OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: November 2022

DFI No. D01508

Figure 1: DFI No. D01508, looking [note cardinal direction]

Identification

Drainage Facility ID (DFI):	D01508
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 56V-004
Location:	District: 4
	Highway No.: 031
	Mile Post: 3.98

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: East

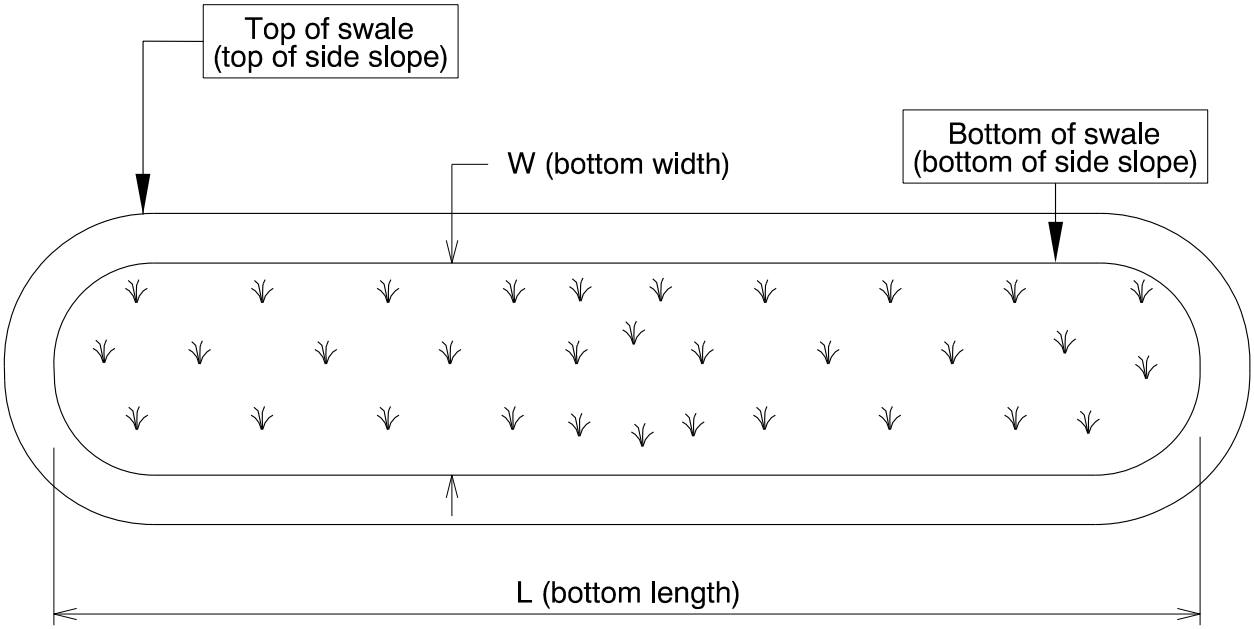
Figure 2: Facility location map

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:

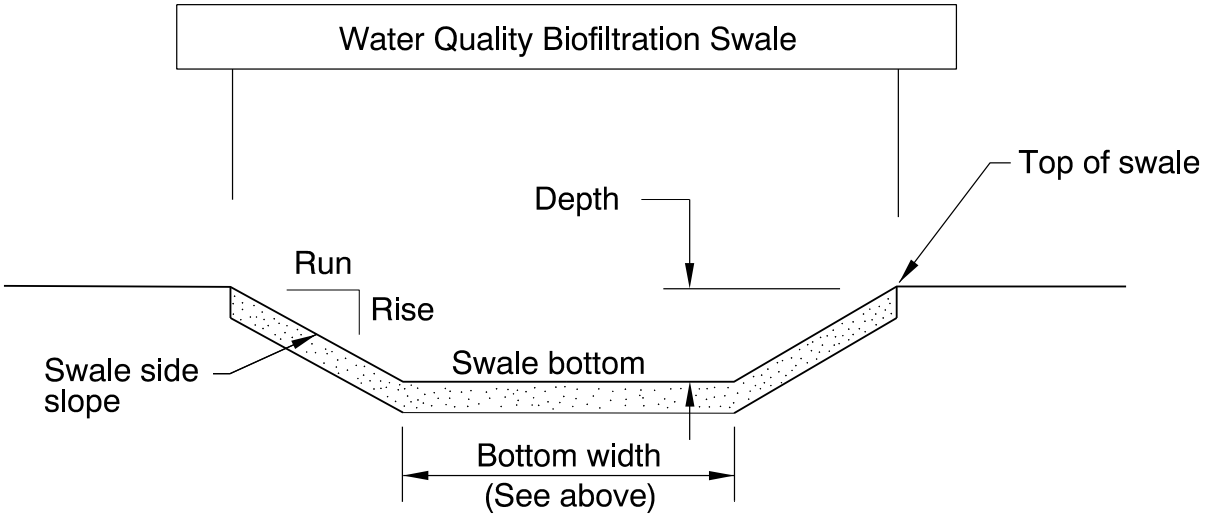
Bottom Length (feet)	Bottom Width (feet)
140	4



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)
2	1	2



Site Specific Information: This facility is located on the east side of northbound US20 just north of NE Merloy Avenue.

