# OPERATION & MAINTENANCE MANUAL

## Water Quality Bioretention Pond

**Manual prepared: May/2023**

**DFI No. D01539**



**Figure 1: DFI No. D01539, looking [note cardinal direction]**

## 1. Identification

| | |
|---|---|
| Drainage Facility ID (DFI): | D01539 |
| Facility Type: | Water Quality Bioretention Pond |
| Construction Drawings: | (V-File Numbers) 56V-076 |
| Location: | District: 3 |
| | Highway No.: 001 |
| | Mile Post: 249.38 to 249.42, [Right] |

## 2. Manual Purpose

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

## 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.

Facility location type: Roadway shoulder

Flow direction: [North]



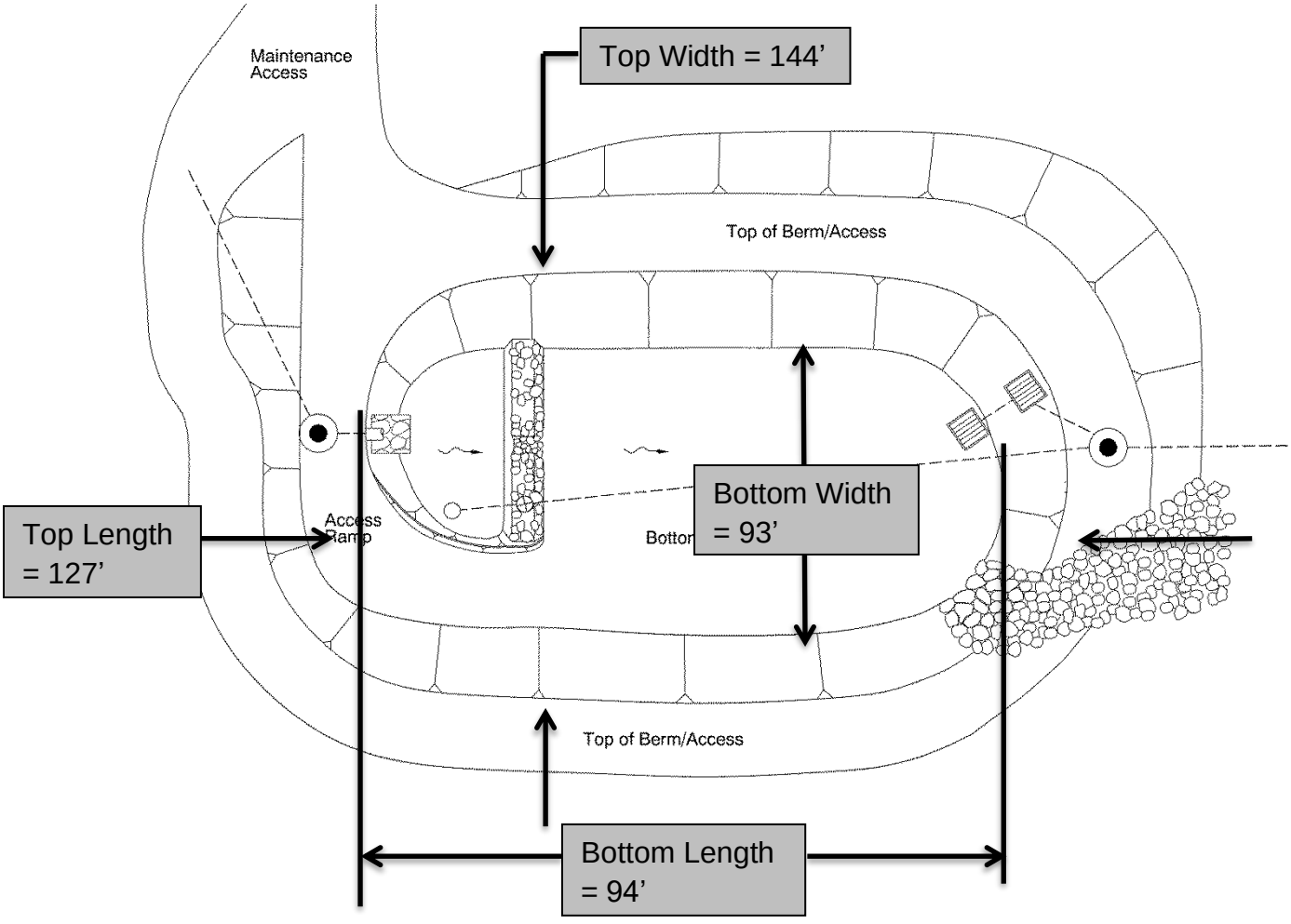
**Figure** 2**: [ODOT Geo-Environmental to insert facility location map]**

## 4. Facility Summary

The pond size is based on storage volume, the bottom and top surface areas and the depth are used for this measurement.

