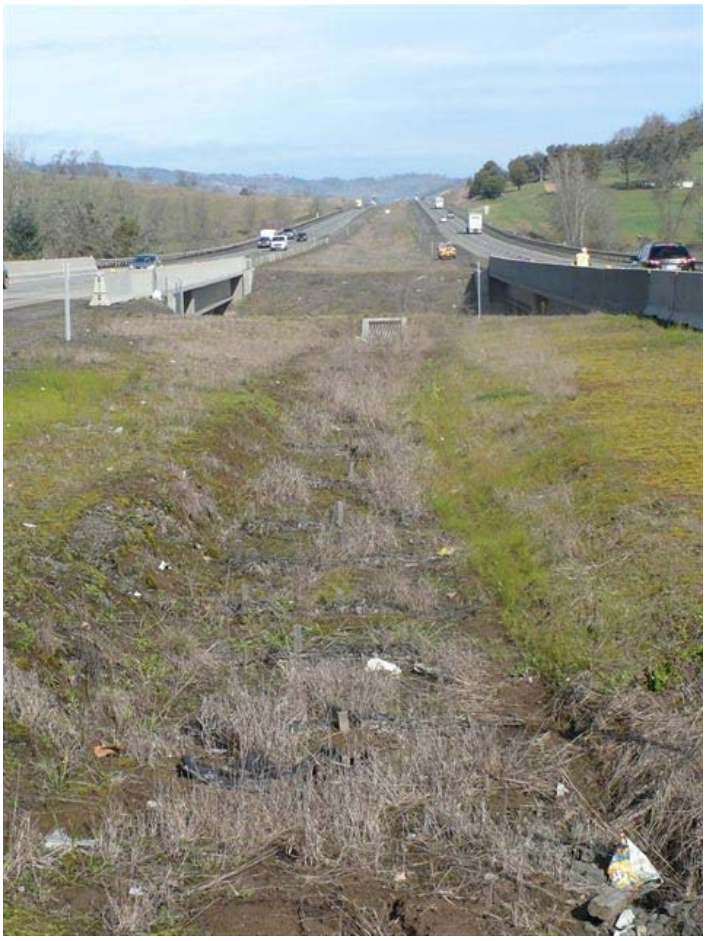
# OPERATION & MAINTENANCE MANUAL

## DFI No.: D00374
## Facility Type: Water Quality Biofiltration Swale



**MARCH, 2011**

**INDEX**

## 1. Identification

| | |
|---|---|
| Drainage Facility ID (DFI): | **D00374** |
| Facility Type: | Water Quality Biofiltration Swale |
| Construction Drawings: | (V-File Number) 38V-097 |
| Location: | District: 7 |
| | Highway No.: 001 |
| | Mile Post: 117.70 / 117.72 (beg./end) |
| | Description: This facility is located in the median of I-5 (Hwy 001, Pacific Highway) on the south 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 Interstate 5.

