OPERATION & MAINTENANCE MANUAL

DFI No. : [D00973]
Facility Type: Water Quality Bio-infiltration Swales

(Swale #D00973: refer sheets GJ-4, GJ-10, 16B, 16B-2, and 16D in attached plans)

Figure 1: Facility location map

[January 2019]

INDEX

1. Identification

Drainage Facility ID (DFI):	**[D00973]**
Facility Type:	[Bio-infiltration Swale]
Construction Drawings:	(V-File Number) [49V-017]
Location:	District: 3
	Highway No.: 219 (Hillsboro-Silverton 140)
	Mile Post: [21.44; 21.54, right (beg./end)]
	Description: located on the west side of 219 north of Industrial Parkway and south of East 3rd Street.

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 Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record:	Consultant Designer – Parametrix, Rebecca S. Cushman, PE, 206-394-3679
Facility construction:	2016/2017
Contractor:	K&E Excavating, Inc. Salem, Oregon.

4. Storm Drain System and Facility Overview

The featured bio-infiltration swales (referred to from this point forward as a swale) functions both as a water quality treatment and retention facility. The facility provides water quality treatment of smaller storm events and retention of the larger storm events. Suspended solids and pollutants are filtered out through a compost amended soil medium used as the growing medium in the swales. Smaller, water quality events, will infiltrate through the compost amended soil. Larger rain events may exceed the infiltration capacity of the compost amended soil and be collected by an area drain.

The following elements are included with this document. Additional information can be found in the supporting drainage report '*Drainage report to support phase 1G final stormwater management facility design, November 2015*'.

A. Maintenance equipment access:
   The water quality treatment compost medium in the swales is not to be compacted. Therefore tracked or tired equipment (equipment) is not allowed in the swale.

B. Heavy equipment access into facility:

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

C. Special Features:

   ☒ Amended Soils
   ☐ Porous Pavers
   ☐ Liners
   ☐ Underdrains

5. Facility Haz Mat Spill Feature(s)

The bio-infiltration swale is not to be used as a hazardous material containment facility. The facility should be protected from hazardous material spills and contamination. A hazardous material spill plan should include protecting the pond from contamination.

6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure cannot safely pass the projected high flows. The end of each swale will act as a broad-crested spillway weir if the area drain becomes compromised.

The auxiliary outlet feature for this facility is:

☐ Designed into facility:
The downstream end of each swale will act similar to a broad crest weir spillway which will convey flows to the downstream receiving water body.

☒ Other, as noted below
This swale is situated along a road with a swale and tributary to Hess Creek downstream. Therefore, no overflow or high flow bypass is provided as there is a drainage path for the high flow to pass downstream.

7. Maintenance Requirements

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 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/Pages/MGuide.aspx

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual. The selected tables are provided and attached to this manual:

Mark as Required and always include Table 1:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☒ Table 3 (water quality bio-infiltration 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 Table

8. Waste Material Handling

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

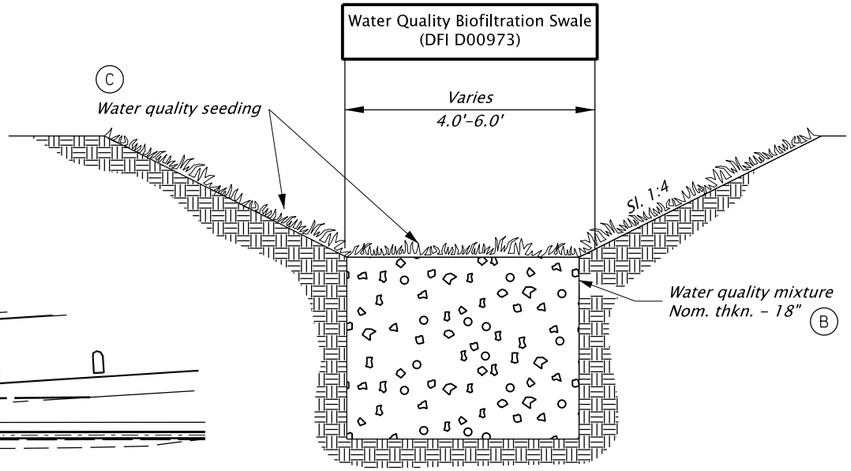
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Manager	(503) 986-2990
ODEQ Northwest Region Office	(503) 229-5263

