

OPERATION & MAINTENANCE MANUAL

Manual prepared: August 2017

DFI No. D01016



Figure 1: DFI No. D01016, looking [east]

1. Identification

Drainage Facility ID (DFI): D01016
Facility Type: Water Quality Biofiltration Swale
Construction Drawings: (V-File Numbers) 51V-030
Location: District: 3
Highway No.: 91
Mile Post: 63.013 to 63.037, East

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 posts, side streets, access location, and stormwater flow directions are noted on the map.

Flow direction: North

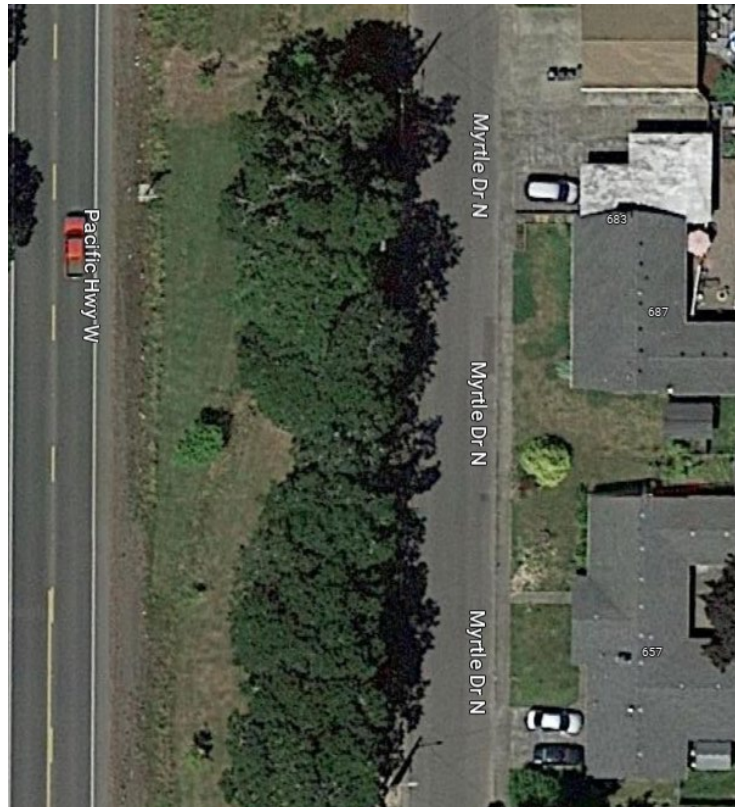


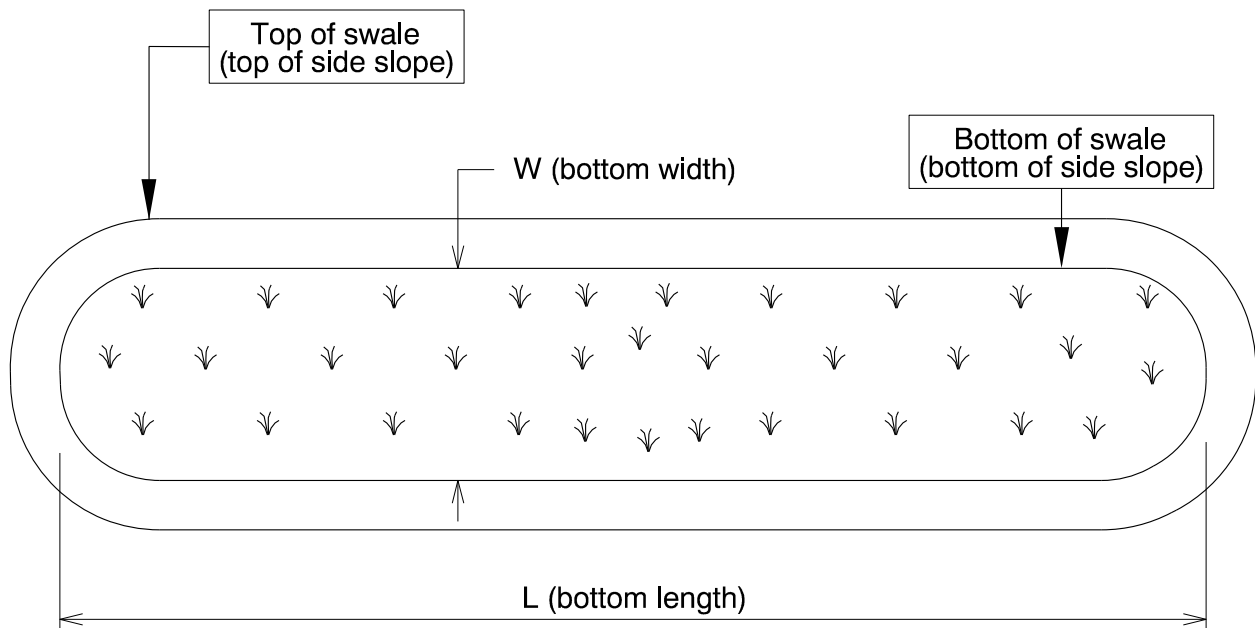
Figure 2: Facility location map

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:

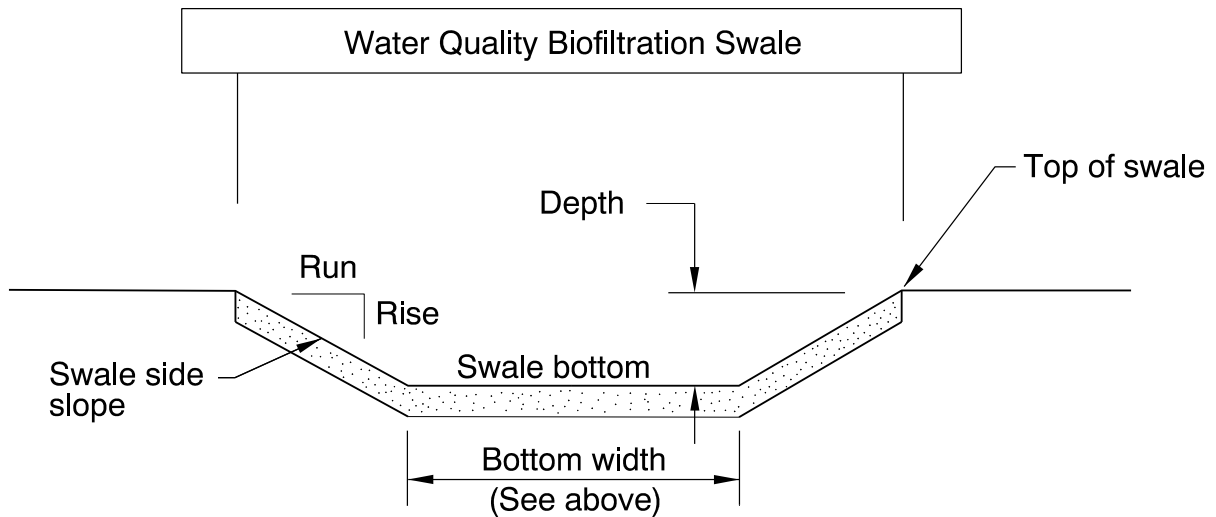
Bottom Length (feet)	Bottom Width (feet)
155	4



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)
1.5		



Site Specific Information:

5. Facility Access

Maintenance access to the facility:

<input type="checkbox"/> Roadside pad	<input checked="" type="checkbox"/> Roadside shoulder
<input type="checkbox"/> Access road with Gate	<input type="checkbox"/> Access road without Gate



Figure 3: [The facility can be accessed from Myrtle Dr. N.]

6. Operational Components / Maintenance Items

Classification

This facility is classified as an:

<input checked="" type="checkbox"/> On-line Swale	<input type="checkbox"/> 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:

<input checked="" type="checkbox"/> No	<input type="checkbox"/> 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:

<input type="checkbox"/> Operational Plan A	<input type="checkbox"/> Operational Plan B	<input type="checkbox"/> 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 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	<input type="checkbox"/>	S1
Weir type flow splitter/flow splitter manhole	<input type="checkbox"/>	S2
Orifice type flow splitter/flow splitter manhole	<input type="checkbox"/>	S3
Standard manhole	<input type="checkbox"/>	S4
Swale Inlet		
Pavement sheet flow	<input type="checkbox"/>	S5
Inlet Pipe (s)	<input type="checkbox"/>	S6
Open channel inlet	<input checked="" type="checkbox"/>	S7
Riprap pad	<input type="checkbox"/>	S8
Ground Cover		
Grass bottom	<input checked="" type="checkbox"/>	S9
Grass side slopes	<input checked="" type="checkbox"/>	S10
Granular drain rock	<input type="checkbox"/>	S11
Plantings	<input type="checkbox"/>	S12
Underground Components		
Geotextile fabric	<input type="checkbox"/>	S13
Water quality mix	<input checked="" type="checkbox"/>	S14
Perforated pipe	<input type="checkbox"/>	S15
Porous pavers (access grid)	<input type="checkbox"/>	S16
Flow Spreader		
Rock basin (used at inlet)	<input type="checkbox"/>	S17
Anchored board (midpoint of swale or every 50 feet along swale bottom)	<input type="checkbox"/>	S18
Other: describe type	<input type="checkbox"/>	S19
Swale Outlet		
Catch basin with grate	<input type="checkbox"/>	S20
Outlet Pipe (s)	<input type="checkbox"/>	S21
Open channel outlet	<input checked="" type="checkbox"/>	S22
Auxiliary Outlet: describe type	<input type="checkbox"/>	S23
Outfall Type		
Waterbody (Creek/Lake/Ocean)	<input type="checkbox"/> C	S24
	<input type="checkbox"/> L	
	<input type="checkbox"/> O	
Ditch	<input checked="" type="checkbox"/>	S25
Storm drain system	<input type="checkbox"/>	S26
Outfall Components		
Riprap pad	<input type="checkbox"/>	S27
Riprap bank protection	<input type="checkbox"/>	S28

7. 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

8. Limitations

Access grid installed:

<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
There are (Choose applicable weight: no, 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, 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.