B. Heavy equipment access into facility:

☒ Allowed (no limitations)
☐ Allowed (with limitations)
☐ Not allowed

C. Special Features:

☒ Amended Soils
☐ Porous Pavers
☐ Liners
☐ Underdrains

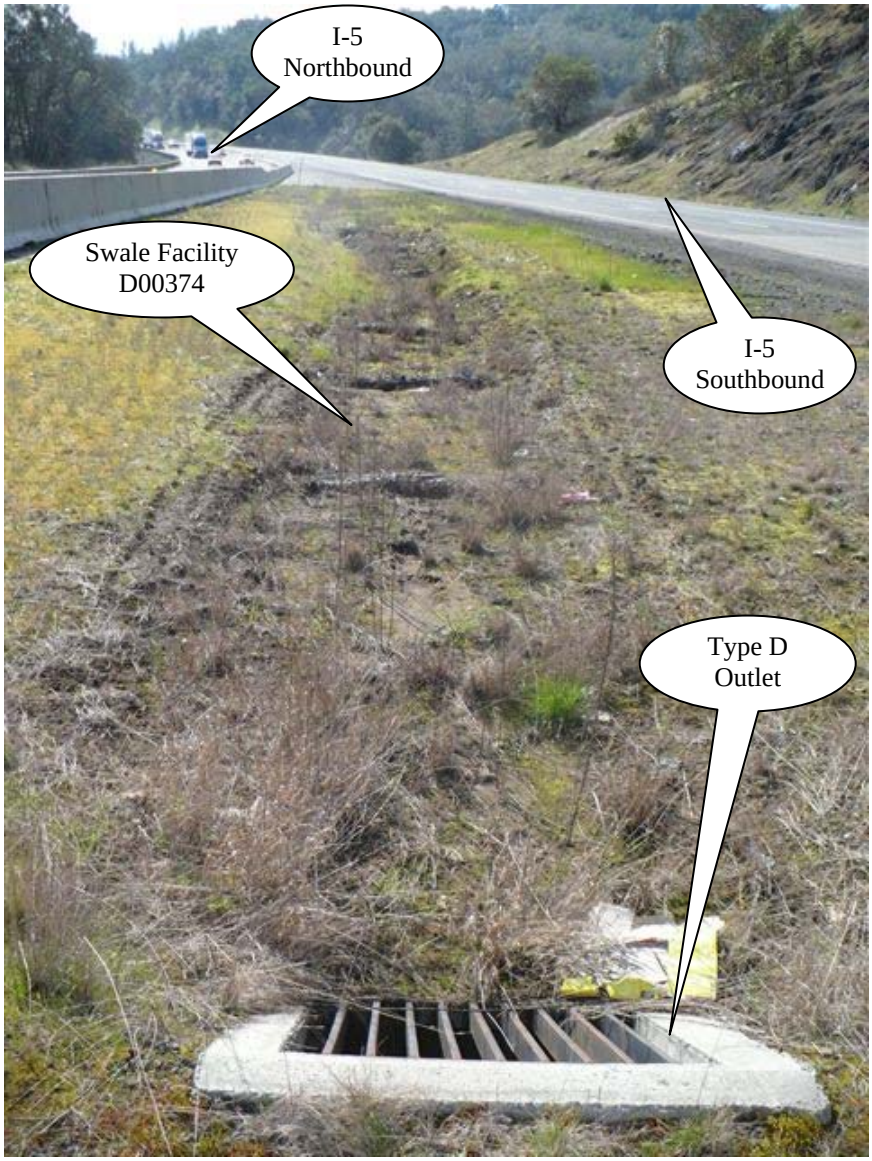


Photo 1: Looking south, flows enter the swale when generated from the north and southbound lanes of I-5. The Type-D inlet/outlet functions as the facility outlet.