4. Facility Access

Maintenance access to the facility:

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

Figure 3: [insert post construction facility access photo and caption text]

5. 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 drain 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:	☐	**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**

6. 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

7. 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.

8. 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

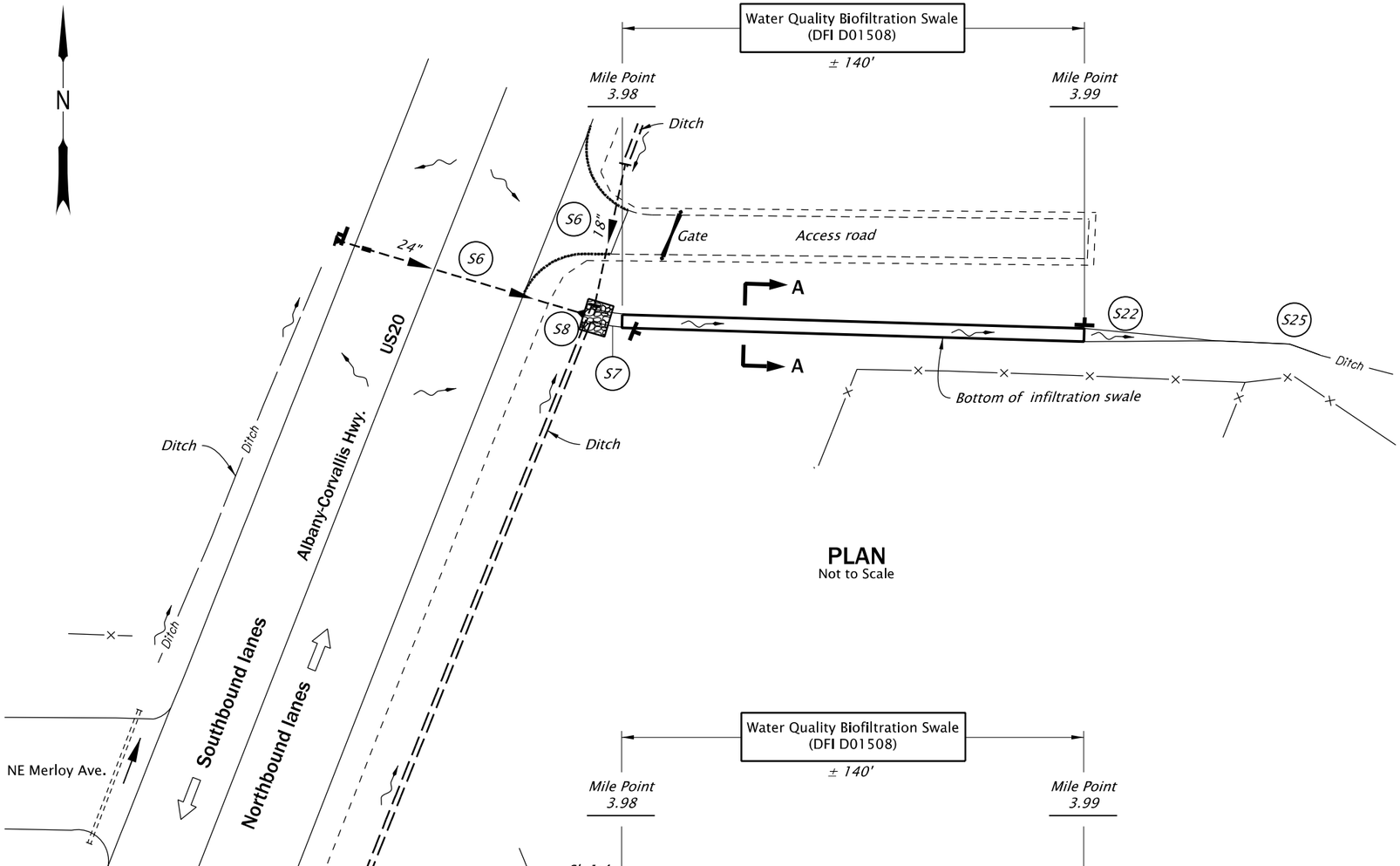
Contact any of the following for more detailed information about management of waste materials found on site:

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

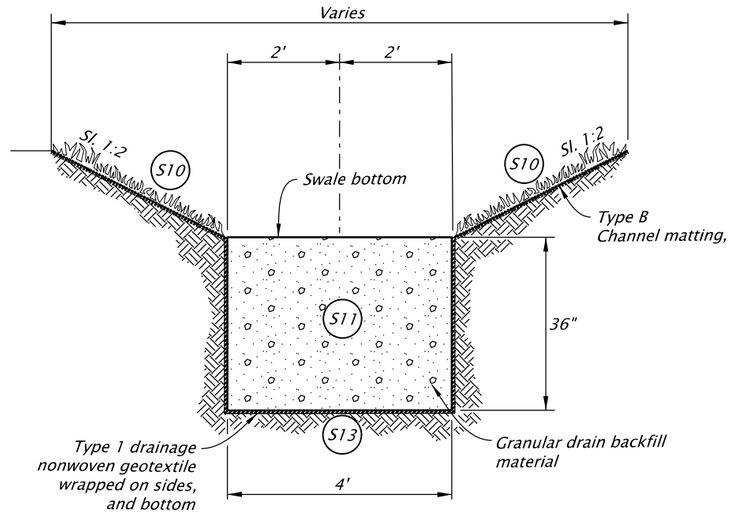
A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D01508