The bottom area and top area of the pond is:

| Bottom Area (sq. ft.) | Top Area (sq. ft.) |
|---|---|
| 8,742 | 18,288 |

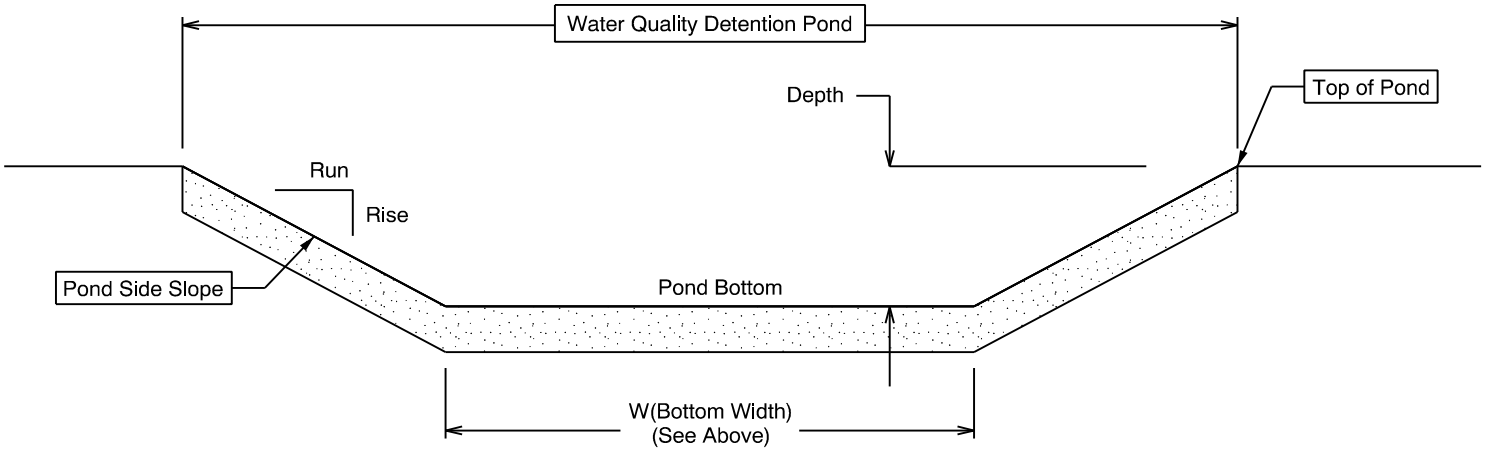


The depth of the pond is the vertical distance measured from the bottom of the pond to the top. The slope of the pond sides is presented by a vertical distance (rise) followed by the horizontal distance (run).

Depth and side slopes:

| **Depth (feet)** |
|---|
| **1** |

| **Side Slope** | |
|---|---|
| **Rise (feet)** | **1** |
| **Run (feet)** | **4** |




**Site Specific Information:** The pond has an underdrain beneath the 18" water quality soil mix to provide water quality treatment along with flow control for the 42% of the 2yr 24hr event to the 50yr rainfall event.

## 5. 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]**

## 6. Operational Components / Maintenance Items

### Classification and Standard Operational (Op) Plan:

This facility is classified as a:

| ☐ Detention Pond (Op Plan A) | ☒ WQ Bioretention Pond (Op Plan B) | ☐ WQ Extended Detention Dry Pond (Op Plan C) | ☐ WQ Detention Pond/Biofiltration Swale Combo (Op Plan D) |
|---|---|---|---|
| **A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A,B,C,D) are provided in the Standard Operation Manual.** | | | |

See Appendix A for the site specific operational plan.

### Key Features/Items:

This facility is classified as a:

| ☒ Dry Pond | ☐ Wet Pond |
|---|---|
| **The pond is wet during storm events and dries during periods of no precipitation.** | **The pond has constant presence of water year round. A portion of the pond dries during periods of no precipitation.** |

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 pond. High flows are diverted around the pond using a bypass component** |

This facility includes a **proprietary structure(s)**:

| ☒ No | ☐ Yes (DXXXXX) |
|---|---|
| **There are no proprietary structures associated with this facility.** | **A proprietary structure is used in the operation of this facility. The proprietary structure is a/an:** describe |

### Operational Components

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 Ponds (implemented April 2014) 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/