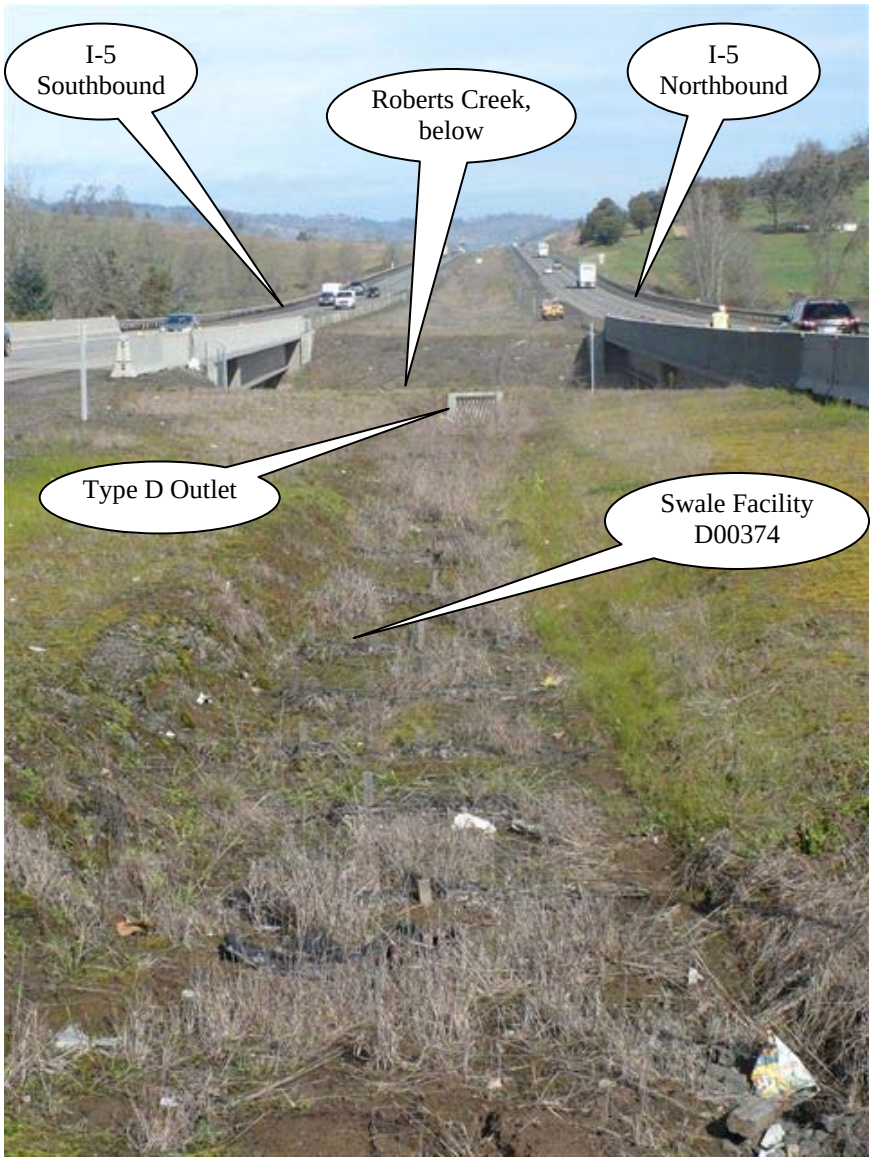



Photo 2: Looking north, flow into the swale is generated from I-5 shown on the left and right side of the picture. The flow is collected in the Type-D inlet/outlet and conveyed under Roberts Creek Road directly into Roberts Creek.

