OPERATION & MAINTENANCE MANUAL

WATER QUALITY BIOFILTRATION SWALE

Manual prepared: July 2017

DFI No. D00242

Figure 1: DFI No. D00242, looking North

1. Identification

Drainage Facility ID (DFI):	D00242
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 38V-012
Location:	District: 2B
	Highway No.: 064
	Mile Post: 22.39 to 22.46

2. Manual Purpose

The purpose of this manual is to outline inspection needs and summarize maintenance actions.

3. Facility Location

The location map below details the facility location. The highway, mile points, side streets, access location, and stormwater flow direction is noted on the map.

Flow direction: North

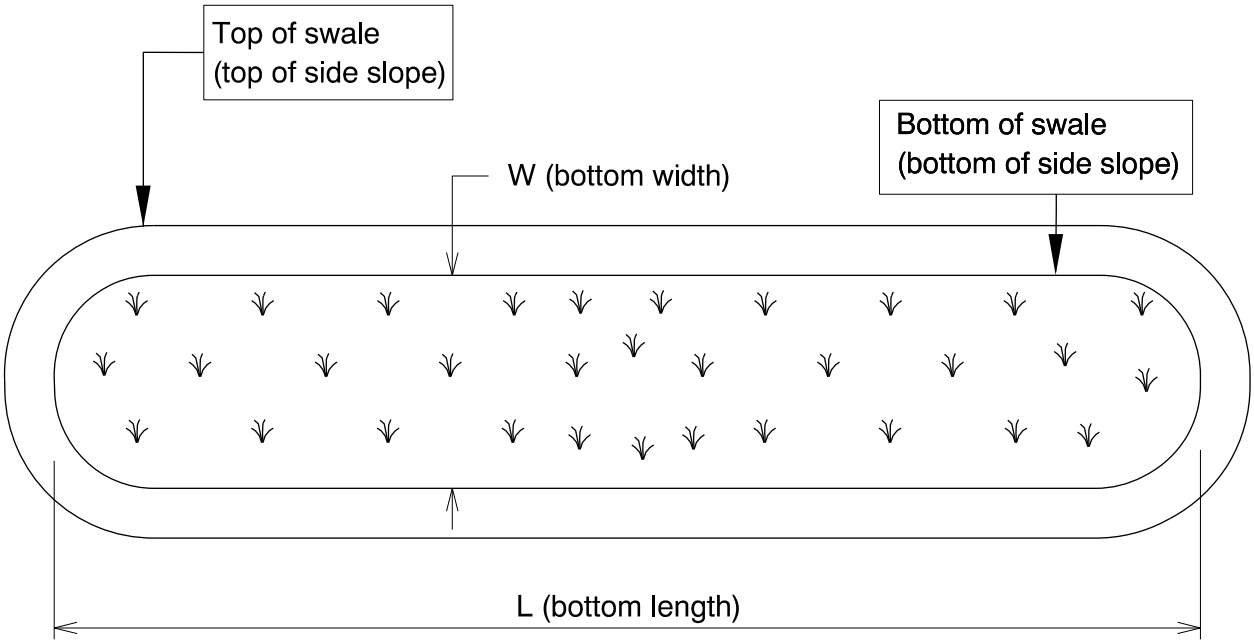
Figure 2: Facility location map

4. 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)
290	**6.5**

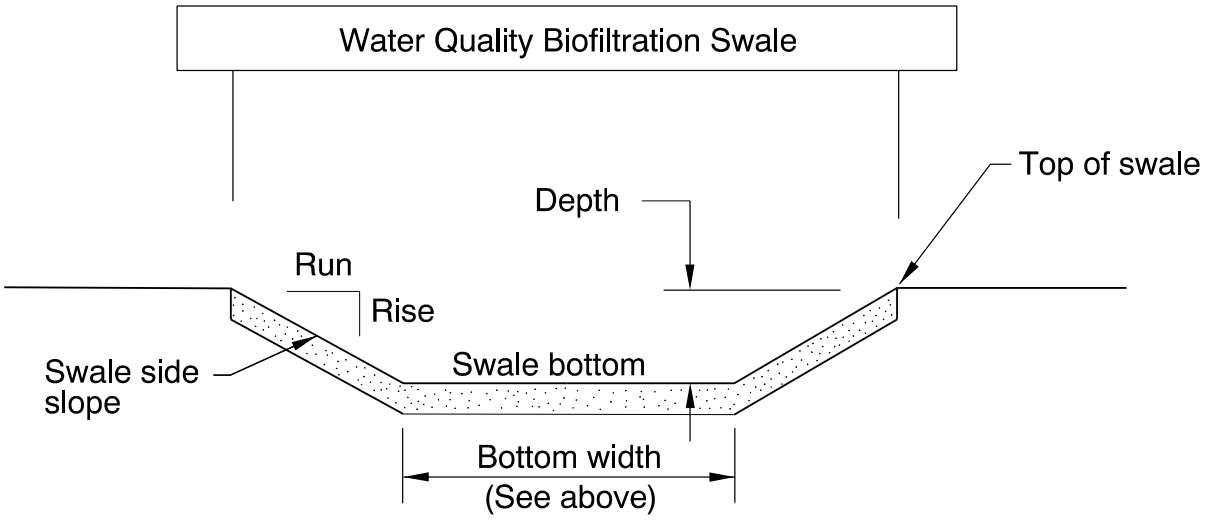


The depth of the swale is the vertical distance measured from the bottom of the swale to the top. The slope of the swale sides is presented by a vertical distance (rise) followed by the horizontal distance (run).