PLAN
Not to Scale



SECTION A-A
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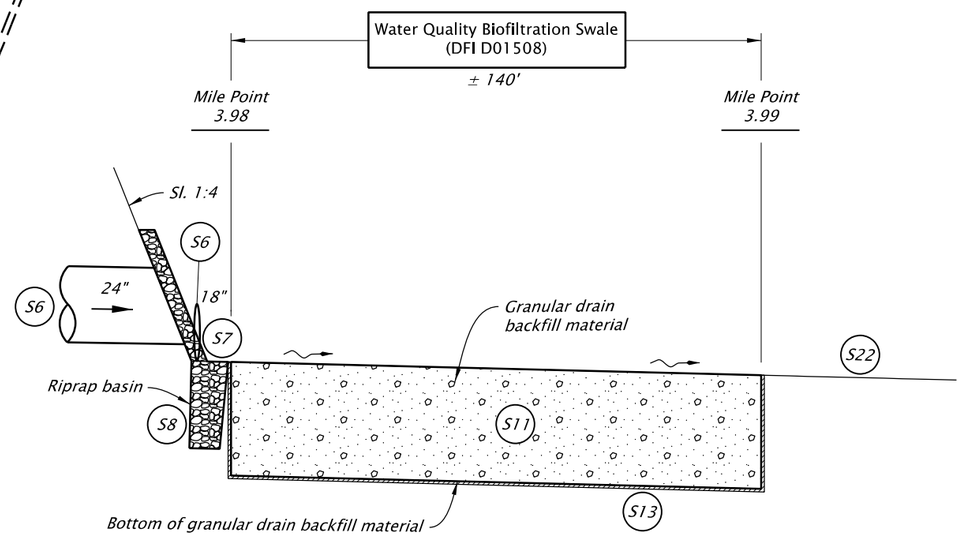


PROFILE
Not to Scale

LEGEND

X#	Facility component (see table 1 in O&M Manual)
◄- - - - -	Storm pipe (facility)
==========	Storm pipe
◄	Conveyance direction
~	Pavement / facility flow path
⇦	Traffic flow direction

OREGON DEPARTMENT OF TRANSPORTATION

Sht. 1 of 1

Prepared By: Edita Bogusławski

Drafted By: Edita Bogusławski

DFI D01508
MAINTENANCE DISTRICT 4 HWY 20
WATER QUALITY BIOFILTRATION SWALE
HIGHWAY MP 3.98 - 3.99
BENTON COUNTY

H_K22302_OM_01_D01508 :: WQ Biofiltration Swale DFI D01508 10/3/2022 11:52:54 AM Ekb

Rotation: 0° Scale: 1"=40'

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 56V-004

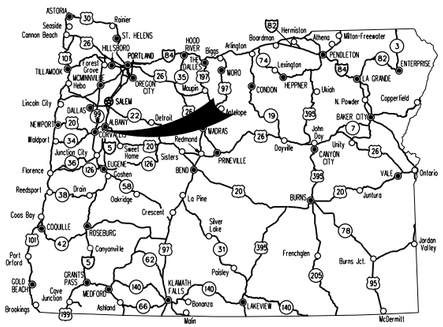
- Sheet No. A01: Cover Sheet
- Sheet No. C01B: Drainage & Utilities
- Sheet No. C01C: Drainage & Utilities Notes
- Sheet No. HA01: Water Quality Facility Plan
- Sheet No. HA02: Details

56V-004

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
A01	Title Sheet
A02	Index Of Sheets Cont.

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, PAVING, SIGNING, STRIPING, & ROADSIDE DEVELOPMENT



Overall Length Of Project – 1.12 Miles

US20: CONIFER BLVD. - MERLOY AVE. SEC.
ALBANY-CORVALLIS HIGHWAY
BENTON COUNTY
JANUARY 2023

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0001 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center (Note: The Telephone Number For The Oregon Utility Notification Center Is (503) 232-1987).