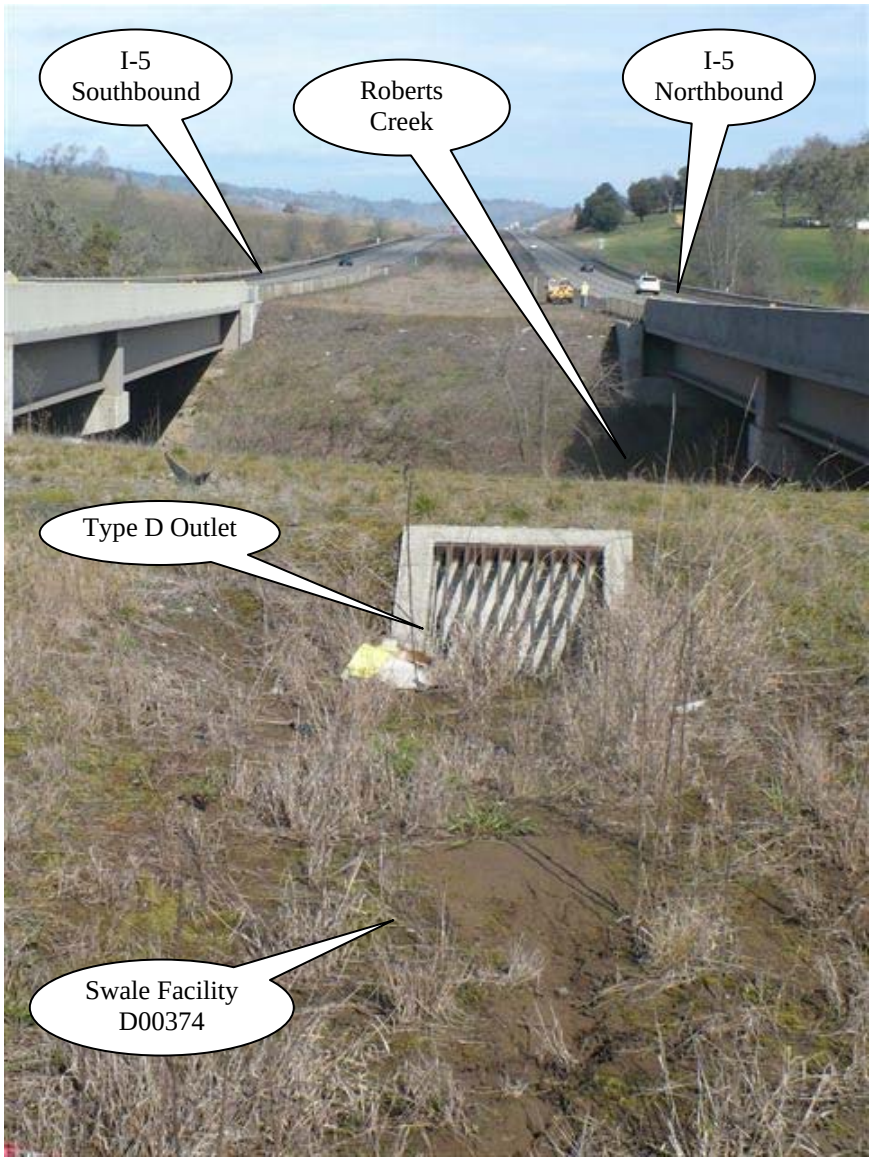


Photo 3: Looking north at the Type-D inlet/outlet shown at the center of the picture. Roberts Creek Road and Roberts Creek are located under the I-5 structures shown.

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

The water quality biofiltration swale can be used to store a volume of liquid by blocking the Type-D inlet/outlet structure of the water quality biofiltration swale. The use of sandbags and/or a steel plate may help facilitate this process; see photos, above.

## 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:

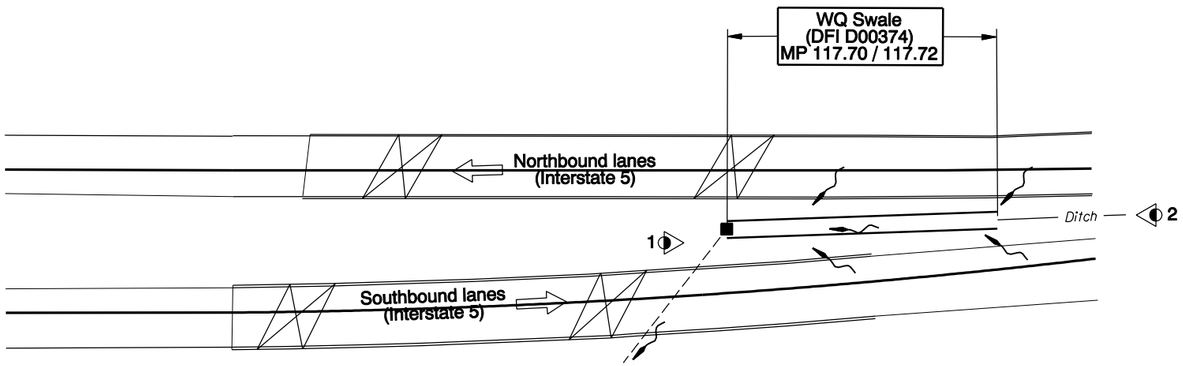
| | |
|---|---|
| ODOT Clean Water Unit | (503) 986-3008 |
| ODOT Statewide Hazmat Coordinator | (503) 229-5129 |
| ODOT Region Hazmat Coordinator | (541) 957-3594 |
| ODEQ Northwest Region Office | (503) 229-5263 |

# Appendix A

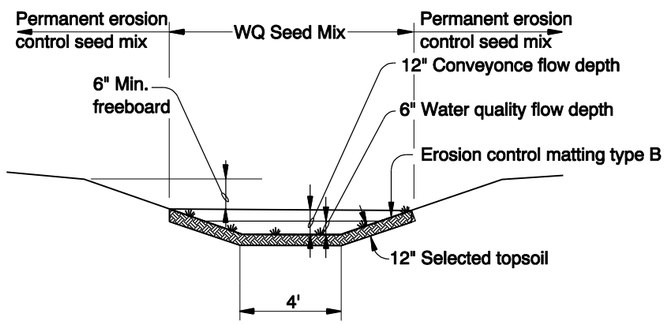
**Content:**

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

## Sec. 13, T. 28 S., R. 6 W., W.M.




PLAN
N.T.S.




TYPICAL WQ SWALE SECTION
N.T.S.

