OPERATION & MAINTENANCE MANUAL

DFI No. D00066
Facility Type: Water Quality Bioslope

June 2016

INDEX

1. Identification

Drainage Facility ID (DFI):	D00066
Facility Type:	Water Quality Bioslope
Construction Drawings:	(V-File Number) 44V-024
Location:	District: 4
	Highway Number: 210
	Mile Post: 1.17 to 1.19
	Description: The bioslope is adjacent to the south roadside shoulder of highway 210 (OR-34). The facility is located 60 feet south of centerline between M.P. 1.17 and M.P. 1.19.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental's Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record:	ODOT Designer -- Region 2 Hydraulics, Bo Miller, (503) 986-2738
Facility construction:	2011
Contractor:	R & R Construction

4. Storm Drain System and Facility Overview

Bioslopes are flow-through stormwater treatment facilities incorporated into roadside embankments and placed between pavement and a downstream conveyance system. These facilities utilize physical straining or filtration, sorption, carbonate precipitation, vegetative uptake and microbial degradation to provide stormwater treatment. Bioslopes are recommended for highway application because of their minimal right-of-way requirements and maintenance schedule. Other names for bioslopes that have been used include ecology embankment and media filter drain.

Bioslopes are designed to treat sheet flow from an adjacent impervious surface. A typical bioslope has the following facility features and components:

- **Vegetated filter strip** – It is provided upstream of the bioslope to evenly distribute flow into the treatment zone, reduce the runoff velocity, and provide pretreatment.
- **Treatment Zone using Ecology mix** – It is provided to remove pollutants as stormwater runoff drains through this zone. The ecology mix is a mixture of aggregate, dolomite, gypsum, and perlite.

- **Sub surface drain** – it is provided to allow positive outflow for runoff at the toe of the bioslope.

Stormwater sheet flows from the highway, across the shoulder and onto the bioslope where it percolates downward through the ecology mix. The pollutants are removed by the ecology mix made up of aggregate, dolomite, gypsum, and perlite mixture, while the treated water collects in a gravel filled toe trench until it percolates into the surrounding soil. The treated water collects in a gravel filled toe trench and is stored in the voids within the gravels until it percolates into the surrounding soil. There are no subsurface drain pipes in the trench under this bioslope. The bioslope is shown, looking from the east in Photos 1 and 2 as well as shown looking from the west in Photos 3 and 4. A plan view and cross-sections of the bioslope are shown in on the operational plan provided in Appendix A.

A. Maintenance equipment access:
The bioslope can be reached from the south roadside shoulder of highway 210 (OR-34). The shoulder slopes are between four to six units horizontal to one unit vertical. Maintenance equipment can park on these slopes near the facility but not on the facility. There are no guardrails at the road edge.

B. Heavy equipment access onto facility:
☐ Allowed (no limitations)
☒ Allowed (with limitations)
☐ Not allowed
Heavy equipment is allowed along the perimeter of the facility and along the roadside shoulder. Entering the facility with heavy equipment, such as a large mower while wet, may cause damage to the facility

C. Special Features:
☒ Amended Soils
☐ Porous Pavers
☐ Liners
☐ Underdrains

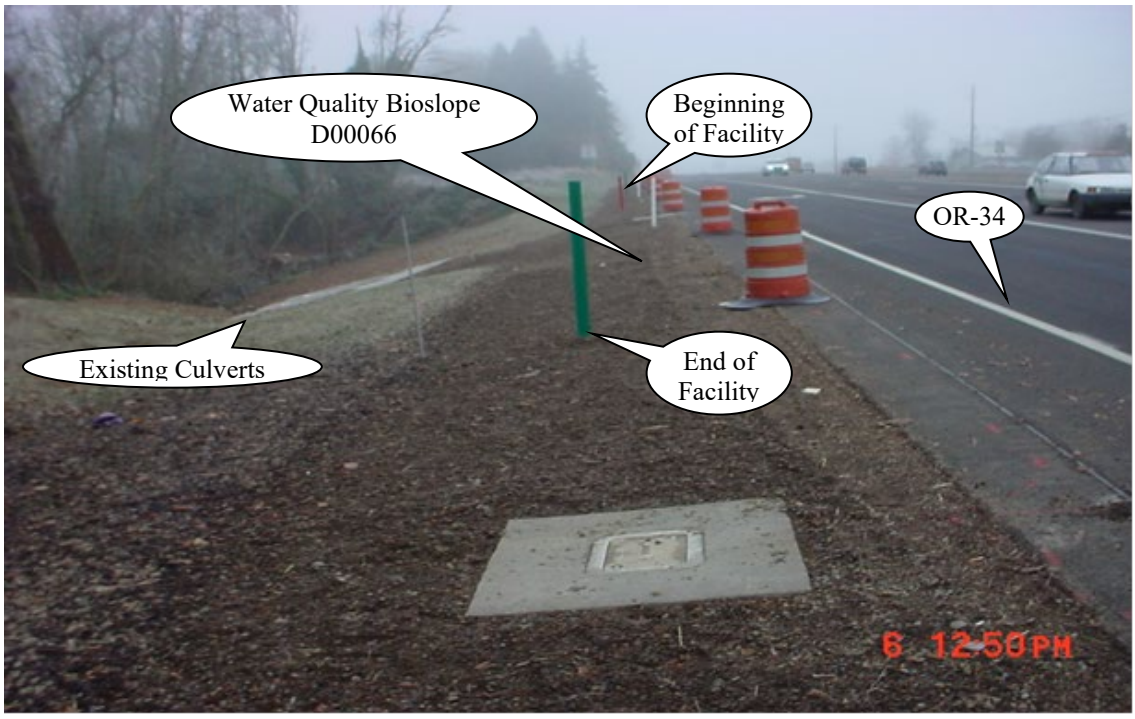


Photo 1: Facility Footprint (a) Looking from East or Decreasing Mileage (taken Dec, 2011)