Depth and side slopes:

Depth (feet)
1

Side slope	
Rise (feet)	**1**
Run (feet)	**4**



Site Specific Information: Site is to be accessed via the N Banfield Conn 3 from HWY 002 to HWY 064.

5. Facility Access

Maintenance access to the swale:

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

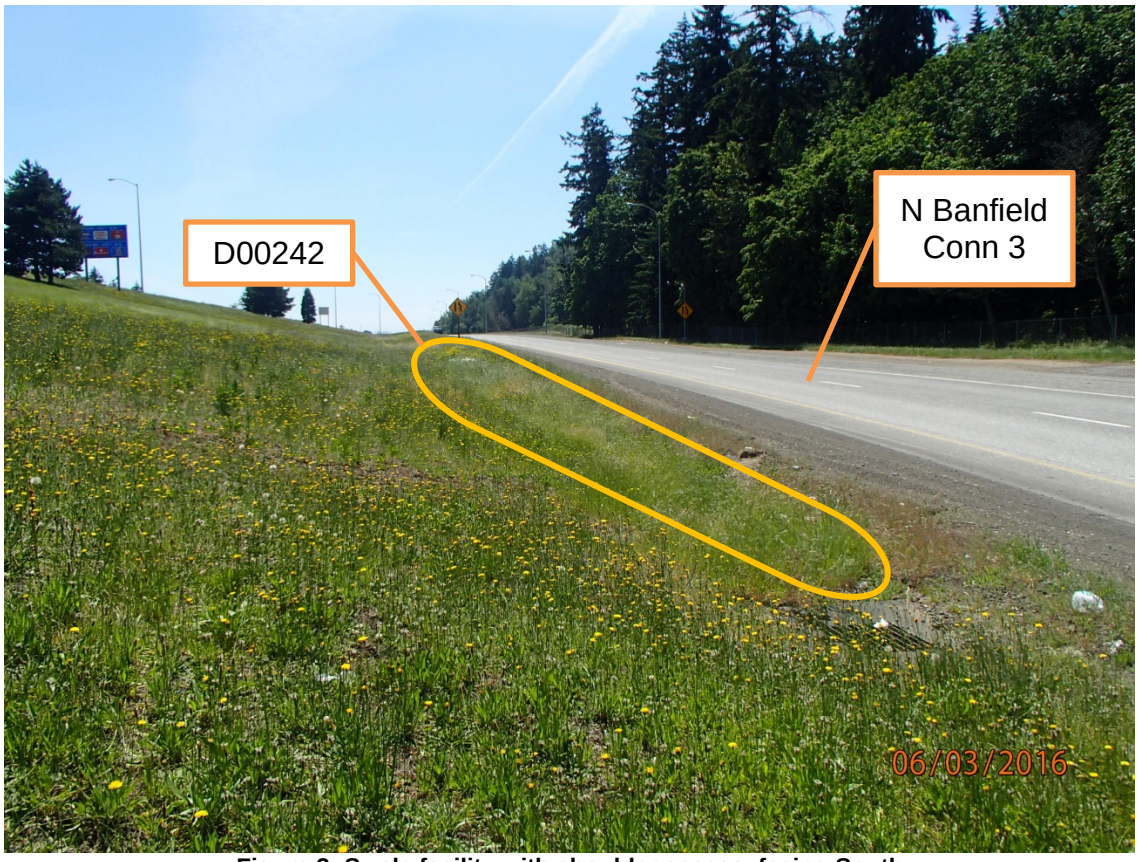


Figure 3: Swale facility with shoulder access, facing South

6. 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 table below titled "Swale Components" has been provided to highlight the applicable components for this facility. The component is in use when the box contains an "x" (e.g. ☒).

How a swale operates, typical footprint configuration, and component definitions and details are outlined in the Standard Operation Manual for Water Quality Biofiltration Swales (implemented March 2017). 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
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 of this O& M Manual for site specific operational plan.

Maintenance Items

Operational components marked in the "Swale Components" table should be inspected and maintained according to Section 5. Each swale component is defined and detailed in the Standard Operation Manual using the associated "ID" number noted below.

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**
Storm drain 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	☐	**S19**
Swale Outlet		
Catch basin with grate	☒	**S20**
Storm drain outlet pipe	☐	**S21**
Open channel outlet	☐	**S22**
Auxiliary Outlet	☐	**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**

7. Maintenance

Maintenance Frequency/Maintain Records

a. Inspect annually. Preferably prior to the rainy season.

b. Clean and maintain as necessary. Refer to the Activity 125 in the Maintenance Guide for conditions when maintenance is needed.

c. Keep a record of inspections, maintenance, and repairs.

Maintenance Guide/Maintenance Actions

The Maintenance Guide outlines the standard maintenance actions for water quality and detention facilities under Activity 125.

There are standard maintenance tables for standard ODOT designs. The maintenance tables describe the following (a) conditions when maintenance is needed (b) recommended maintenance to correct the condition. 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 and detention facilities
- Tables 3 (Maintenance of Water Quality or Biofiltration Swales): Contains maintenance information for swales

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

http://www.oregon.gov/ODOT/HWY/OOM/pages/mguide.aspx

8. Limitations

Access grid installed:

☒ No	☐ Yes
There are (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, or 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.