LEGEND:

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

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: J. Carpenter

Drafted By: B. Shafer

**DFI D00374**
**MAINTENANCE DISTRICT 7 HWY 1**
**WQ QUALITY BIOFILTRATION SWALE**
PACIFIC HIGHWAY MP 117.70/117.72
DOUGLAS COUNTY

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DFI00374

# 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

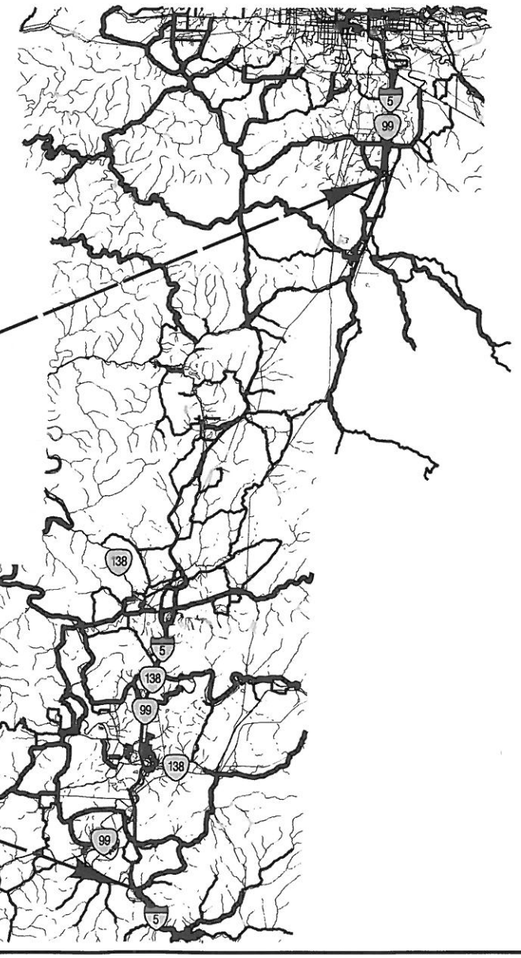
## GRADING, DRAINAGE, STRUCTURES & PAVING

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

## PACIFIC HIGHWAY

### DOUGLAS AND LANE COUNTIES

### April 11, 2007




**BEGINNING OF PROJECT**

**M.P. 180.49**

**END OF PROJECT**

**M.P. 113.44**

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

N

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.
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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 |
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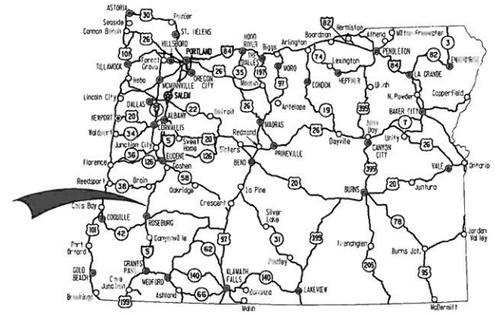
| 1 | 4/11/07 | As Constructed |



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.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

**OREGON TRANSPORTATION COMMISSION**

| | |
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| Stuart Foster | CHAIRMAN |
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| Mike Nelson | COMMISSIONER |
| Randall Pape | COMMISSIONER |
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| Matt Garrett | DIRECTOR OF TRANSPORTATION |

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

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
JAMES F. BAUMAN
ORIGINAL
SEALED
EXPIRES: 12/31/07

OREGON DEPARTMENT OF TRANSPORTATION CONCURRENCE

TECHNICAL SERVICES MANAGING ENGINEER _____ DATE _____

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

| FEDERAL HIGHWAY ADMINISTRATION | PROJECT NUMBER | SHEET NO. |
|---|---|---|
| OREGON DIVISION | OTIA-SO-S001(197) | 1 |