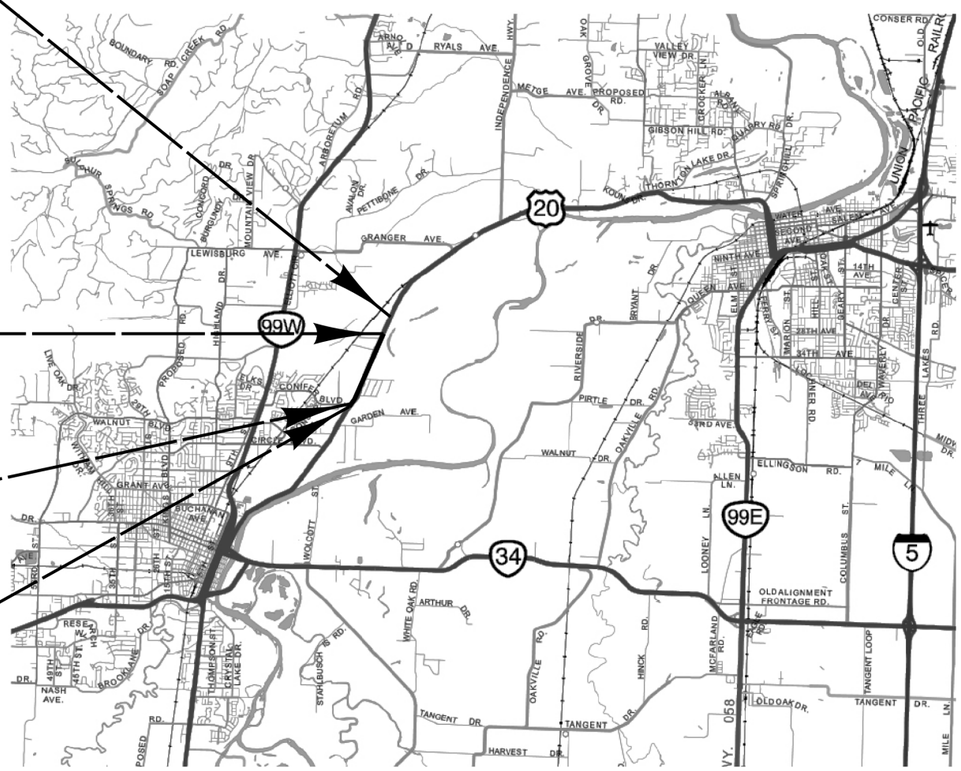
LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

BEGINNING OF CONTRACT
US20 (MP 4.29)

BEGINNING OF PROJECT
STA. "E" 102+71.0 (MP 4.12)

END OF PROJECT
STA. "E" 162+02.0 (MP 3.00)

END OF CONTRACT
STA. "E" 166+62 (MP 2.91)



N

T. 4 S., R. 11 W., W.M.

PLANS PREPARED FOR
OREGON DEPARTMENT OF TRANSPORTATION
By:

DAVID EVANS AND ASSOCIATES INC.
2100 S River Parkway, Suite 100
Portland Oregon 97201
Phone: 503.223.6663

OREGON TRANSPORTATION COMMISSION

Robert Van Brocklin	CHAIR
Alando Simpson	COMMISSIONER
Julie Brown	COMMISSIONER
Sharon Smith	COMMISSIONER
Maurice Henderson	COMMISSIONER
Kristopher W. Strickler	DIRECTOR OF TRANSPORTATION

These plans were developed using ODOT design standards. Exceptions to these standards, if any, have been submitted and approved by the ODOT Chief Engineer or their delegated authority.

Approving Authority: _____
Signature & date

_____
Print name and title

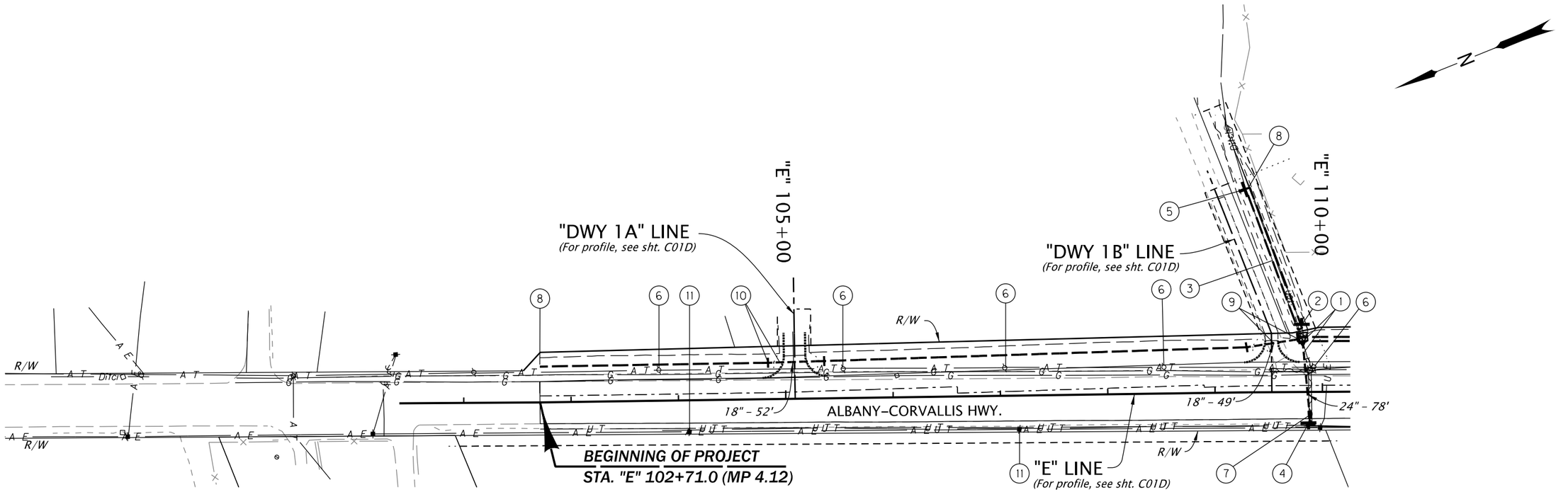
_____
Concurrence by ODOT Chief Engineer