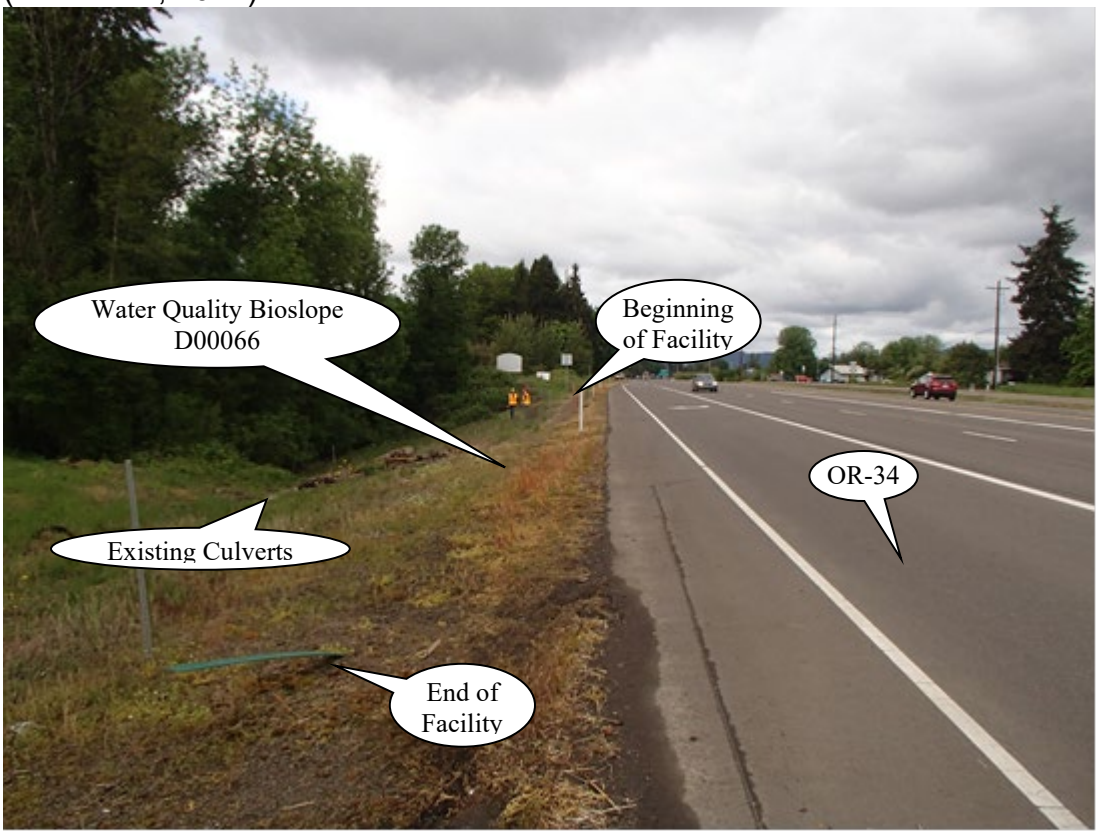


Photo 2: Facility Footprint (b) Looking from East or Decreasing Mileage (taken April, 2016)

Photo 3: Facility Footprint (b) Looking from West or Increasing Mileage (taken Dec, 2011)

Photo 4: Facility Footprint (c) Looking from West or Increasing Mileage (taken April, 2016)