*Index Of Roadway Drawings On Sheet 1A*

*Standard Drg. Nos.*

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STATE OF OREGON

# DEPARTMENT OF TRANSPORTATION

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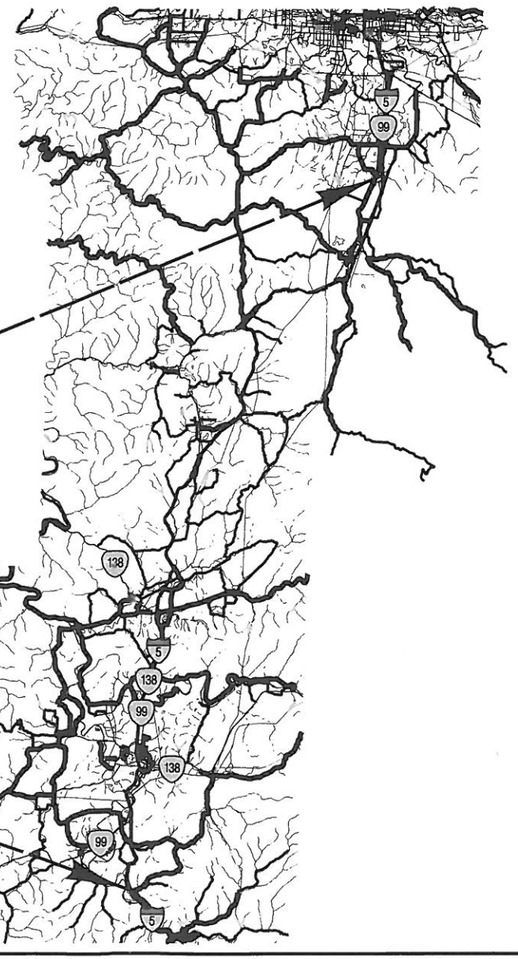
### DOUGLAS AND LANE COUNTIES

### April 11, 2007




**BEGINNING OF PROJECT**
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| Rev. No. | Date | Revision |
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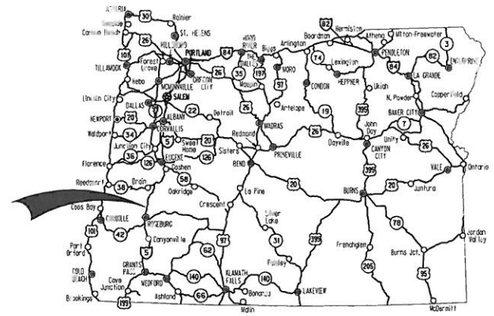
| 1 | 4/11/07 | As Constructed |



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OREGON DEPARTMENT OF TRANSPORTATION
CONCURRENCE

TECHNICAL SERVICES MANAGING ENGINEER _____ DATE _____

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PACIFIC HIGHWAY
LANE AND DOUGLAS COUNTIES

| FEDERAL HIGHWAY ADMINISTRATION | PROJECT NUMBER | SHEET NO. |
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| OREGON DIVISION | OTIA-SO-S001(197) | 1 |

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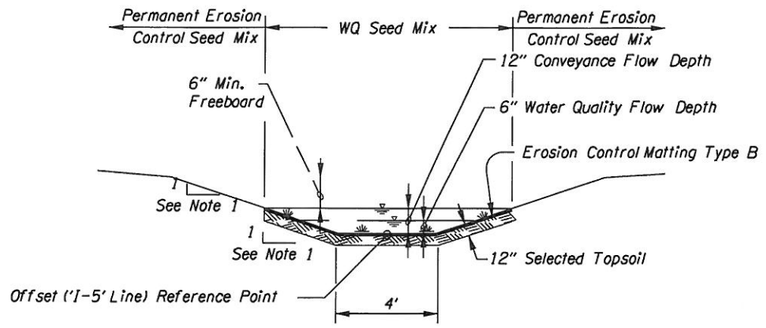
04/07 CONTRACT 13111




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 |

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 - Tim Yamada
Designed By - Chris Allen
Drafted By - Robert Luke