### 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 in the table below.

| Table 1: Stormwater Pond Components | | ID # |
|---|---|---|
| **Upstream Manholes/Structures** | | |
| Pre-treatment Manhole<br>Type: describe | ☐ | **P1** |
| Water Quality Manhole<br>Type: | ☐ | **P2** |
| Flow Splitter Manhole (Weir/Orifice) | ☐ | **P3** |
| Standard Manhole | ☐ | **P4** |
| Sediment Basin/Forebay | ☒ | **P5** |
| Forebay Dewatering Riser Pipe (outlet) | ☐ | **P6** |
| **Facility Inlet** | | |
| Pavement Sheet Flow | ☐ | **P7** |
| Inlet Pipe(s) | ☒ | **P8** |
| Open Channel Inlet | ☐ | **P9** |
| Riprap Pad (Energy Dissipater) | ☒ | **P10** |
| **Ground Cover** | | |
| Grass Bottom | ☒ | **P11** |
| Grass Side Slopes | ☒ | **P12** |
| Granular Drain Rock | ☐ | **P13** |
| Plantings | ☐ | **P14** |
| **Underground Components** | | |
| Geotextile Fabric: Nonwoven, type 1 | ☒ | **P15** |
| Impermeable Liner | ☐ | **P16** |
| Water Quality Mix | ☒ | **P17** |
| Perforated Pipe | ☒ | **P18** |
| Bottom Marker (ex. Porous Pavers) | ☒ | **P19** |

| | | |
|---|---|---|
| **Flow Spreader** | | |
| Anchored Board (midpoint of pond or every 50 feet along pond bottom) | ☐ | **P20** |
| Other: describe | ☐ | **P21** |
| **Facility Outlet** | | |
| Catch Basin with Grate | ☒ | **P22** |
| Outlet Pipe(s) | ☒ | **P23** |
| Outlet/Flow Control Structure | ☒ | **P24** |
| Auxiliary Outlet | ☒ | **P25** |
| Hazmat Control Valve: Specify make/model | ☐ | **P26** |
| **Outfall Type** | | |
| Waterbody (**C**reek/**L**ake/**O**cean) | ☐ **C**<br>☐ **L**<br>☐ **O** | **P27** |
| Ditch | ☒ | **P28** |
| Storm Drain System | ☐ | **P29** |
| **Outfall Components** | | |
| Riprap Pad | ☒ | **P30** |
| Riprap Bank Protection | ☐ | **P31** |

## 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 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 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 Ponds:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities
- Table 2 (Maintenance of Stormwater Ponds): Contains maintenance information for ponds

The ODOT Maintenance Guide can be viewed at the following website:
http://www.oregon.gov/ODOT/HWY/OOM/pages/mguide.aspx

The Blue Book can be viewed at the following website:
http://www.oregon.gov/ODOT/Maintenance/Documents/blue_book.pdf

## 8. Limitations

There are access limitations for this facility:

| ☒ No | ☐ Yes |
|---|---|
| **There are medium duty porous pavers installed in this pond.** | |

Ponds are designed to allow equipment access along the bottom if an access grid is installed. If an access grid is NOT installed, vehicles entering the pond 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.

If no access grid then: Equipment wheels should be kept on the tops and side slopes. Mower arms may be run along the pond 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

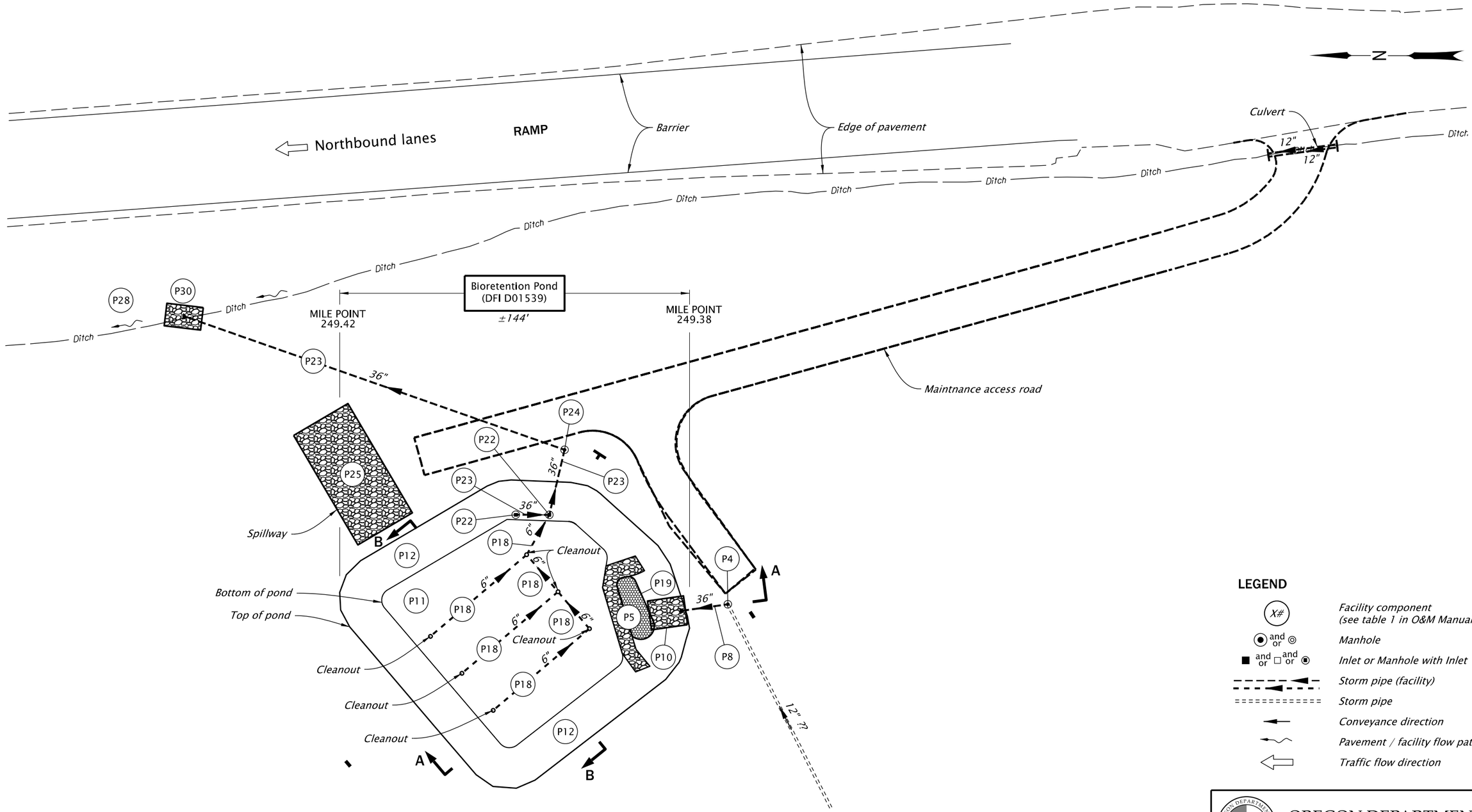
Contact any of the following for more detailed information about management of waste materials found on site:

| | |
|---|---|
| ODOT Clean Water Unit | (503) 986-3008 |
| ODOT Statewide Hazmat Coordinator | (503) 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 D01539**




**PLAN**
**NOT TO SCALE**

**LEGEND**

- X# — Facility component (see table 1 in O&M Manual)
- and or — Manhole
- and or □ and or — Inlet or Manhole with Inlet
- Storm pipe (facility)
- Storm pipe
- Conveyance direction
- Pavement / facility flow path
- Traffic flow direction

OREGON DEPARTMENT OF TRANSPORTATION

Sht. 1 of 2

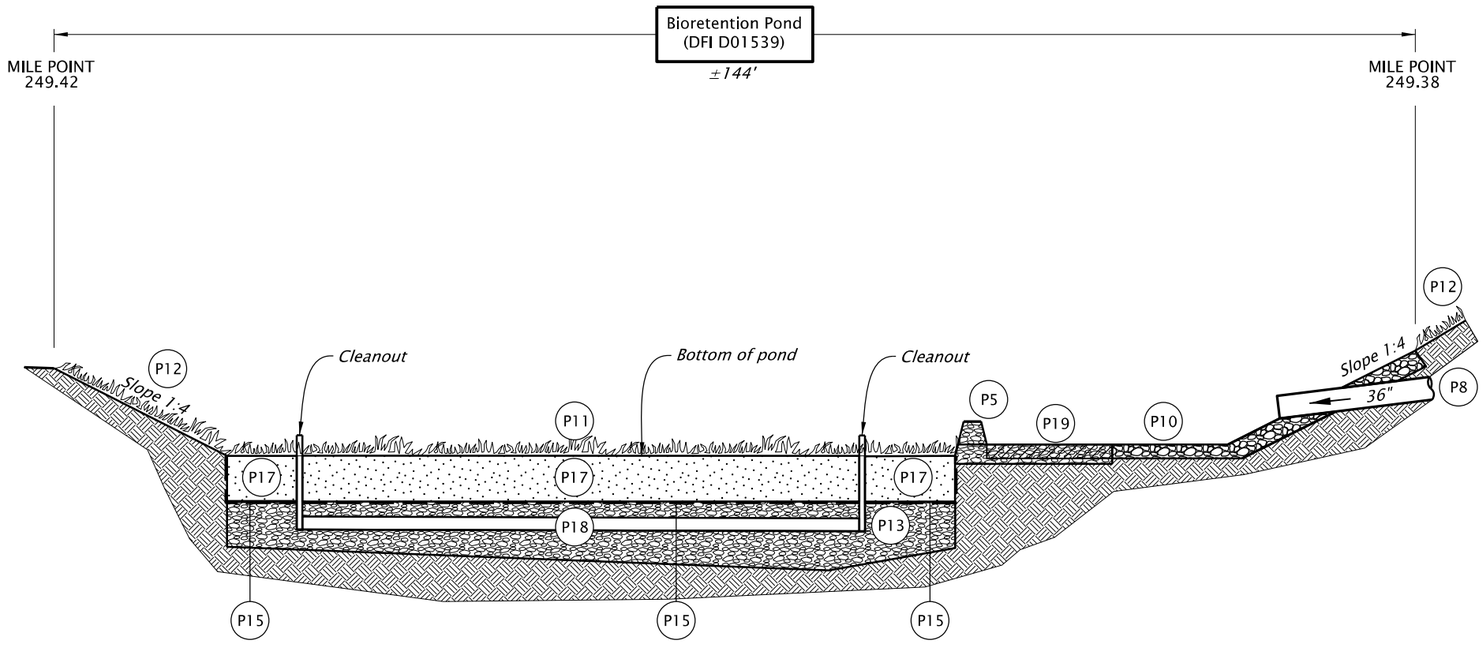
Prepared By: Atalla Raskin

Drafted By: Christine Benavidez

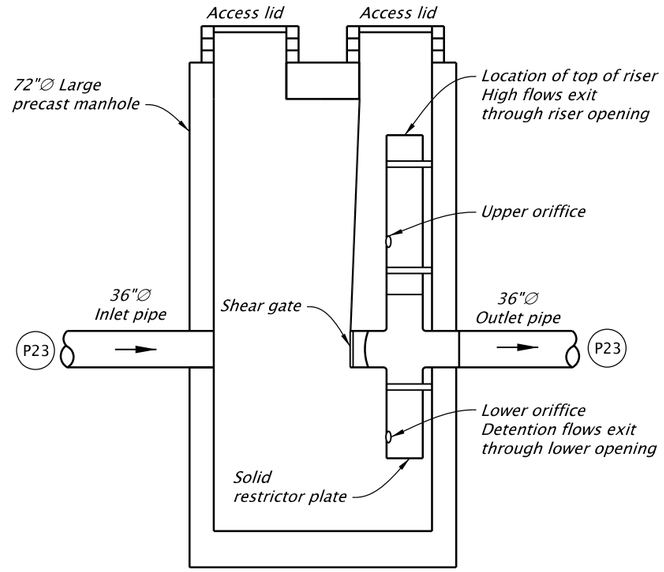
**DFI D01539**
**MAINTENANCE DISTRICT 3 HWY 001**
**BIORETENTION POND**
HIGHWAY MP 249.38 - 249.42
MARION COUNTY

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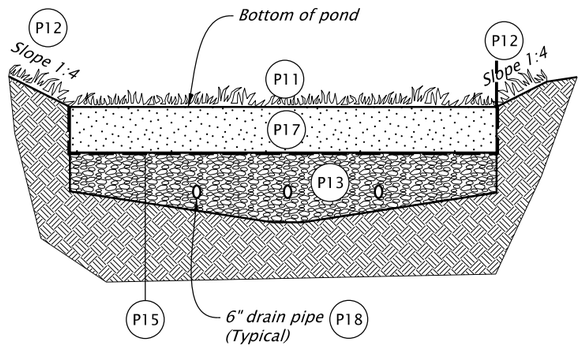
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## SECTION A-A
NOT TO SCALE




## FLOW CONTROL STRUCTURE
NOT TO SCALE




## SECTION B-B
NOT TO SCALE

OREGON DEPARTMENT
OF TRANSPORTATION

Sht. 2 of 2

Prepared By:
Atalla Raskin

Drafted By:
Christine Benavidez