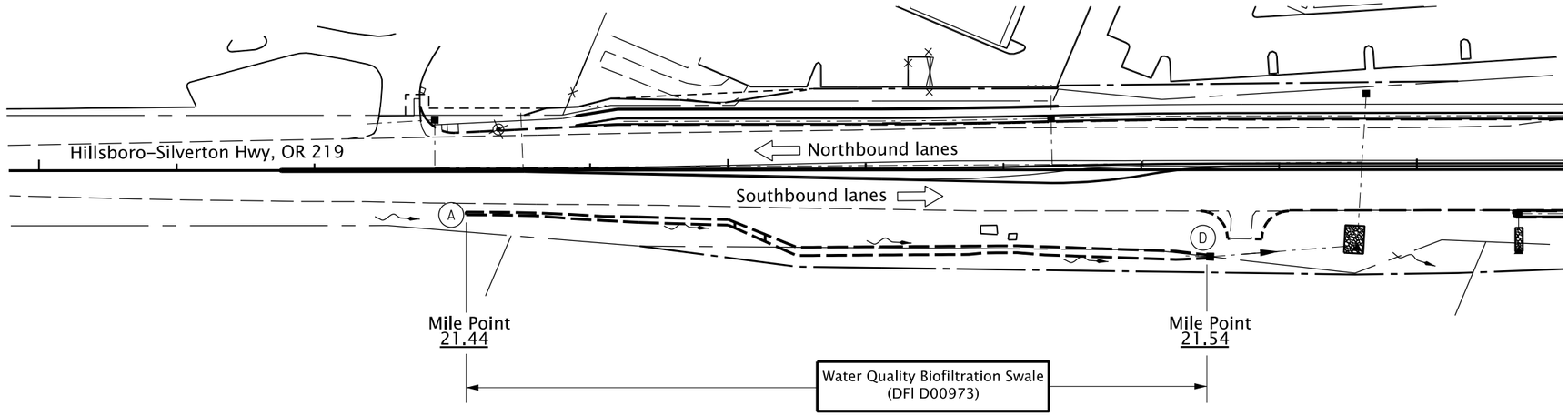
Appendix A

Content:

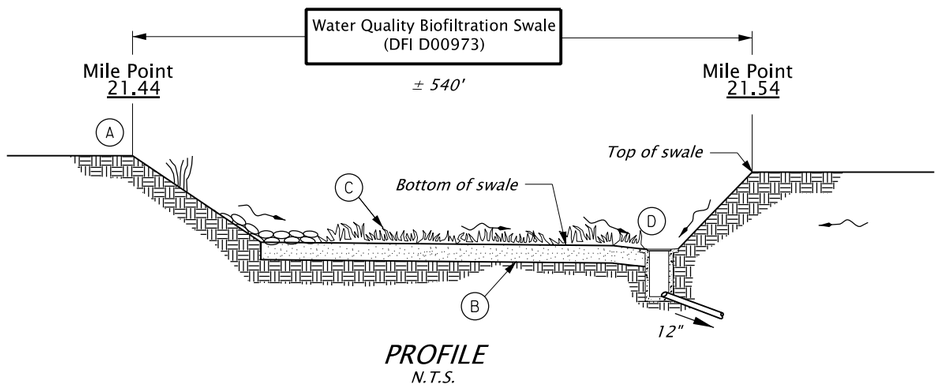
- **O&M Plan and Detail Drawing(s)**



SECTION A-A
N.T.S.



PLAN
N.T.S.



PROFILE
N.T.S.

LEGEND:

A	*Inlet Ditch*
B	*Water Quality Soil Mixture Nom. Thickness 18"*
C	*Water Quality Seeding*
D	*Type 'D' Ditch Inlet Structure*
◉ and/or ◎	*Manhole*
■ and/or □	*Inlet*
▬▬▬▬◄	*Storm Pipe (Facility)*
- - - - - -	*Storm Pipe*
◄	*Conveyance Direction*
◄~	*Pavement / Facility Flow Path*
⇦	*Traffic Flow Direction*

OREGON DEPARTMENT OF TRANSPORTATION

Sht. ## of ##

Prepared By: R. CUSHMAN

Drafted By: D. GODFREY

DFI D00973
MAINTENANCE DISTRICT 3 HWY 140
WATER QUALITY BIOFILTRATION SWALE
HILSBORO-SILVERTON HWY MP21.44-MP21.54
YAMHILL COUNTY