DRAINAGE DETAILS

SHEET NO. 2B-5

CH2MHILL

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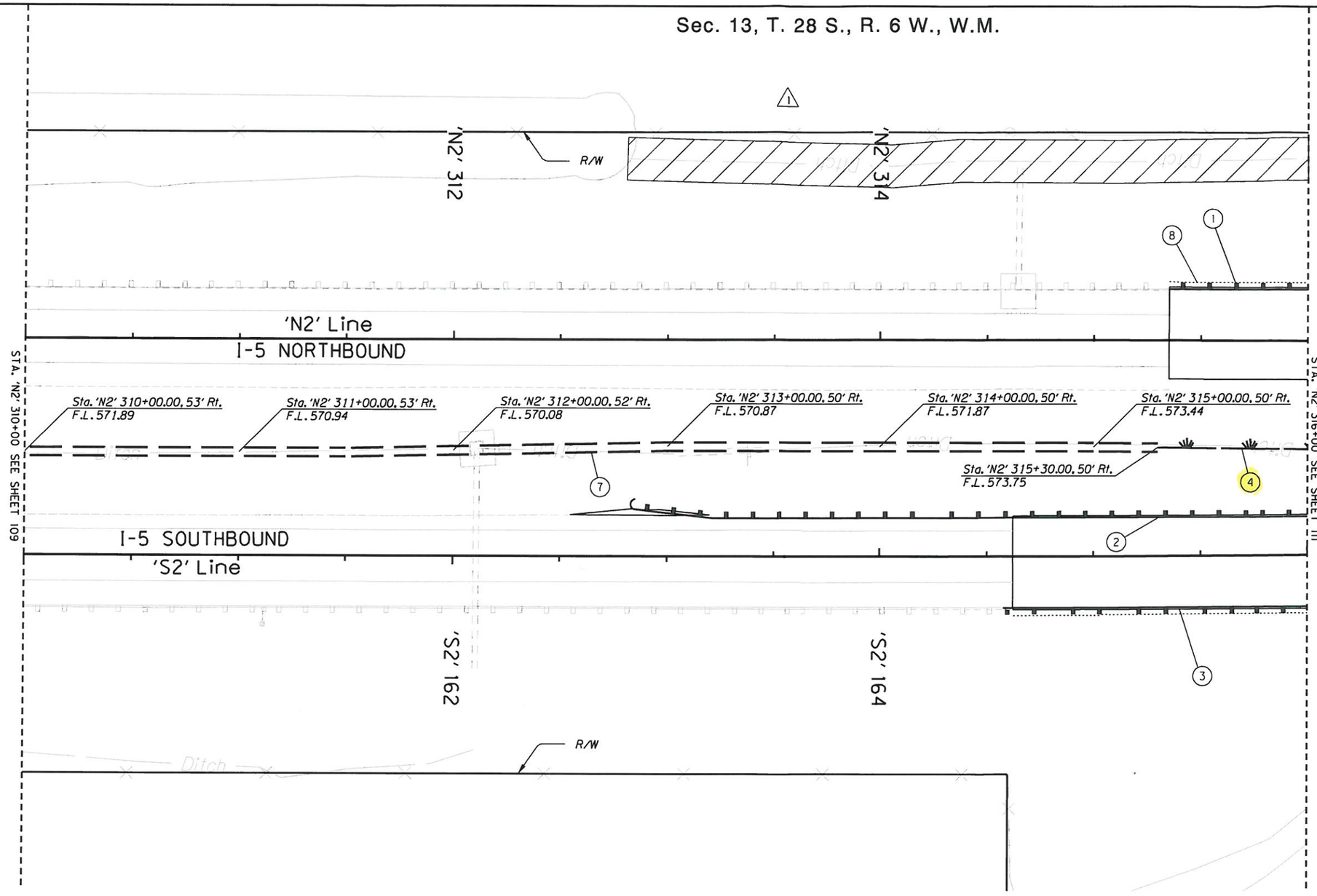
04/07 CONTRACT 13111

Sec. 13, T. 28 S., R. 6 W., W.M.