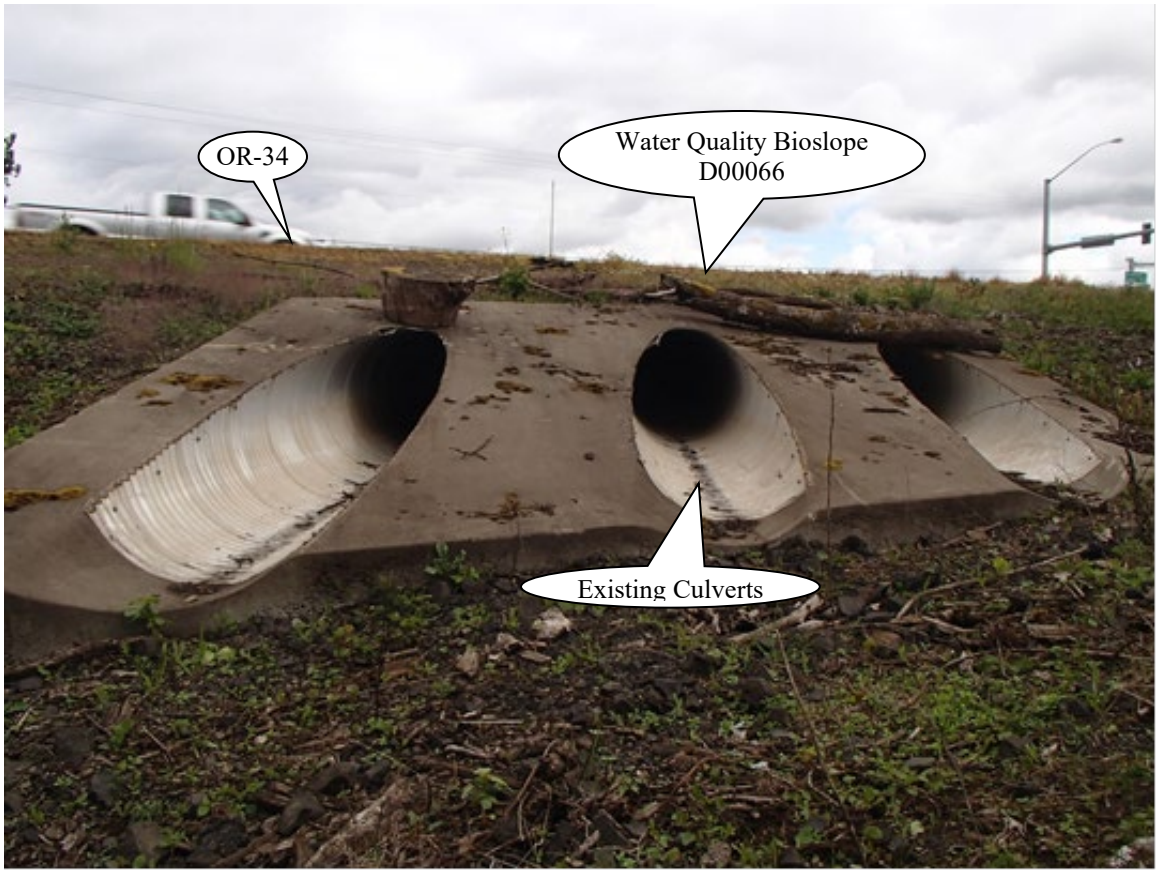


Photo 5: Existing Culverts Looking from South (taken April 2016)

5. Facility Haz Mat Spill Feature

Spill prevention is important to the successful operation of a stormwater management system. Prevention measures shall be taken at all times when handling substances that contaminate water. Should a spill occur, immediate attention is required and corrective measures shall be enacted as part of the response to control the spill.

The bioslope can capture small Haz Mat spills. The contaminated bioslope materials must be removed and the facility reconstructed as shown on the attached ODOT Project Plans Sheets found in Appendix B.

6. Auxiliary Outlet (High Flow Bypass)

Runoff that is not captured by the bioslope flows down the roadway embankment slopes and into the roadway drainage ditches.

The overflow outlets for this facility are:

☐ Designed into facility
☒ Other, as noted below
The roadside ditches collect flows that exceed the facility's capacity.

7. Maintenance Actions

Routine maintenance tables for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance actions for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance actions in addition to the routine actions are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual:

☒ **Table 1 (general maintenance)**
☐ **Table 2 (stormwater ponds)**
☐ **Table 3 (water quality biofiltration swales)**
☐ **Table 4 (water quality filter strips)**
☒ **Table 5 (water quality bioslopes)**
☐ **Table 6 (detention tank)**
☐ **Table 7 (detention vault)**
☐ **Appendix C (proprietary structure)**
☒ **Special Maintenance actions:**

The bioslope is near the pavement edge and it is covered with shoulder aggregate. Vegetation will be sparse and there are no actions for its establishment or maintenance.

8. Waste Material Handling

Contaminated material removed from the facility is defined as waste by DEQ. Refer to the road waste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

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) 229-5129
ODOT Region Hazmat Coordinator	(503) 986-2647
ODEQ Northwest Region Office	(503) 229-5263

Appendix A

Content:

- **Operational Plan Drawing**

Water Quality Bioslope
DFI D00062

+/- 950'

Water Quality Bioslope
DFI D00064

+/- 634'

+/- 30'

WQ Bioslope
DFI D00063

WQ Bioretention Cell
DFI D00068

EOP

Frontage Rd

EOP

Ditch

EOP

Westbound lanes

OR-34; HWY 210; Corvalis-Lebanon

Eastbound lanes

EOP

12" Conc.

U T FO

Ditch

40" x 64"
Arch CMP's

+/- 45'

WQ Bioslope
DFI D00070

NE Walcott St

18" Pipe

12"-125'

12"-21'

12"-22'

12"-16'

12" Pipe

12"-26'

12"-14'

12"-15'

12"-118'

12"-56'

SE Peoria Rd

Water Quality Bioslope
DFI D00065

+/- 375'

WQ Bioslope
DFI D00066

+/- 110'

A

B

PLAN
N.T.S.

N

Water Quality Bioslope
DFI D00066

Highway Shldr.

3.00' Aggregate Shoulder

3.00' Aggregate Strip

3.00' Vegetated Strip

Sl. var. 1:5 min. to 1:2 max.

Shldr. Aggregate

Media Filter Drain Mix
Nom. thickness 12"

2.50'

3.50'

Drainage Geotextile, Type 2

2.00'

Subsurface Drain with Granular Drain Backfill Material

SECTION B-B
N.T.S.

M.P 1.17

M.P 1.19

Exist Ground

6"-8"

4"-6"

1.0'

2.5'

Bottom of Facility

SECTION A-A
N.T.S.

LEGEND:

- Manhole
- Inlet
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Media Filter Drain Mix (Ecology Mix)
- Granular Drain Backfill Material
- Shoulder Aggregate
- Existing Soil
- Vegetation
- Facility Start
- Facility End

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Scott Sooter

Drafted By: Scott Sooter

DFI D00066
MAINTENANCE DISTRICT 04 HWY 210
WATER QUALITY BIOSLOPE
HIGHWAY MP 1.17-1.19
LINN COUNTY

DFI_D00066.dgn

Appendix B

Content:

- **ODOT Project Plan Sheets**
    - ***Cover/Title Sheet***
    - ***Water Quality/Detention Plan Sheets***
    - ***Details***

44V-24

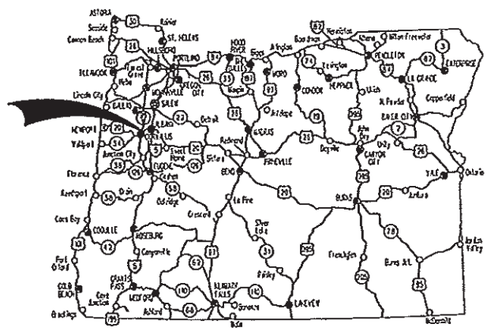
INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd.
1A-2	Std. Drg. Nos.

