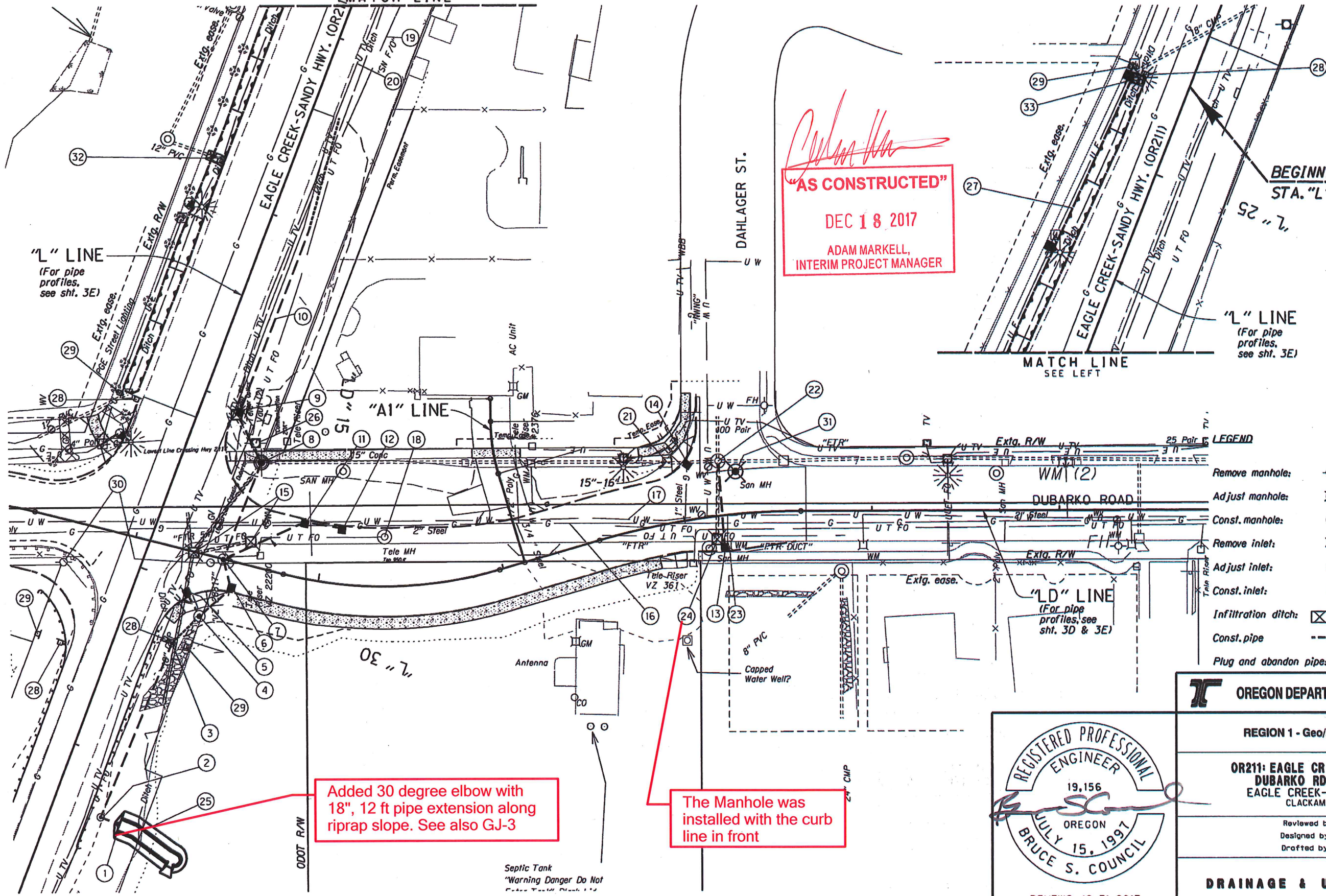
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STP-S172(007)	1A

Standard Drawings located on the web at:
http://www.oregon.gov/ODOT/HWY/ENGSERVICES/Pages/standard_drawings_home.aspx

Sec. 13 & 24, T. 2 S, R. 4 E, W.M.

