

# **OPERATION & MAINTENANCE MANUAL**

**DFI No.: D00373**

**Facility Type: Water Quality Biofiltration  
Swale**



**MARCH, 2011**



## 1. Identification

Drainage Facility ID (DFI): **D00373**  
Facility Type: Water Quality Biofiltration Swale  
Construction Drawings: (V-File Number) 38V-097  
Location: District: 7  
Highway No.: 001  
Mile Post: 117.74 / 117.76 (beg./end)  
Description: This facility is located in the median of I-5 (Hwy 001, Pacific Highway) on the north side of the Roberts Creek Bridge. Access can be obtained from the inside shoulder of I-5.

## 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 Hydraulics Engineer (541) 957-3693

Or

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

## 3. Construction

Engineer of Record: ODOT Designer – Region 3 Tech. Center, James Bauman, 541-957-3573

Facility construction: 2007  
Contractor: CH2M Hill, Inc., (Design – Build)

#### 4. Storm Drain System and Facility Overview

A water quality swale is a flat-bottomed open channel designed to treat stormwater runoff from highway pavement areas. This type of facility is lined with grass. Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass.

Stormwater for the facility is conveyed to the facility through sheet flow generated by the northbound and southbound travel lanes of I-5. Refer to the Operational Plan in Appendix A for further information. Water conveyed into the swale undergoes treatment as it flows through the length of the channel. The treated water flows out of the swale through a riprap infiltration basin and is conveyed directly into Roberts Creek.

##### A. Maintenance equipment access:

Maintenance crew can access the facility from the inside shoulder of I-5.

##### B. Heavy equipment access into facility:

- Allowed (no limitations)
- Allowed (with limitations)
- Not allowed

##### C. Special Features:

- Amended Soils
- Porous Pavers
- Liners
- Underdrains



Photo 1: Looking north, flow into the swale is generated from I-5 shown on the left and right side of the picture. Riprap basins shown at the bottom of the picture function to infiltrate flow and dissipate energy.

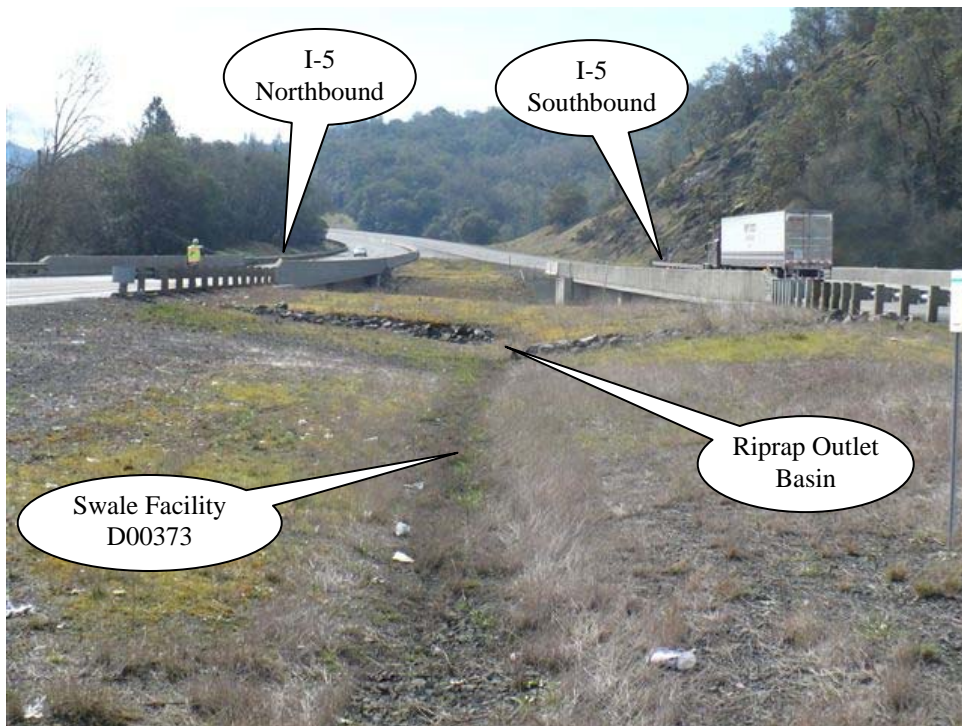


Photo 2: Looking south, flow into the swale is generated from I-5 shown on the left and right side of the picture.

## 5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the flow path and outlet channel of the water quality biofiltration swale. Constructing a sandbag dam upstream from the riprap basins may help facilitate this process; see photos 1 & 2.

## 6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

Designed into facility

Other, as noted below

There is no auxiliary outlet for this facility.

## 7. Maintenance Requirements

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

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

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 requirements:

Note: Special maintenance Requirements Require Concurrence from ODOT SR Hydraulics Engineer.