**DFI D01539**
**MAINTENANCE DISTRICT 3 HWY 001**
**BIORETENTION POND**
HIGHWAY MP 249.38 - 249.42
MARION COUNTY

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# B Appendix B – Project Contract Plans

## Contents:

**Site Specific Subset of Project Contract Plan 56V-076**

N

"L3N" LINE

"L3N" 535

"CNB" 255

"CNB" LINE

COMMERCIAL ST. (NB)

"NB" 540

"NB" LINE

"NB" 535

"CNB" 250

PACIFIC HWY. (I-5)

"SB" LINE
*(For profile, see sht. C11F)*

"SB" 540

"SB" 535

"CNB" 245

COMMERCIAL ST. (SB)

Access Control

Access Control

Ditch

12" - 29'

12" - 29'

36" - 164'

36" - 27'

36" - 14'

36" - 18'

12" - 40'

12" - 81'

12" - 116'

12" - 178'

12" - 141'

12" - 116'

12" - 149'

12" - 116'

A E

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

REGISTERED PROFESSIONAL ENGINEER
74328PE
OREGON
SEPT. 9, 2008
ATALIA SAMPSON RASKIN
RENEWS: 12-31-2024

# I-5: KUEBLER BLVD. TO DELANEY RD. WIDENING SEC.

PACIFIC HIGHWAY
MARION COUNTY

Designer: Atalia Raskin
Reviewer: Natalie Newcomer
Drafter: Christine Benavidez
Checker: Atalia Raskin

**DRAINAGE & UTILITIES**

SHEET NO. C11C

## CONSTRUCTION NOTES

1. *Sta. "SB" 537+17.7, 22.3' Lt.*
   *Const. type "G-2" inlet*
   *Const. 18" sump*