46V-108

Adam Markell
"AS CONSTRUCTED"
DEC 18 2017
ADAM MARKELL,
INTERIM PROJECT MANAGER



BEGINNING OF PROJECT
STA. "L" 24+50 (M.P. 5.49)



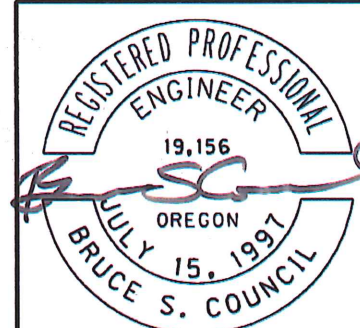
Scale: 1" = 50'

LEGEND

- Remove manhole:
- Adjust manhole:
- Const. manhole:
- Remove inlet:
- Adjust inlet:
- Const. inlet:
- Infiltration ditch:
- Const. pipe:
- Plug and abandon pipe:

Added 30 degree elbow with 18", 12 ft pipe extension along riprap slope. See also GJ-3

The Manhole was installed with the curb line in front



RENEWS: 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - Geo/Hydro/HazMat Unit

OR211: EAGLE CR - SANDY HWY AT DUBARKO RD (SANDY) SEC. EAGLE CREEK-SANDY HIGHWAY CLACKAMAS COUNTY

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

DRAINAGE & UTILITIES

SHEET NO. 3C

Added 30 degree elbow and 18" - 12 ft pipe

Install 18" storm sewer pipe - 21' and 5' depth

1 Sta. "L" 31+31.4, 39' Lt. Const. sloped end Inst. 18" storm sew. pipe - 11' 5' depth (For details, see sht. GJ-3) (See drg. nos. RD316, RD318, RD380, RD384, RD386, RD388, RD390 & RD393)

2 Sta. "L" 31+31.4, 26.7' Lt. Const. type "PVC" inlet Inst. 18" drain pipe - 100' (For details, see sht. GJ, "PVC" Inlet) (For cross section, see sht. GJ-3)

3 Sta. "L" 30+31.5, 30.2' Lt. Const. type "PVC" inlet Inst. 18" storm sew. pipe - 21' 5' depth (For details, see sht. GJ) (For cross section, see sht. GJ-3)

4 Sta. "L" 30+12.9, 38.8' Lt. Const. sedimentation manhole 72" dia. Inst. 12" storm sew. pipe - 13' 5' depth Inst. 18" storm sew. pipe - 22' 5' depth Trench resurf. - 11 sq. yd. (See drg. nos. RD300, RD302, RD340, RD346 & RD356)

5 Sta. "LD" 14+34.8, Rt. Const. type "G-2" inlet w/ 1.5' sump (See drg. nos. RD364, RD376)

6 Sta. "LD" 14+55.8, Rt. Const. type "G-2" inlet w/ 1.5' sump Inst. 18" storm sew. pipe - 16' 5' depth Trench resurf. - 6 sq. yd.

7 Sta. "LD" 14+48.2, 0.20' Rt. Const. shallow manhole 48" dia. Inst. 12" storm sew. pipe - 48' 5' depth Inst. 18" storm sew. pipe - 55' 10' depth Trench resurf. - 37 sq. yd. (See drg. nos. RD335, RD336 & RD344)

8 Sta. "LD" 14+55.7, 54.7' Lt. Remove manhole Const. manhole 48" dia. Inst. 12" storm sew. pipe - 27' 5' depth Inst. 15" storm sew. pipe - 4' 5' depth Connect to extg. pipe Trench resurf. - 9 sq. yd.

9 Sta. "L" 29+06.3, Lt. Remove inlet Const. type "Type D" inlet w/ 1.5' sump (See drg. no. RD370)

10 Sta. "L" 27+40 to "L" 29+15, Lt. Const. infiltration ditch Inst. 12" drain pipe - 167' Inst. Drainage Geotextile, Type 1 - 190 sq. yd. (For details see sht. GJ)

11 Sta. "LD" 14+86.4, Lt. Const. type "G-2" inlet w/ 1.5' sump Inst. 12" storm sew. pipe - 20' 10' depth Trench resurf. - 7 sq. yd.