## 8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste 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:

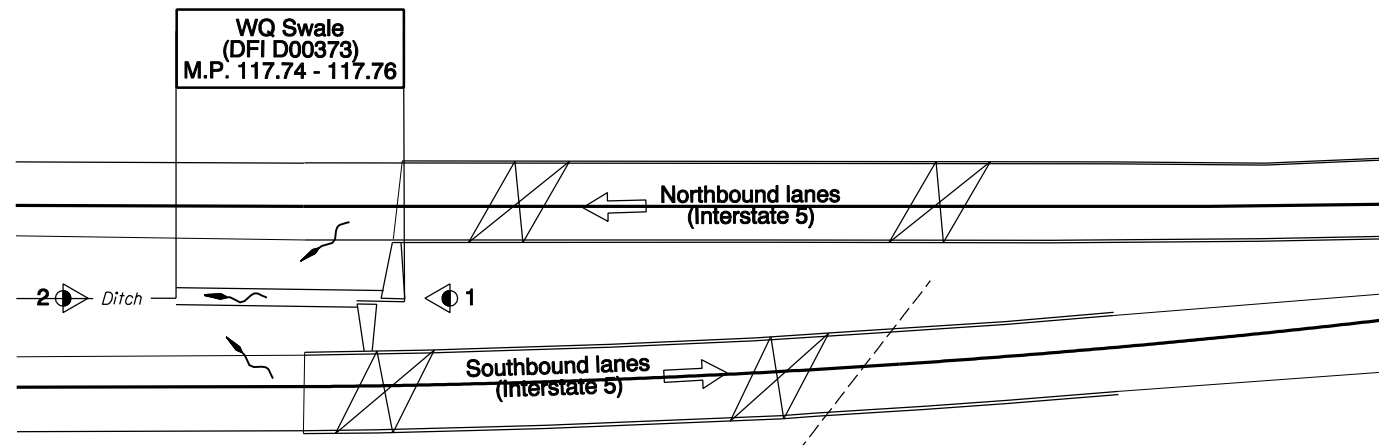
ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(541) 957-3594
ODEQ Northwest Region Office	(503) 229-5263

# Appendix A

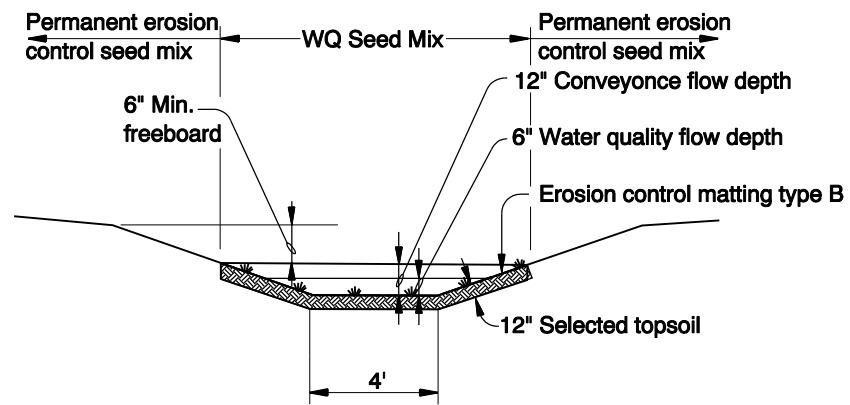
## Content:

- **Operational Plan and Profile Drawing(s)**





**PLAN**  
N.T.S.



**TYPICAL WQ SWALE SECTION**  
N.T.S.

**LEGEND:**

- Photo Location / Direction
- Manhole
- Inlet
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: J. Carpenter  
 Drafted By: B. Shafer

**DFI D00373**  
**MAINTENANCE DISTRICT 7 HWY 1**  
**WQ QUALITY BIOFILTRATION SWALE**  
 PACIFIC HIGHWAY MP 117.74/117.76  
 DOUGLAS COUNTY

# Appendix B

## Content:

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

Index Of Roadway Drawings On Sheet 1A  
Standard Drg. Nos.

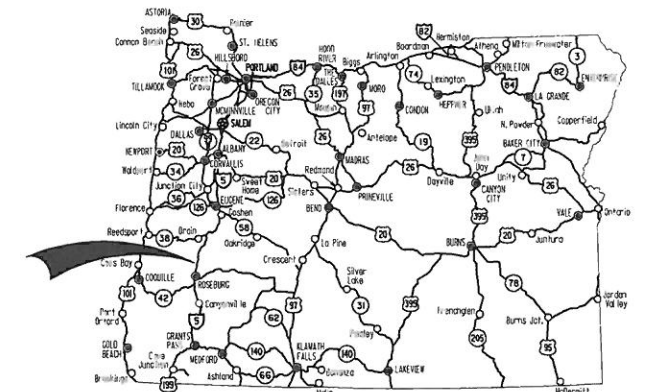
- BR150 Double Strip Seal Expansion Joint
- BR155 Bridge Joint Details
- BR203 Standard Transition Concrete Bridge Rail to Guardrail
- BR236 Trailing End Br. Connection Concrete Br. Rail to Guardrail
- BR240 Protective Fencing
- BR241 Protective Fencing
- BR350 Temp. Diaphragm Beam for Prestressed Concrete Beams
- RD364 Concrete Inlets Types G-1, G-2 & G-2M
- RD376 Misc. Drainage Structures, Siphon Box & Inlet Adj. Cap
- RD400 Guardrail and Metal Median Barrier
- RD405 Guardrail and Metal Median Barrier Parts
- RD415 Guardrail and Metal Median Barrier Parts
- RD425 2'6" - 4'0" Flared Terminal
- RD440 Guardrail Installation at Bridge Ends
- RD450 Guardrail Anchors (Steel)
- RD470 Guardrail Over Low-Fill Culverts
- RD500 Precast Concrete Barrier Pin and Loop Assembly
- RD515 Median Barrier Anchoring Details
- RD516 Securing Concrete Barrier To Roadway
- RD530 Guardrail Transition to Concrete Barrier
- RD545 Precast Tall (42") Concrete Barrier
- RD550 Cast-In-Place Concrete Barrier Transition To Bridge Rail
- RD560 Cast-In-Place Barrier Transition To Standard Concrete Barrier
- RD570 Guardrail Transition to Tall Concrete Barrier
- RD600 Portland Cement Concrete Pavement
- RD605 Continuously Reinforced Concrete Pavement
- RD610 Asphalt Pavement Details
- RD700 Curbs
- RD810 Barbed And Woven Wire Fences
- RD900 Traffic Control Plans Details
- RD920 Traffic Control Plans Freeway Sections
- RD945 Traffic Control Plans Details
- RD950 Temporary Barricades
- RD955 Temporary Impact Attenuators
- RD960 Temporary Impact Attenuators

