OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: February 2021

DFI No. D00123

Figure 1: DFI No. D00123, looking north

Identification

Drainage Facility ID (DFI):	D00123
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 27V-057
Location:	District: 03
	Highway No.: 001
	Mile Post: 258.00 to 258.07, Left

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: north

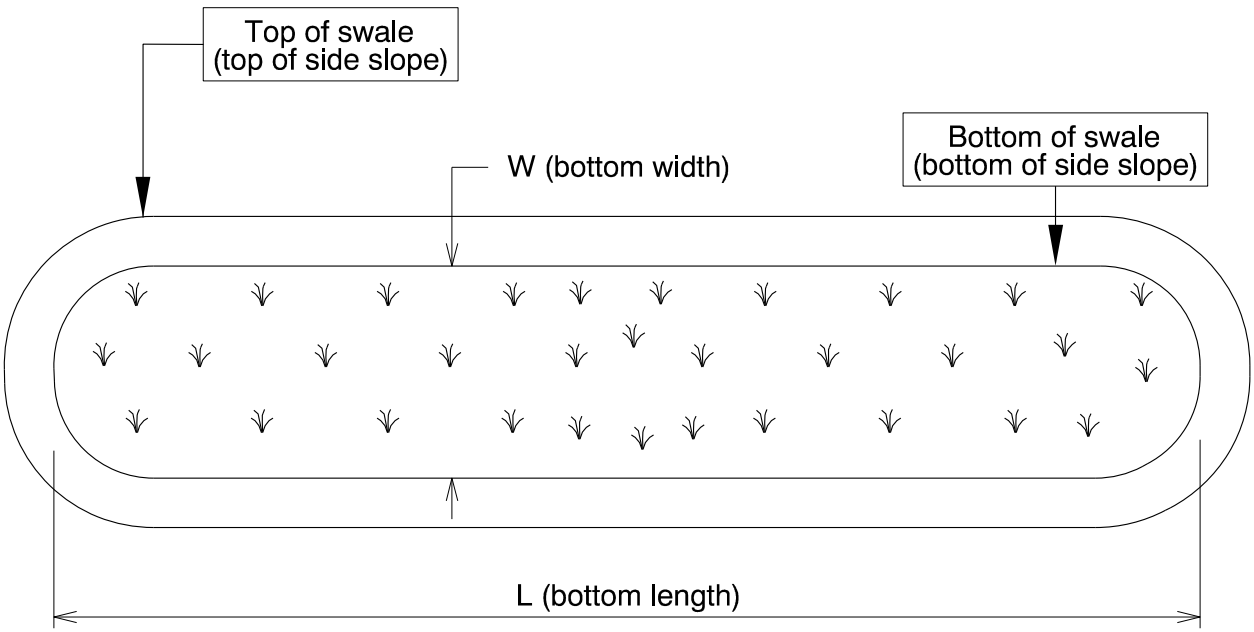
Figure 2: Facility location map

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:

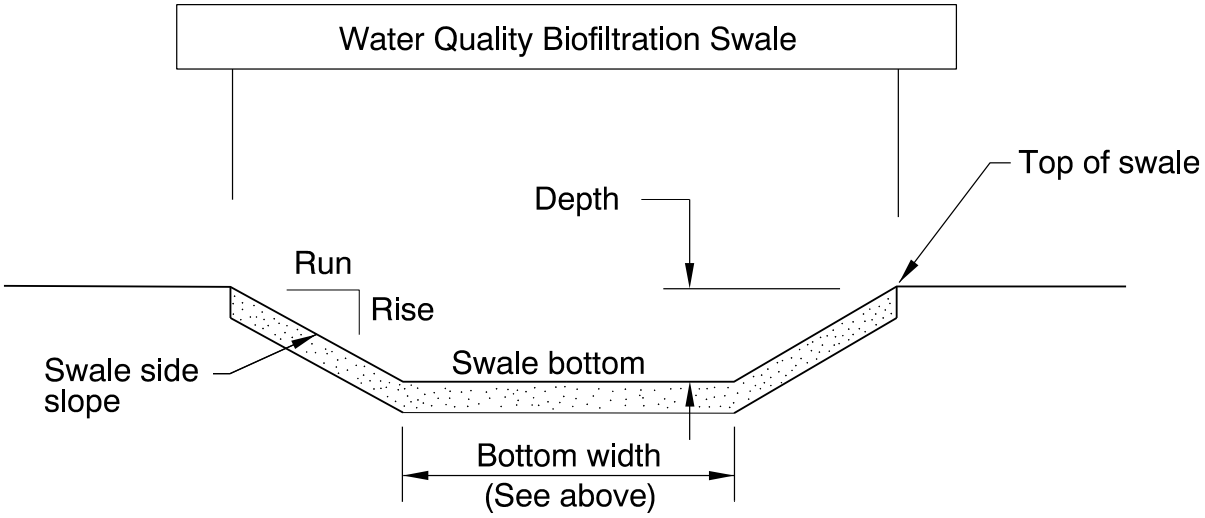
Bottom Length (feet)	Bottom Width (feet)
200	25



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)
8	1	3



Site Specific Information: There is a sound wall separating the facility from I-5. There is a drainage ditch located adjacent to this facility that runs along the sound wall. The drainage ditch acts as the outfall of facility DFI D00364 (located on the east side of I-5).

There is a City of Salem stormwater facility serving Hawthorne Avenue NE (immediately in front of the facility) between the facility (D00123) and Hawthorne Avenue.

Facility Access

Maintenance access to the facility:

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

Location is in NE Salem at 3900 Hawthorne Avenue NE, between Silverton Road and Hyacinth Street. A sound wall separates the facility from the Pacific Highway (I-5).

Figure 3: Facility access pad with gate

4. 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 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:

☐ Operational Plan A	☒ Operational Plan B	☐ 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	☐	**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**
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: Stone Embankment	☒	**S19**
Swale Outlet		
Catch basin with grate	☐	**S20**
Outlet Pipe (s)	☒	**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**

5. 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

6. Limitations

Access grid installed:

☒ No	☐ Yes
There are no 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.