12 Sta. "LD" 15+09.5, Lt. Const. type "G-2" inlet w/ 1.5' sump

13 Sta. "LD" 17+19.5, Rt. Const. type "G-2" inlet w/ 1.5' sump

14 Sta. "LD" 17+04.7, Lt. Const. type "G-2" inlet w/ 1.5' sump Connect to extg. pipe

15 Remove inlet - 2 Abandon pipe - 4

16 Relocate Gas line (NW Natural) (By others)

17 Relocate potable water line (City of Sandy) (For details, see shts. WA - WA-2)

18 Relocate telecommunications line (Frontier) (By others)

19 Relocate telecommunications line (SandyNet) (By others)

20 Relocate telecommunications line (Reliance Connects) (By others)

21 Sta. "LD" 16+96.3, Lt. Remove inlet Extend 15" storm sew. pipe - 16', Rt. 10' depth Connect to extg. pipe Trench resurf. - 2 sq. yd.

22 Sta. "LD" 17+21.2, 29.0' Lt. Inst. 12" storm sew. pipe 46' 5' depth Connect to extg. manhole Trench resurf. - 15 sq. yd.

23 Relocate water meter (For details, see sht. WA)

24 Remove inlet

25 Sta. "L" 31+39.5, 78.1' Lt. Construct riprap channel Const. loose riprap (Cl. 50) - 61 tons Riprap geotextile type 1, level B - 20 sq. yd. (For details, see sht. GJ-2)

26 Preserve & protect utility pole & boxes

27 Sta. "L" 24+50 sta. "L", 29+15 Re-grade & re-vegetate existing water quality swale D00774 (For details, see sht. GJ-4)

28 Inst. field facility marker, type S1 - 4 (See drg. no. RD399) (For details, see sht. GJ)

29 Inst. field facility marker, type S2 - 4 (See drg. no. RD399) (For details, see sht. GJ)

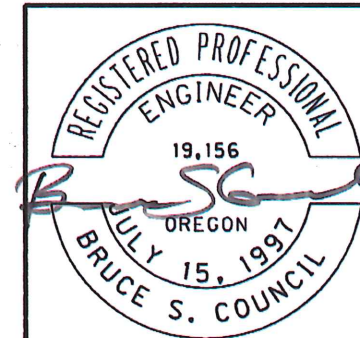
30 Remove utility pole (by others)

31 Minor adjust manhole Use method "B", circular cut (See drg. no. RD360)

32 Sta. "L" 27+82.9, 43.6' Rt. Const. riprap pad - 4 ton Inst. riprap geotextile, type 1 - 20 sq. yd. (For details, see sht. GJ-2)