9. Waste Material Handling

Material removed from the facility is defined as waste by the Department of Environmental Quality (DEQ). Refer to the road waste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options:

http://www.oregon.gov/ODOT/HWY/OOM/pages/ems.aspx

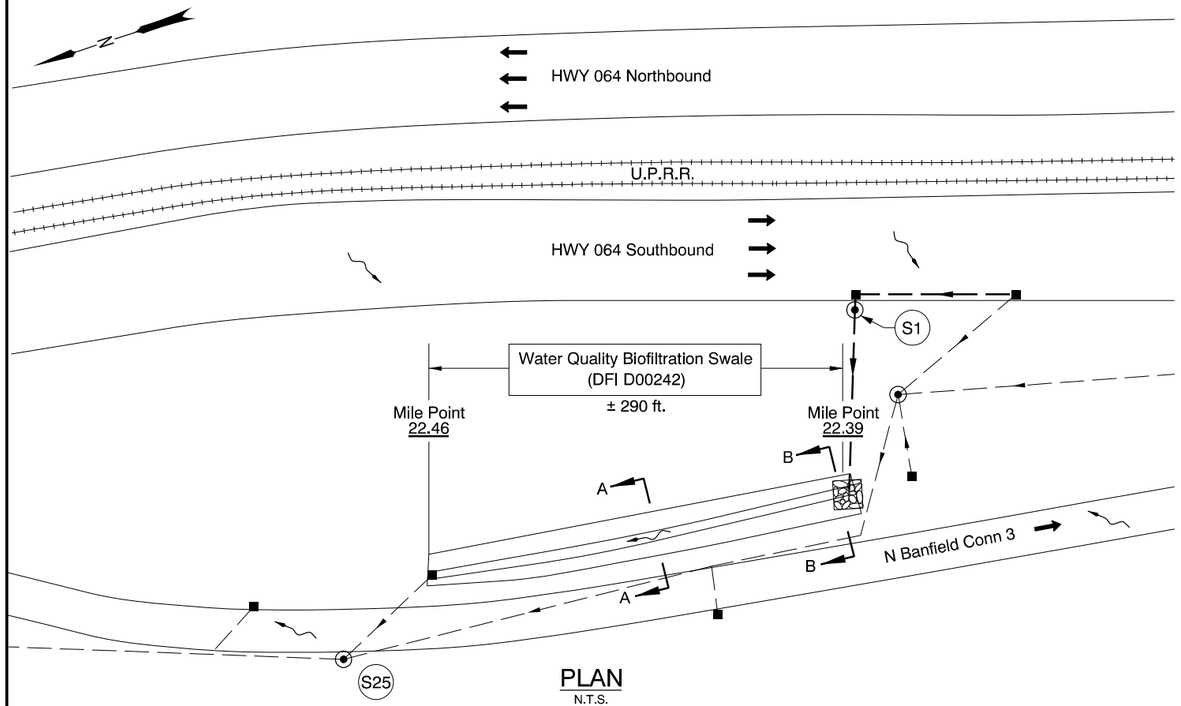
Contact any of the following for more detailed information about management of waste materials found on site:

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

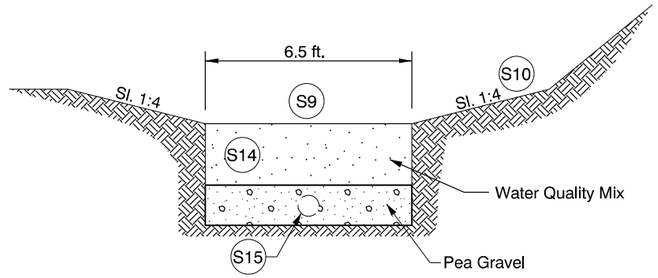
Appendix A

Content:

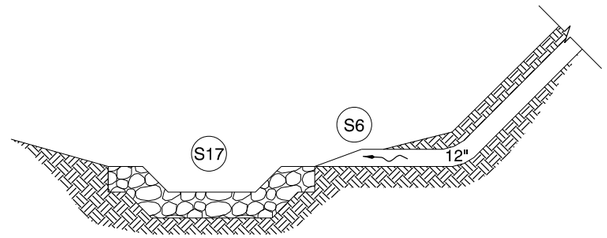
- **Site Specific Operational Plan**



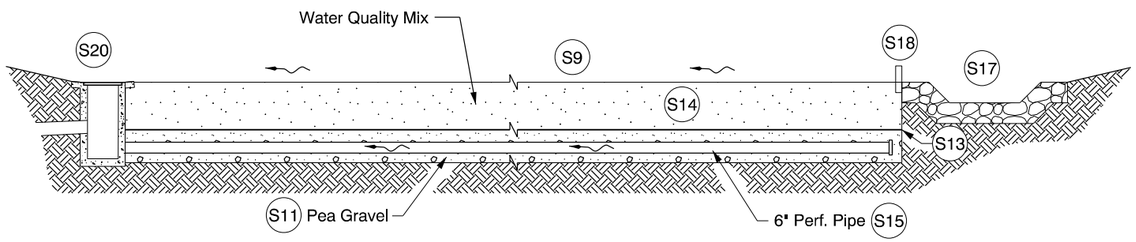
PLAN
N.T.S.



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.



PROFILE
N.T.S.

LEGEND

- Stormwater Flow Path
- Manhole
- Catch Basin
- Storm Pipe (Facility)
- Storm Pipe
- S# Table 1: Facility Components

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Brooklyn Scholz

Drafted By: Brooklyn Scholz

DFI D00242
MAINTENANCE DISTRICT 2B HWY 064
WATER QUALITY BIOFILTRATION SWALE
HIGHWAY MP 22.39, 22.46
MULTNOMAH

DFI_D00242.dgn

Appendix B

Content:

- **ODOT Project Plan Sheets**

38V-012

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index of Sheets, Cont.
1A-2	Index of Sheets, Cont.