7. 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

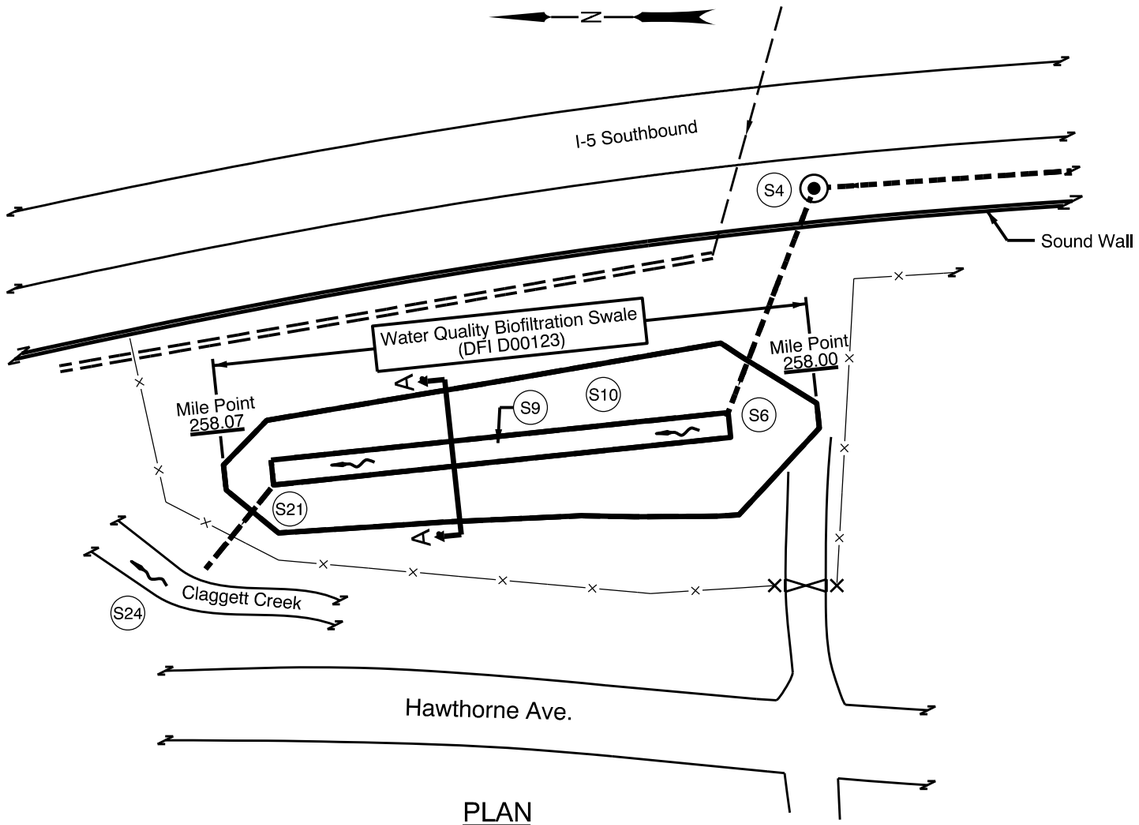
Contact any of the following for more detailed information about management of waste materials found on site:

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

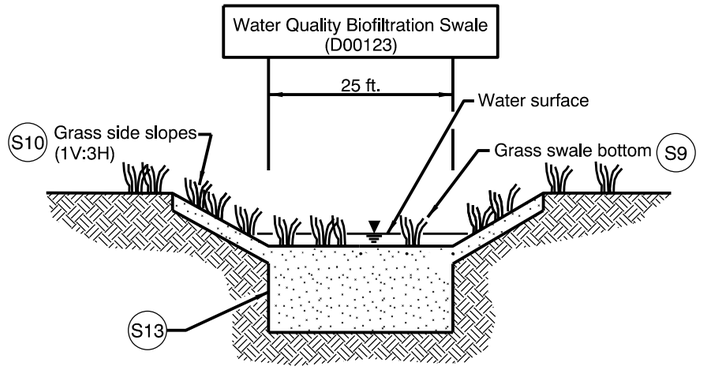
A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D00123



PLAN
NTS



Cross Section A-A
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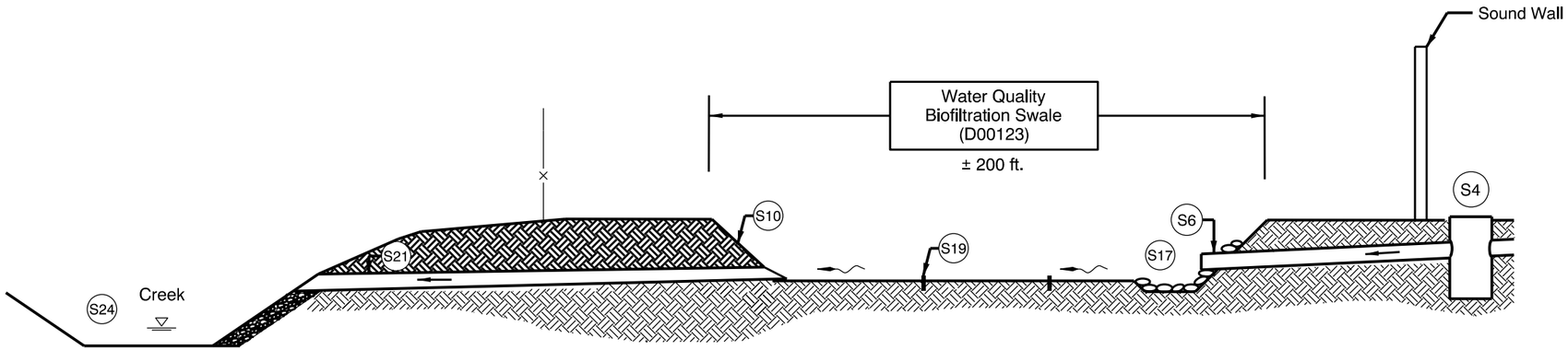


PROFILE
N.T.S.

LEGEND:

- S# — Facility Component (See Table 1 in O&M Manual)
- Fence
- Storm Pipe (Facility)
- Storm Pipe
- Manhole
- Conveyance Direction
- Flow Path

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Travis Burrier

Drafted By: Brooklyn Scholz

DFI D00123
MAINTENANCE DISTRICT 3 HWY 001
POND/BIOFILTRATION SWALE COMBO
HIGHWAY MP 258.03
MARION

\Scdata\env_sec\Hydraulics\Hydraulics OM*_WORKING\Dist_03\D00123_03_001\Operational Plan

Rotation: 0° Scale: 1"=100'

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 27V-057

KEY # 05370

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd. & Standard Drawing Nos.
1B	Plan Sheet Layout
2	Pacific Hwy. Typicals
2A, 2A-2	Ramp Typicals
2A-3 Thru 2A-6 Incl.	Portland Rd. Typicals
2A-7	Ward Dr. & Silverton Rd. Typicals
2A-8	Ward Ct., 34th St., & Cul-De-Sac Typicals
2B	Continuously Reinforced Concrete Pavements
2B-2	Continuously Reinforced Concrete Pavements Replacement Tied Splice Lap
2B-3	Median Earth Mound At Bridge Column, Embankment Widening For Sound Wall, Earth Mound At Sound Wall, Shoulder Barrier Locations & Planting Mound At Soundwalls
2B-4	Concrete Barrier Mound With Type "B" Curb, Grouting Holes Plan & Grout Details For Precast Concrete Barrier
2B-5	Concrete Barrier Mound With Curb
2B-6	12'-6" Transition Section For Median Barrier Or Shoulder Barrier (Cast-In-Place), Transition Concrete Bridge Rail To Median Barrier Or Shoulder Barrier (Cast-In-Place)
2B-7	Accessible Route Driveway Details
2B-8	Raised Rt. Turn Channelization Island & Sloped Pipe Detail
2B-9	Stone Embankment Stabilization Curb Transition, Type "B" Modified Curb, Asphalt Concrete Sidewalk Ramp, Work Restriction Areas 42" C.C.P. Water Line, Embankment Benching, Sidewalk Tapers
2B-10	Reconstruct Inlet, Inlet Cap, Surfacing Drain Connections At Inlets, Manhole Adjustment Sequence, City Of Salem Standard Valve Box
2B-11	Manhole With Inlet & Surface Drain At Inlet
2B-12	Sediment Control Manhole
2B-13	Sloped Pipe & Diversion Manhole
2B-14	Typical Swale, Modify Existing Casting, & Type "ME" Modified Inlet
2B-15	Flow Spreaders
2B-16	Outlet Basin & Energy Dissipator
2B-17	Swale No. 1
2B-18	Swale No. 2
2B-19	Swale 1 & 2 Profiles
2B-20	Swale No. 3 & 4
2B-21	Swale 3 & 4 Profiles
2B-22	Flood Basin Detail & Profile
2B-23	Flood Plain Sections

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

AS CONSTRUCTED
PROJECT MANAGER
3-13-00

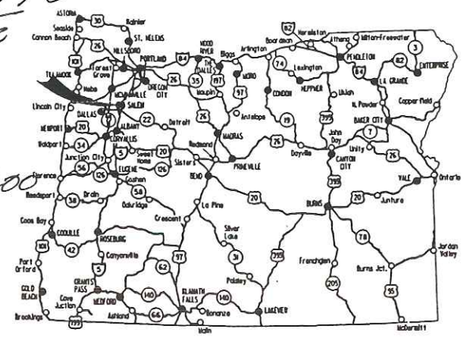
PLANS FOR PROPOSED PROJECT

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

S.P.T.C. - SILVERTON ROAD SEC.