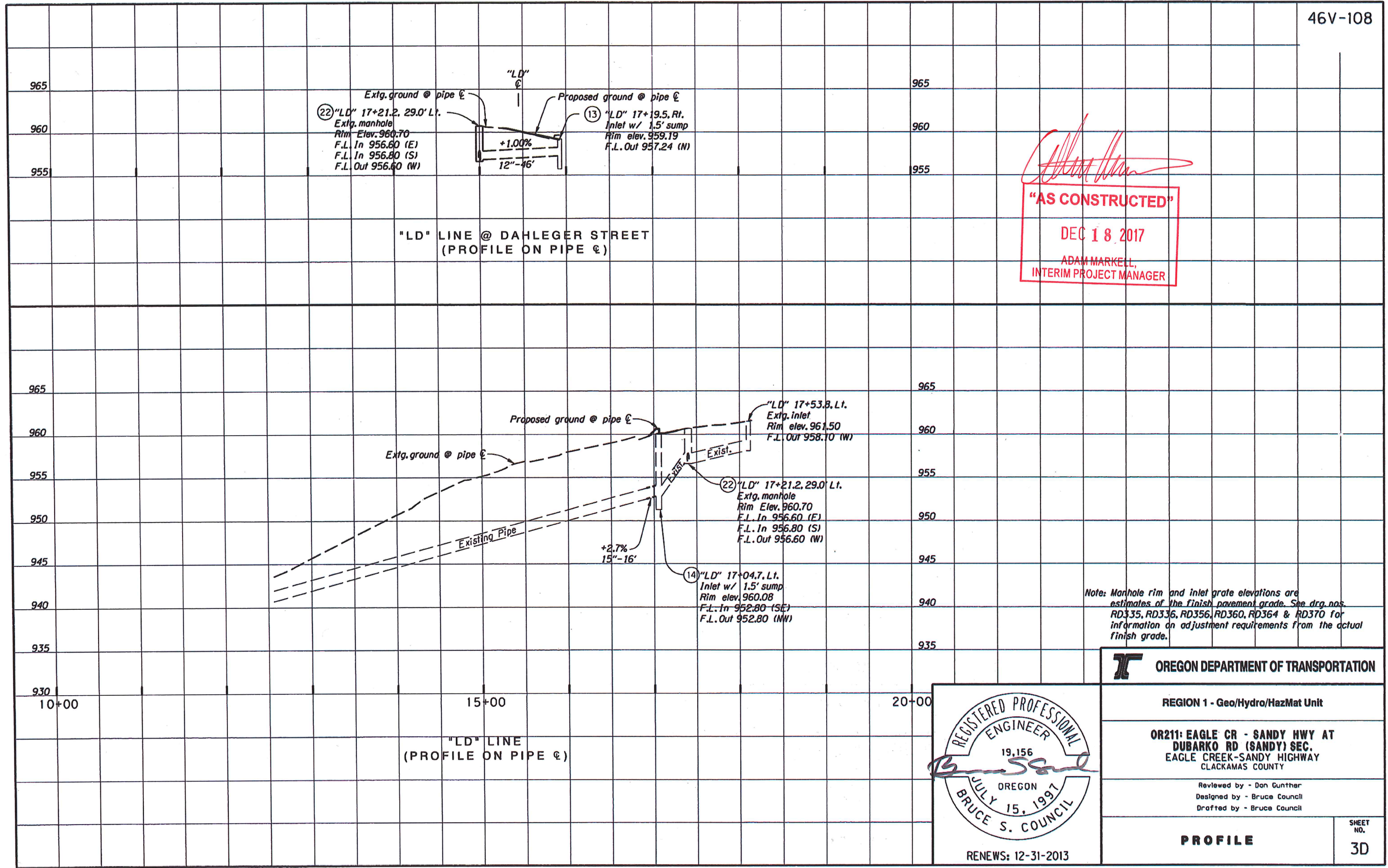
33 Sta. "L" 24+53.6, 30.2' Rt. Const. riprap pad - 4 ton Inst. riprap geotextile, type 1 - 20 sq. yd. (For details, see sht. GJ-2)

AS CONSTRUCTED DEC 18 2017 ADAM MARKELL, INTERIM PROJECT MANAGER



RENEWS: 12-31-2013

Table with project details: OREGON DEPARTMENT OF TRANSPORTATION, REGION 1 - Geo/Hydro/HazMat Unit, OR211: EAGLE CR - SANDY HWY AT DUBARKO RD (SANDY) SEC. EAGLE CREEK-SANDY HIGHWAY CLACKAMAS COUNTY, Reviewed by - Dan Gunther, Designed by - Bruce Council, Drafted by - Bruce Council, DRAINAGE NOTES, SHEET NO. 3C-2



[Signature]

"AS CONSTRUCTED"

DEC 18 2017

ADAM MARKELL,
INTERIM PROJECT MANAGER

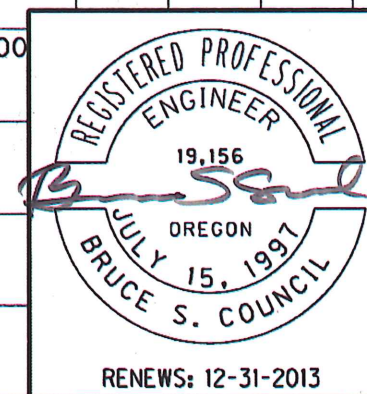
Note: Manhole rim and inlet grate elevations are estimates of the finish pavement grade. See drg. nos. RD335, RD336, RD356, RD360, RD364 & RD370 for information on adjustment requirements from the actual finish grade.