STATE OF OREGON  
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT  
**GRADING, DRAINAGE, STRUCTURES & PAVING**

**I-5: CLARKS BRANCH TUNNEL MILL RACE SEC.  
DESIGN-BUILD PROJECT**

**PACIFIC HIGHWAY  
DOUGLAS AND LANE COUNTIES  
April 11, 2007**

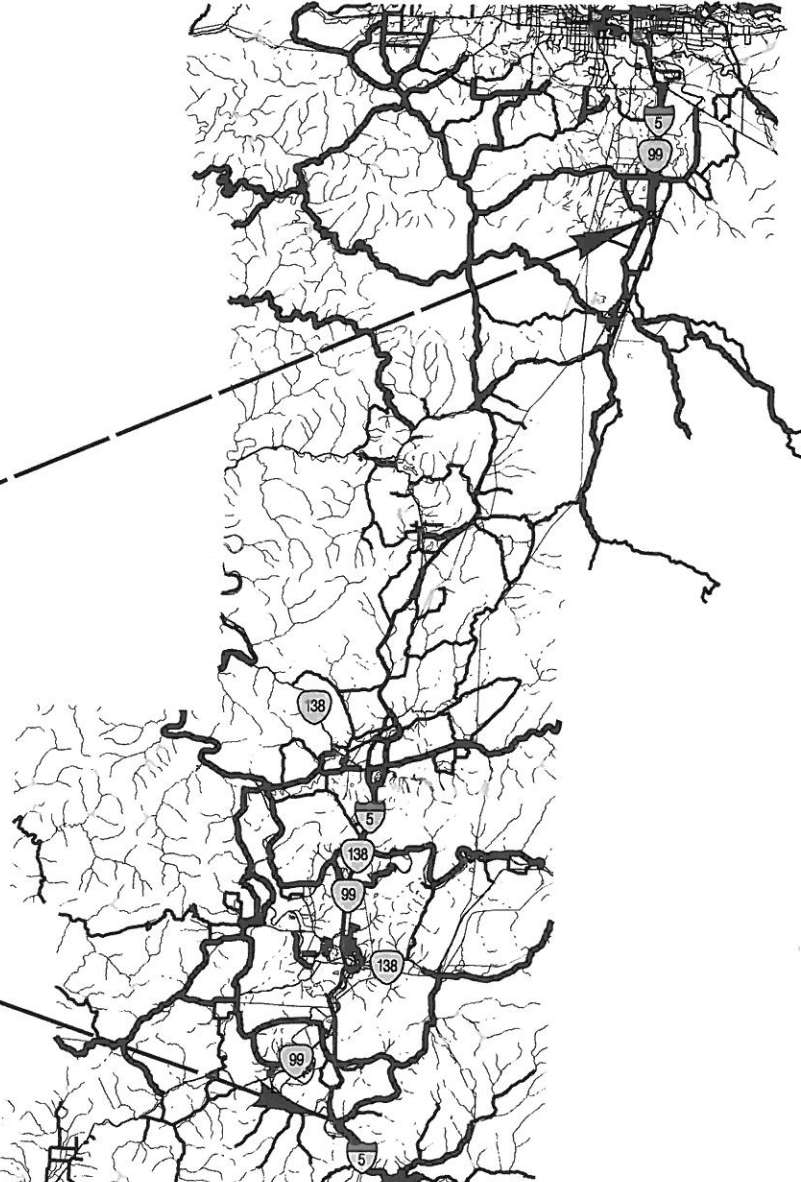


Overall Length Of Project - 67.05 Miles

**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.)

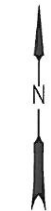


REVISED AS CONSTRUCTED  
04/07 CONTRACT 13111  
DESIGN MGR. JAMES BAUMAN



**BEGINNING OF PROJECT**  
**M.P. 180.49**

**END OF PROJECT**  
**M.P. 113.44**



Sec. 26, T. 19 S., R. 3 W., W.M.  
Sec. 35, T. 19 S., R. 3 W., W.M.  
Sec. 2, T. 20 S., R. 3 W., W.M.  
Sec. 11, T. 20 S., R. 3 W., W.M.  
Sec. 1, T. 28 S., R. 6 W., W.M.  
Sec. 2, T. 28 S., R. 6 W., W.M.  
Sec. 11, T. 28 S., R. 6 W., W.M.  
Sec. 12, T. 28 S., R. 6 W., W.M.  
Sec. 13, T. 28 S., R. 6 W., W.M.  
Sec. 14, T. 28 S., R. 6 W., W.M.  
Sec. 23, T. 28 S., R. 6 W., W.M.  
Sec. 24, T. 28 S., R. 6 W., W.M.