THIS IS THE FILENAME LOCATION ################################ DD-MMM-YYYY HH:MM USERNAME

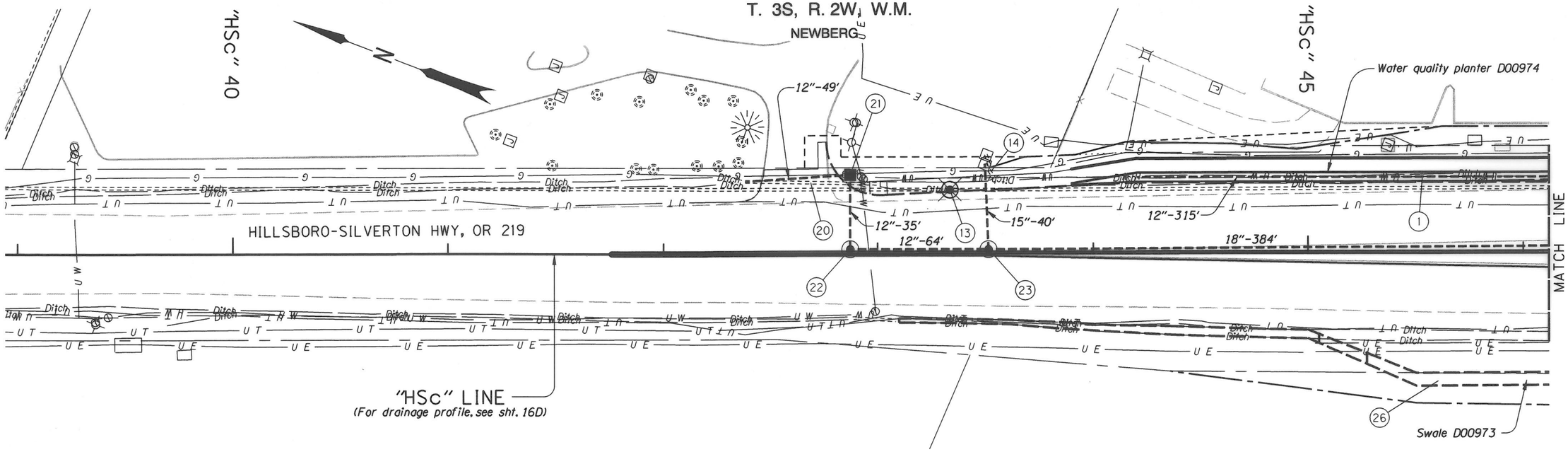
Swale_D009973.dgn

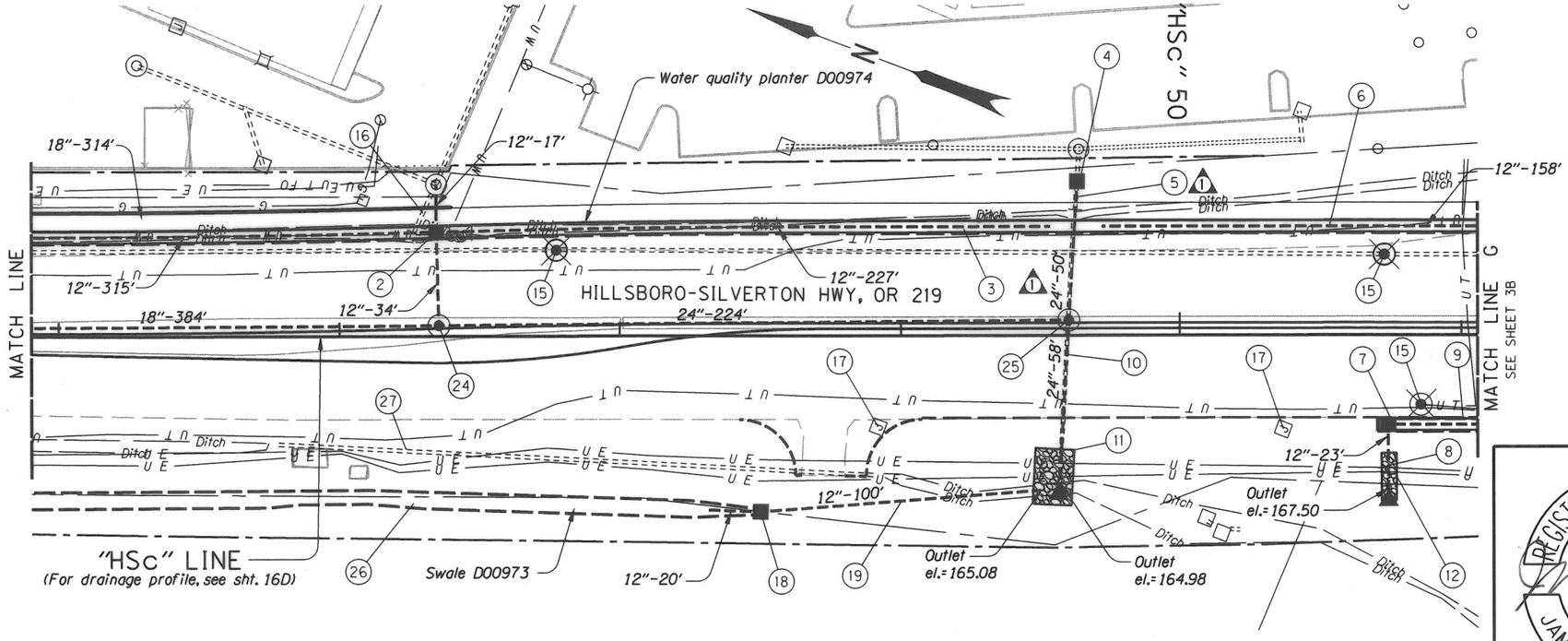
Appendix B

Content:

- **Plans and Detail Drawing(s)**

T. 3S, R. 2W, W.M.





No.	DATE	REVISIONS	BY
1	05-17-16	Deleted catch basin and updated stormwater planter design	J.A.P.

REGISTERED PROFESSIONAL ENGINEER
58027
OREGON
JULY 15, 2003
JAMES A PHILLIPS
EXPIRES: 12/31/16

OREGON DEPARTMENT OF TRANSPORTATION

Parametrix

OR18: NEWBERG-DUNDEE BYPASS (PHASE 1G) (SPRINGBROOK RD) SEC.
HILLSBORO-SILVERTON, PACIFIC HWY WEST, & SALMON RIVER HWYS.
YAMHILL COUNTY

Design Team Leader - Rebecca Cushman
Designed By - Ryan Retzlaff
Drafted By - Jim Phillips

DRAINAGE & UTILITIES

SHEET NO. 16B

(1) Const. stormwater planter D00974
Inst. 12" drain pipe - 315'
s=0.0049'/ft
I.E.(in)= 168.66
I.E.(out)= 167.11
Inst. cleanout - 3
(For details, see shts. GJ, GJ-2, GJ-3, GJ-4, GJ-11, and GJ-12)

(2) Sta. "HSc" 47+34.53, 37.33' Lt.
Const. catch basin, type 3 (modified)
Inst. 12" storm sew pipe - 17'
5' depth
Connect to extg. manhole
(For details, see sht. GJ-9)

(3) Const. stormwater planter D00974
Inst. 12" drain pipe - 227'
s=0.0030'/ft
I.E.(in)= 167.79
I.E.(out)= 167.11 (1)
Inst. cleanout - 3
(For details, see shts. GJ, GJ-2, GJ-3, GJ-4, GJ-11 & GJ-12)

(4) Sta. "HSc" 49+63.29, 55.10' Lt.
Const. type "D" inlet
Connect to extg. storm sew. pipe

(1) (5) Remove pipe - 13'

(6) See sht. 3B-2, note 9
Const. stormwater planter D00974
Inst. 12" drain pipe
Inst. cleanout

(7) Sta. "HSc" 50+73.75, 32.00' Rt.
Const. catch basin, type 3 (modified)
(For details, see sht. GJ-9)

(8) Sta. "HSc" 50+73.75, 32.00' Rt., F.L. El. 168.00 to
Sta. "HSc" 50+73.75, 55.25' Rt. F.L. El. 167.50
Inst. 12" storm sew. pipe - 23'
5' depth
s=0.022'/ft
Const. paved end slope - 26 sq.ft.