REVISED PLAN SHEETS INCORPORATED

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

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

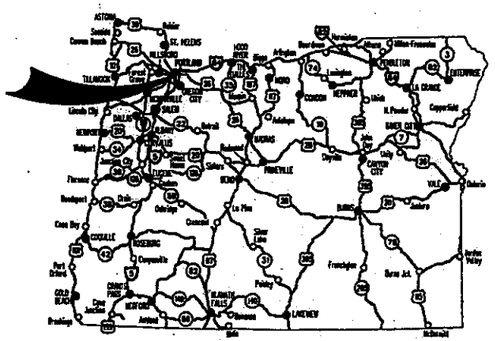
I-205: COLUMBIA RIVER BR.
WILLAMETTE RIVER BR. (UNIT 2) SEC.

REVISED PLAN SHEETS INCORPORATED

EAST PORTLAND FREEWAY

MULTNOMAH & CLACKAMAS COUNTIES

FEBRUARY 2005



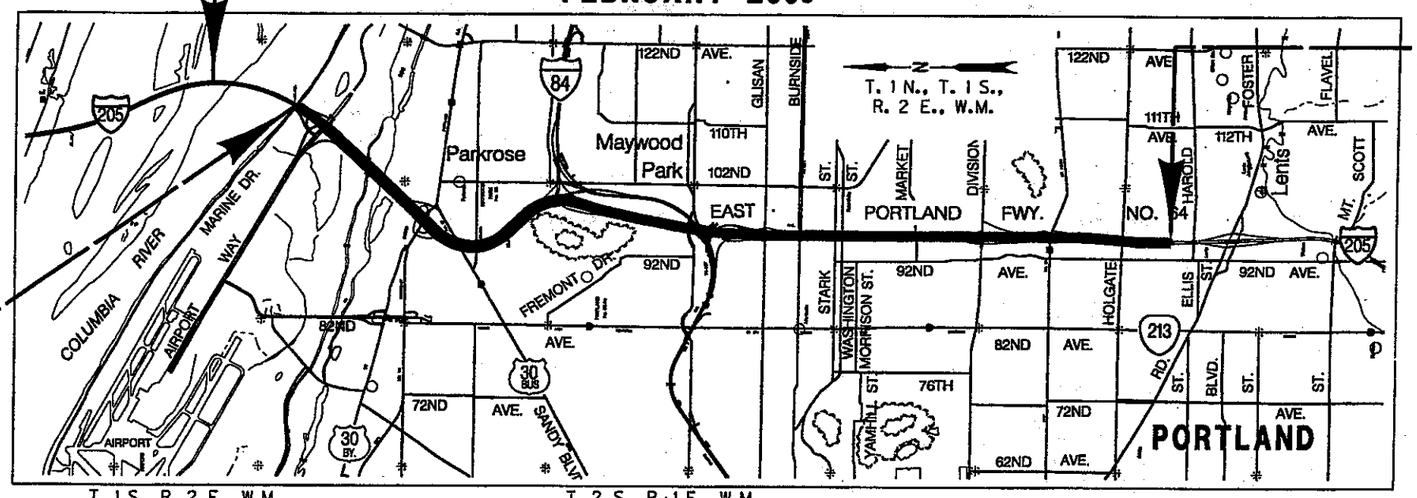
Overall Length Of Project - 36.77 km (22.85 Miles)

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.)

BEGINNING OF CONTRACT LIMITS

IM-BHF-S064(028)

STA. "L" 1+061.00 (M.P. 26.60)



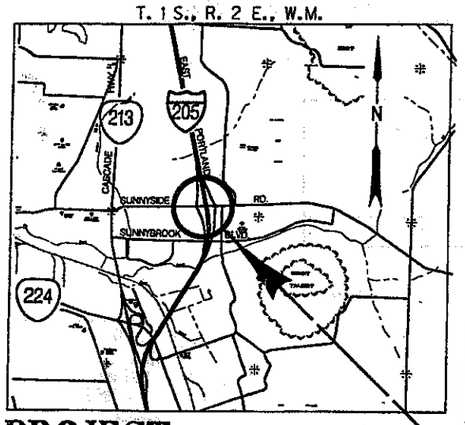
BEGINNING OF PAVING

STA. "L" 3+844.375 (M.P. 24.86)

END OF PAVING

STA. "L" 14+340.00 (M.P. 18.35)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE



PROJECT

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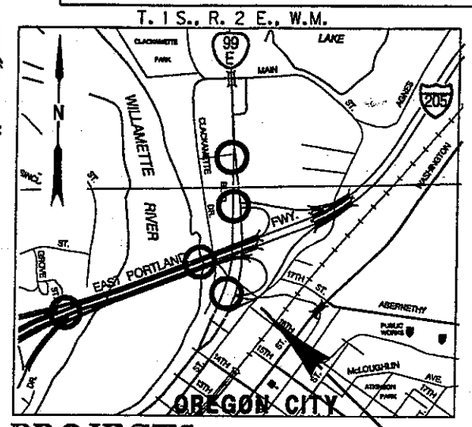
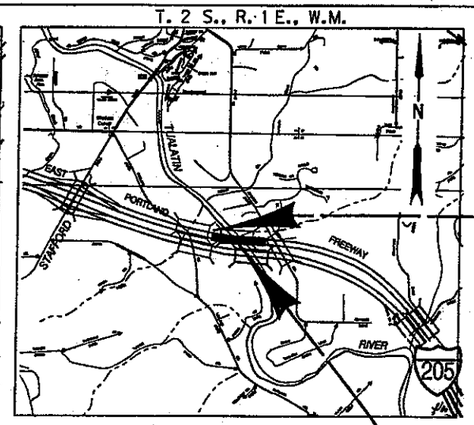