PACIFIC HIGHWAY

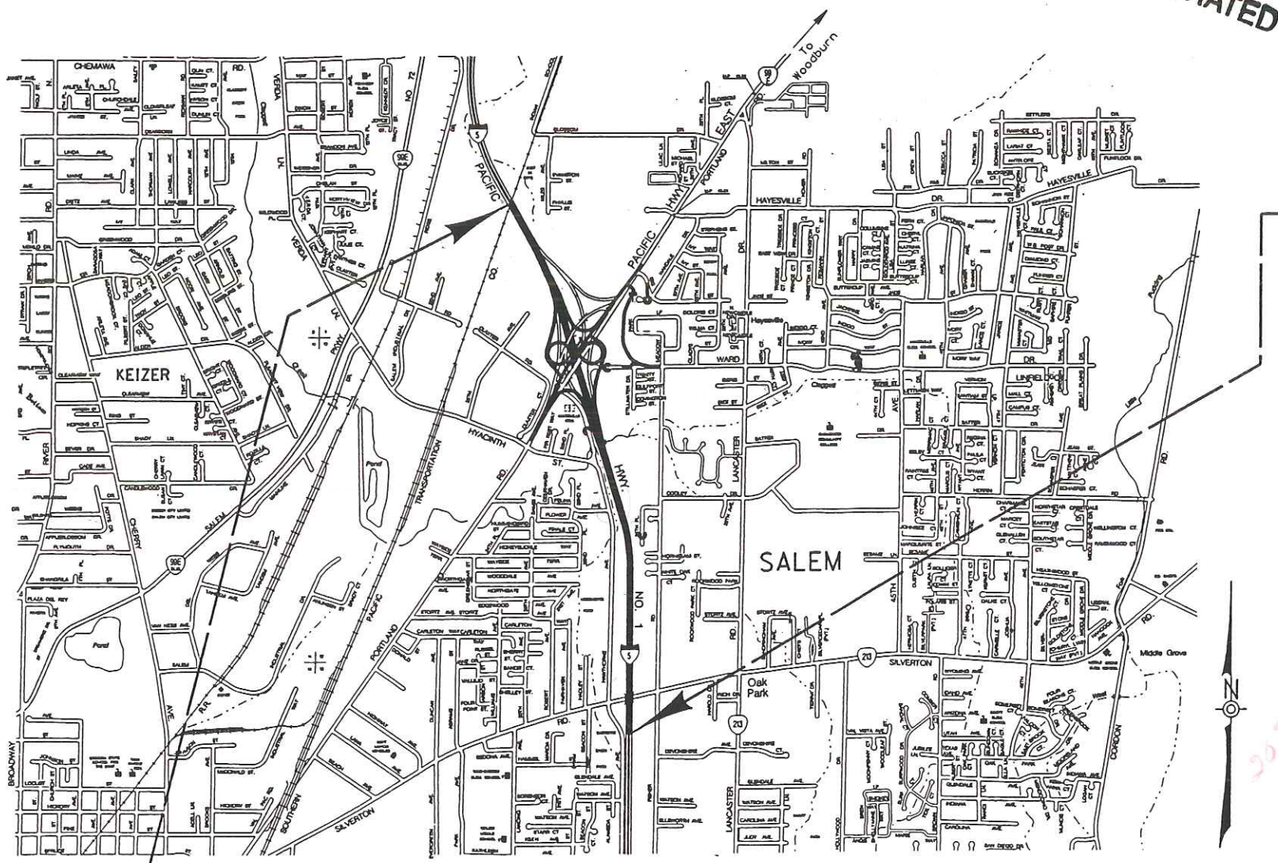
MARION COUNTY
MAY 1996



Overall Length Of Project - 1.81 Miles

REVISED PLAN
SHEETS INCORPORATED

REVISED PLAN
SHEETS INCORPORATED



T. 7 S., R. 3 W., W.M.

IDR-S00-1(031)
BEGINNING OF PROJECT
STA. 99 + 35 (M.P. 259.10)

IDR-S00-1(031)
END OF PROJECT
STA. 194 + 70 (M.P. 257.29)

THE TRAFFIC CONTROL YOU SEE PROVIDE PROTECTS YOU AS WELL AS THE PUBLIC. LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE.

OREGON TRANSPORTATION COMMISSION

Henry H. Hewitt	CHAIRMAN
Susan Brody	VICE CHAIRMAN
Cynthia J. Ford	COMMISSIONER
Steven H. Corey	COMMISSIONER
Stuart Foster	COMMISSIONER
Kenneth E. Husby	INTERIM DIRECTOR OF TRANSPORTATION