2. *Sta. "SB" 538+34.8, 21.7' Lt.*
   *Const. inside drop manhole with "G-2" inlet*
   *Inst. 12" storm sewer pipe - 141'*
   *5' depth*
   *Inst. 12" storm sewer pipe - 116'*
   *20' depth*
   *Inst. 12" storm sewer pipe - 178'*
   *10' depth*
   *(See dwg. no. RD350)*

3. *Sta. "NB" 536+07.6, 350.0' Lt.*
   *Const. manhole with ditch inlet*
   *(For profile, see sht. HA08)*

4. *Sta. "SB" 532+00.9, 22.3' Lt.*
   *Const. type "G-2" inlet*
   *Const. 18" sump*

5. *Sta. "NB" 538+15.3, 35.4' Lt.*
   *Const. manhole with "G-2" inlet*
   *Remove inlet*
   *Grate el. - 472.77'*
   *FL in - 458.20' (W)*
   *FL out - 458.20' (E)*
   *Inst. 12" storm sewer pipe - 81'*
   *20' depth, sl. 1.62%*

6. *Sta. "NB" 538+23.3, 72.1' Lt.*
   *Const. manhole*
   *Connect to extg. storm sewer pipe*
   *Remove 12" pipe - 40'*
   *Rim el. - 462.76'*
   *FL in - 457.72' (W)*
   *FL out - 457.52' (E) (Extg.) (Field verify)*
   *Inst. 12" storm sewer pipe - 40'*
   *10' depth, sl. 1.21%*

7. *Sta. "NB" 536+22.9, 350.0' Lt.*
   *Const. manhole with ditch inlet*
   *Inst. 36" storm sewer pipe - 14'*
   *5' depth*
   *(For profile, see sht. HA08)*

8. *Sta. "NB" 536+29.9, 376.7' Lt.*
   *Const. flow control manhole*
   *Inst. 36" storm sewer pipe - 27'*
   *20' depth, sl- 3.85%*
   *(For profile, see sht. HA08)*
   *(For details, see sht. HA19)*

9. *Sta. "NB" 537+02.9, 312.1' Lt.*
   *Const. manhole 72" dia.*
   *Connect to extg. storm sewer pipes*
   *Rim el. - 451.44'*
   *FL in - 443.60' (SW) (Extg.) (Field verify)*
   *FL out - 443.40' (N)*
   *(See dwg. no. RD346)*

10. *Sta. "NB" 536+83.9, 310.4' Lt.*
    *Const. sloped end*
    *Const. paved end slope*
    *Const. loose riprap (Class 50) - 16 cu. yd.*
    *FL in - 443.20' (S)*
    *Inst. 36" storm sewer pipe - 18'*
    *10' depth, sl. 1.53%*
    *(For details, see sht. HA19)*

11. *Const. bioretention pond, D01539*
    *(For details, see sht. HA07)*

12. *Sta. "NB" 534+55.4, 428.0' Lt.*
    *Const. sloped end*
    *Const. paved end slope*
    *Const. loose riprap (Class 50) - 20 cu. yd.*
    *Inst. 36" storm sewer pipe - 164'*
    *20' depth*
    *(For profile, see sht. HA08)*
    *(For details, see sht. HA19)*

13. *Sta. "SB" 539+76.8, 22.3' Lt.*
    *Const. type "G-2" inlet*
    *Const. 18" sump*
    *Inst. 12" storm sewer pipe - 116'*
    *5' depth*

14. *Sta. "SB" 540+93.9, 22.3' Lt.*
    *Const. type "G-2" inlet*
    *Const. 18" sump*
    *Inst. 12" storm sewer pipe - 149'*
    *5' depth*

15. *Sta. "NB" 535+34.1, 246.4' Lt.*
    *Inst. field facility marker, Type S1*

16. *Sta. "NB" 537+13.8, 307.7' Lt.*
    *Inst. field facility marker, Type S1*

17. *Sta. "NB" 536+35.2, 369.2' Lt.*
    *Inst. field facility marker, Type S2*
    *DFI no. D01539*
    *MP 249.39*

18. *Sta. "L3N" 537+75.6, 34.9' Rt. to*
    *Sta. "L3N" 538+04.2, 33.2 Rt.*
    *Const sloped ends*
    *Inst. 12" culv. pipe - 29'*
    *5' depth, sl. 4.09%*
    *FL lt. - 460.88' (N)*
    *FL rt. - 459.72' (S)*

19. *See sht. C10B, note 5*
    *Inst. 12" storm sewer pipe*

20. *Sta. "SB" 533+24.63, 0.9' Rt.*
    *Remove inlet*
    *Remove 15" pipe - 120'*

21. *Sta. "SB" 534+43.57, 10.4' Rt.*
    *Remove inlet*

22. *Sta. "SB" 535+80.45, 157.4' Rt.*
    *Remove outfall*
    *Remove 12" pipe - 192'*