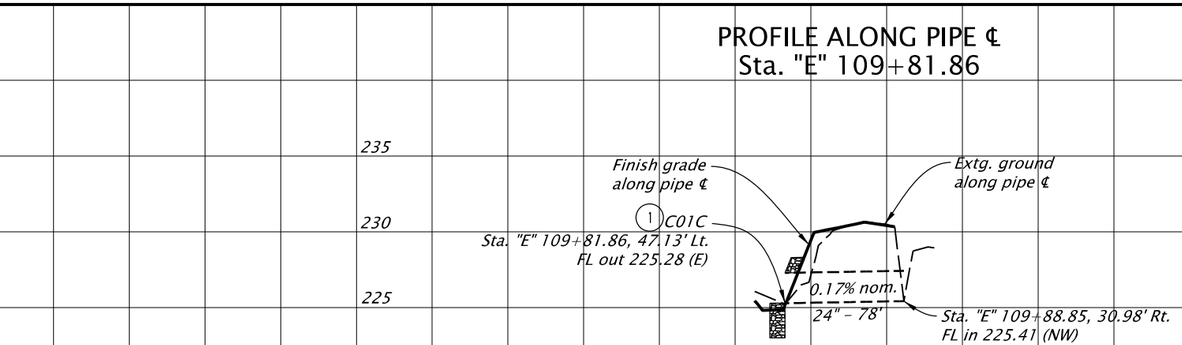
US20: CONIFER BLVD. - MERLOY AVE. SEC.
ALBANY - CORVALLIS HIGHWAY
BENTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	S031(017)	A01

Sec. 18, T. 11S, R.4W, W.M.

56V-004





NOTE:
Subgrade not shown for clarity.

110

HWY: 031	
M.P.: 3.98	
UNIT FILE CODE	N/A
DFI/TSSU NO.	D01508 D050428

REGISTERED PROFESSIONAL ENGINEER
17810PE
DIGITALLY SIGNED 2022.11.10 14:05:56-08'00'
OREGON
JULY 25, 1995
EDWARD J. CHAMBERLAND II
RENEWS: 12-31-2023

DAVID EVANS AND ASSOCIATES INC.
2100 S River Parkway, Suite 100
Portland Oregon 97201
Phone: 503.223.6663

OREGON DEPARTMENT OF TRANSPORTATION

US20: CONIFER BLVD. - MERLOY AVE. SEC.
ALBANY - CORVALLIS HIGHWAY
BENTON COUNTY

Designer: Edita Boguslawski/Megan Stites	Reviewer: Ed Chamberland
Drafter: Edita Boguslawski	Checker: Natalie Newcomer

DRAINAGE & UTILITIES

SHEET NO. C01B

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

1. *Sta. "E" 109+81.86, 47.13' Lt. to*
   Sta. "E" 109+88.85, 30.98' Rt.
   Remove inlet
   Remove 12" pipe - 35'
   Remove 12" pipe - 4'
   Remove 24" pipe - 50'
   Remove 30" pipe - 10'
   Inst. 24" culv. pipe - 78'
   10' depth
   Trench resurf. - 27 sq. yd.
   Const. sloped end, Lt. & Rt.
   Const. paved end slope, Lt. & Rt. - 74 sq. ft.
   Const. riprap basin
   (For details, see sht. HA02)
   (See dwg. nos. RD302, RD317, RD318, RD319, & RD320)

2. *Sta. "E" 109+81.16, 63.00' Lt.*
   Inst. drainage facility ID marker, Type S2
   DFI no. D01508
   MP 3.98
   (See dwg. no. RD399)

3. *Sta. "E" 109+79.59, 58.71' Lt. to*
   Sta. "E" 109+31.65, 190.24' Lt.
   Const. water quality biofiltration swale
   DFI no. D01508
   (For details, see shts. HA01 & HA02)

4. *Sta. "E" 109+86.81, 29.00' Rt.*
   Inst. culv. ID marker, Type 2
   DFI no. D050428
   MP 3.98
   (See dwg. no. RD398)

5. *Sta. "E" 109+30.40, 189.25' Lt.*
   Inst. drainage facility ID marker, Type S2

6. *Relocate utility pole - 5*
   (By others)

7. *Sta. "E" 109+88.38, 25.00' Rt.*
   Inst. culv. ID marker, Type 1

8. *Connect to extg. ditch*

9. *Sta. "E" 109+30.00, 41.95' Lt. to*
   Sta. "E" 109+78.20, 49.20' Lt.
   Inst. 18" culv. pipe - 49', Sl.=3.32%
   5' depth
   FL in 226.47 (NE)
   FL out 224.84 (SW)
   Const. sloped end, Lt. & Rt.

10. *Sta. "E" 104+83.95', 33.96' Lt. to*
    Sta. "E" 105+36.25, 34.80' Lt.
    Inst. 18" culv. pipe - 52', Sl.=0.21%
    5' depth
    FL in 227.05 (NE)
    FL out 226.94 (SW)
    Const. sloped end, Lt. & Rt.