REGISTERED PROFESSIONAL ENGINEER 8496 OREGON AUGUST 22, 1975 THOMAS D. LULAY Expires Dec. 31, 1996

Thomas D. Lulay

TECHNICAL SERVICES MANAGING ENGINEER

302 sheets

S.P.T.C. - SILVERTON ROAD SEC.
PACIFIC HIGHWAY
MARION COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
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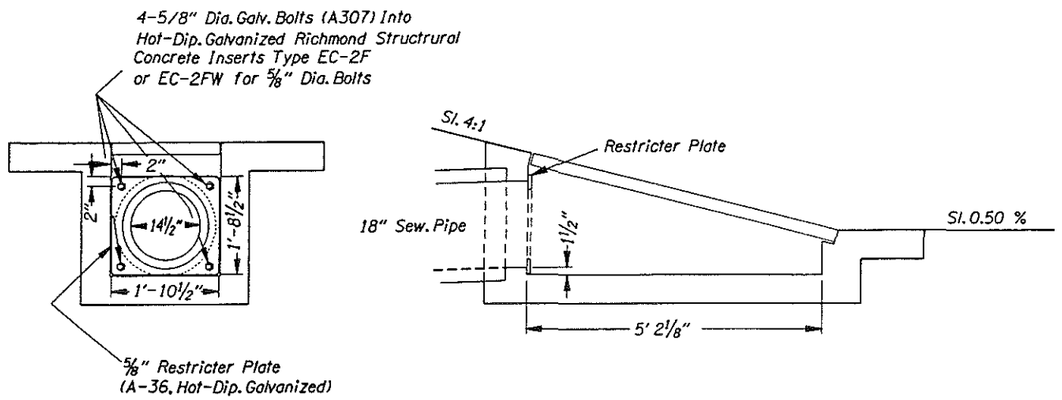
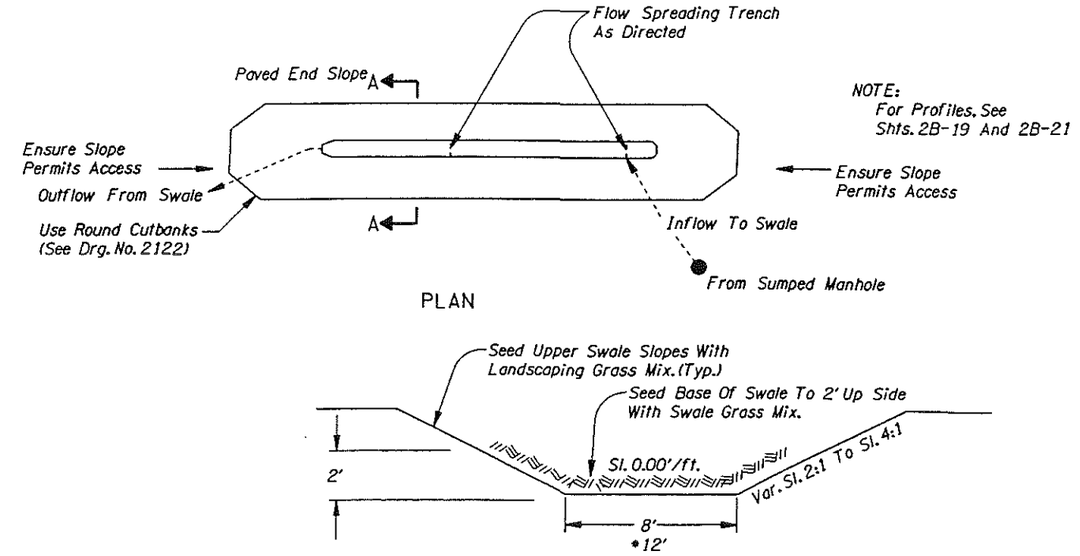
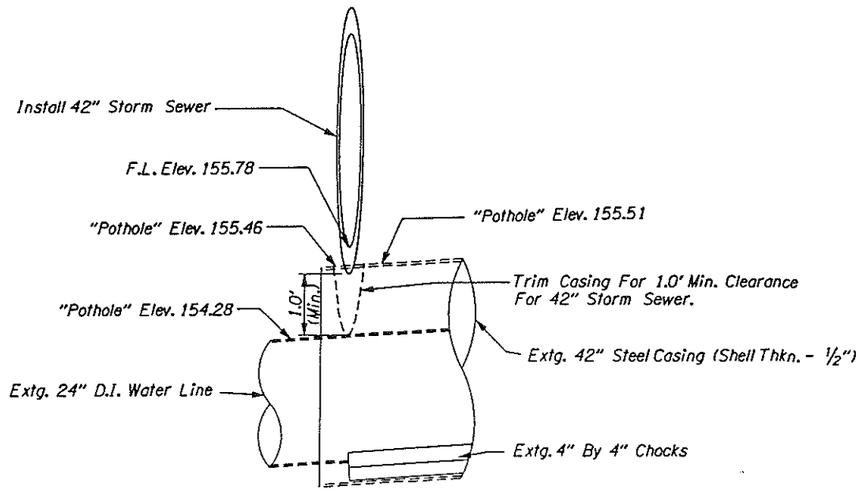


(For Details Not shown, See Drg. No. 2105 & 2105A)

MODIFIED TYPE "M-E" INLET WITH RESTRICTER PLATE



SWALE NOS. 1, 2, AND 4
*SWALE NO. 3



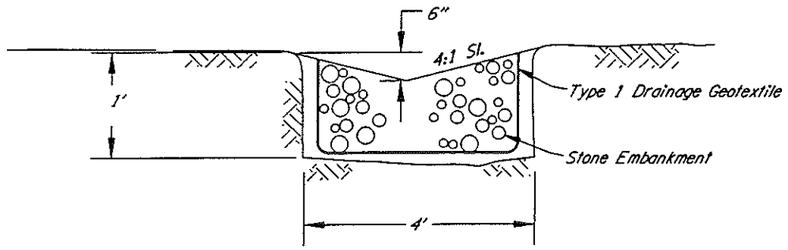
Scale: 10' Vert. To 1' Horz.

MODIFY EXISTING WATER LINE CASING
STA. 138+61.2; 77.6' Lt.

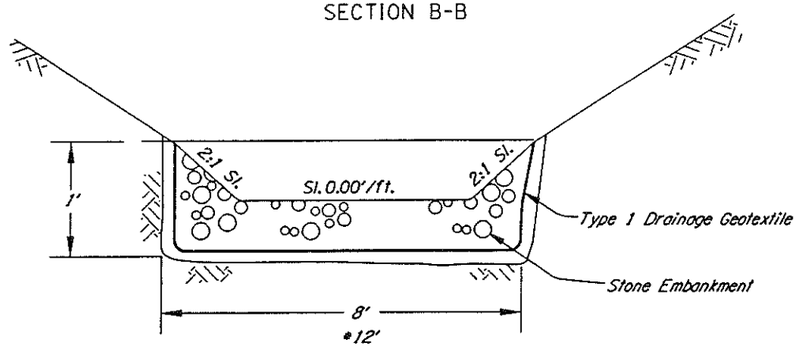
S.P.T.C. - SILVERTON ROAD SE.
PACIFIC HIGHWAY
MARION COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2B-14

D E T A I L S



SECTION B-B



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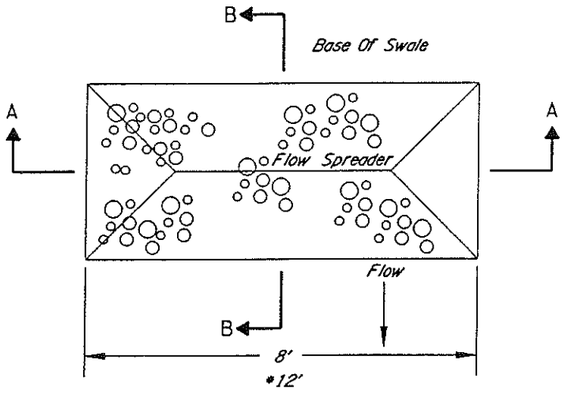
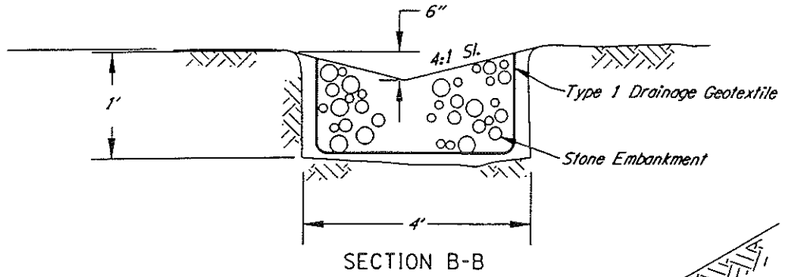