9. 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

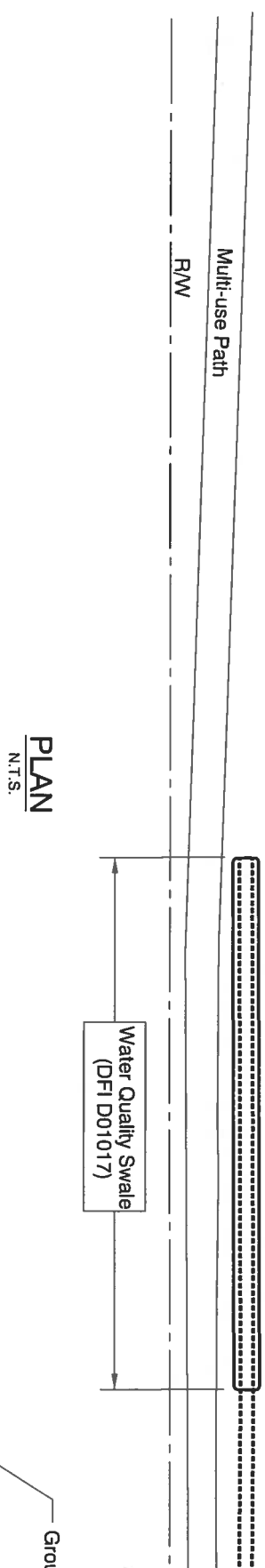
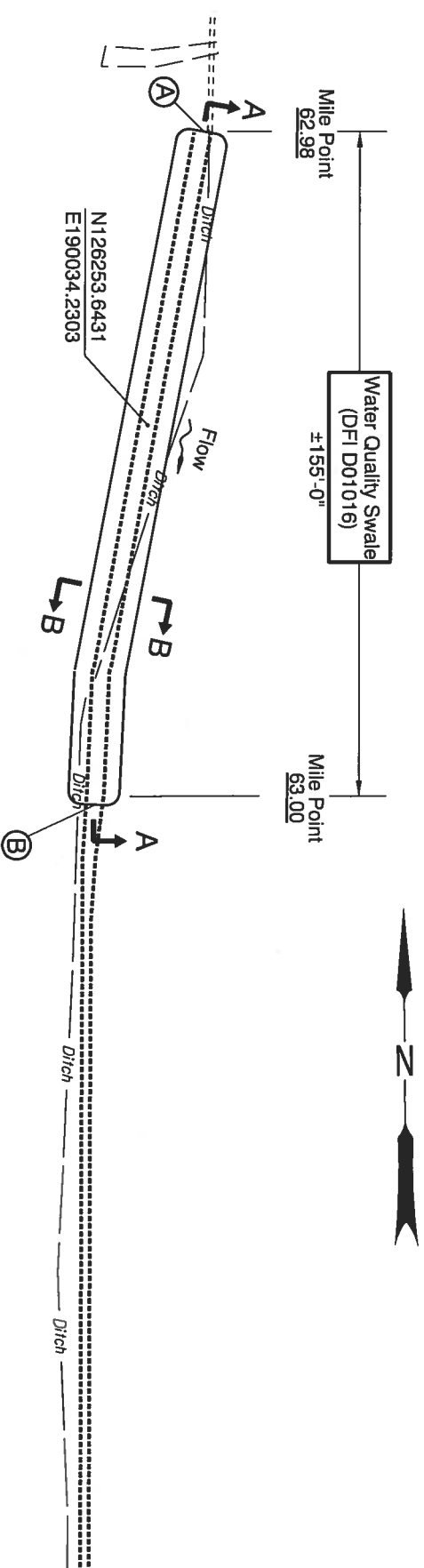
Contact any of the following for more detailed information about management of waste materials found on site:

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

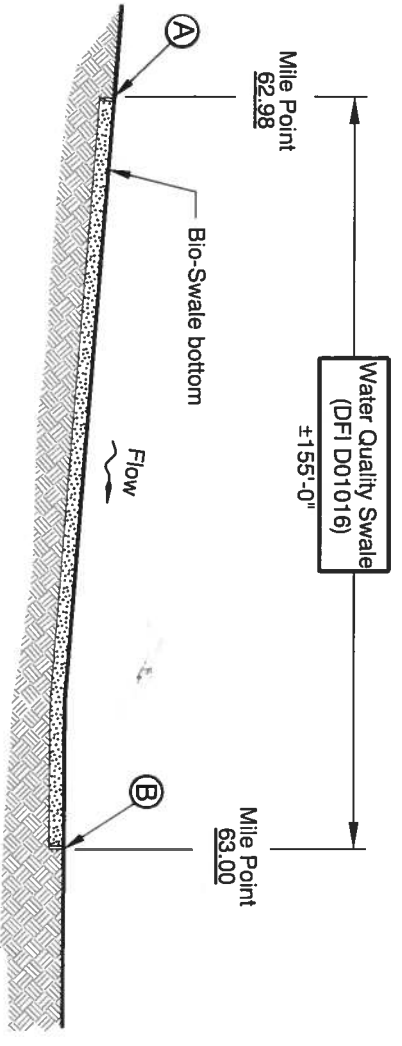
A Appendix A – Site Specific Operational Plan

Contents:

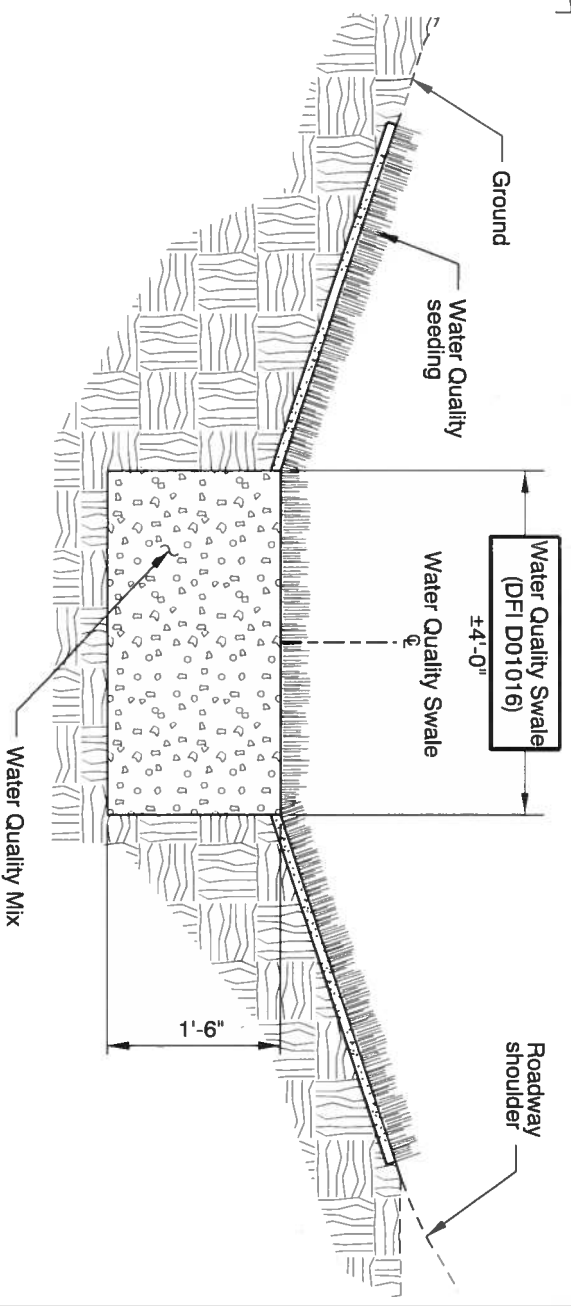
Operational Plan: DFI D01016



PLAN
N.T.S.



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

- Ⓐ Facility Inlet A
- Ⓑ Facility Inlet B
- Ditch Line
- ↗ Pavement / Facility Flow Path
- ↔ Traffic Direction
- ▭ Swale Boundary

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Bruce Carnichael
Drafted By: Julie Renz