(9) See sht. 3B-2, note 27
Const. stormwater planter D00978
Inst. 12" drain pipe

(10) Sta. "HSc" 49+60.19, 5.50' Lt., F.L. El. 165.56 to
Sta. "HSc" 49+56.75, 52.70' Rt., F.L. El. 164.98
Remove pipe - 93'
Inst. 24" storm sew. pipe - 58'
10' depth
s=0.010'/ft.
Const. paved end slope - 44 sq.ft.
Trench resurf. - 14 sq.yd.

(11) Const. 13'x22'x2' loose riprap energy dissipator pad (class 50) - 22 cu.yd.
(For details, see sht. GJ-5)

(12) Const. 5'x17'x2' loose riprap energy dissipator pad (class 50) - 7 cu.yd.
(For details, see sht. GJ-5)

(13) Major adjust manhole
(See drg. no. RD360)

(14) Remove pipe - 8'

(15) Minor adjust manhole - 3

(16) Remove pipe - 20'

(17) Remove junction box - 2
(For details, see signal plans)
(For drg. nos., see sht. 1A)

(18) Sta. "HSc" 48+50.00, 63.00' Rt.
Const. type "D" inlet
Rim elev. = 166.90
I.E.(in) = 165.40
I.E.(out) = 165.40
Inst. 12" drain pipe - 20'
s=0.0060'/ft

(19) Sta. "HSc" 48+50.00, 63.00' Rt., F.L. El. 165.40 to
Sta. "HSc" 49+50.00, 55.40' Rt., F.L. El. 165.08
Inst. 12" storm sew. pipe - 100'
5' depth
s=0.0032'/ft

(20) Remove pipe - 62'
Trench resurf. - 14 sq.yd.

(21) Sta. "HSc" 42+87.30, 36.62' Lt.
Const. type "D" inlet
Rim elev. = 173.32
I.E.(in) = 170.55
I.E.(out) = 170.45
Inst. 12" storm sew. pipe - 49'
5' depth

(22) Sta. "HSc" 42+87.30, 2.00' Lt.
Const. manhole, 48" dia. with tamperproof cover
Inst. 12" storm sew. pipe - 35'
5' depth
Trench resurf. - 7 sq.yd.

(23) Sta. "HSc" 43+51.34, 2.00' Lt.
Const. manhole, 48" dia. with tamperproof cover
Inst. 12" storm sew. pipe - 64'
5' depth
Inst. 15" storm sew. pipe - 40'
5' depth
Connect to extg. ditch inlet
Trench resurf. - 30 sq.yd.

(24) Sta. "HSc" 47+35.36, 3.84' Lt.
Const. manhole, 48' dia. with tamperproof cover
Inst. 12" storm sew. pipe - 34"
5' depth
Inst. 18" storm sew. pipe - 384'
10' depth
Trench resurf. - 158 sq.yd.

(25) Sta. "HSc" 49+60.19, 5.50' Lt.
Const. manhole, 60' dia. with tamperproof cover
Inst. 24" storm sew. pipe - 50' (1)
10' depth
Inst. 24" storm sew. pipe - 224'
10' depth
Trench resurf. - 111 sq.yd.

(26) Const. water quality biofiltration swale D00973
width varies
slope slopes = 1:4
Inst. field facility markers - 4
(For details, see shts. GJ-4 and GJ-12)

(27) Remove pipe - 214'

No.	DATE	REVISIONS	BY
(1)	05-17-16	Deleted catch basin and updated stormwater planter design	J.A.P.

REGISTERED PROFESSIONAL ENGINEER
58027
OREGON
JULY 15, 2003
JAMES A PHILLIPS
EXPIRES: 12/31/16

OREGON DEPARTMENT OF TRANSPORTATION

Parametrix

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HILLSBORO-SILVERTON, PACIFIC HWY WEST, & SALMON RIVER HWYS.
YAMHILL COUNTY

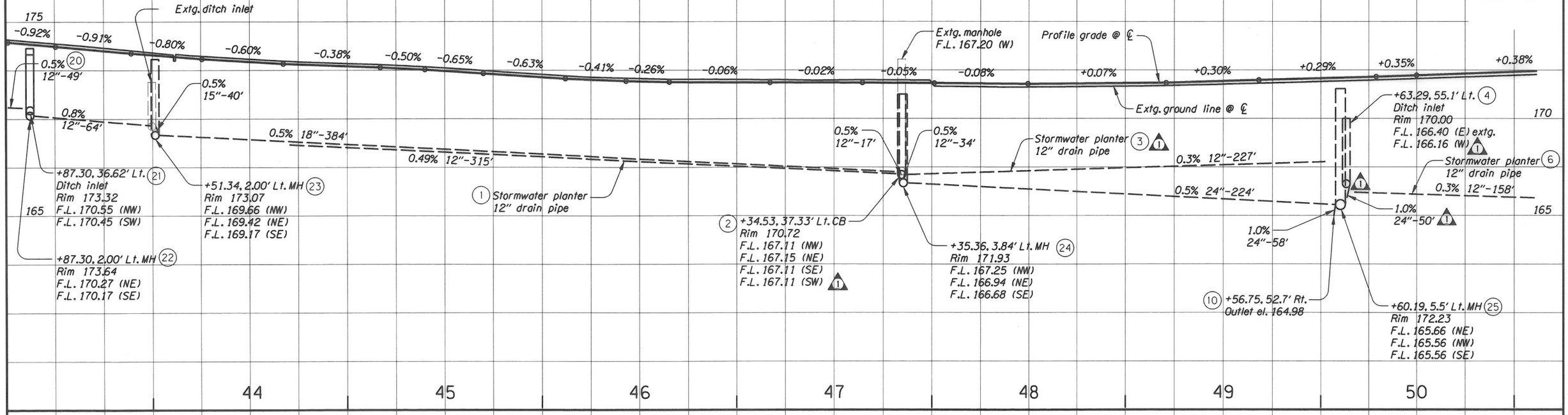
Design Team Leader - Rebecca Cushman
Designed By - Ryan Retzlaff
Drafted By - Jim Phillips