PROJECTS

VARIOUS LOCATIONS



PROJECT

STA. "L" 30+160.00 (M.P. 3.93)

END OF CONTRACT LIMITS

STA. "L" 30+400.00 (M.P. 4.15)

"AS CONSTRUCTED"

Mark Besom

Date 4-3-07 | Project Mngr

METRIC

OREGON TRANSPORTATION COMMISSION

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Michael Nelson	COMMISSIONER
Randall Papé	COMMISSIONER
John Russell	COMMISSION
Bruce A. Warner	DIRECTOR OF TRANSPORTATION

REGISTERED PROFESSIONAL ENGINEER 13,704 OREGON JULY 16, 1987 CATHERINE M. NELSON Expires Dec. 31, 2005

Catherine M. Nelson

STATE HIGHWAY ENGINEER

I-205: COLUMBIA R. BR. - WILLAMETTE R. BR. (UNIT 2) SEC.
EAST PORTLAND FREEWAY
MULTNOMAH & CLACKAMAS COUNTIES

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	IM-BHF-S064(028)	1

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VIEW 1

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2B Thru 2B-25 Incl.	Details
2C Thru 2C-13 Incl.	Traffic Control Plans
2D	Pipe Data Sheet
3, 4, 5, 5A, 5B,	Alignment & General Construction
5C	Pipe Profile
5D	
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1 66285	Deck Plan
66286	Typical Sections and Joint Details
BRIDGE NO. 16055, 16055A (Columbia Slough)	
1 66287	Plan and Elevation
1 66288	Deck Plan
66289	Typical Sections and Joint Details
BRIDGE NO. 13516A (I-84)	
1 66290	Plan and Elevation
1 66291	Deck Plan
66292	Typical Section and Joint Details
BRIDGE NO. 13516A (I-84 M.P. 5.70)	
66293	Structure Mount - Plan & Elevation
BRIDGE NO. 13528 (S.E. Division St.)	
1 66294	Plan and Elevation
1 66295	Deck Plan
66296	Typical Section and Joint Details
BRIDGE NO. 13531 (S.E. Powell Blvd.)	
1 66297	Plan and Elevation
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66299	Typical Section and Joint Details
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66302	Rail Details
66303	Joint Details
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66305	General Notes
1 66306	Sign Bridge Elevation @ M.P. 9.26
66307	End Truss Details - 1
66308	End Truss Details - 2
66309	End Truss Details - 3
66310	Sign Bridge Support Details
66311	Sign Mounting Details
1 66312	Sign Bridge Elevation @ M.P. 9.00
1 **BRIDGE NO. 20010 (M.P. 24.067)**	
1 66313	Footing Modification
DETAILS	
1 66314	M.C.S.S. - Drilled Shaft Foundation Details
1 **BRIDGE NO. 16312A (M.P. 18.614)**	
1 66315	Structure Mount - Plan & Elevation

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BRIDGE NO. 20013 & 20014 (M.P. 24.635 & 24.670)	
66317	Monotube Cantilever Sign Supports - Elevations
BRIDGE NO. 20015 & 20016 ("PB" 1+365 & "AW" 3+109)	
66318	Monotube Cantilever Sign Supports - Elevations
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66319	Monotube Cantilever Sign Support - Elevation
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66320	Structure Mounts - Plan & Elevation
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66327	Sign Bridge - Plan & Elevation
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66328	Cantilever Truss Arm for Signals
66329	Cantilever Truss Arm for Signals Details
BRIDGE NO. 7031A (I-84 M.P. 4.97)	
66330	Structure Mount - Plan & Elevation
1 **BRIDGE NO. 13528 (M.P. 19.625)**	
1 68306	Plan & Elevation
1 **BRIDGE NO. 13507 (M.P. 24.666)**	
1 68307	Plan & Elevation
1 **BRIDGE NO. 09667 (M.P. 23.242)**	
1 68308	Plan & Elevation
1 **BRIDGE NO. 09666 (M.P. 23.683)**	
1 68313	Plan & Elevation
2 BRIDGE NO. 13507 (M.P. 24.666)	
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ILLUMINATION	
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13616	Ramp Loop Replacement Plan - Division St.
13617	Ramp Loop Replacement Plan - Washington St.
13618	Ramp Loop Replacement Plan - Airport Way
13619 13620	Weigh-In-Motion Replacement Plan - M.P. 24.65
13621	Road & Weather Information System Plan - M.P. 19.61
13622	Lents Traffic Count/Classifier Plan - M.P. 18.34
13623	Signal Modification & Loop Replacement Plan - Powell Blvd.
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13628 Thru 13630 Incl.	Signal Modification & Loop Replacement Plan - Glisan St.
13631	Signal Modification & Loop Replacement Plan - Columbia Blvd.
13632	Signal Modification - Oregon City
13633	Signal Mounting Details
13634	Signal Mounting Details

"AS CONSTRUCTED"