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - Geo/Hydro/HazMat Unit

OR211: EAGLE CR - SANDY HWY AT
DUBARKO RD (SANDY) SEC.
EAGLE CREEK-SANDY HIGHWAY
CLACKAMAS COUNTY

Reviewed by - Don Gunther
Designed by - Bruce Council
Drafted by - Bruce Council

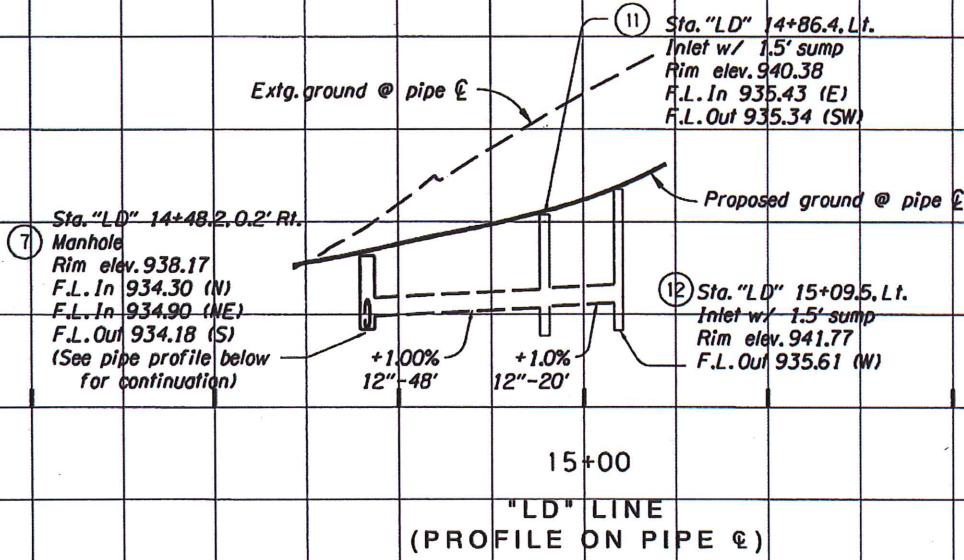


PROFILE

SHEET NO.
3D

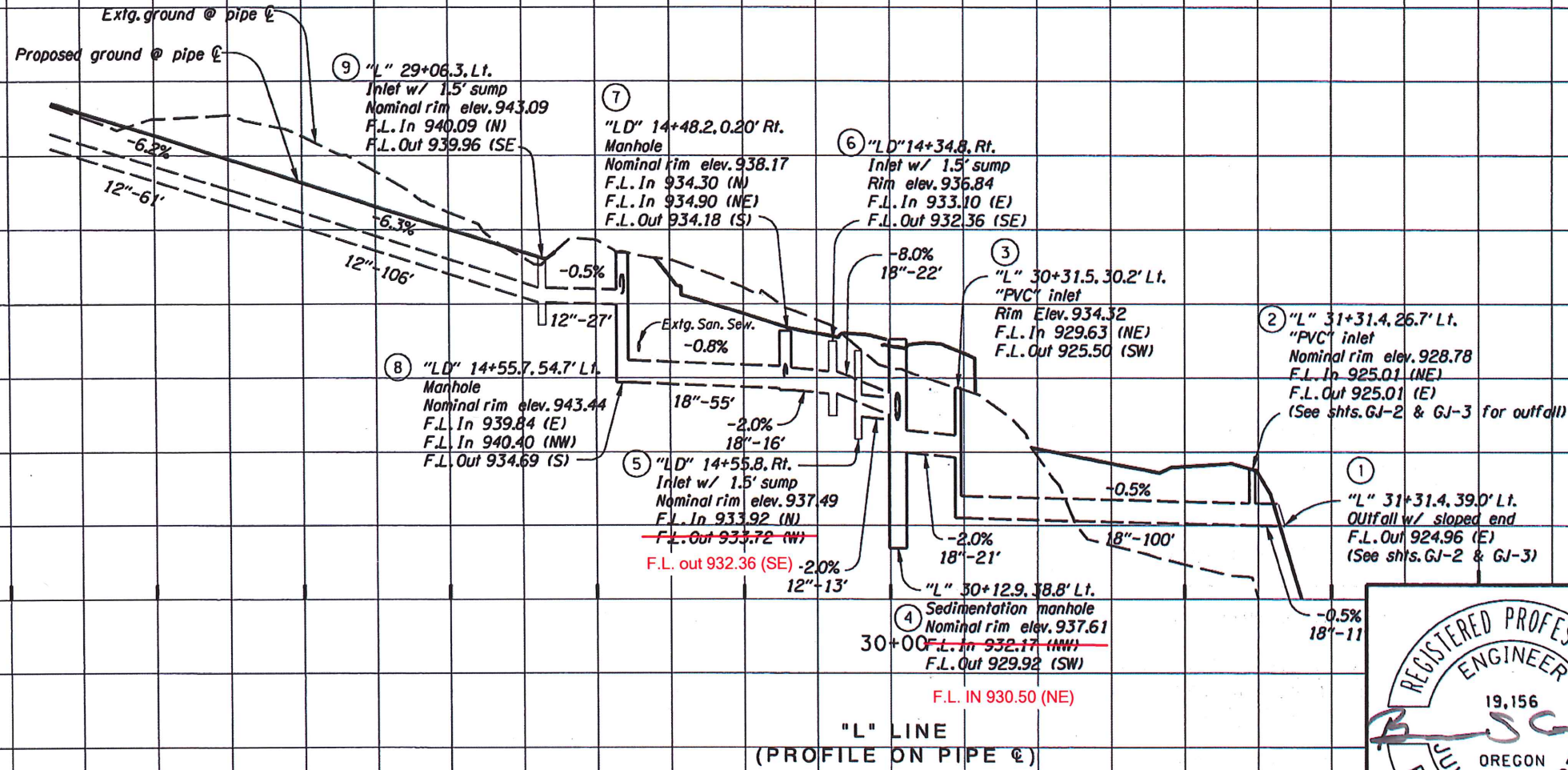
950
945
940
935
930

950
945
940
935
930

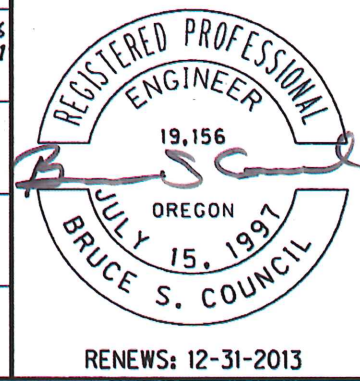


Adam Markell
"AS CONSTRUCTED"
 DEC 18 2017
 ADAM MARKELL
 INTERIM PROJECT MANAGER

955
950
945
940
935
930
925
920



Note: Manhole rim and inlet grate elevations are estimates of the finish pavement grade. See drg. nos. RD335, RD336, RD356, RD360, RD364 & RD370 for information on adjustment requirements from the actual finish grade.