PLAN

FLOW SPREADER
*SWALE NO. 3



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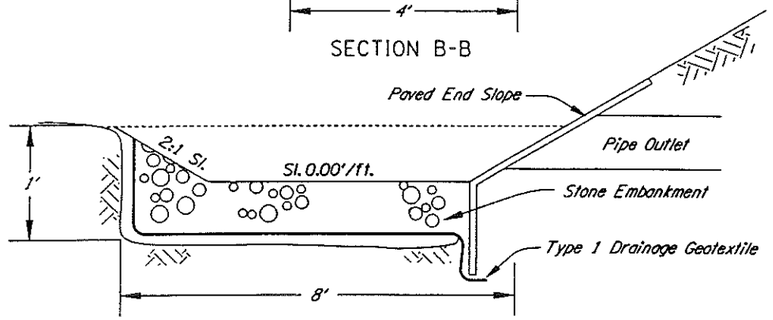

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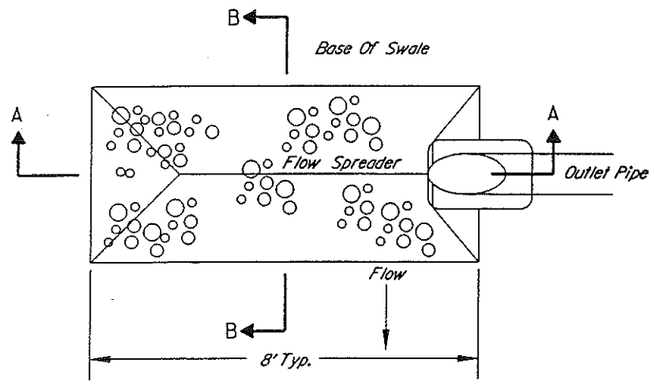

PLAN

FLOW SPREADER
AT PIPE OUTLET

S.P.T.C. - SILVERTON ROAD SEC. PACIFIC HIGHWAY MARION COUNTY			
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2B-15

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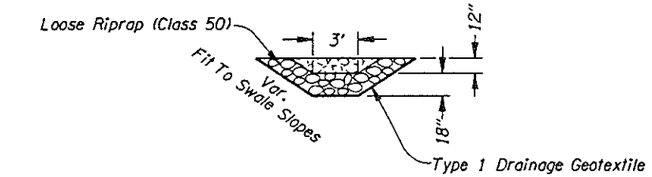

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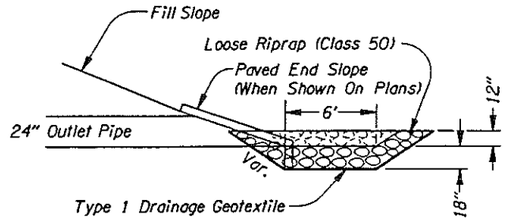

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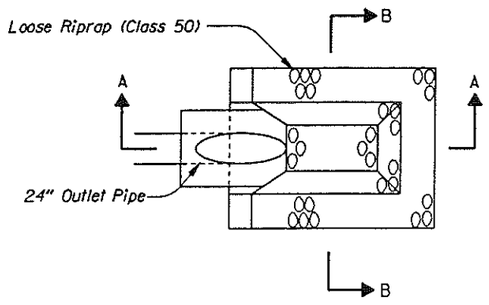
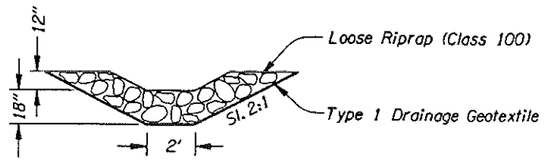


PLAN

OUTLET BASIN



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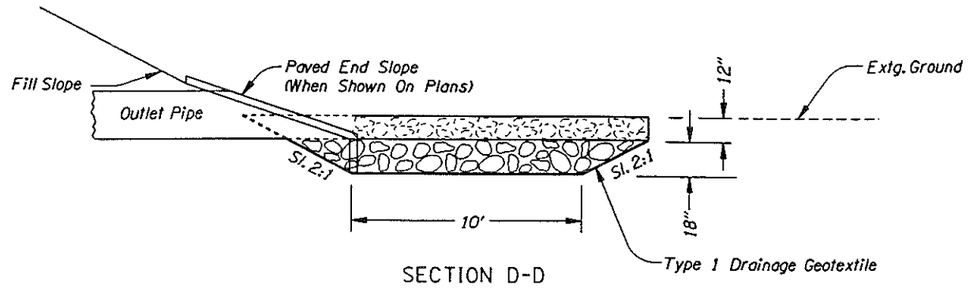

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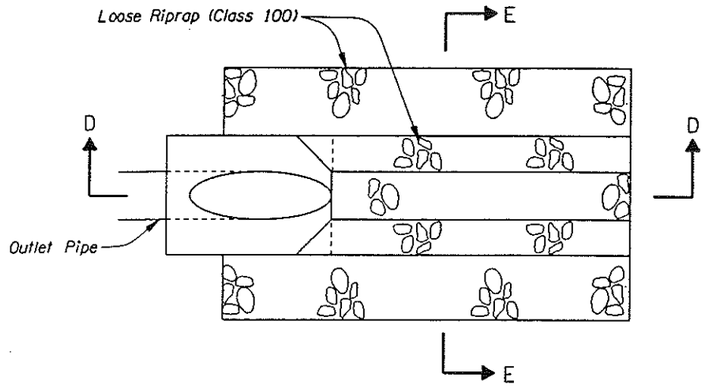
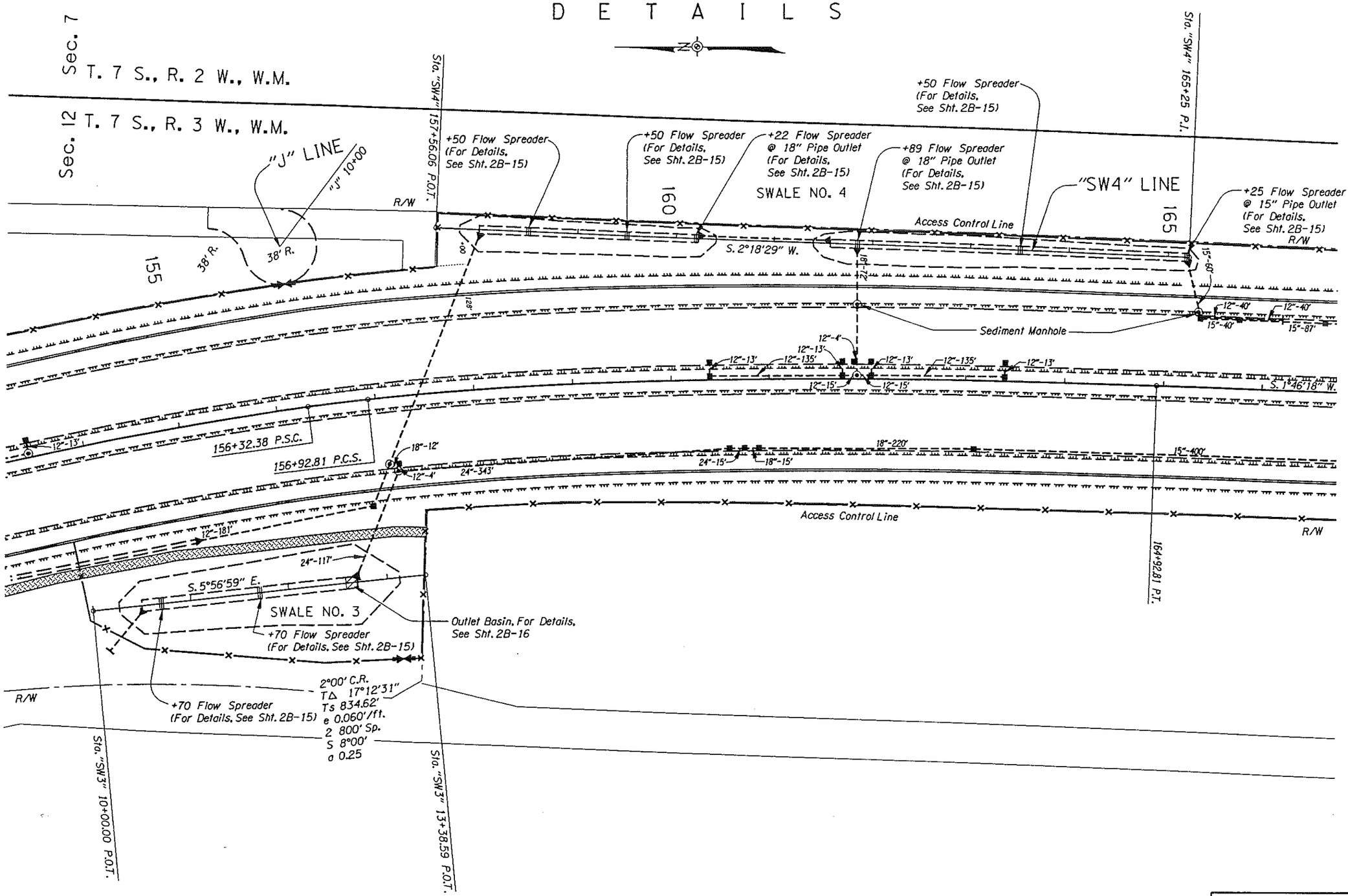