11. *Maintain and protect utility pole - 2*

REGISTERED PROFESSIONAL ENGINEER
17810PE
DIGITALLY SIGNED 2022.11.10 14:06:00-08'00'
OREGON
JULY 25, 1995
EDWARD J. CHAMBERLAND II
RENEWS: 12-31-2023

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

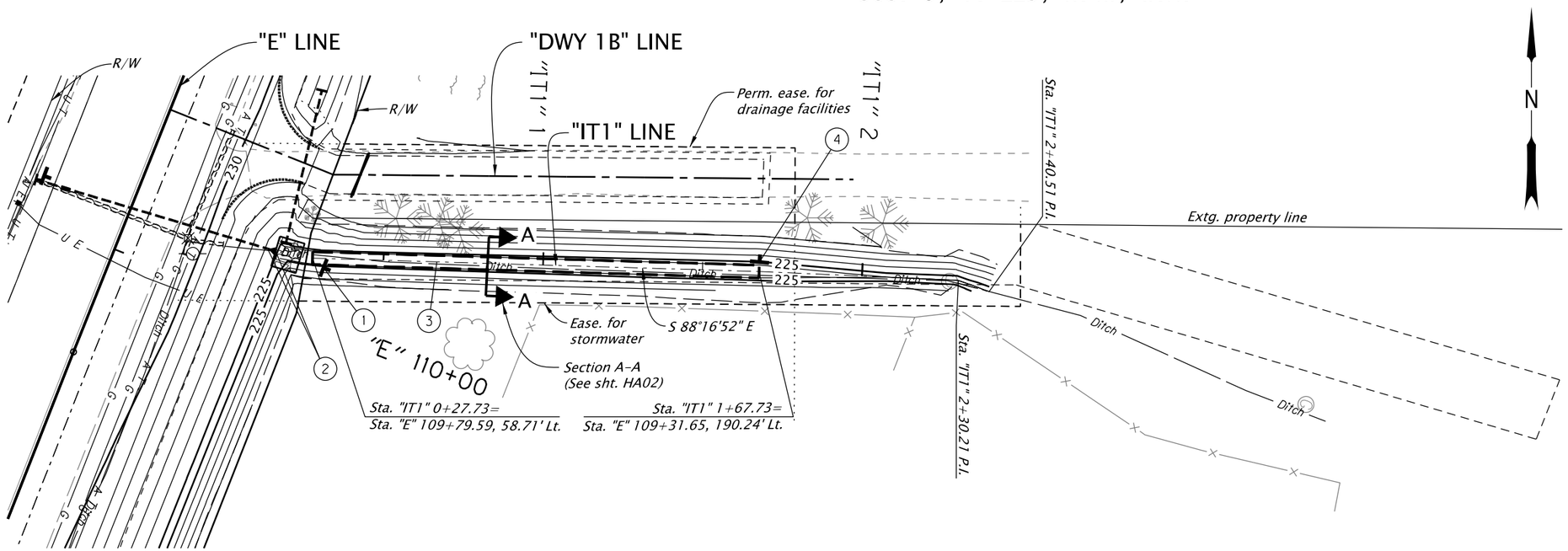
DAVID EVANS AND ASSOCIATES INC.
2100 S River Parkway, Suite 100
Portland Oregon 97201
Phone: 503.223.6663

US20: CONIFER BLVD. - MERLOY AVE. SEC.
ALBANY - CORVALLIS HIGHWAY
BENTON COUNTY

HWY: 031	
M.P.: 3.98	
UNIT FILE CODE	N/A
DFI/TSSU NO.	D01508 D050428
Designer: Edita Boguslawski/Megan Stites	Reviewer: Ed Chamberland
Drafter: Edita Boguslawski	Checker: Natalie Newcomer
DRAINAGE & UTILITIES NOTES	SHEET NO. C01C

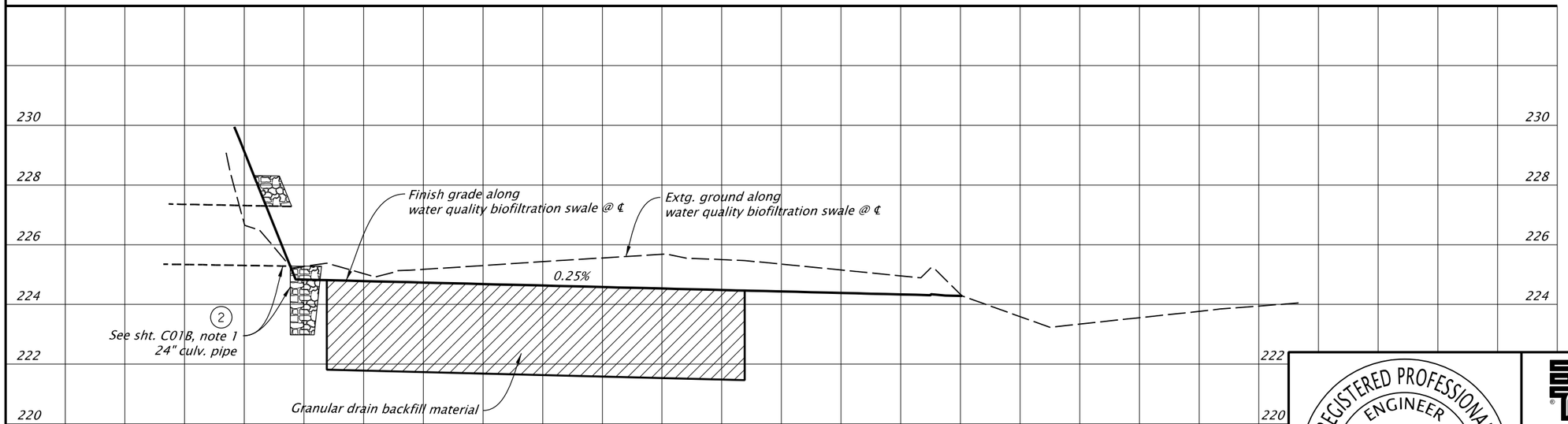
Sec. 8, T. 11S, R.4W, W.M.