OREGON DEPARTMENT OF TRANSPORTATION

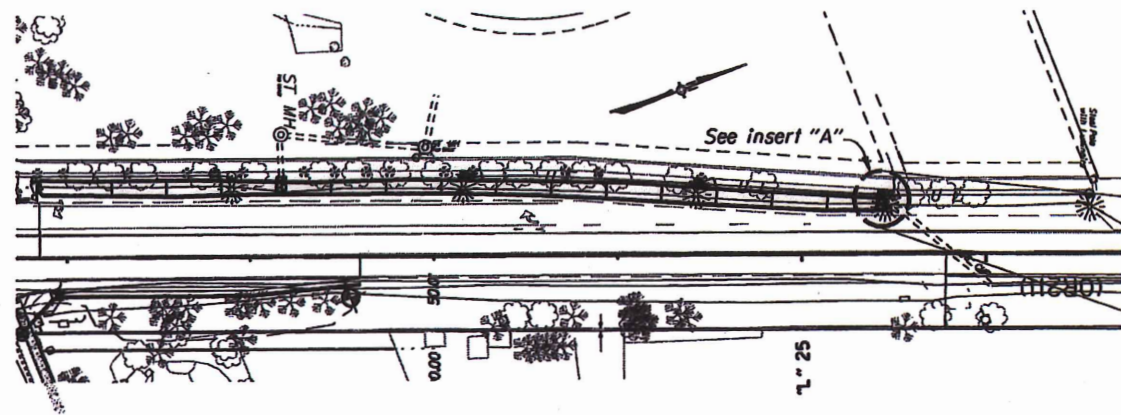
REGION 1 - Geo/Hydro/HazMat Unit

OR211: EAGLE CR - SANDY HWY AT DUBARKO RD (SANDY) SEC. EAGLE CREEK-SANDY HIGHWAY CLACKAMAS COUNTY

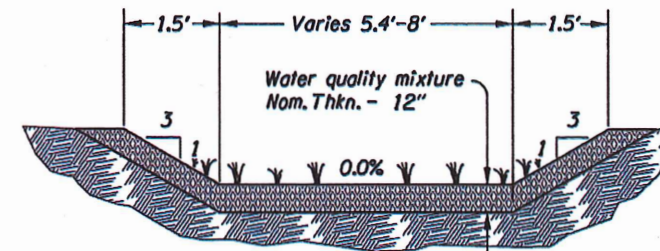
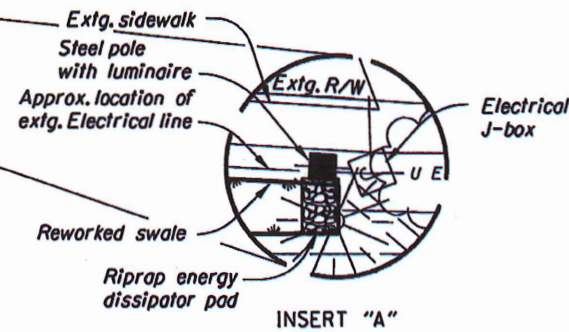
Reviewed by - Dan Gunther
 Designed by - Bruce Council
 Drafted by - Bruce Council