PLAN

ENERGY DISSIPATOR

S.P.T.C. - SILVERTON ROAD SEC. PACIFIC HIGHWAY MARION COUNTY			
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2B-16

D E T A I L S



SWALE NO. 3 AND SWALE NO. 4

(For Location, See Shts. 7B & 8B

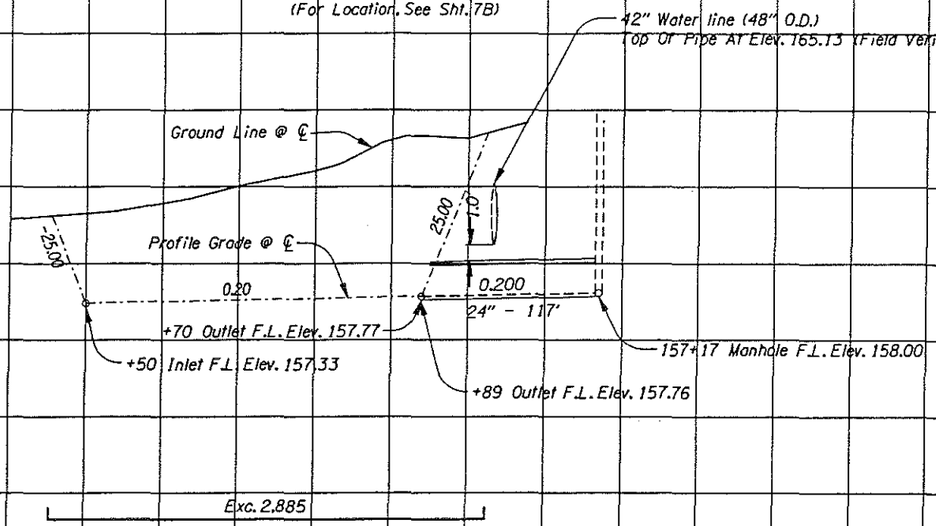
S.P.T.C. - SILVERTON ROAD SE..
PACIFIC HIGHWAY
MARION COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2B-2(

D E T A I L S

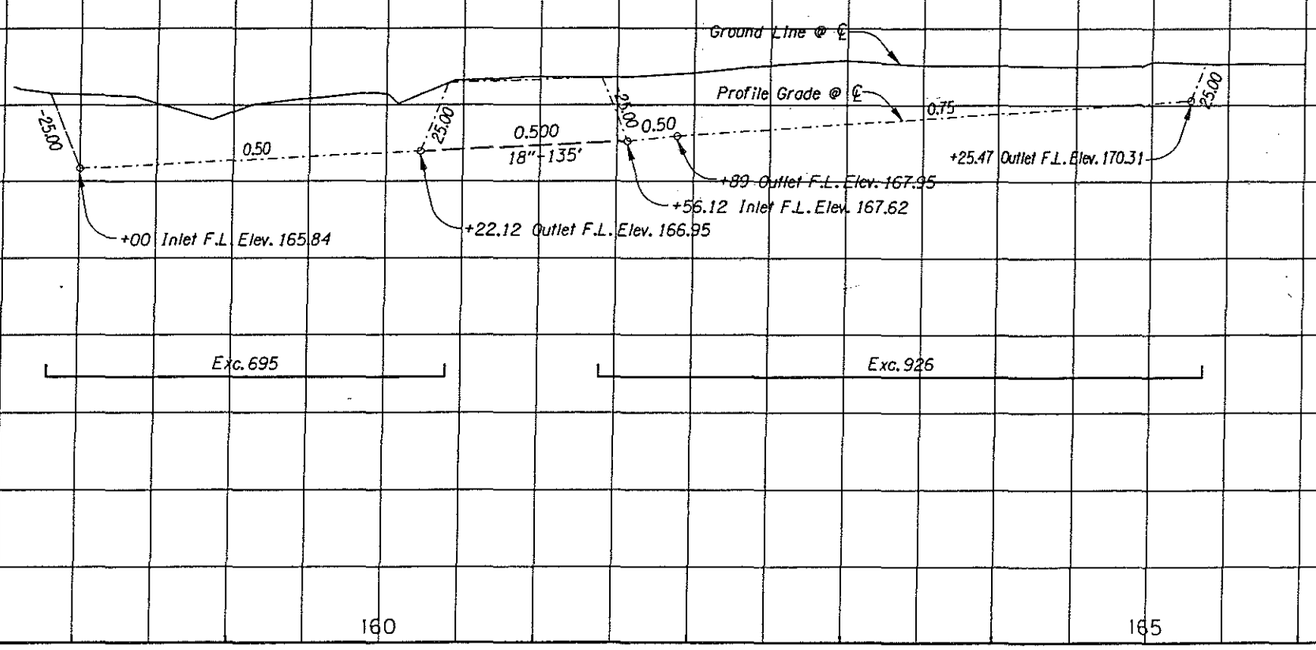
"SW3" LINE
SWALE 3

(For Location, See Sht. 7B)



"SW4" LINE
SWALE 4

(For Location, See Shts. 7B & 8B)