23. *Sta. "SB" 536+65.12, 11.5' Rt.*
    *Remove Inlet*

24. *Sta. "SB" 537+02.40, 11.0' Rt.*
    *Remove inlet*
    *Remove 12" pipe - 37'*

25. *Sta. "SB" 539+30.55, 1.03' Lt.*
    *Remove outfall*
    *Remove 15" pipe - 99'*

26. *Sta. "NB" 539+77.9, 12.3' Rt.*
    *Const. type "G-2MA" inlet*
    *Const. 18" sump*
    *Remove inlet*
    *Grate el. - 481.77'*
    *FL out - 476.00 (NW)*

27. *Sta. "L3N" 537+75.6, 33.6' Rt. to*
    *Sta. "L3N" 538+04.2, 32.0 Rt.*
    *Const sloped ends*
    *Inst. 12" culv. pipe - 29'*
    *5' depth, sl. 3.79%*
    *FL lt. - 460.73' (N)*
    *FL rt. - 459.65' (S)*

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Designer: Atalia Raskin | Reviewer: Natalie Newcomer
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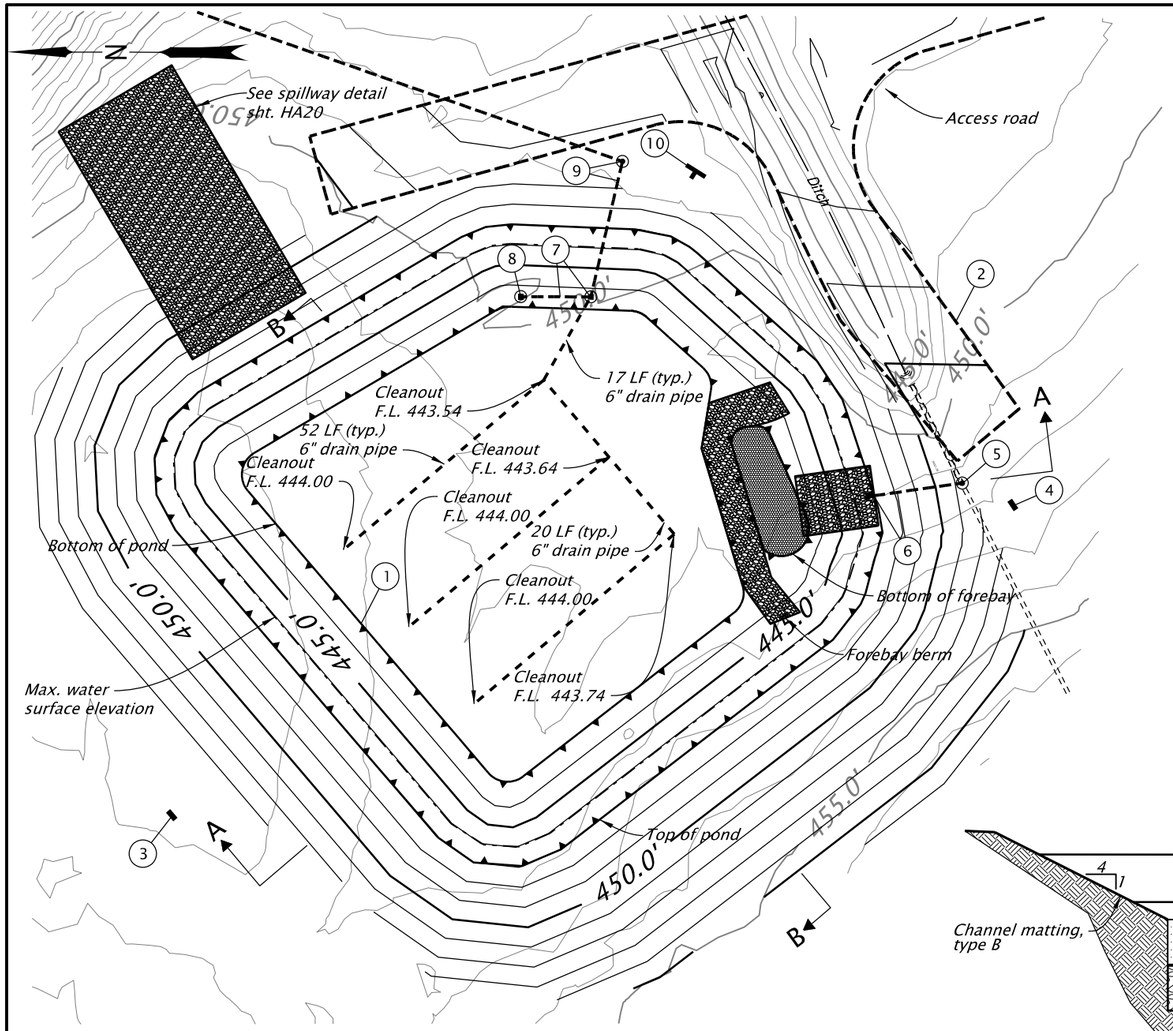
**DRAINAGE & UTILITIES NOTES**