PROFILE

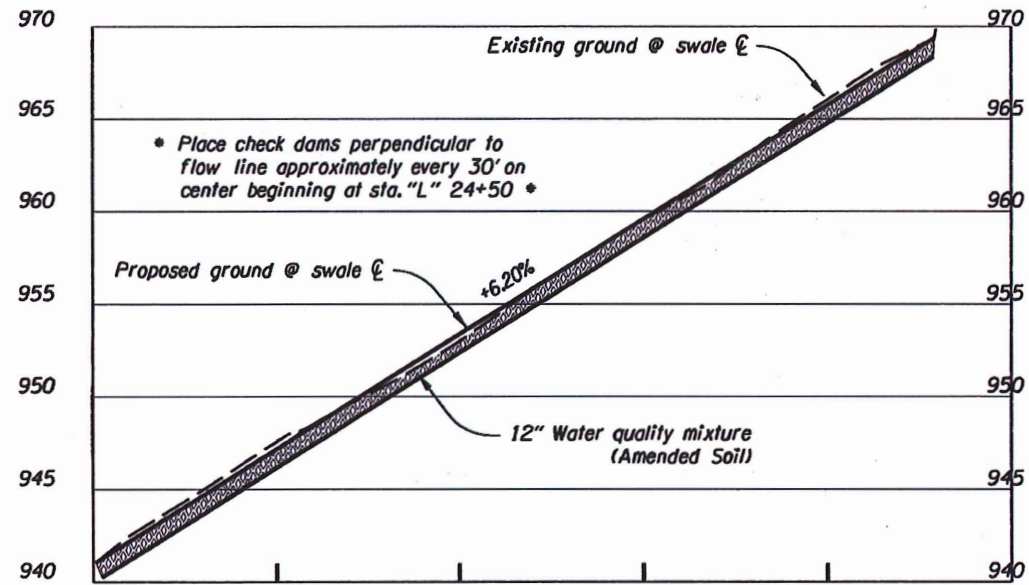
SHEET NO. 3E



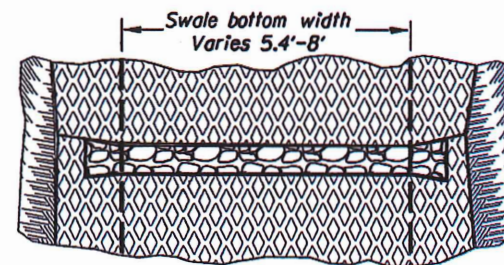
Water Quality Biofiltration Swale (DFI D00774)



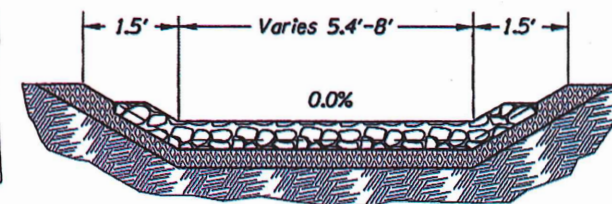
WATER QUALITY SWALE TYPICAL SECTION (See sht. 3C)



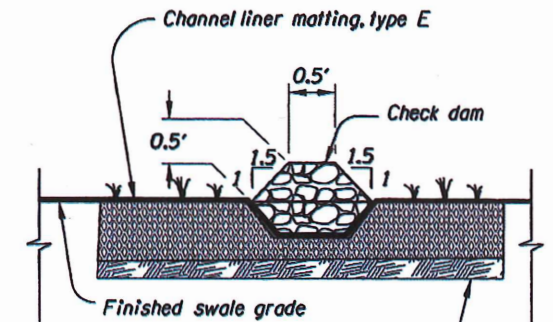
"L" 29+15.62 WATER QUALITY SWALE PROFILE "L" 24+50



PLAN VIEW)



FRONT VIEW)

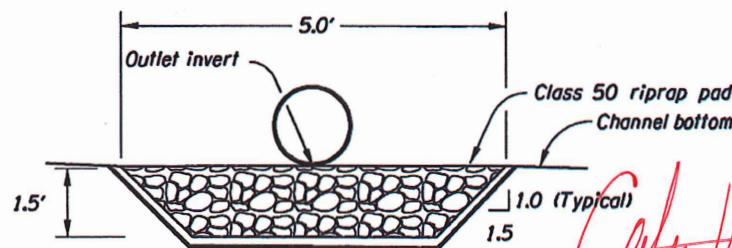
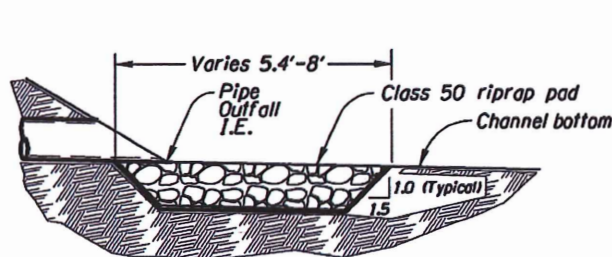


END VIEW)

WATER QUALITY SWALE TYPICAL CHECK DAM (See sht. 3C)

Note: Protect & preserve trees & tree roots to the greatest extent possible.

** Drawing Not to Scale **



WATER QUALITY SWALE TYPICAL RIPRAP ENERGY DISSIPATOR PAD

"AS CONSTRUCTED"

DEC 18 2017

ADAM MARKELL, INTERIM PROJECT MANAGER



OREGON DEPARTMENT OF TRANSPORTATION	
REGION 1 - Geo/Hydro/HazMat Unit	
OR211: EAGLE CR - SANDY HWY AT DUBARKO RD (SANDY) SEC. EAGLE CREEK-SANDY HIGHWAY CLACKAMAS COUNTY	
Reviewed by - Don Gunther Designed by - Bruce Council Drafted by - Bruce Council	
WATER QUALITY DETAILS	SHEET NO. GJ-4