Mark Bean

Date 4-3-07 | Project Mngr

2 NEW SHEET MAY, 2005

1 Revised January 20, 2005 By S. Failmezger

I-205: COLUMBIA R. BR. - WILLAMETTE R. BR. (UNIT 2) SEC.
EAST PORTLAND FREEWAY
MULTNOMAH & CLACKAMAS COUNTIES

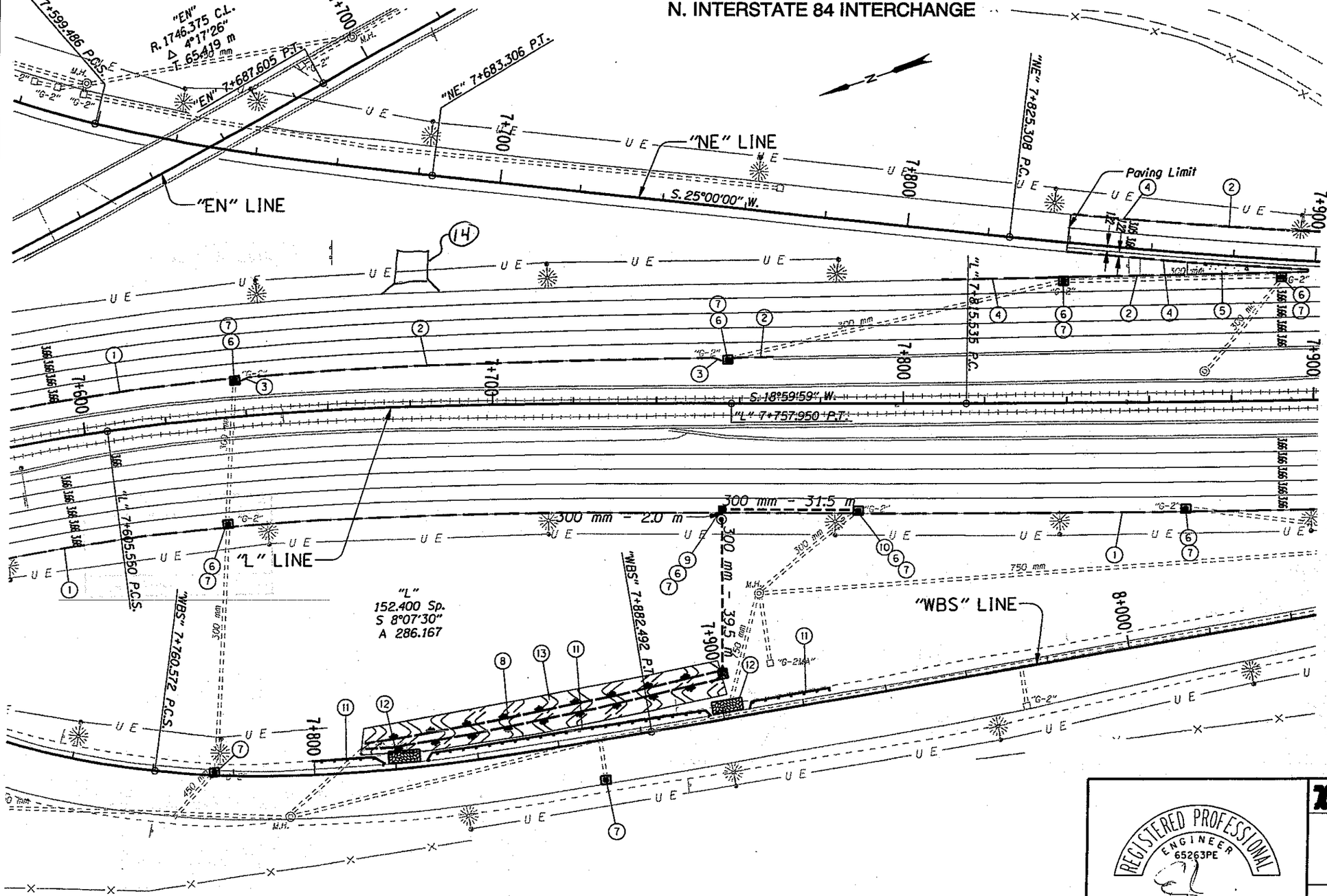
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		1A

THIS IS THE FILE NAME LOCATION ********** DD-MMM-YYYY HH:MM

VIEW 2 \\scregl\hwye66u\ODOT_DATA\projects\11942_Col_Will_Unit2\Design\Title Sheet\11942r1.tsl 1/20/2005 10:46:30 AM hwye66u

VIEW 2

Sec. 28, T.1 N., R.2 E., W.M.
N. INTERSTATE 84 INTERCHANGE



"AS CONSTRUCTED"

Mark Bern

Date 4-3-07 | Project Mngr

LEGEND

- Inlet Protection
- Unsupported Sediment Fence
- Aggregate Const. Entrance
- Compost Blanket With Seed

All Dimensions Are In Meters (m) Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER 65263PE OREGON NOVEMBER 14, 2000 EILEEN PHELAN Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-205: COLUMBIA RIVER BR. - WILLAMETTE RIVER BR. (UNIT 2) SEC.
EAST PORTLAND FREEWAY
MULTNOMAH & CLACKAMAS COUNTIES

Project Leader - Sandy Van Bemmel
Designed By - Scott Fallmezger
Drafted By - Scott Fallmezger

ALIGNMENT & GENERAL CONSTRUCTION

SHEET NO. 18

(1) See Sht. 17A, Note 3
Remove Extg. Curb
Const. Mod. Low Profile Mountable Curb (Type A)
(For Details, See Shts. 2B-11 & 2B-19)

(2) Remove Extg. Curb
Const. Mod. Low Profile Mountable Curb (Type A)
(For Details, See Sht. 2B-11)

(3) Remove Extg. Curb
Const. Mod. Low Profile Mountable Curb (Type A)
(For Details, See Sht. 2B-11)

(4) Const. Curb Transition
(For Details, See Sht. 2B-18)

(5) Remove Extg. Conc. Island
Const. Type "C" Conc. Island (Mountable)
(For Details, See Sht. 2B-7)

(6) Modify Conc. Inlet - 8
(For Details, See Shts. 2B-8, 2B-9 & 2B-10)