OR34: Roche Street - Wolcott Rd
Corvallis-Lebanon Hwy 210 Linn
C14326 CON03172 K#12580
X_HPP-S210(013)
BI Note Est Date

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, STRUCTURE, PAVING, SIGNING, SIGNALS & ROADSIDE DEVELOPMENT

OR34: ROCHE STREET - WOLCOTT ROAD SEC.
CORVALLIS - LEBANON HIGHWAY
LINN COUNTY
FEBRUARY 2011

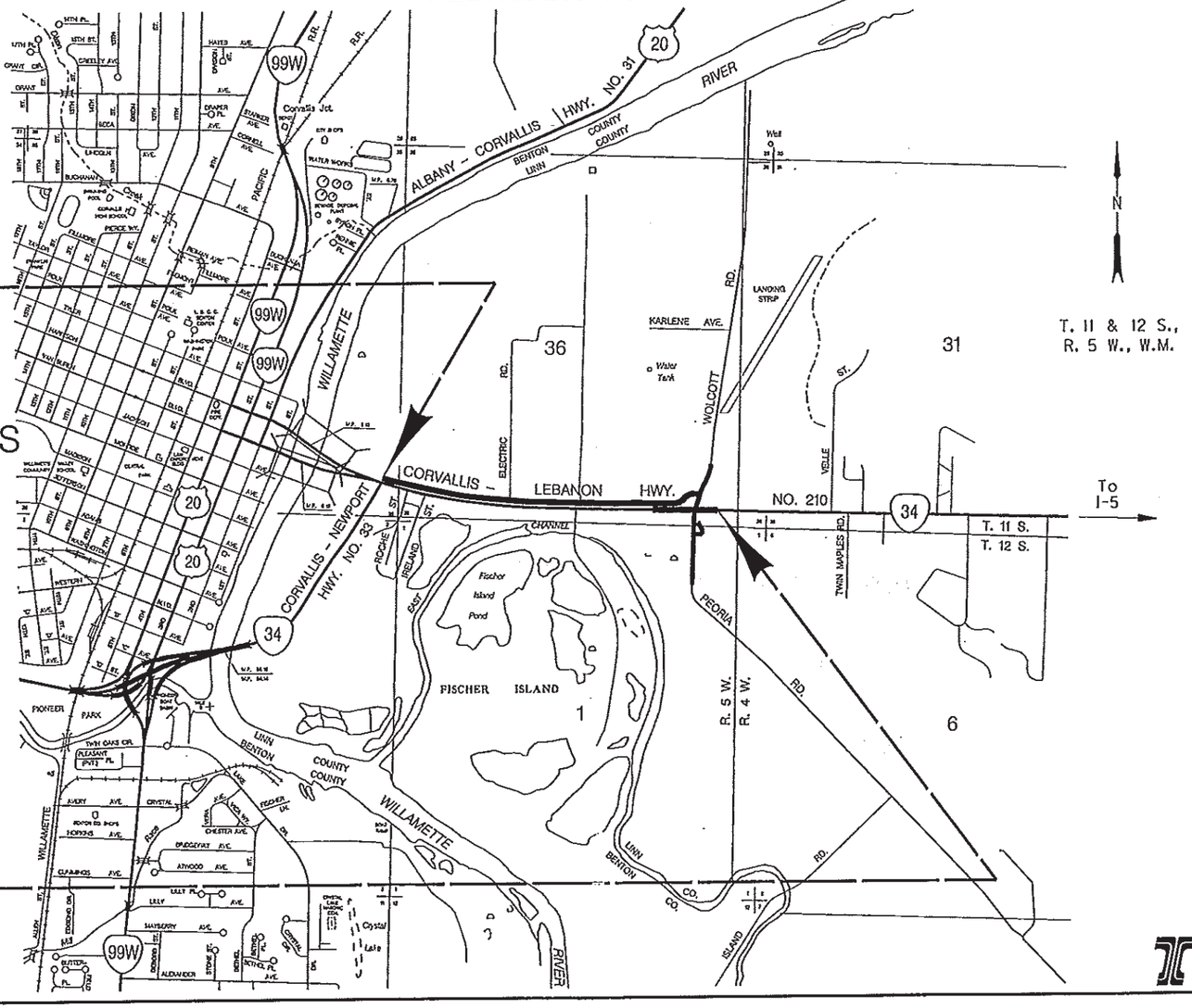


Overall Length Of Project - 0.92 Miles

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

X-HPP-S210(013)
BEGINNING OF PROJECT
STA. "SP" 1+20 (M.P. 0.34)



T. 11 & 12 S.,
R. 5 W., W.M.

X-HPP-S210(013)
END OF PROJECT
STA. "L" 77+00 (M.P. 1.26)

ORIGINAL

NOT REVISED AS CONSTRUCTED

RAY CRANSTON, P.L.S.

DATE 2-14-2012

OREGON TRANSPORTATION COMMISSION

Gail Achterman	CHAIR
Michael Nelson	VICE-CHAIR
Mary F. Olson	COMMISSIONER
Alan Brown	COMMISSIONER
David Lohman	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.