Rev. No.	Date	Revision
1	4/11/07	As Constructed

**OREGON TRANSPORTATION COMMISSION**

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Mike Nelson	COMMISSIONER
Randall Pope	COMMISSIONER
Janice J. Wilson	COMMISSIONER
Matt Garrett	DIRECTOR OF TRANSPORTATION

PLANS PREPARED FOR  
**ODOT**  
BY:  
**CH2MHILL**

EXPIRES: 12/31/07

OREGON DEPARTMENT OF TRANSPORTATION  
CONCURRENCE

TECHNICAL SERVICES MANAGING ENGINEER	DATE	
<b>I-5: CLARKS BRANCH TO TUNNEL MILL RACE SEC. DESIGN-BUILD PROJECT PACIFIC HIGHWAY LANE AND DOUGLAS COUNTIES</b>		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO. <b>1</b>
OREGON DIVISION	OTIA-SO-S001(197)	

Index Of Roadway Drawings On Sheet 1A  
Standard Drg. Nos.

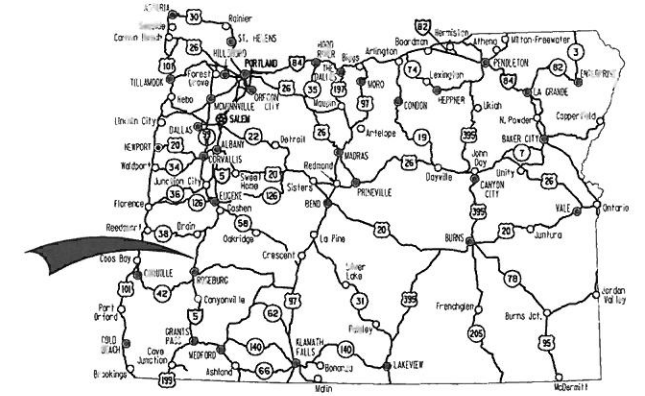
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STATE OF OREGON  
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT  
GRADING, DRAINAGE, STRUCTURES & PAVING

**I-5: CLARKS BRANCH TUNNEL MILL RACE SEC.  
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PACIFIC HIGHWAY  
DOUGLAS AND LANE COUNTIES  
April 11, 2007