56V-004



1. See sht. C01B, note 2
   Install drainage facility ID marker, Type S2
2. See sht. C01B, note 1
   Inst. culv. pipe
   Const. sloped end
   Const. paved end slope
   Const. riprap basin
3. See sht. C01B, note 3
   Const. water quality biofiltration swale D01508
4. See sht. C01B, note 5
   Install drainage facility ID marker, Type S2

WATER QUALITY BIOFILTRATION SWALE "IT1" PLAN
(WATER QUALITY BIOFILTRATION SWALE D01508)



WATER QUALITY BIOFILTRATION SWALE "IT1" PROFILE
(WATER QUALITY BIOFILTRATION SWALE , D01508)

HWY: 031
M.P.: 3.98

UNIT FILE CODE
N/A

DFI/TSSU NO.
D01508

REGISTERED PROFESSIONAL ENGINEER
17810PE
DIGITALLY SIGNED 2022.11.10 17:41:38-08'00'
OREGON
JULY 25, 1995
EDWARD J. CHAMBERLAND III
RENEWS: 12-31-2023

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Phone: 503.223.6663

OREGON DEPARTMENT OF TRANSPORTATION

US20: CONIFER BLVD. - MERLOY AVE. SEC.
ALBANY - CORVALLIS HIGHWAY
BENTON COUNTY

Designer: Edita Boguslawski/Megan Stites
Drafter: Edita Boguslawski
Reviewer: Ed Chamberland
Checker: Natalie Newcomer

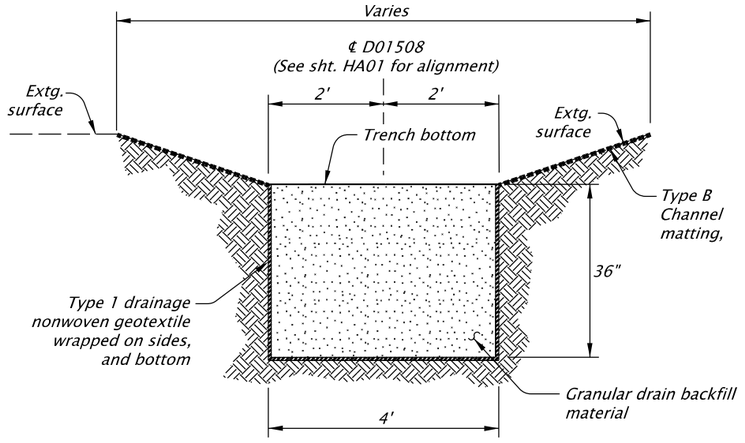
WATER QUALITY FACILITY PLAN

SHEET NO.
HA01

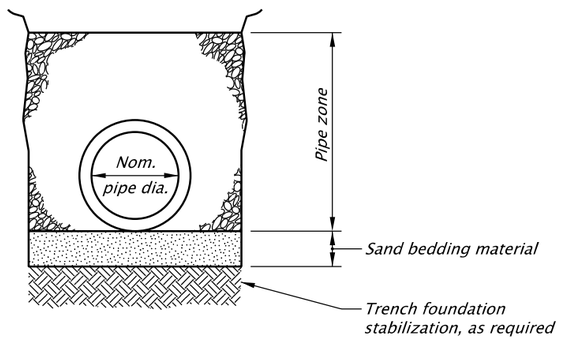
STORMWATER FIELD MARKER TABLE D01508
STA. "E" 109+30.40, LT.

Facility Location		DFI Number	Type S2 Marker	
Station	MP		Begin	End
Sta. "E" 109+81.16, LT.	3.98	D01508	✓	
Sta. "E" 109+30.40, LT.	3.98	D01508		✓

✓ Check where appropriate



WATER QUALITY BIOFILTRATION SWALE D01508
CROSS SECTION A-A
STA. "E" 109+79.59, 58.71' LT. TO
STA. "E" 109+31.65, 190.24' LT.
N.T.S.

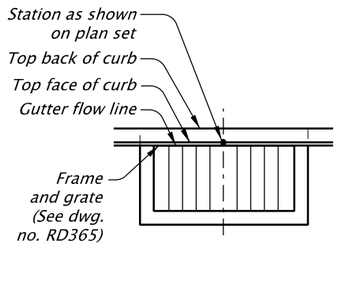


NOTES:
1. Pipe bedding shall be sand.
2. For other details, see dwg. no. RD300.