DFI D01016
MAINTENANCE DISTRICT 4 HWY 001
WATER QUALITY BIOFILTRATION SWALE
OR99W MP 62.98-63.00
POLK COUNTY

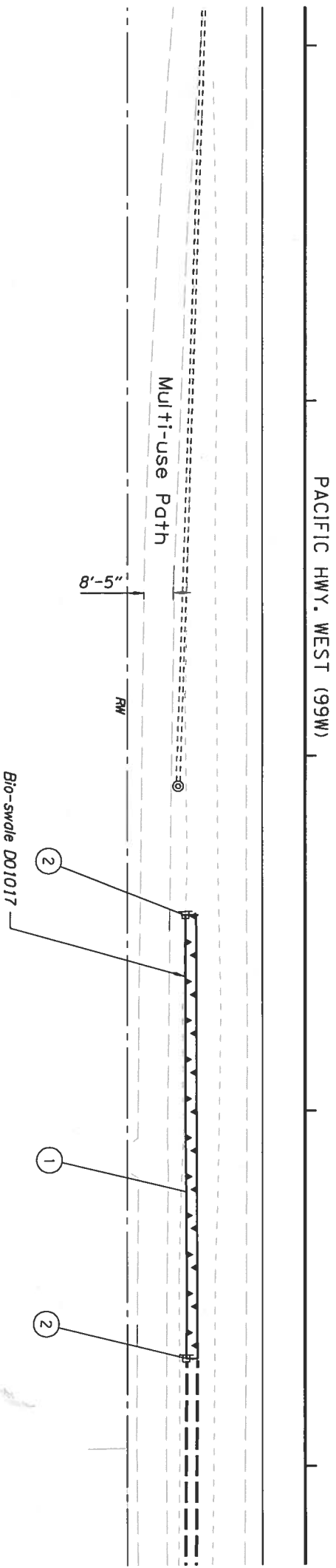
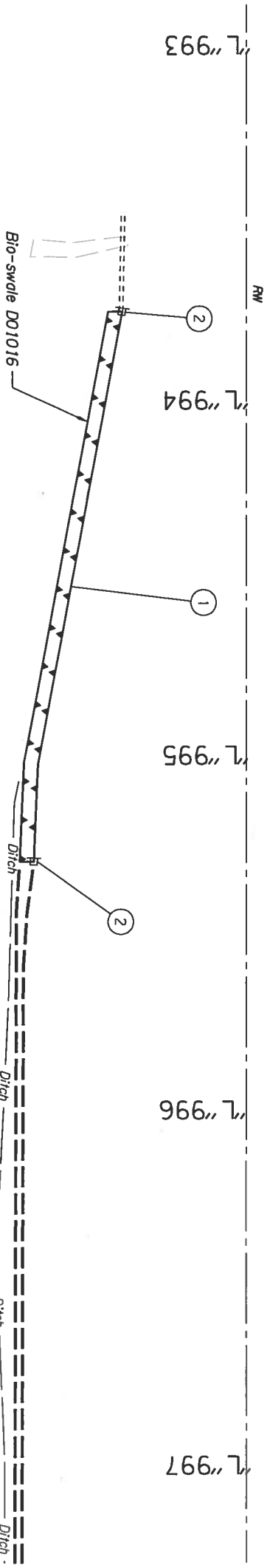
B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 51V-030



ADVANCE COPY
SUBJECT TO CHANGE



BIO-SWALE TABLE (measured in ft.)

DPI #	Inlet station offset	Outlet station offset	Inlet flow line elev. (ft)	Outlet flow line Elev. (ft.)	Bottom width	Length (ft.)	Slope (%)
D01017	"L" 996+70.	"L" 995+45.	190.670	190.045	3	125	0.5
D01016	"L" 995+30.	"L" 993+75.	188.662	186.297	4	155	1.53

- 1 Construct Bio-Swales - See table for information
Water quality cell excavation - 55 cu.yd.
Water quality mix - 55 cu.yd.
(For details see sheet HA03)
- 2 Install Type S2 markers - 4
(For details see dwg. RD399)

Notes:
1. Station offsets are at the center of the bio-swale bottom.
2. Bottom width of Bio-swales shown.

HWY. 99W	M.P.
Polk	County
D01016 & D01017	DPI No.