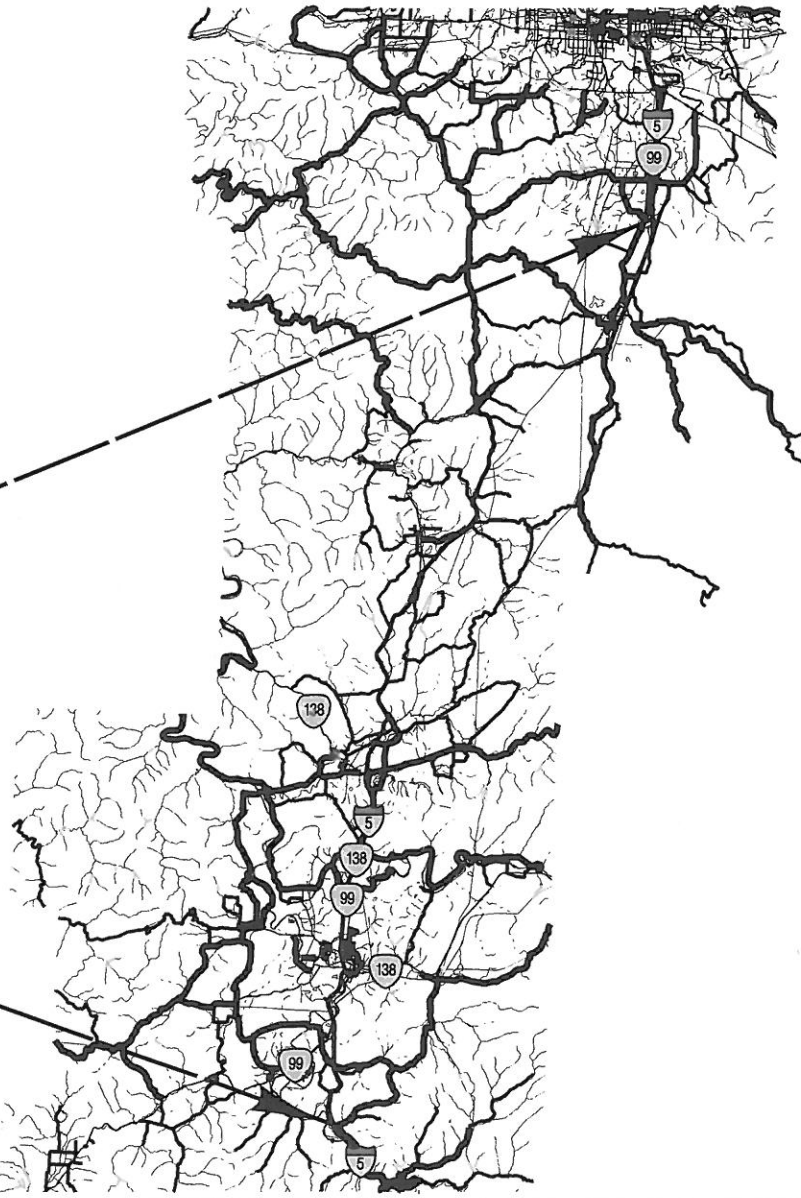


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REVISED AS CONSTRUCTED  
04/07 CONTRACT 13111  
DESIGN MGR. JAMES BAUMAN



**BEGINNING OF PROJECT**  
M.P. 180.49

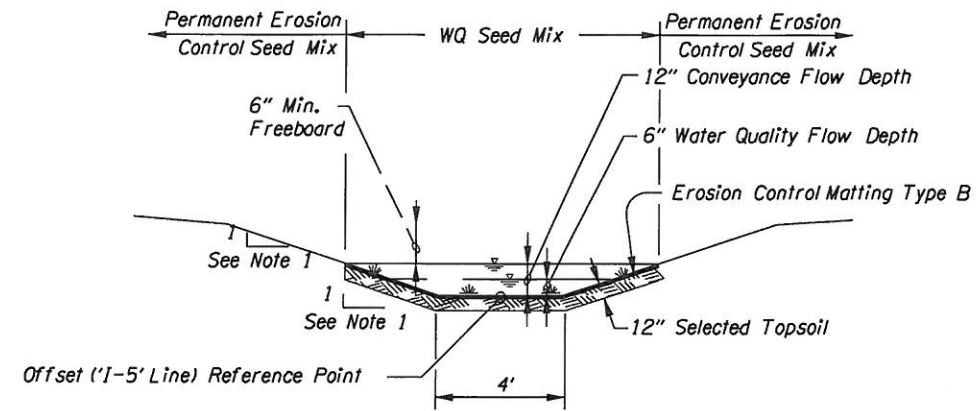
**END OF PROJECT**  
M.P. 113.44

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Rev. No.	Date	Revision
1	4/11/07	As Constructed

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Randall Pape	COMMISSIONER	
Janice J. Wilson	COMMISSIONER	
Matt Garrett	DIRECTOR OF TRANSPORTATION	
PLANS PREPARED FOR <b>ODOT</b> BY: <b>CH2MHILL</b>		
EXPIRES: 12/31/07		
OREGON DEPARTMENT OF TRANSPORTATION CONCURRENCE		
TECHNICAL SERVICES MANAGING ENGINEER _____ DATE _____		
<b>I-5: CLARKS BRANCH TO TUNNEL MILL RACE SEC. DESIGN-BUILD PROJECT</b> PACIFIC HIGHWAY LANE AND DOUGLAS COUNTIES		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	OTIA-S0-S001(197)	1