DRAINAGE NOTES

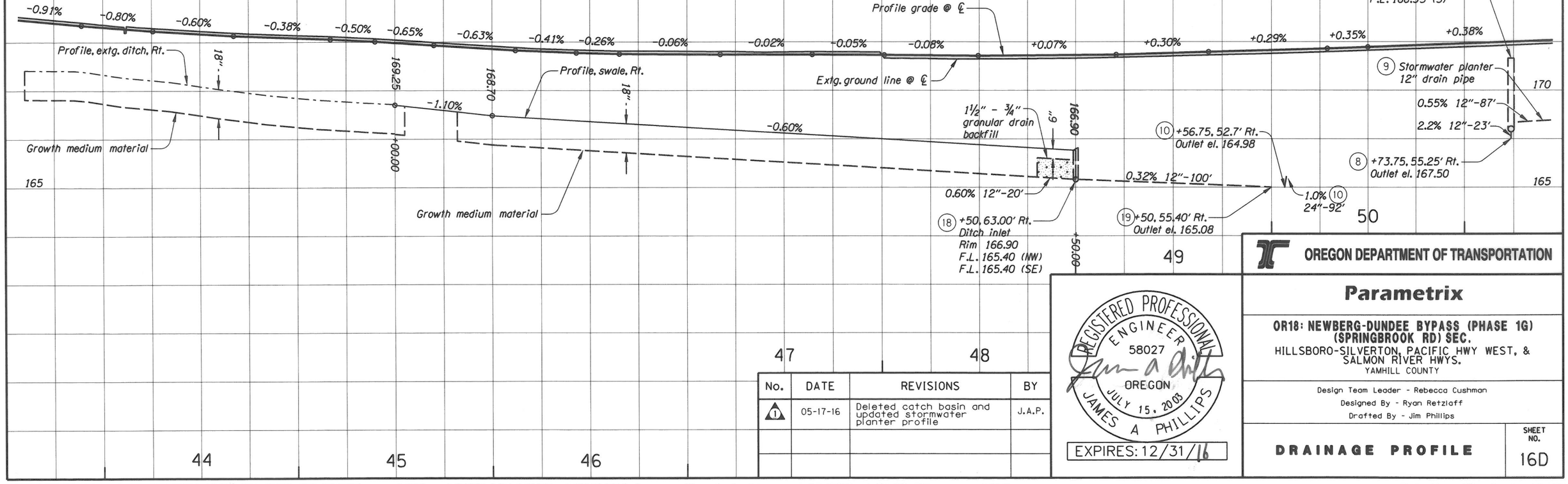
SHEET NO. 16B-2

49V-017

"HSc" LINE, LEFT



"HSc" LINE, RIGHT



No.	DATE	REVISIONS	BY
1	05-17-16	Deleted catch basin and updated stormwater planter profile	J.A.P.

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JULY 15, 2003
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EXPIRES: 12/31/16

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YAMHILL COUNTY

Design Team Leader - Rebecca Cushman
Designed By - Ryan Retzlaff
Drafted By - Jim Phillips

DRAINAGE PROFILE

SHEET NO. 16D

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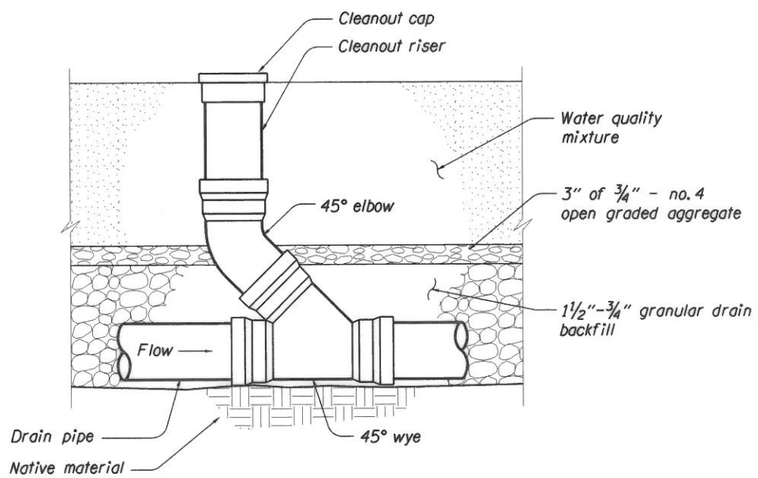
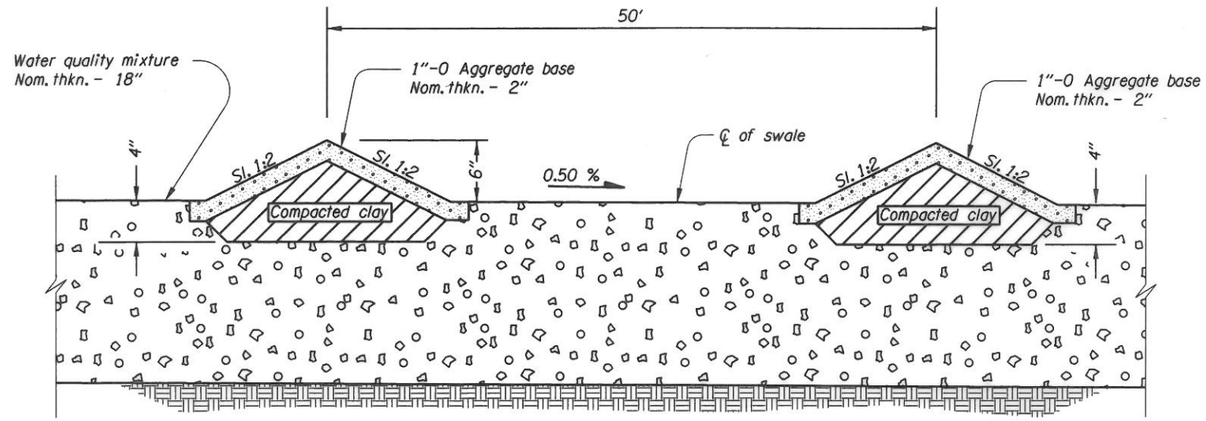
Rotation: 0° Scale: 1"=50'