By: Carol A. Cartwright 1/10/11
Signature & date

Carol Cartwright - R2 Tech Center Manager
Print name and title

Concurrence by ODOT Chief Engineer

OR34: ROCHE STREET - WOLCOTT ROAD SEC.
CORVALLIS - LEBANON HIGHWAY
LINN COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	X-HPP-S210(013)	1

PE000743

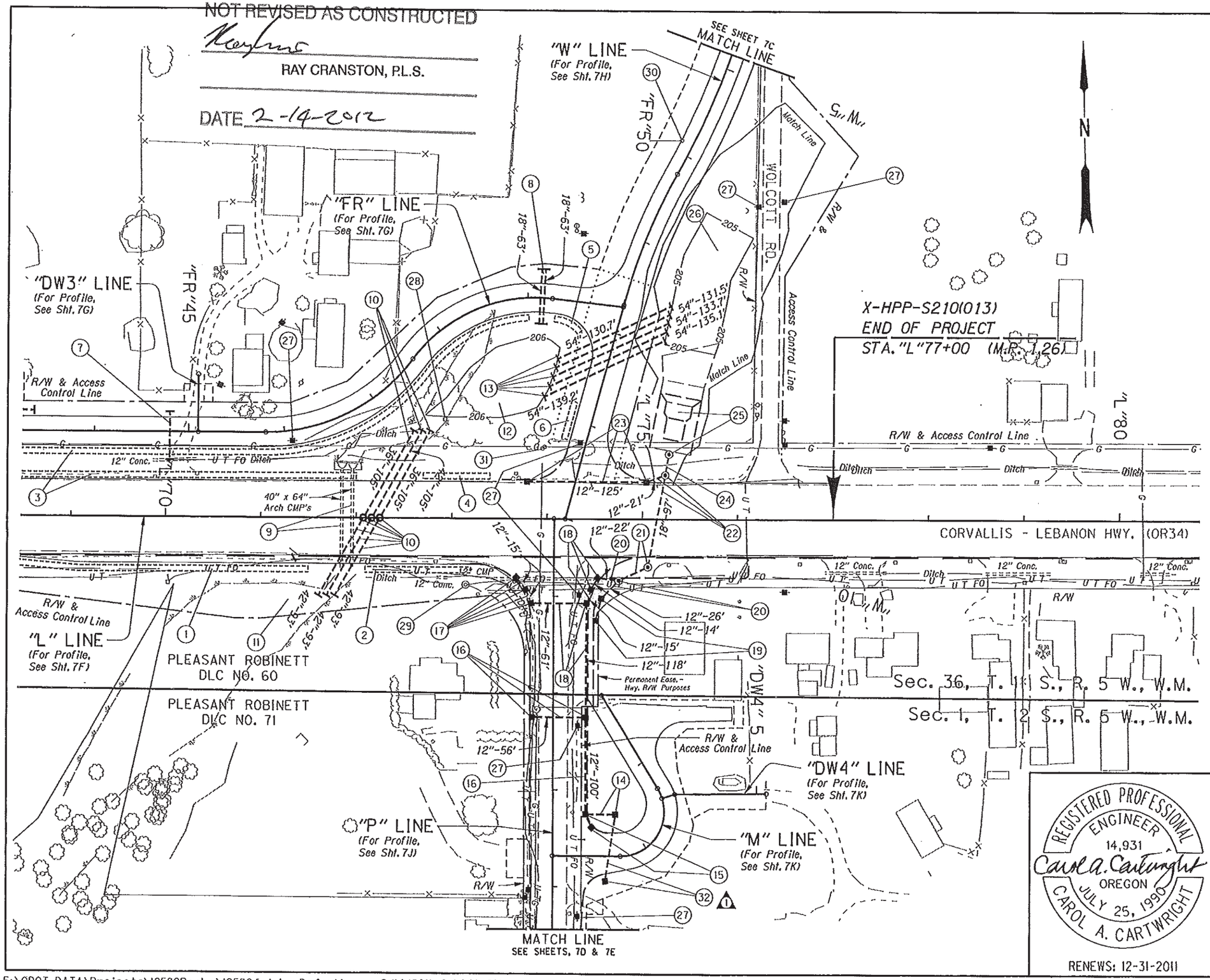
F:\ODOT_DATA\Projects\12580Roche\12580R2.tsl :: Default 12/29/2010 10:46:53 AM hwye07x

1/263

NOT REVISED AS CONSTRUCTED

RAY CRANSTON, P.L.S.

DATE 2-14-2012



No.	DATE	REVISIONS	BY
1	02-14-11	Added Pipe & Inlet	K.F.

OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

OR34: ROCHE STREET - WOLCOTT ROAD SEC.
CORVALLIS - LEBANON HIGHWAY
LINN COUNTY

Design Team Leader - Carol Cartwright
Designed By - Kathy Fry
Drafted By - Jeff Larson

DRAINAGE & UTILITIES

SHEET NO. 7B

REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JULY 25, 1990
CAROL A. CARTWRIGHT

RENEWS: 12-31-2011

(1) See Sht. 6, Note 6

(2) Sta. "L" 72+10 To Sta. "L" 73+20, Rt.
Const. Bioslope
(For Details, See Sht. GJ & GJ-9)

(3) See Sht. 6, Note 5

(4) Sta. "L" 72+70 To Sta. "L" 73+40, Lt.
Const. Bioslope
(For Details, See Sht. GJ & GJ-9)

(5) Sta. "FR" 49+30 To Sta. "FR" 49+60, Rt.
Const. Bioslope
(For Details, See Sht. GJ & GJ-9)

(6) Sta. "W" 8+80 To Sta. "W" 9+20, Rt.
Const. Bioslope
(For Details, See Sht. GJ & GJ-9)

(7) Sta. "FR" 44+80
Inst. 10" Culv. Pipe (DI) - 50'
5' Depth
(For Details, See Sht. GE-5)

(8) Sta. "FR" 49+13 To Sta. "FR" 49+17
Inst. 18" Culv. Pipes - 126' (Total)
5' Depth
(For Details, See Sht. GE-5)
(See Drg. No. RD300)