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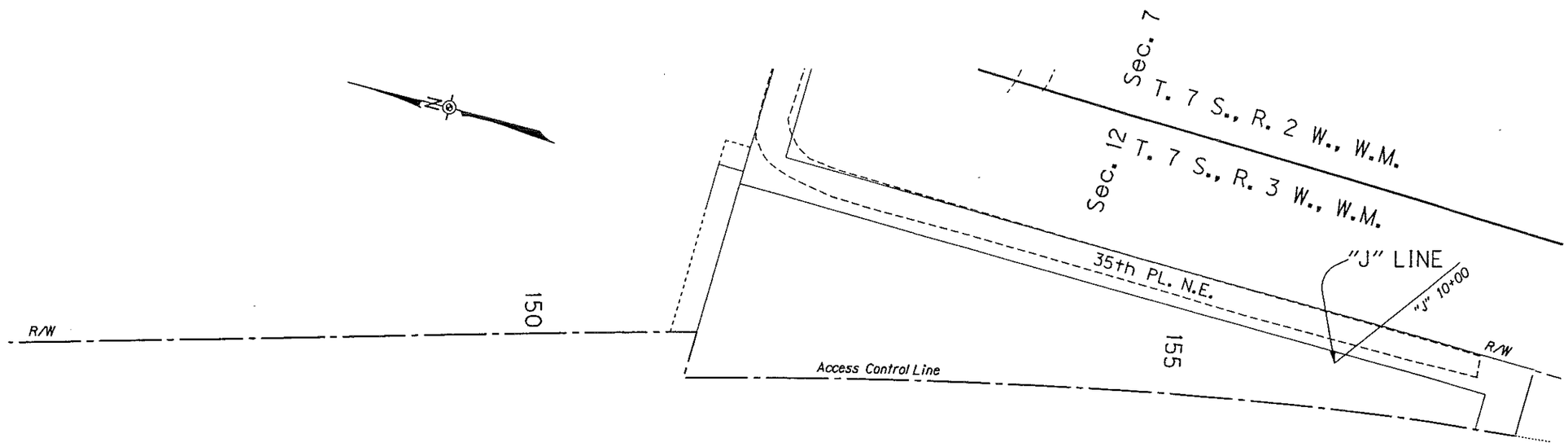
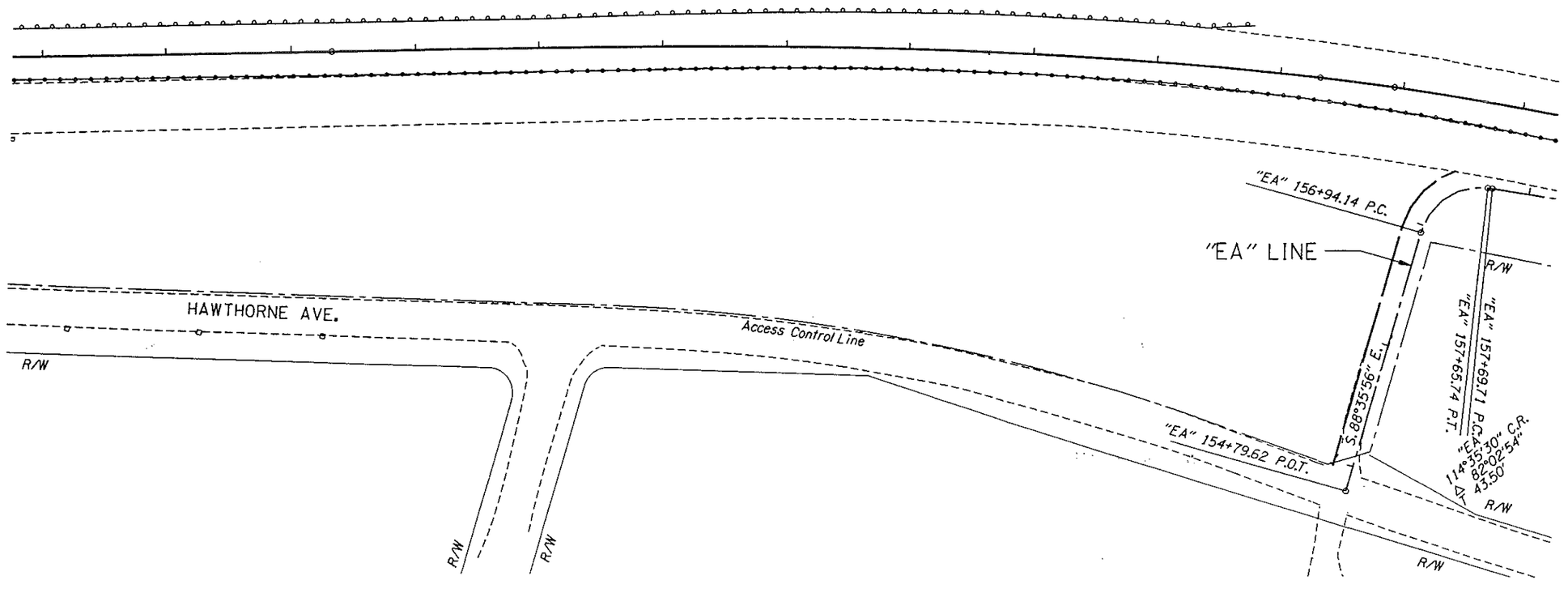
S.P.T.C. - SILVERTON ROAD SEC.
PACIFIC HIGHWAY
MARION COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2B-21

DETOUR ALIGNMENT





Work Restriction Area, Shown Thus: ▨
(For Details, See Sht. 2B-12)