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

N

0 25 50 75
Scale In Feet

| 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

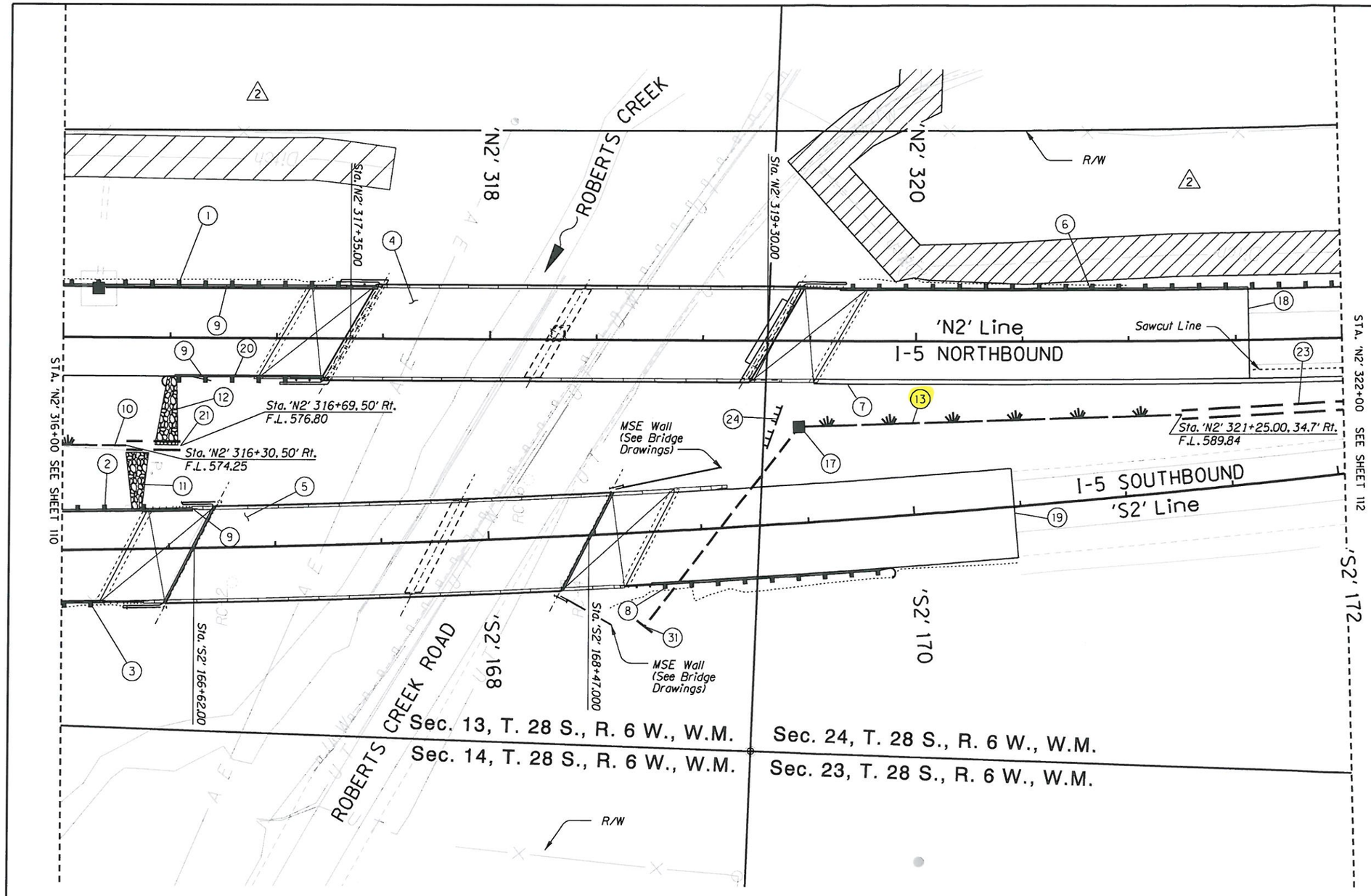
Reviewed By - Shari Munroe
Designed By - Andy Kutansky
Drafted By - Robert Luke

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

SHEET NO. 110

CH2MHILL

REVISED AS CONSTRUCTED
04/07 CONTRACT 13111




| 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 |

N

0 25 50 75
Scale In Feet

Legend:

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

SHEET NO. 111

CH2MHILL

REVISED AS CONSTRUCTED
04/07 CONTRACT 13111

(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)

△2 (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)

(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.
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
Grate Elev. 583.00
F.L. Elev. 581.50

(18) Sta. 'N2' 321+54.76
Match Extg. Pvmt. Rt.

(19) Sta. 'S2' 170+47.00
Match Extg. Pvmt.

(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

(23) 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 Grate

△2 (31) Sta. 'S2' 168+71.00, 44.1' Rt.
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 |

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

ROADWAY PLAN NOTES

SHEET NO. 111A