(9) Remove Extg. Pipes - 2
Trench Resurfacing - 138 Sq. Yd.
(For Details, See Sht. 2B-8)
(See Drg. No. RD302)

(10) Sta. "L" 72+07.5
Sta. "L" 72+16
Sta. "L" 72+24.5
Const. Shallow Manhole - 3
Inst. 42" Culv. Pipe - 384' (Total)
10' Depth
Inst. 36" Culv. Pipe - 210' (Total)
5' Depth
Const. Paved End Slope - 740 Sq. Ft.
Const. Riprap (Class 100) - 10 Cu. Yd.
Inst. Riprap Geotextile (Type 1) - 21 Sq. Yd.
Trench Resurf. - 211 Sq. Yd.
(For Details, See Shts. GE, GE-5 & 2B-8)
(See Drg. Nos. RD300, RD320, RD342, RD356
RD388, RD390 & RD391)

(11) Side Slope At Pipes
Contour Grading Plan
(For Details, See Sht. GN)

(12) Loop Depression
Contour Grading Plan
(For Details, See Sht. GN)

(13) Sta. "W" 7+98 To Sta. "W" 8+37.2
Inst. 54" Culv. Pipes - 671' (Total)
10' Depth
Const. Paved End Slope - 1,770 Sq. Ft.
(For Details, See Shts. GE-3 & GE-5)
Const. Riprap (Class 100) - 15 Cu. Yd.
Inst. Riprap Geotextile (Type 1) - 38 Sq. Yd.
(See Drg. No. RD300)

(14) Sta. "P" 3+25, Lt.
Const. Type "G-2MA" Mod. Inlet
Inst. 12" Sew. Pipe - 31.5'
5' Depth
(For Details, See Sht. 2B-3)

(15) Sta. "P" 3+25, Lt.
Const. Type "CG-2" Inlet - 2
Inst. 12" Sew. Pipe - 15'
5' Depth

(16) Sta. "P" 2+25, Lt. & Rt.
Const. Type "CG-2" Inlet - 2
Inst. 12" Sew. Pipe - 156'
5' Depth
Trench Resurfacing - 9 Sq. Yd.

(17) Sta. "P" 1+07, Rt.
Const. Type "CG-2" Inlet - 3
Inst. 12" Sew. Pipe - 30'
5' Depth

(18) Sta. "P" 1+07, Lt.
Const. Type "CG-2" Inlet - 3
Inst. 12" Sew. Pipe - 208'
5' Depth

(19) Sta. "P" 1+25 To Sta. "P" 1+01.8, Lt.
Const. Type "G-2" Inlet - 2
Inst. 12" Sew. Pipe - 24'
5' Depth

(20) Sta. "P" 0+83.4, 68' Lt.
Const. Manhole With Inlet
Inst. 12" Sew. Pipe - 48'
5' Depth
(See Drg. No. RD348)

(21) Sta. "P" 0+69, Lt.
Const. Manhole
Inst. 18" Sew. Pipe - 34'
5' Depth

REVISED AS CONSTRUCTED

RAY CRANSTON, P.L.S.

DATE 2-14-2012

(22) Sta. "L" 75+23.7, Lt.
Const. Manhole
Inst. 12" Sew. Pipe - 21'
5' Depth
Inst. 18" Sew. Pipe - 97'
5' Depth
Trench Resurfacing - 30 Sq. Yd.
(For Details, See Sht. 2B-8)

(23) Sta. "P" 73+79, Lt.
Const. Type "G-2" Inlet - 2
Inst. 12" Sew. Pipe - 125'
5' Depth

(24) Sta. "L" 75+23.7 To Sta. "B1" 3+99
Inst. 18" Sew. Pipe - 22'
5' Depth

(25) Const. Bioretention Cell
Const. Diversion M.H.
(For Details, See Sht. GJ-2, Note 2)

(26) Wolcott Road Depression
Contour Grading Plan
(For Details, See Sht. GN)

(27) Relocate Power Pole - 7
(By Others)

(28) Relocate Communication Riser
(By Others)

(29) Relocate Telephone M.H.
(By Others)

Left in Place
Not Necessary

(30) Relocate Water Valve
(By Others)

(31) Adjust Gas Valve Boxes - 2
(By Others)

(1) (32) Sta. "M" 1+55, Rt.
Const. Type "D" Inlet
Inst. 12" Sew. Pipe - 70'
5' Depth

No.	DATE	REVISIONS	BY
1	02-14-11	Added Note	K.F.

REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JULY 25, 1990
CAROL A. CARTWRIGHT

RENEWS: 12-31-2011

OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

OR34: ROCHE STREET - WOLCOTT ROAD SEC.
CORVALLIS - LEBANON HIGHWAY
LINN COUNTY

Design Team Leader - Carol Cartwright
Designed By - Kathy Fry
Drafted By - Jeff Larson

NOTES

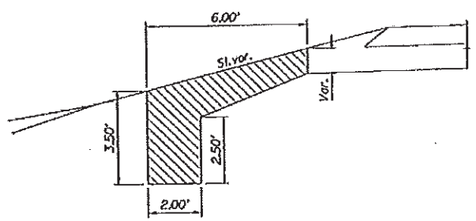
SHEET NO. 7B-2

REVISED AS CONSTRUCTED

RAY CRANSTON, P.L.S.