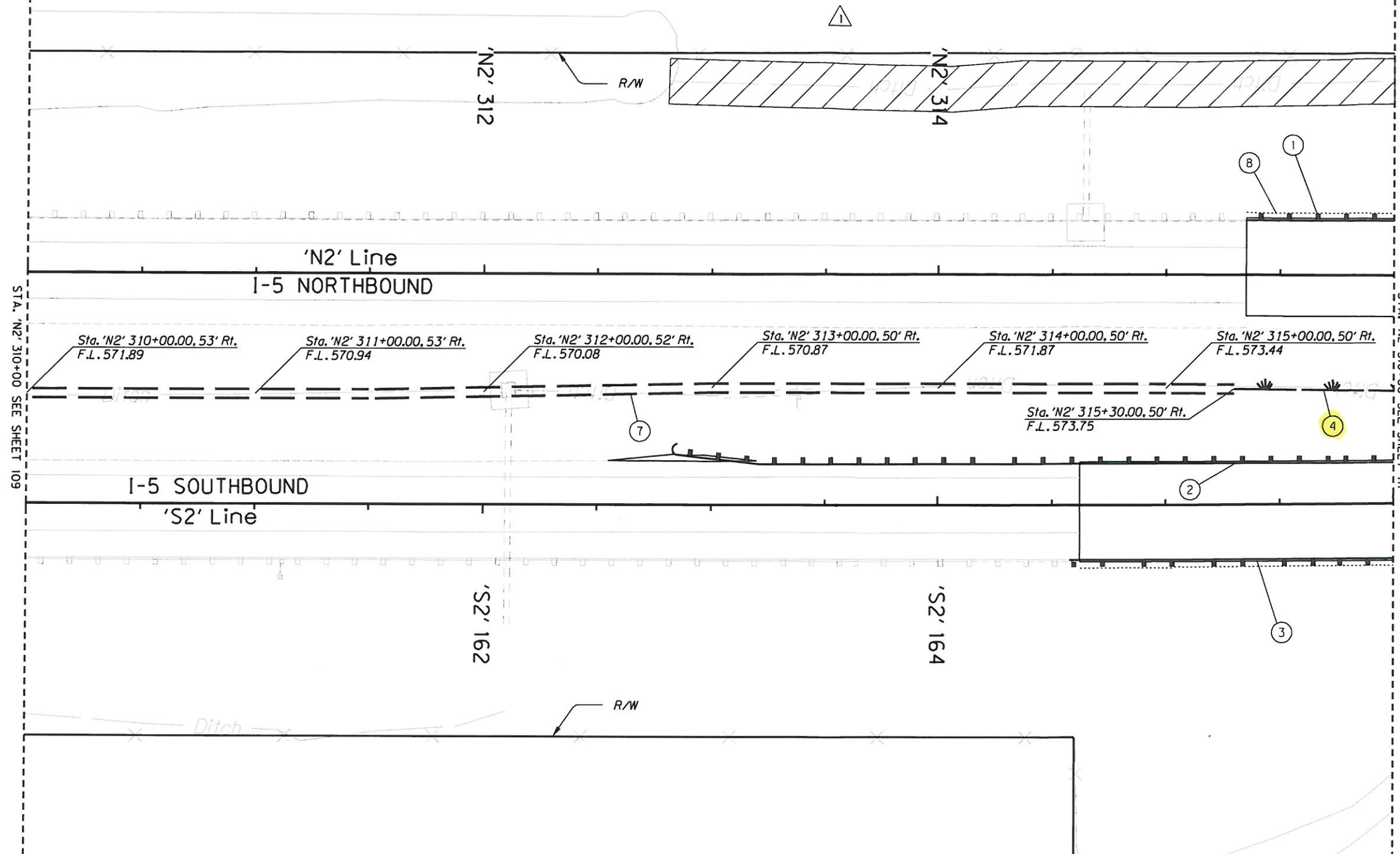
**Notes:**

1. Sideslopes In The Water Quality Section Of The Swale Shall Be 4H:1V Maximum. Sideslopes In the Conveyance Flow Depth Section Above The Water Quality Flow Depth Shall Match Embankment Slopes, Not To Exceed 3H:1V.
2. Erosion Control Matting Materials And Installation Per ODOT Std. Spec. Section 280.

**TYPICAL BIOSWALE SECTION**

Rev. No.	Date	Revision
1	4/11/2007	As Constructed

<b>OREGON DEPARTMENT OF TRANSPORTATION</b> ROADWAY ENGINEERING SECTION	
<b>I-5: CLARKS BRANCH TO TUNNEL MILL RACE SEC. DESIGN-BUILD PROJECT</b> PACIFIC HIGHWAY LANE AND DOUGLAS COUNTIES	
Reviewed By - Tim Yamada Designed By - Chris Allen Drafted By - Robert Luke	
<b>DRAINAGE DETAILS</b>	SHEET NO. <b>2B-5</b>



- ① Sta. 'N2' 315+33.39 To Sta. 'N2' 317+33.39  
Tie To Extg. Guardrail  
Const. Guardrail (Type 2A) - 200'  
Const. Bridgerail To Guardrail Connection  
(For Details, See Sht. C2S-403 And Drg. Nos. RD400, RD405, RD415)
- ② Sta. 'S2' 162+80.36 To Sta. 'S2' 166+42.86  
Const. Guardrail (Type 2A) - 362.5'  
Const. Flared Terminal - 1  
W=4, E=0'  
Const. Guardrail (Type 3) - 12.5'  
Const. Guardrail Transition - 1  
(For Details, See Sht. C2S-402 And Drg. Nos. RD400, RD405, RD415, RD425, RD440)
- ③ Sta. 'S2' 164+57.15 To Sta. 'S2' 166+38.08  
Const. Guardrail (Type 2A) - 150'  
Const. Guardrail (Type 3) - 12.5'  
Const. Guardrail Transition - 1  
Tie to Extg. Guardrail  
(For Details, See Sht. C2S-402 And Drg. Nos. RD400, RD405, RD415, RD425, RD440)
- ④ Sta. 'N2' 315+30.00, 50' Rt., F.L. 573.75  
Sta. 'N2' 316+30.00, 50' Rt., F.L. 574.25  
Const. Bioswale - 100'  
At 0.5% Grade  
(For Details, See Sht. 2B-5)
- ⑦ Const. Median Ditch  
(See Sht. 109, Note 1)