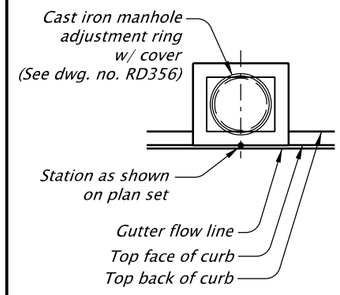
PIPE BEDDING NEAR GAS LINES
N.T.S.

CULVERT ID MARKER TABLE							
Culvert Location		Structure Number	DFI Number	Type 1 Marker		Type 2 Marker	
Station	MP			Inlet	Inlet & Outlet	Inlet	Inlet & Outlet
Sta. "E" 109+88.38, RT.		N/A		✓			
Sta. "E" 109+86.81, RT.	3.98	N/A	D050428			✓	
Sta. "E" 132+93.06, RT.		N/A		✓			
Sta. "E" 132+91.13, RT.	3.55	N/A	D050427			✓	

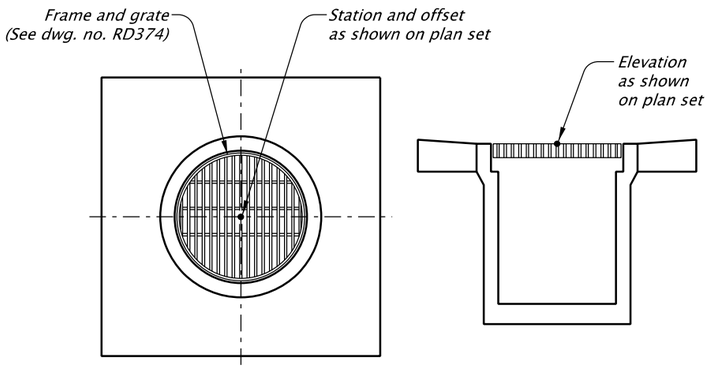
See Std. Dwg. RD398 ✓ Check where appropriate



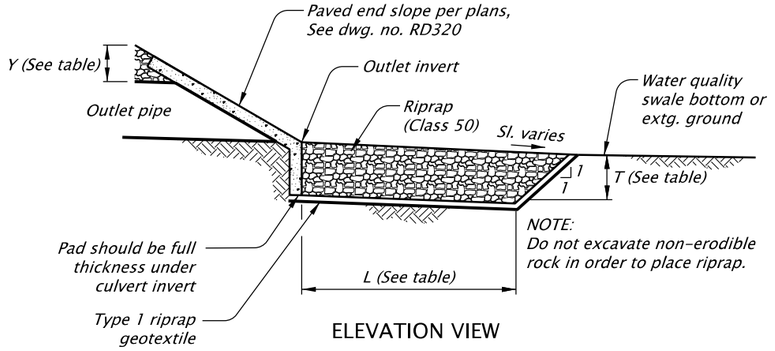
CONCRETE INLETS TYPE CG-2
N.T.S.



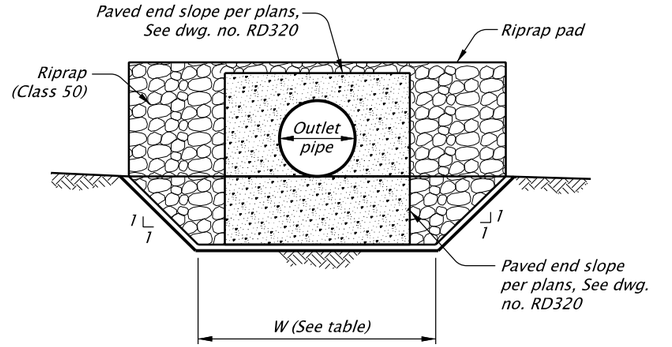
CONCRETE INLETS TYPE CG-3, OPTION 1 TOP
N.T.S.



CONCRETE FIELD INLETS
N.T.S.



ELEVATION VIEW



END VIEW

RIPRAP DESIGN TABLE

CALLOUT NOTE	LENGTH (L)	WIDTH (W)	DEPTH (T)	DEPTH (Y) (ABOVE PIPE)
Sht. C01D, note #1	8'	10'	2.3'	1'
Sht. C03B, note #4	*4'	7.5'	2.3'	1'
Sht. C04B, note #1	5'	6.3'	2.3'	1'

*Length includes v-ditch back of slope.

RIPRAP BASINS
N.T.S.

REGISTERED PROFESSIONAL ENGINEER
17810PE
DIGITALLY SIGNED 2022.11.10 17:41:43-08'00'
OREGON
JULY 25, 1995
EDWARD J. CHAMBERLAND II
RENEWS: 12-31-2023

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

DAVID EVANS AND ASSOCIATES INC.
2100 S River Parkway, Suite 100
Portland Oregon 97201
Phone: 503.223.6663

US20: CONIFER BLVD. - MERLOY AVE. SEC.
ALBANY - CORVALLIS HIGHWAY
BENTON COUNTY

HWY: 031
M.P.: 3.55, 3.98
UNIT FILE CODE: N/A
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