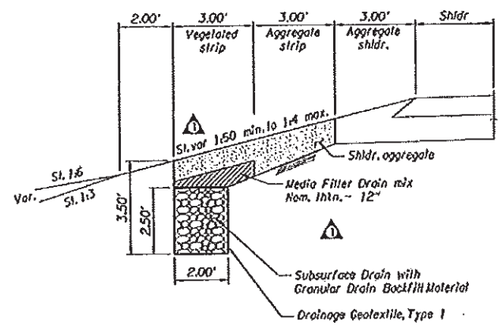
DATE 2-21-12

44V-024



Pay Limits of Bioslope Excavation

BIOSLOPE EXCAVATION



BIOSLOPE SECTION
1:50 MIN. SLOPE

NOTE:
Side-slopes are shown as vert. to horiz.

No.	DATE	REVISIONS	BY
1	04-12-11	Modified detail, removed note	BU

REGISTERED PROFESSIONAL ENGINEER
14475
Bo Miller
OREGON
JULY 26, 1989
BO MILLER
RENEWS: 12-31-2012

OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

OR34: ROCHE STREET - WOLCOTT ROAD SEC,
CORVALLIS - LEBANON HIGHWAY
LINN COUNTY

Reviewed By - Bruce Carmichael, P.E.
Designed By - Bo Miller, P.E.
Drafted By - Sandra Glah

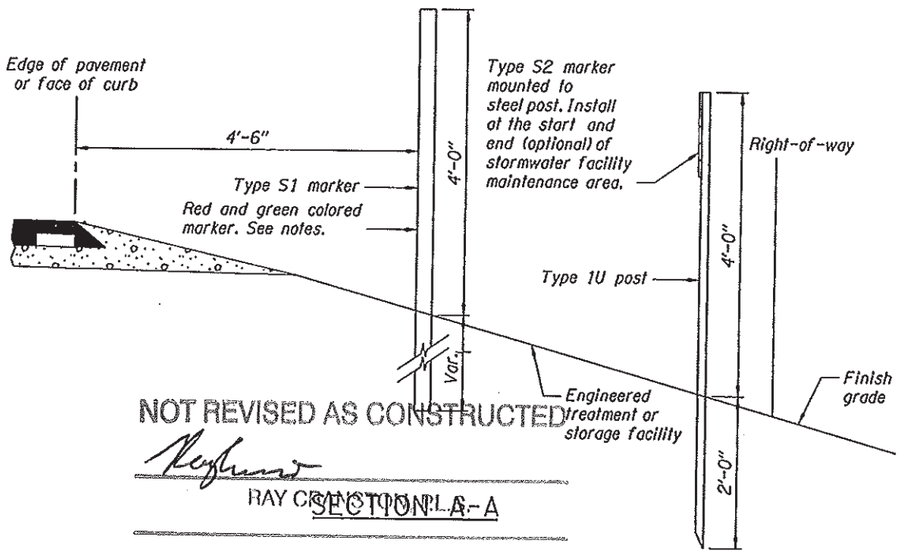
STORMWATER
BIOSLOPE DETAILS

SHEET NO. GJ

\\Scdata2\2610drafting\Projects\12580_roche-wolcott\Sandra_Glah\12580f.gjl :: Default 4/12/2011 10:43:44 AM hwye947