RENEWS: 12-31-2017

OREGON DEPARTMENT OF TRANSPORTATION

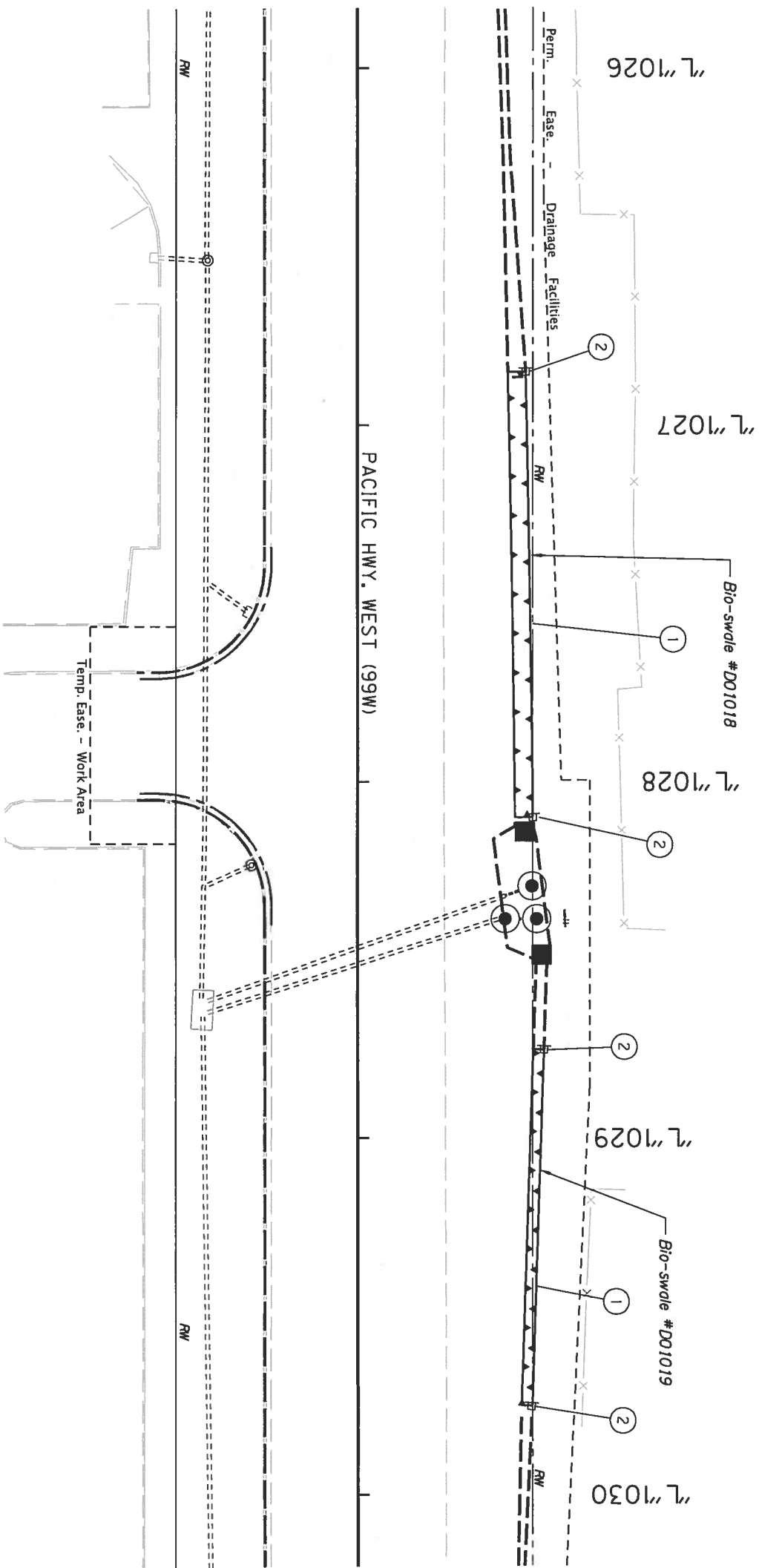
OR99W: HOFFMAN RD. TO MONMOUTH S.C.L. SEC.

PACIFIC HIGHWAY WEST
POLK COUNTY

Designer: Bruce Carmichael, P.E.
Reviewer: Dustin Haas, P.E.
Drafter: Julie Renz
Checker:

STORMWATER

SHEET NO. HA01



BIO-SWALE TABLE (measured in ft.)

DFI #	Inlet station offset	Outlet station offset	Inlet flow line elev. (ft.)	Outlet flow line Elev. (ft.)	Bottom width	Length (ft.)	Slope (%)
D01018	"L" 1026+85, 44.62 Lt.	"L" 1028+10, 46.60 Lt.	193.607	192.982	5	125	0.5
D01019	"L" 1029+75, 47.40 Lt.	"L" 1028+75, 50.69 Lt.	193.920	193.170	3	100	0.75

- ① Construct Bio-Swales - See table for information
Water quality cell Excavation - 45 cu. yd.
Water quality mix - 45 cu. yd.
(For details see sheet HA03)
- ② Install Type S2 markers - 4
(For details see dwg. RD399)

5/14

Notes:
1. Station offsets are at the center of the bio-swale bottom.
2. Bottom width of Bio-swales shown.

ADVANCE COPY
SUBJECT TO CHANGE

HWY: 99W	M.P.:
County	Polk
DFI No	D01018 & D01019

REGISTERED PROFESSIONAL ENGINEER
DESIGN APPROVED
PLANS FOR REVIEW ONLY
 W. ARMICHAEL
 3305 W. ARMY ST. SE
 TUMACACI, AZ 85628
 520-843-2200
 RENEWS: 12-31-2017