Legend:  
No Work Zone

Rev. No.	Date	Revision
②	4/11/2007	As Constructed
①	8/04/2006	Added No Work Zone

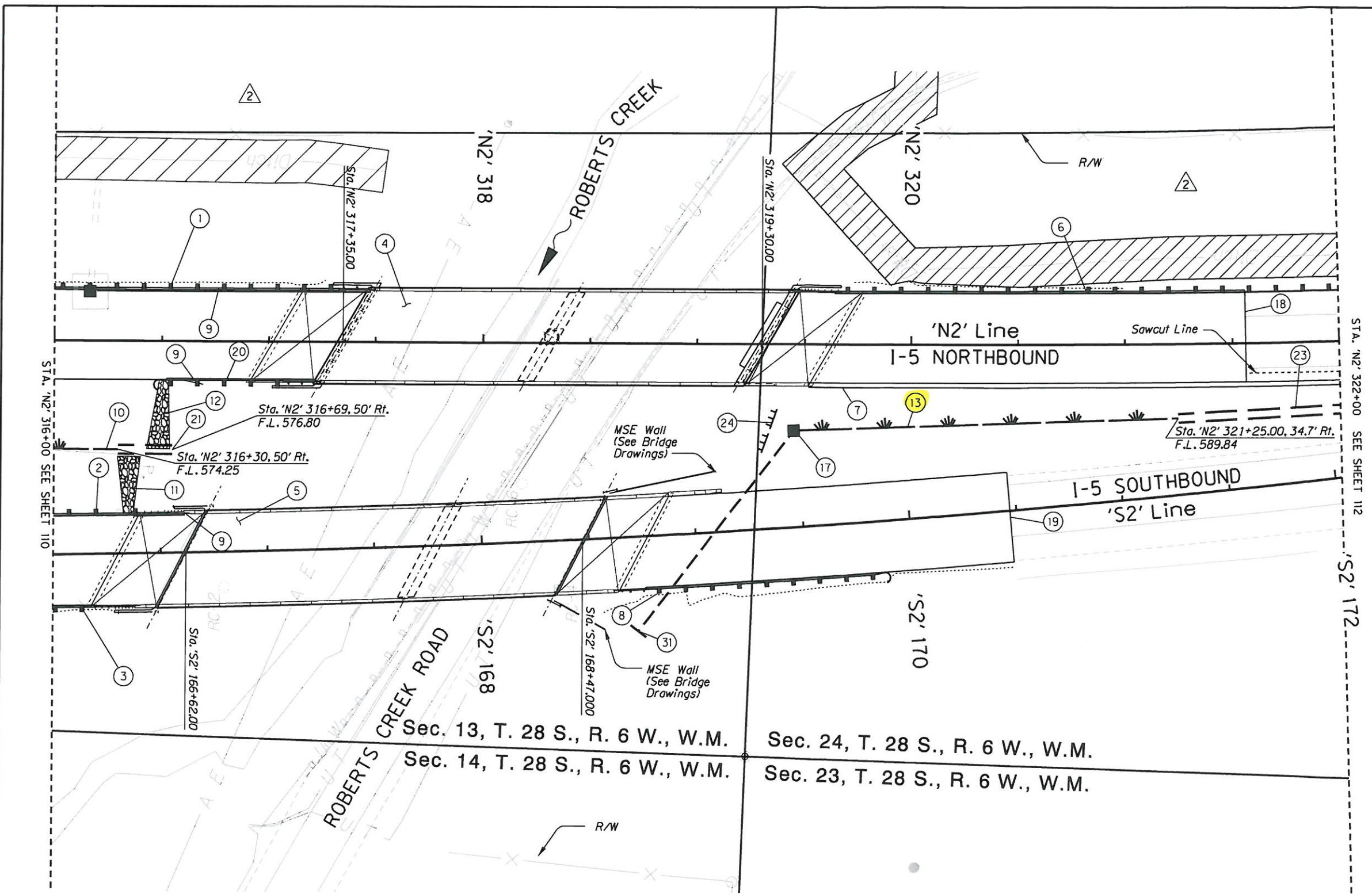
**OREGON DEPARTMENT OF TRANSPORTATION**  
ROADWAY ENGINEERING SECTION

**I-5: CLARKS BRANCH TO TUNNEL MILL RACE SEC. DESIGN-BUILD PROJECT**  
PACIFIC HIGHWAY  
LANE AND DOUGLAS COUNTIES

Reviewed By - Shari Munroe  
Designed By - Andy Kutansky  
Drafted By - Robert Luke

STA. 'N2' 310+00 TO STA. 'N2' 316+00  
ROADWAY PLAN

SHEET NO. 110

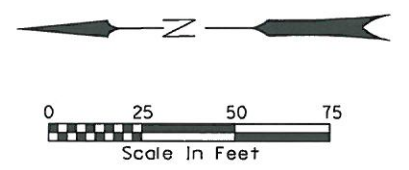


STA. 'N2' 322+00 SEE SHEET 112  
S2' 172

STA. 'N2' 316+00 SEE SHEET 110

Legend:  
No Work Zone

Rev. No.	Date	Revision
4	4/11/2007	As Constructed
3	4/11/2007	Removed Pavement Drain
2	8/04/2006	Bridge Extension And Revision To Limits Of Work
1	12/15/2005	Drainage Revisions



**OREGON DEPARTMENT OF TRANSPORTATION**  
ROADWAY ENGINEERING SECTION

**I-5: CLARKS BRANCH TO TUNNEL MILL RACE SEC. DESIGN-BUILD PROJECT**  
PACIFIC HIGHWAY  
LANE AND DOUGLAS COUNTIES


Reviewed By - Shari Munroe  
Designed By - Andy Kutansky  
Drafted By - Robert Luke