1:1200_BL - 001

Attachment 1
OR34: Roche Street - Wolcott Road
C14326, CCO 01
Page 4 of 6

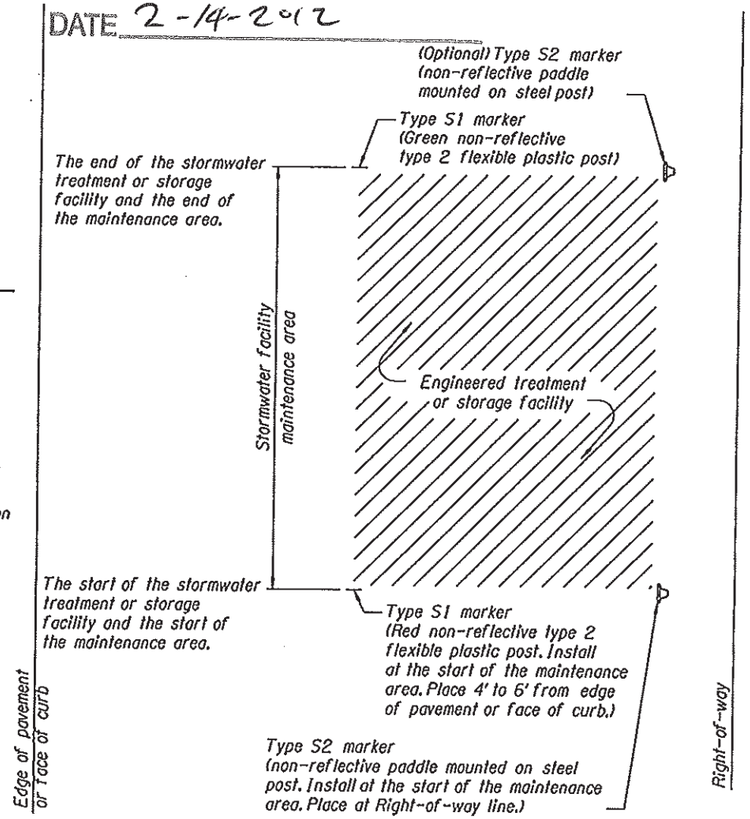


NOT REVISED AS CONSTRUCTED

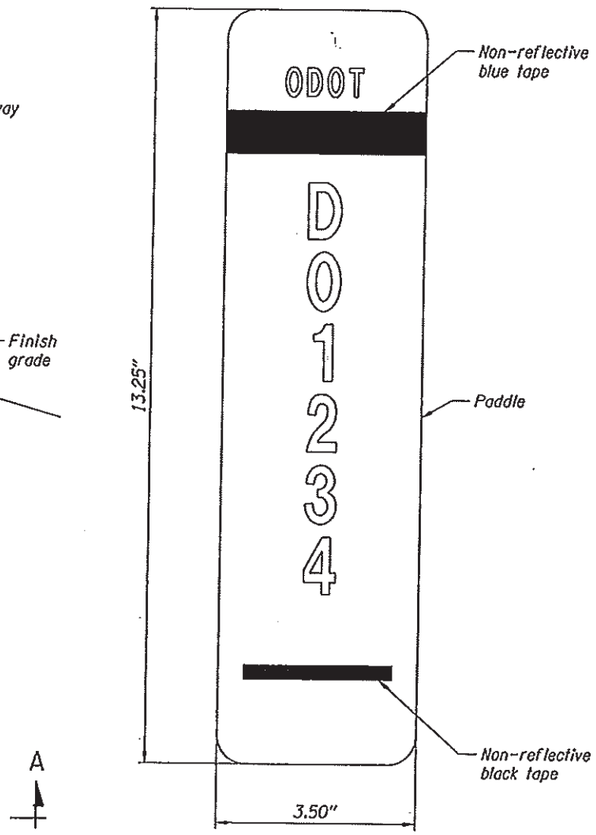
RAY CHRISTOPHER L.A.-A

SECTION L.A.-A

DATE 2-14-2012

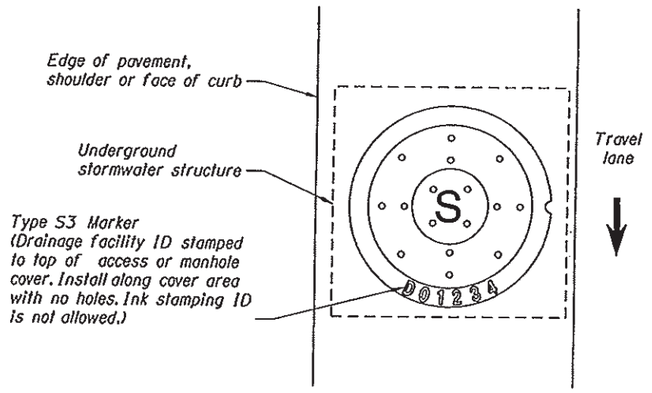


TYPE S1 & S2 MARKERS INSTALLATION DETAIL



TYPE S2 MARKER

(STATE SUPPLIED ITEM)



TYPE S3 MARKER INSTALLATION DETAIL

MARKER TABLE

FACILITY LOCATION		DFI NO.	TYPE S2 MARKER LOCATION		TYPE S1 MARKER		TYPE S3 MARKER
STATION	HWY MP, OFFSET		BEGIN	END	RED	GREEN	
"FR" 39+75	1.03, 67.15' Lt	D00062	✓		✓		
"FR" 49+00	1.20, 209.17' Lt	D00062		✓		✓	
"FR" 49+30	1.20, 207.96' Lt	D00063	✓		✓		
"FR" 49+60	1.21, 191.63' Lt	D00063		✓		✓	
"L" 65+00	1.03, 41.85' Lt	D00064	✓		✓		
"L" 72+00	1.17, 43.49' Lt	D00064		✓		✓	
"L" 67+75	1.08, 42.67' Rt	D00065	✓		✓		
"L" 71+50	1.15, 53.79' Rt	D00065		✓		✓	
"L" 72+10	1.17, 53.78' Rt	D00066	✓		✓		
"L" 73+20	1.19, 53.28' Rt	D00066		✓		✓	
"L" 72+70	1.18, 43.55' Lt	D00067	✓		✓		
"L" 73+40	1.19, 43.81' Lt	D00067		✓		✓	
"L" 75+28	1.23, 67.16' Lt	D00068					✓
"P" 9+20	1.19, 900.65' Rt	D00069					✓
"W" 8+80	1.21, 121.87' Lt	D00070	✓		✓		
"W" 9+20	1.21, 83.25' Lt	D00070		✓		✓	

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

NOTES:

Stormwater Facility Field Marker Type S1:
1. See Standard Drawing TM570 for Type 2 flexible plastic post dimensions. Do not mount reflective sheeting to flexible plastic post.
2. A red Type S1 marker is used to mark the start of a stormwater facility maintenance area. A green Type S1 marker is used to mark the end of a stormwater facility maintenance area.
3. Place 4 to 6 feet from edge of pavement or face of curb.
4. See marker table for installation locations.

Stormwater Facility Field Marker Type S2:
1. Paddle:
   - Aluminum sheet, nominal thickness 0.050"
   - White non-reflective background
   - Mount paddle to one (1) Type 1U steel post using 3/16" diameter aluminum blind rivets and washers. See Standard Drawing TM 570 detail labeled "Steel Posts" for mounting a traffic target. Install paddle onto Type 1U steel post using the same hole pattern.
   - Text and numbers are Type C font in non-reflectorized black
   - Band is non-reflective blue tape
   - Do not mount paddle to other highway signing posts
   - Install paddle parallel to travel lane
   - Prepare paddle for each "DFI" noted in the marker table
2. Steel Posts:
   - See Standard Drawing TM571 for Type 1U steel post dimensions

Stormwater Facility Field Marker Type S3:
1. The top of access or manhole cover shall be stamped with the drainage facility ID. Ink stamping ID is not allowed.

REGISTERED PROFESSIONAL ENGINEER
14475
Bo Miller
OREGON
JULY 26, 1989
BO MILLER

RENEWS: 12-31-2010

OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

OR34: ROCHE STREET - WOLCOTT ROAD SEC.
CORVALLIS - LEBANON HIGHWAY
LINN COUNTY

Reviewed By - Angela J. Kargel
Designed By - Taundra Mortensen
Drafted By - Jeff Larson

STORMWATER DETAILS

SHEET NO. GJ-9