CLEANOUT TABLE

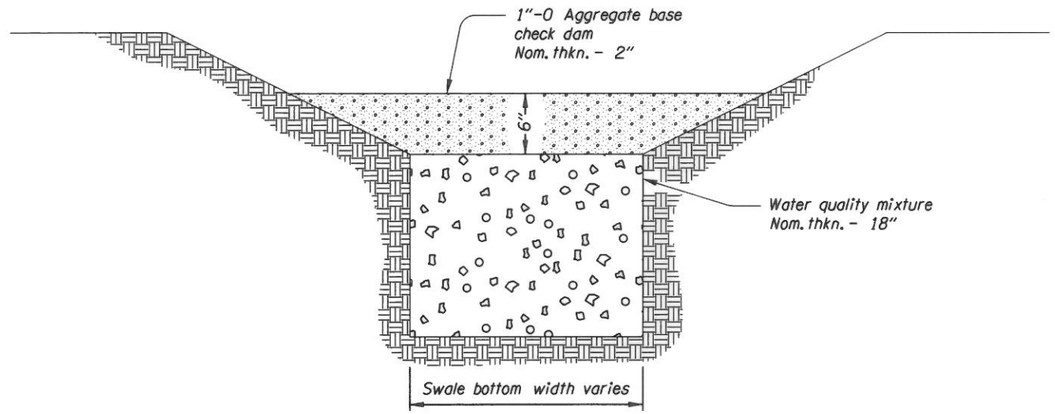
Cleanout #	Sta. and offset	Cleanout #	Sta. and offset
1	"HSc" 44+21, 35.50' Lt.	41	"SB" 27+46, 26.00' Rt.
2	"HSc" 45+25, 35.50' Lt.	42	"SB" 28+85, 26.00' Rt.
3	"HSc" 46+25, 35.60' Lt.	43	"SB" 29+25, 24.25' Lt.
4 (2)	"HSc" 47+60, 37.90' Lt.	44	"SB" 29+85, 26.00' Rt.
5	"HSc" 48+60, 39.00' Lt.	45	"SB" 30+91, 26.00' Rt.
6 (2)	"HSc" 49+60, 39.00' Lt.	46	"SB" 31+00, 24.25' Lt.
7	"HSc" 49+72, 39.00' Lt.	47	"SB" 31+85, 26.00' Rt.
8	"HSc" 50+75, 39.90' Lt.	48	"SB" 33+16, 25.00' Rt.
9	"HSc" 51+60, 32.00' Rt.	49	"SB" 33+58, 24.25' Lt.
10	"HSc" 53+73, 40.50' Rt.	50	"SB" 34+50, 24.25' Lt.
11	"HSc" 54+75, 40.50' Rt.	51	"SB" 35+63, 26.00' Rt.
12	"HSc" 56+20, 40.50' Rt.	52	"SB" 35+85, 24.25' Lt.
13	"HSc" 57+30, 54.50' Lt.	53	"SB" 37+63, 24.25' Lt
14	"HSc" 57+85, 40.50' Rt.	54	"SB" 36+60, 26.00' Rt.
15	"HSc" 58+30, 54.42' Lt.	55	"SB" 37+65, 26.00' Rt.
16	"HSc" 59+30, 45.24' Lt.	56	"SB" 38+60, 24.25' Lt.
17	"HSc" 60+10, 40.50' Lt	57	"SB" 38+60, 26.00' Rt
18	"HSc" 61+15, 40.50' Lt.	58	"SB" 40+14, 24.25' Lt.
19	"HSc" 62+15, 40.50' Lt	59	"SB" 40+40, 26.00' Rt.
20	"HSc" 63+15, 40.50' Lt.	60	"SB" 40+67, 24.25' Lt.
21	"HSc" 64+15, 40.50' Lt.	61	"SB" 41+58, 26.00' Rt.
22 (1)	"HSc" 66+23, 40.50' Lt.	62	"SB" 41+70, 24.25' Lt.
23	Not Used	63	"SB" 43+44, 24.50' Rt.
24 (1)	Not Used	64	"SB" 43+53, 24.25' Lt.
25	"IP" 10+85, 34.22' Rt.	65	"SB" 44+50, 24.25' Lt.
26	"IP" 10+90, 28.20' Lt.	66	"SB" 44+65, 24.25' Rt.
27	"IP" 11+85, 30.64' Rt.	67	"SB" 45+53, 24.25' Lt.
28	"IP" 11+92, 28.20' Lt.	68	"SB" 45+57, 24.25' Rt.
29	"SB" 10+85, 38.25' Lt.	69	"SB" 46+56, 24.25' Lt.
30	"SB" 11+85, 38.25' Lt.	70	"SB" 46+72, 26.00' Rt.
31	"SB" 12+91, 41.70' Lt.	71	"SB" 47+50, 26.00' Rt.
32	"SB" 14+30, 29.50' Lt.	72	"SB" 47+85, 24.25' Lt.
33	"SB" 20+10, 26.00' Rt.	73	"SB" 48+47, 26.00' Rt.
34	"SB" 21+20, 26.00' Rt.	74	"SB" 48+88, 24.25' Lt.
35	"SB" 22+07, 26.00' Rt.	75	"SB" 49+55, 26.00' Rt.
36	"SB" 23+68, 26.00' Rt.	76	"SB" 51+65, 26.00' Rt.
37	"SB" 24+72, 26.00' Rt.	77	"SB" 52+17, 24.25' Lt.
38	"SB" 24+86, 26.00' Rt.	78	"SB" 52+74, 26.00' Rt.
39	"SB" 25+70, 26.00' Rt.	79	"SB" 52+84, 26.00' Rt.
40	"SB" 27+07, 25.50' Lt.	80	"SB" 53+87, 26.00' Rt.
		81	"SB" 50+56, 24.25' Lt. (3)