STA. 'N2' 316+00 TO STA. 'N2' 322+00  
**ROADWAY PLAN**

SHEET NO. **111**

- ① Const. Guardrail  
(See Sht. 110, Note 1)
- ② Const. Guardrail  
(See Sht. 110, Note 2)
- ③ Const. Guardrail  
(See Sht. 110, Note 3)
- ② ④ Bridge No. 20422  
Const. Structure - 195'  
Rdwy. Width 42'  
And Reinf. Panel At Bridge Ends  
(For Details, See Sht. C2N-101)
- ⑤ Bridge No. 20389  
Const. Structure - 185'  
Rdwy. Width 42'  
And Reinf. Panel At Bridge Ends  
(For Details, See Sht. C2-101)
- ⑥ Sta. 'N2' 319+47.61 To  
Sta. 'N2' 323+65.76  
Const. Guardrail (Type 2A) - 387.5'  
Const. Guardrail (Type 3) - 12.5'  
Const. Guardrail Transition - 1  
Tie To Extg. Guardrail  
(For Details, See Sht. C2S-402 And  
Drg. Nos. RD400, RD405, RD415,  
RD425, RD440)
- ⑦ Sta. 'N2' 319+51.48 To  
Sta. 'N2' 328+59.00  
Const. Precast Tall Conc. Barrier - 912.5'  
(Scuppered)  
Const. Barrier Transition - 2  
(See Drg. Nos. RD516, RD545,  
RD550 & RD560)
- ② ⑧ Sta. 'S2' 168+63.21 To  
Sta. 'S2' 169+87.32  
Const. Bridgerail To Guardrail Connection  
Const. Guardrail (Type 2A) - 124.4'  
Const. Type 1 Anchor  
Const. Type C Endpiece  
(For Details, See Sht. C2S-403 And  
Drg. Nos. RD400, RD405, RD415, RD450)
- ⑨ Sta. 'N2' 316+18.00 To  
Sta. 'N2' 317+48.00, Lt.  
Sta. 'N2' 316+53.00 To  
Sta. 'N2' 317+23.00, Rt.  
Sta. 'S2' 166+38.00 To  
Sta. 'S2' 166+61.00, Lt.  
Inst. Asph. Conc. Drainage Curb  
(See Drg. No. RD700)
- ⑩ Const. Bioswale  
(See Sht. 110, Note 4)
- ⑪ Sta. 'S2' 166+35.00, Lt. ②  
Const. Riprap Pad (Class 50)  
4' (Top) x 10' (Bottom) x 28' x 2'  
Underlay W/ Riprap Geotextile - Type 1
- ⑫ Sta. 'N2' 316+43.00, Rt.  
Const. Riprap Pad (Class 50)  
4' (Top) x 10' (Bottom) x 33' x 2'  
Underlay W/ Riprap Geotextile - Type 1
- ⑬ Sta. 'N2' 319+45.00, 40' Rt.  
F.L. 583.00 To  
Sta. 'N2' 321+25.00, 34.7' Rt.  
F.L. 589.84  
Const. Bioswale - 180'  
At 3.8% Grade  
(For Details, See Sht. 2B-5)
- ⑰ Sta. 'S2' 169+48.30, 45.0' Lt.  
Const. Type "D" Inlet  
Gate Elev. 583.00  
F.L. Elev. 581.50
- ⑱ Sta. 'N2' 321+54.76  
Match Extg. Pvmf. Rt.
- ⑲ Sta. 'S2' 170+47.00  
Match Extg. Pvmf.
- ⑳ Sta. 'N2' 316+47.90 To  
Sta. 'N2' 317+22.29  
Const. Bridgerail To Guardrail Connection  
Const. Guardrail (Type 2A) - 74.4'  
Const. Type 1 Anchor  
Const. Type C Endpiece  
(For Details, See Sht. C2S-403 And  
Drg. Nos. RD400, RD405, RD415, RD450)
- ㉑ Sta. 'N2' 316+30.00 To  
Sta. 'N2' 316+69.00  
Const. Median Ditch  
(See Plans For Offsets/F.L.)  
4' Flat Bottom, Varying Slope
- ㉒ Sta. 'N2' 321+25.00 To  
Sta. 'N2' 324+10.00  
Const. Median Ditch  
(See Plans For Offsets/F.L.)  
"V" Bottom, Varying Slope
- ㉔ Sta. 'N2' 319+32.00  
Const. Ditch Dike  
Top Of Berm EL. 584.50  
Match Top Of Sloped  
Inlet Gate
- ㉓ Sta. 'S2' 168+71.00, 44.1' Rt. ③  
Inst. 12" CPEP Culv. Pipe - 118'  
I.E. 580.98

Rev. No.	Date	Revision
④	4/11/2007	As Constructed
③	4/11/2007	Removed Pavement Drain
②	8/04/2006	Bridge Extension And Revision To Limits Of Work
①	12/15/2005	Guardrail And Drainage Revisions

 <b>OREGON DEPARTMENT OF TRANSPORTATION</b> ROADWAY ENGINEERING SECTION	
<b>I-5: CLARKS BRANCH TO TUNNEL MILL RACE SEC.</b> <b>DESIGN-BUILD PROJECT</b> PACIFIC HIGHWAY LANE AND DOUGLAS COUNTIES	
Reviewed By - Shari Munroe Designed By - Andy Kutansky Drafted By - Robert Luke	
<b>ROADWAY PLAN NOTES</b>	SHEET NO. <b>111A</b>