S.P.T.C. - SILVERTON ROAD SEC. PACIFIC HIGHWAY MARION COUNTY			
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		7

/usr/fd3/jenkins/projects/05370/05370f.plt 3-MAR-1996 10:03

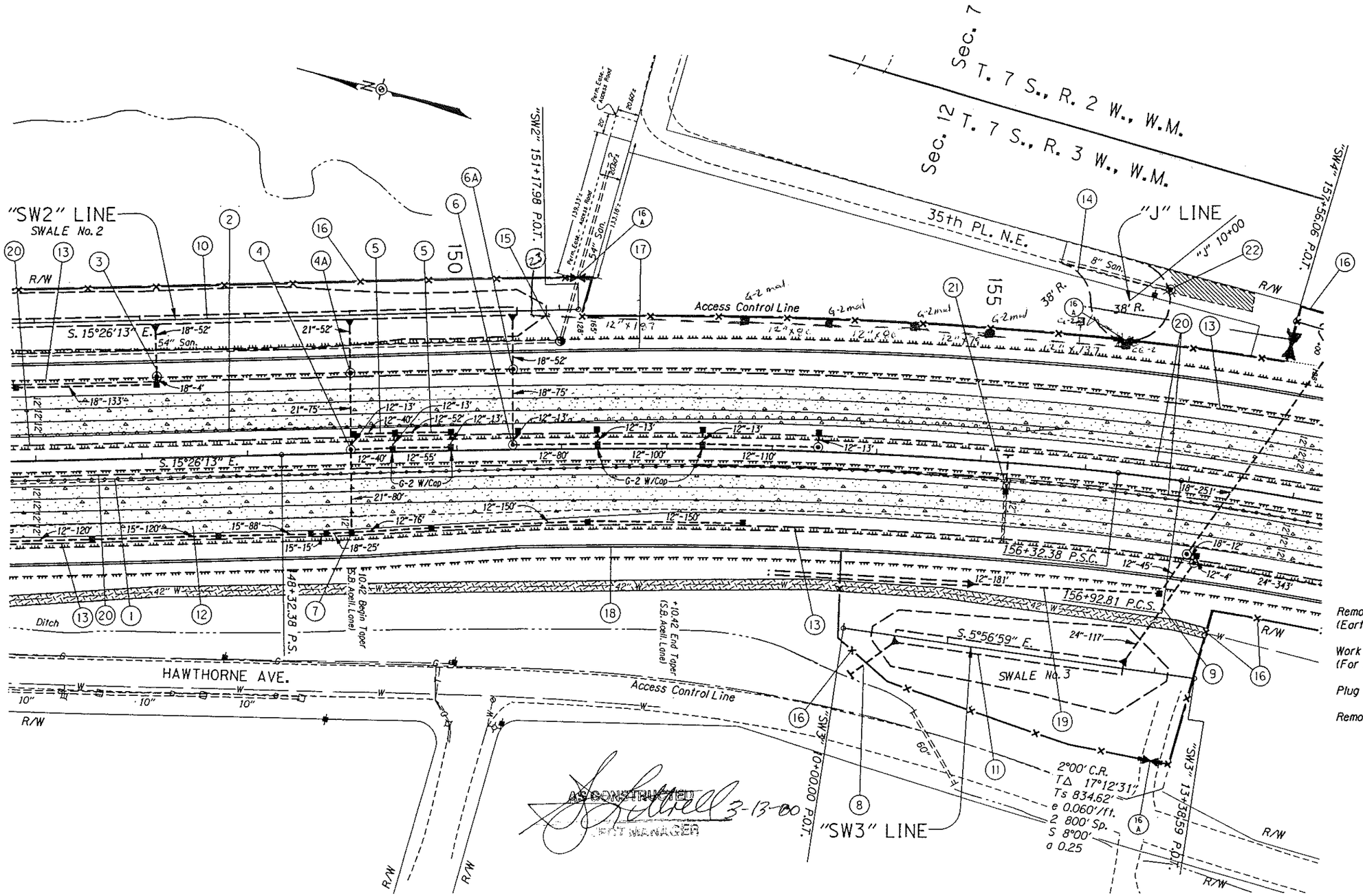
VIEW A1

BRIDGE DETAILS CHECKED S. Gruber 3/96

3-MAR-1996 09:35

/usr/fd3/jenkins/projects/05370/05370f.pl2

VIEW A2



Remove Old Roadway, Shown Thus: ▨
(Earthwork Incl. In Main Roadway Distr.)

Work Restriction Area, Shown Thus: ▨
(For Details, See Sht. 2B-9)

Plug And Abandon Extg. Pipe, Shown Thus: ⊨

Remove Extg. Inlet, Shown Thus: ⊠

S.P.T.C. - SILVERTON ROAD SE
PACIFIC HIGHWAY
MARION COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		7A

(X) See Sht. 6A, Note 2

(2) See Sht. 6A, Note 3

(3) Sta. 145+82 To Sta. 147+15, Lt.
Const. Precast Sediment Control Manhole 60"
Const. Type "G-2" Inlet
Inst. 18" Sewer Pipe - 189'
Const. Paved End Slope, Lt.
Tr. Exc. - 96 C.Y.
(For Details, See Shts. 2B-10 And 2B-12)

(4) Sta. 148+99 To Sta. 149+94
Const. Precast Manhole
(4A) Const. Precast Sediment Control Manhole 60"
Const. Type "G-2" Inlet - 3
Const. Type "G-2" Inlet With Cap - 2
Inst. 12" Sewer Pipe - 134'
Inst. 21" Sewer Pipe - ~~207'~~ 262
Const. Paved End Slope, Lt.
Tr. Exc. - 168 C.Y.
(For Details, See Shts. 2B-10 And 2B-12)

(5) Sta. 149+02 To Sta. 149+94, Lt.
Inst. 12" Slotted Drain Pipe - ~~92'~~ 94
(For Details, See Sht. 2B-11)

(6) Sta. 150+54 To Sta. 153+44, Lt.
Const. Precast Manhole - 2
(6A) Const. Precast Sediment Control Manhole 60"
Const. Type "G-2" Inlet - 4
Const. Type "G-2" Inlet With Cap - 2
Inst. 12" Sewer Pipe - ~~342'~~ 344
Inst. 18" Sewer Pipe - 127
Const. Paved End Slope, Lt.
Tr. Exc. - 192 C.Y.
(For Details, See Shts. 2B-10 And 2B-12)

(7) Sta. 145+31 To Sta. 152+75, Rt.
Const. Type "G-2" Inlet - 8
Inst. 12" Sewer Pipe - 496'
Inst. 15" Sewer Pipe - 223'
Inst. 18" Sewer Pipe - 25'
Tr. Exc. - 292 C.Y.
(For Details, See Sht. 2B-10)

(8) Inst. 24" Culv. Pipe - ~~53'~~ 59
Const. Paved End Slope
Tr. Exc. - 35 C.Y.
(For Details, See Shts. 2B-8 And 2B-21)

(9) Sta. 156+75 To Sta. 160+60, Rt.
Const. Precast Manhole
Const. Type "G-2" Inlet
Inst. 12" Sewer Pipe - 4'
Inst. 18" Sewer Pipe - 12'
Inst. 24" Sewer Pipe - ~~460'~~ 456
Const. Paved End Slope
Tr. Exc. - 310 C.Y.
(For Details, See Shts. 2B-10 And 2B-21)

(10) See Sht. 6C, Note 12

(11) Const. Swale No. 3
(For Details, See Sht. 2B-14, 2B-15, 2B-16, 2B-20, & 2B-21)

(12) See Sht. 6A, Note 5

(13) Const. Type "B" Curb

(14) Const. Type "C" Curb

(15) Sta. 151+00±, Lt.
Reconst. Manhole
Const. Slope Protector

(16) (17) Const. Type "CL-6" Fence
Inst. 12'x72" Chain Link Single Gate - X 4

(17) Sta. 145+71 To Sta. 169+25, Lt.
Bridge No. 18068
Const. Sound Wall No. 1
Const. Earth Mound
(Earthwork Incl. In Main Rdwy. Distr.)
(For Details, See Sht. 2B-3)
(For Drg. Nos., See Sht. 1A)

(18) See Sht. 6A, Note 15

(19) Sta. 153+00± To Sta. "S4" 158+00
Const. Precast Diversion Manhole
Const. Type "B" Inlet
Inst. 12" Sewer Pipe - ~~226'~~ 220
Inst. 18" Sewer Pipe - 251'
Const. Paved End Slope - 2
Const. Energy Dissipator, Rt.
Constr. Loose Riprap (Class 100) - 10 C.Y.
Under Pvmt. - 90'
Const. Outlet Ditch
"V" Bottom, 3:1 Slopes
Tr. Exc. - 212 C.Y.
Dt. Exc. - 150 C.Y.
(For Details, See Shts. 2B-13 And 2B-16)

(20) Const. Type "B" Mod. Curb
(For Details, See Sht. 2B-9)

(21) Sta. 155+25
Const. Temp. Inlet
Inst. 12" Temp. Drainage Pipe - 34'
Remove Temp. Inlet
Remove Temp. Drainage Pipe
Tr. Exc. - 25 C.Y.

(22) Adjust Extg. Manhole

(23) Sta 150+58 to 156+20
Const. G-2 mod Inlets - 4
Const CG-2 inlet
Const. G-2 Inlet
Install 12" Sewer Pipe 564'

AS CONSTRUCTED
3-13-00
PROJECT MANAGER

S.P.T.C. - SILVERTON ROAD SEC.
PACIFIC HIGHWAY
MARION COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		7B

BRIDGE DETAILS CHECKED: S. Gaertner 3/13/00

29-FEB-1996 06:09 bridge

/usr/td3/jenkins/projects/05370/05370f.nl1

VIEW 82