CLEANOUT DETAIL



SWALE PROFILE SECTION



SWALE SECTIONS

WATER QUALTIY BIOFILTRATION SWALE

NOTES:

1. Hand tamp water quality mixture material directly under check dam.
2. Key clay core into water quality mixture material.

No.	DATE	REVISIONS	BY
1	03-31-16	Deleted Wilsonville Rd. connection to Hwy 219, & revised drainage design	J.A.P.
2	05-17-16	Updated stormwater planter design and adjusted cleanout spacing	J.A.P.
3	01-19-17	Adjusted storm planter, pipes, inlets, and cleanouts for new driveway location	J.A.P.

REGISTERED PROFESSIONAL ENGINEER
58027
OREGON
JULY 15, 2003
JAMES A PHILLIPS
EXPIRES: 12/31/18

OREGON DEPARTMENT OF TRANSPORTATION

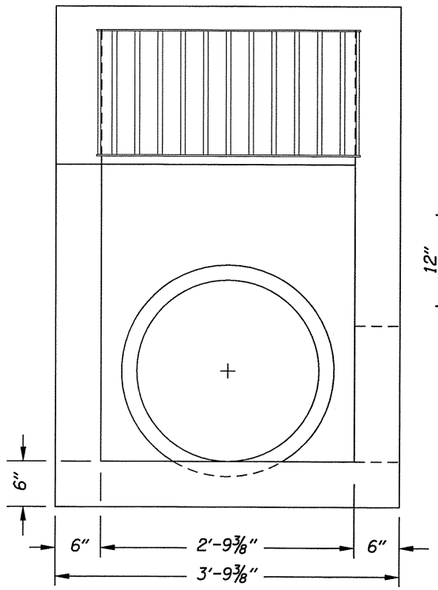
Parametrix

OR18: NEWBERG-DUNDEE BYPASS (PHASE 1G) (SPRINGBROOK RD) SEC.
HILLSBORO-SILVERTON, PACIFIC HWY WEST, & SALMON RIVER HWYS.
YAMHILL COUNTY

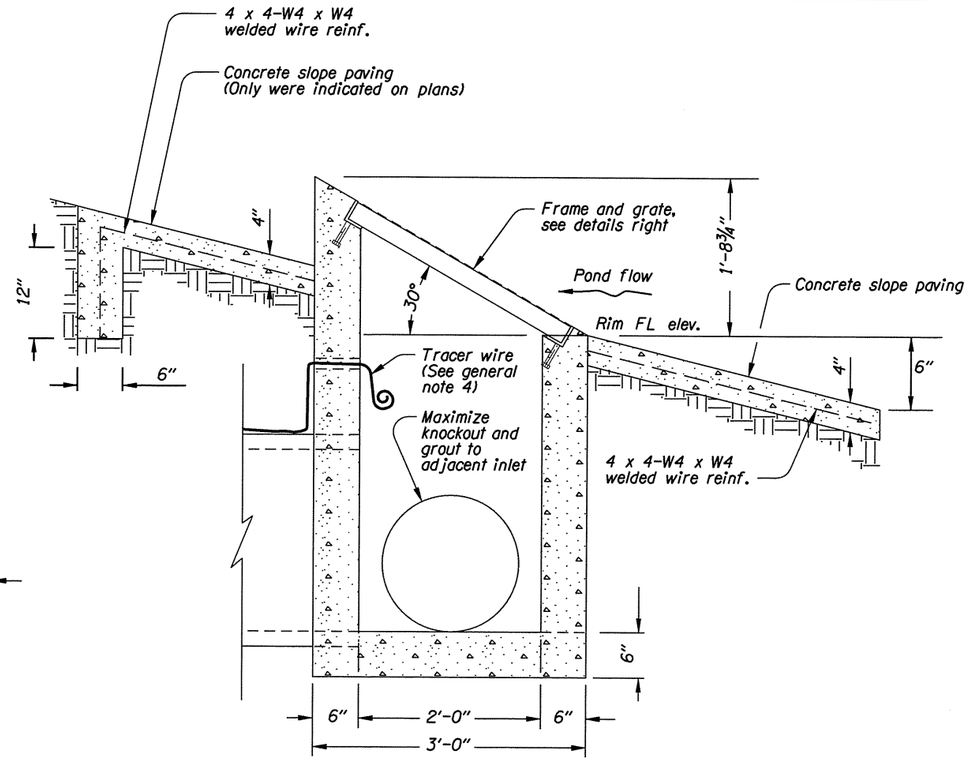
Design Team Leader - Rebecca Cushman
Designed By - Ryan Retzlaff
Drafted By - Jim Phillips