(7) Const. Inlet Protection (Type 3) - 10

(8) Sta. "WBS" 7+840, Lt.
Const. Water Quality Swale
Exc. - 95 m^3
Connect To Extg. Inlet
(For Details, See Shts. GHJ-1 & GHJ-2)

(9) Sta. "L" 7+755.986, 29.0 Rt.
Const. Strom Sew. Pollution Control Manhole
Const. "G-2" Inlet Mod., Flow-Split
Inst. 300 mm Storm Sew. Pipe - 41.5 m
1.5 m Depth
Inst. Three Piece Elbow
Inst. Slope Anchor - 2
Const. Paved End Slope - 2.4 m^2
Const. Loose Riprap (Class 25) - 5.4 MG
(See Drg. Nos. RD320, RD326, RD330, RD332, RD340, RD344 & RD356)
(For Details, See Shts. GHJ-2 & GHJ-6)

(10) Sta. "L" 7+789.461, 26.9 Rt.
Inst. 300 mm Storm Sew. Pipe - 31.5 m
1.5 m Depth
Connect To Extg. Inlet

(11) Const. Unsupported Sediment Fence

(12) Const. Construction Entrance - 2
(See Drg. No. RD1000)

(13) Apply Compost Blanket To Water Quality Swale And Seed With Water Quality Seed Mix.
(For Details, See Shts. GHJ-1 & GHJ-2)

(14) CONST. POLICE PARKING PAD

"AS CONSTRUCTED"
Mark Bemm
Date 4-3-07 | Project Mngr

All Dimensions Are In Meters (m)
Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
65263PE
OREGON
NOVEMBER 14, 2000
EILEEN PHELAN
Expires Dec. 31, 2005

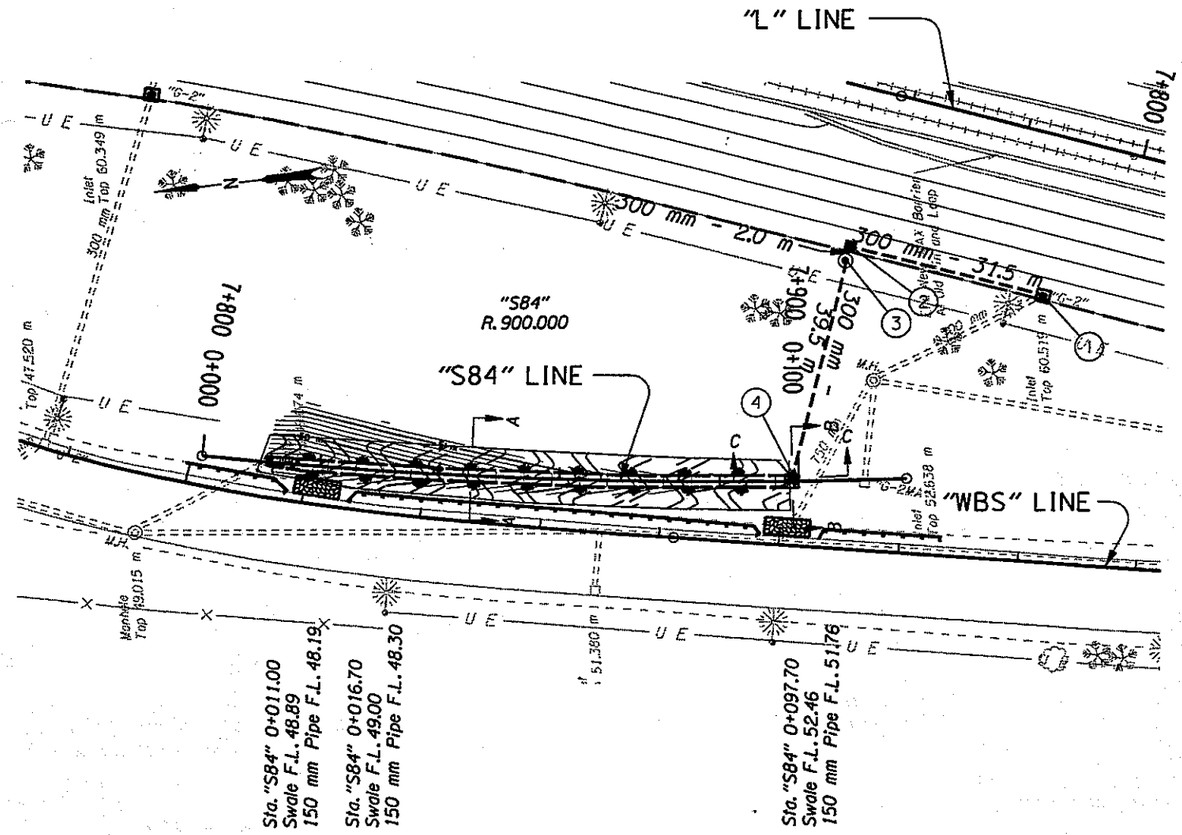
OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-205: COLUMBIA RIVER BR. -
WILLAMETTE RIVER BR. (UNIT 2) SEC.
EAST PORTLAND FREEWAY
MULTNOMAH & CLACKAMAS COUNTIES

Project Leader - Sandy Van Bemmel
Designed By - Scott Failmezger
Drafted By - Scott Failmezger

CONSTRUCTION NOTES

SHEET NO. 18A



(1) *Extg. "G-2" Inlet*
F.L. 59.20

(2) *Const. "G-2" Inlet Mod., Flow-Split*
S. F.L. 59.60
W. F.L. 59.60

(3) *Const. Storm Sewer Pollution Control Manhole*
E. F.L. 59.25
W. F.L. 59.25

(4) *Const. Paved End Slope*
F.L. 52.41

"AS CONSTRUCTED"