OREGON DEPARTMENT OF TRANSPORTATION

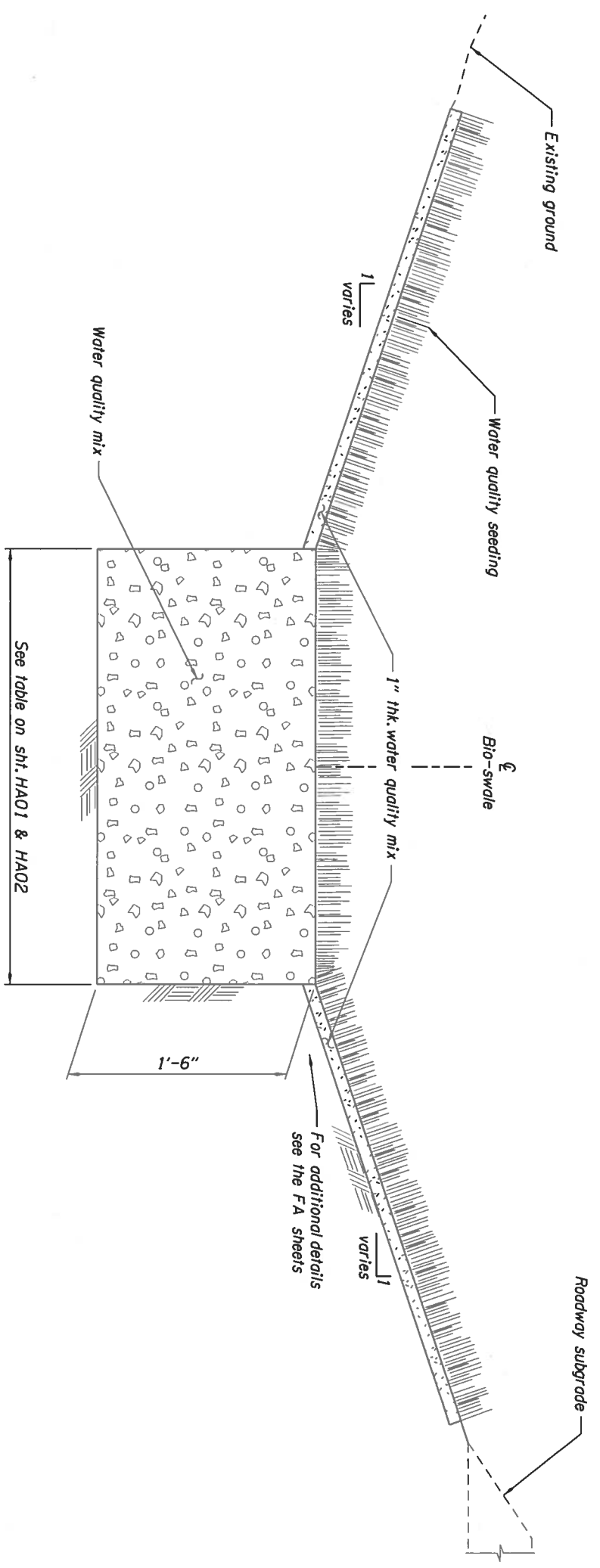
OR99W: HOFFMAN RD. TO MONMOUTH S.C.L. SEC.

PACIFIC HIGHWAY WEST
POLK COUNTY

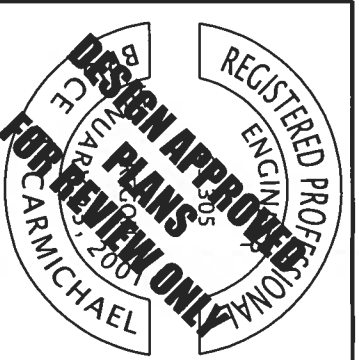
Designer: Bruce Carmichael, P.E.
Reviewer: Dustin Haas, P.E.
Drafter: Julie Benz
Checker:

STORMWATER

SHEET NO.
HA02



TYPICAL SECTION



RENEWALS: 12-31-2017

OREGON DEPARTMENT
OF TRANSPORTATION

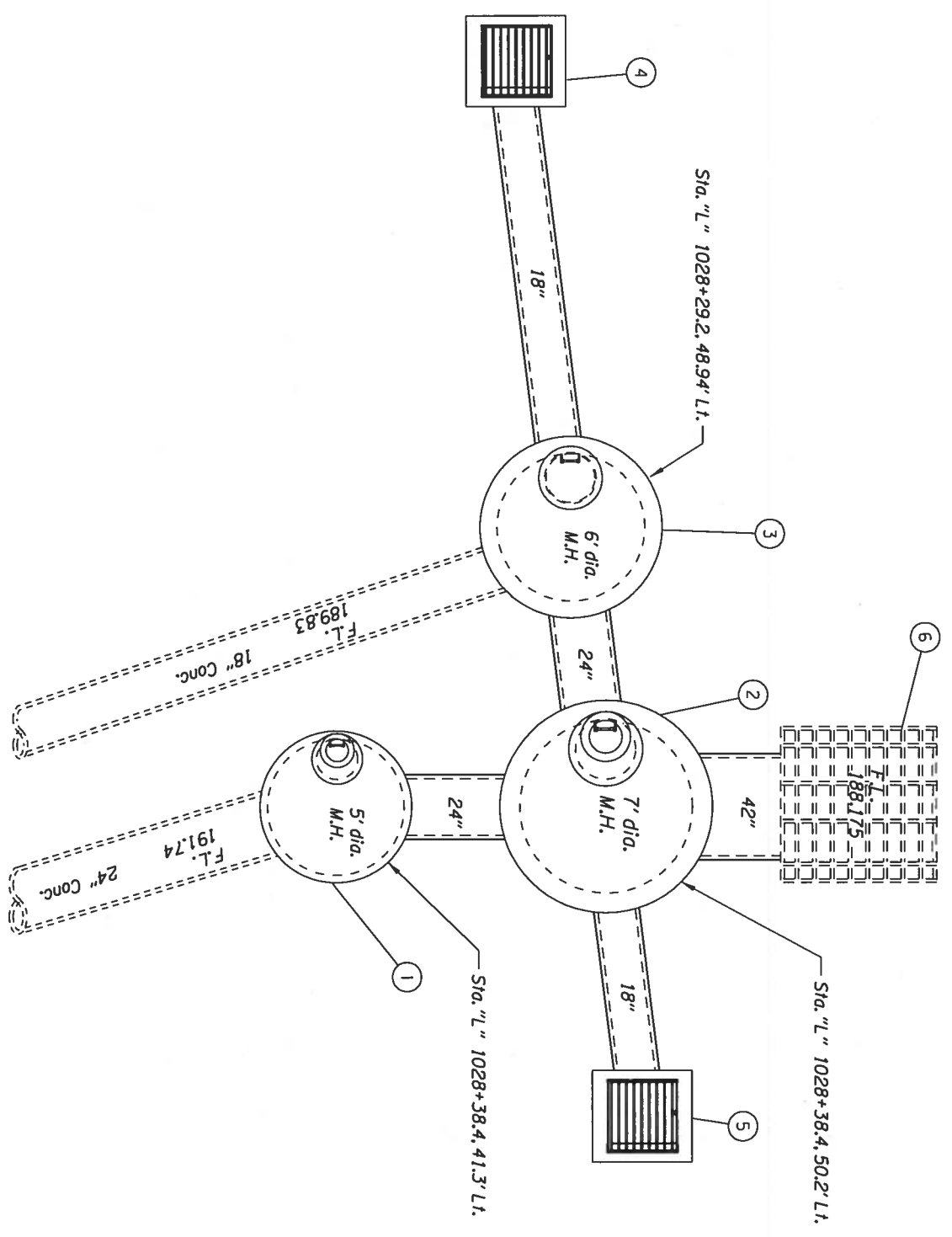


OR99W: HOFFMAN RD. TO MONMOUTH S.C.L. SEC.
PACIFIC HIGHWAY WEST
POLK COUNTY

Designer: Bruce Carmichael, P.E.
Reviewer: Dustin Haas, P.E.
Drafted: Julie Renitz
Checker:

STORMWATER DETAILS

SHEET NO.
HA03



- ① Sta. "L" 1028+38.4, 41.3' Lt.
Install 5' dia. M.H.
M.H. bottom El. = 190'
M.H. outside top El = 195'
Connect existing 24" dia. concrete pipe - 2'
F.L. 24" out (E) = 191'
- ② Sta. "L" 1028+38.4, 50.2' Lt.
Install 7' dia. M.H.
M.H. bottom El. = 188'
M.H. outside top El = 195'
Install 24" dia. pipe - 18'
Install 18" dia. pipe - 10'
F.L. 24" in (W) = 190.9'
F.L. 24" in (N) = 188.92'
F.L. 18" in (S) = 189.4'
F.L. 42" out (E) = 188.5'
- ③ Sta. "L" 1028+29.2, 48.94' Lt.
Install 6' dia. M.H.
M.H. bottom El. = 188'
M.H. outside top El = 195'
Extend 18" dia. concrete pipe and connect to M.H. - 10'
Install 18" dia. pipe - 15'
F.L. 18" in (N) = 189.4'
F.L. 24" out (S) = 189'
- ④ Sta. "L" 1028+14, 46.87' Lt.
Install Type "D" Inlet
Inlet bottom El. = 189.5'
Inlet grate F.L. El. = 192.96'
F.L. 18" out (S) = 189.5'
- ⑤ Sta. "L" 1028+48.5, 51.56' Lt.
Install Type "D" Inlet
Inlet bottom El. = 189.5'
Inlet grate F.L. El. = 192.97'
F.L. 18" out (N) = 189.5'
- ⑥ Sta. "L" 1028+38.4, 56.6' Lt.
Remove drain grate
Install 42" dia. pipe - 7'
Install 42" dia. pipe to existing 42" dia. pipe and M.H.
Seal pipe connection against leaks

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REVISIONS: 12-31-2017

**OREGON DEPARTMENT
OF TRANSPORTATION**

OR99W: HOFFMAN RD. TO MONMOUTH S.C.L. SEC.

PACIFIC HIGHWAY WEST
POLK COUNTY

Designer: Bruce Cammichael, P.E. Reviewer: Dustin Haas, P.E.
Drafter: Julie Renz Checker:

STORMWATER DETAIL

SHEET NO.
HA04