WATER QUALITY DETAILS

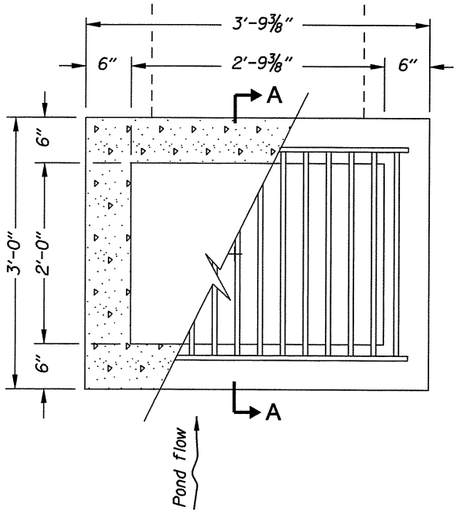
SHEET NO. GJ-4



ELEVATION

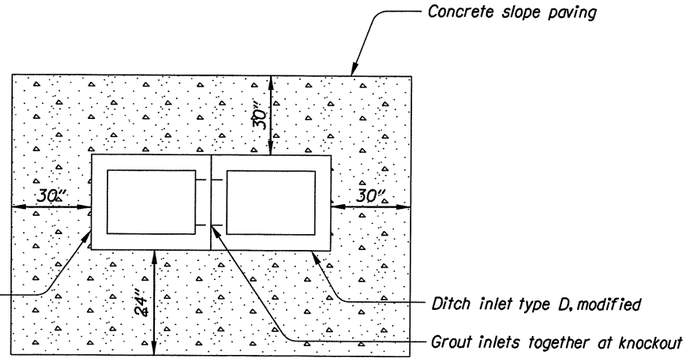


SECTION A-A



PLAN

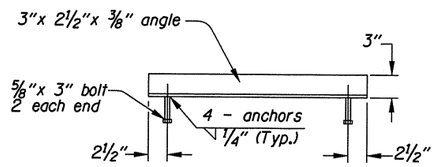
DITCH INLET TYPE D - MODIFIED



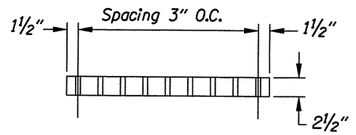
PAVED CULVERT END SLOPE - DUAL INLETS

GENERAL NOTES:

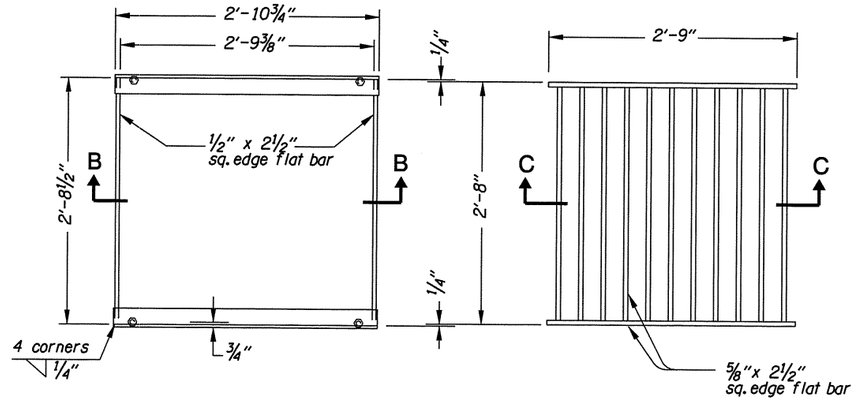
1. *All concrete shall be commercial grade concrete.*
2. *Catch basin, frame, and grates shall meet H20 loading.*
3. *⅝" cross bars shall be flush with the grate surface and may be fillet welded, resistance welded or electroforged to bearing bars.*
4. *See Std. Drg. RD336 for tracer wire details, or approved alternate.*
5. *All exposed conc. edges shall be chamfered ¾".*
6. *All metal reinforcement shall be placed 1½" clear of nearest face of concrete unless shown or noted otherwise.*



SECTION B-B



SECTION C-C



PLAN
FRAME

PLAN
GRATE - TYPE 1

REGISTERED PROFESSIONAL ENGINEER
82067PE
OREGON
NOVEMBER 12, 2008
REBECCA S. CUSHMAN
EXPIRES: 12/31/15

OREGON DEPARTMENT OF TRANSPORTATION

Parametrix

OR18: NEWBERG-DUNDEE BYPASS (PHASE 1G) (SPRINGBROOK RD) SEC.
HILLSBORO-SILVERTON, PACIFIC HWY WEST, & SALMON RIVER HWYS.
YAMHILL COUNTY

Design Team Leader - Rebecca Cushman
Designed By - Ryan Retzlaff
Drafted By - Jim Phillips

WATER QUALITY DETAILS

SHEET NO.
GJ-10