Date 4-3-07 | Project Mngr

WATER QUALITY SWALE "S84"

(For Location, See Sht. 18A, Note 8)
(For Additional Details, See Shts. GHJ-2 & GHJ-6)

All Dimensions Are In Meters (m) Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
62,609
OREGON
MAY 9, 2000
HENRY MINTON ALLEN
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

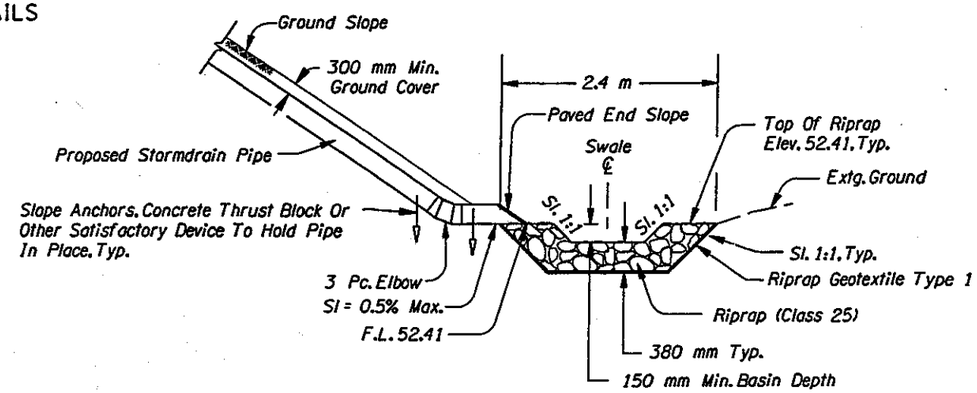
I-205: COLUMBIA RIVER BR. - WILLAMETTE RIVER BR. (UNIT 2) SEC.
EAST PORTLAND FREEWAY
MULTNOMAH & CLACKAMAS COUNTIES

Project Leader - Sandy Van Bemmel
Designed By - Henry Allen
Drafted By - Henry Allen & Scott Fallmezger

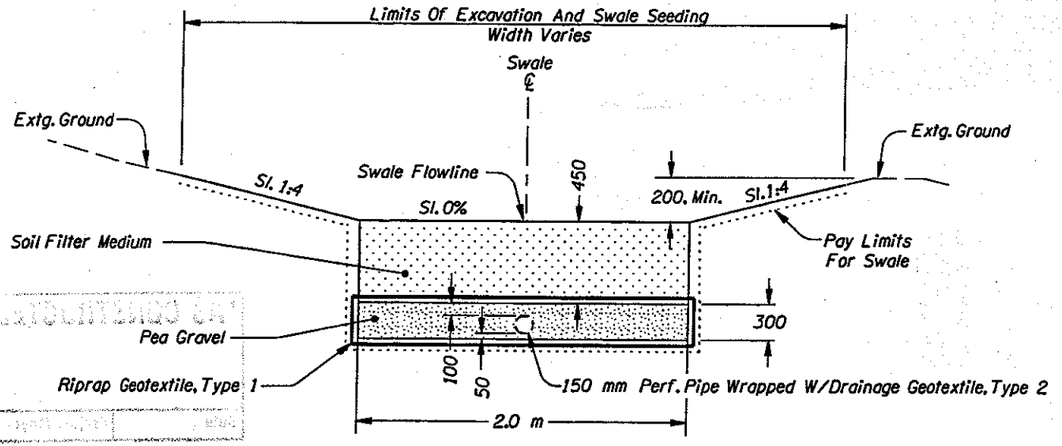
WATER QUALITY DETAILS

SHEET NO. GHJ-1

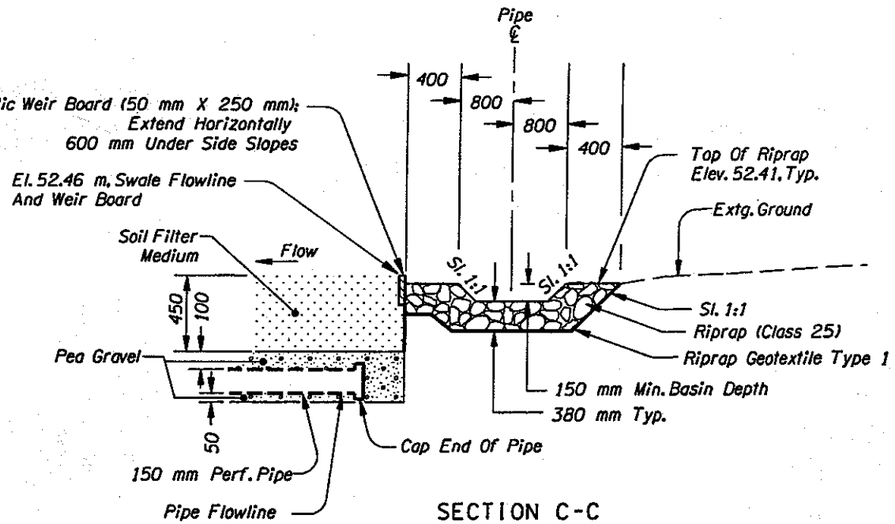
WATER QUALITY SWALE "S84" DETAILS



SECTION B-B
RIPRAP BASIN



SECTION A-A
SWALE STRUCTURE



SECTION C-C
RIPRAP BASIN AND
SWALE SECTION

All Dimensions Are In Millimeters (mm) Unless Otherwise Noted.

"AS CONSTRUCTED"
Date 4-3-07 | Project Mngr

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WATER QUALITY DETAILS

SHEET NO. GHJ-2