SHEET NO. C11D



FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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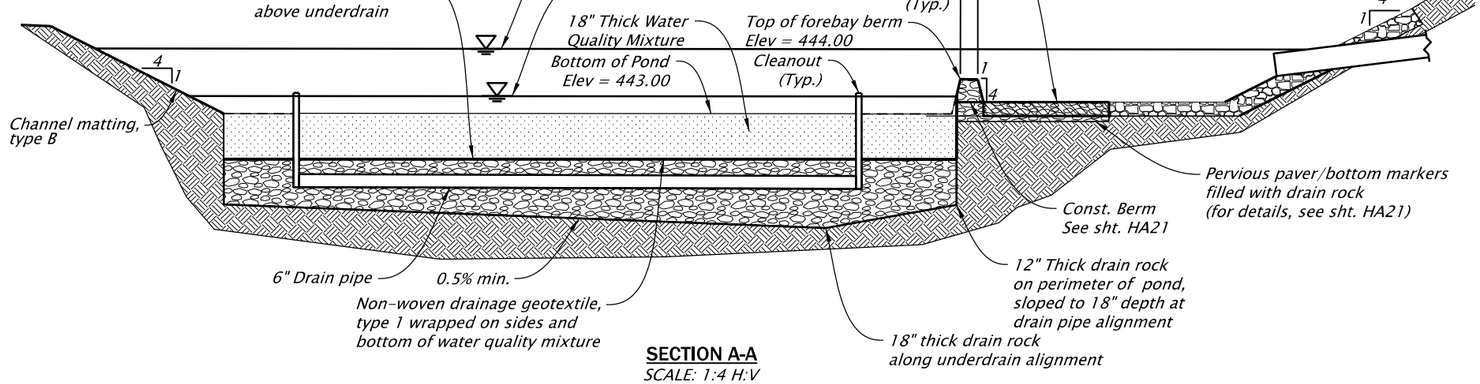



1. *Sta. "NB" 535+28.7, 317' Lt. to Sta."NB" 536+85.6, 303'Lt. Const. bioretention/detention pond, D01539*
   - *Exc. - 4,840 cu. yd*
   - *Emb. - 0.3 cu. yd.*
   - *Water Quality Mix - 325 cu.yd.*
   - *Drainage geotextile, type 1 - 701 sq. yd.*
   - *Porous Pavers - 338 sq. ft.*

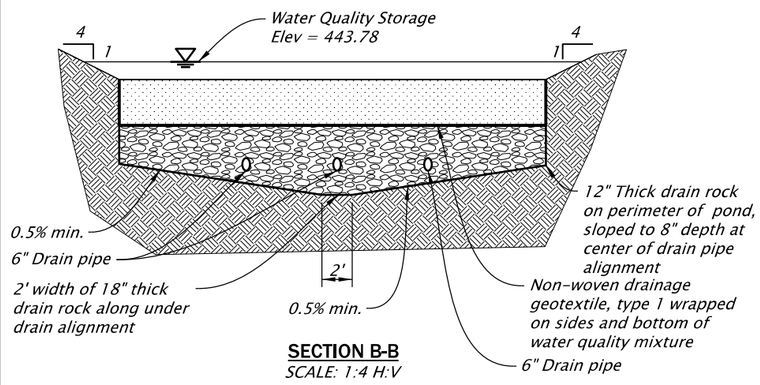
   *Remove any accumulated sediment and temporary erosion control materials from water quality facilities and replace with water quality mixture materials prior to placing permanent seeding and planting.*
2. *Const. maintenance access road (For details, see sht. BB12)*
3. *See sht. C11C, note 15*
4. *See sht. C11C, note 16*
5. *See sht. C11C, note 9*
6. *See sht. C11C, note 10*
7. *See sht. C11C, note 7*
8. *See sht. C11C, note 3*
9. *See sht. C11C, note 8*
10. *See sht. C09B, note 17*

## BIORETENTION/DETENTION POND, "D01539"

*Scale: Not To Scale*




**SECTION A-A**
*SCALE: 1:4 H:V*




**SECTION B-B**
*SCALE: 1:4 H:V*

## FIELD FACILITY MARKER TABLE D01539

| FACILITY LOCATION | | DFI D01539 | TYPE S1 MARKER | | TYPE S2 MARKER | |
|---|---|---|---|---|---|---|
| STATION | MP | | RED | GREEN | BEGIN | END |
| "NB" 537+14, Lt. | 249.38 | D01539 | ✓ | | | |
| "NB" 535+34, Lt. | 249.42 | D01539 | | ✓ | | |
| "NB" 536+35, Lt. | 249.39 | D01539 | | | ✓ | |

✓ *Check where appropriate*
*Red = Beginning of facility*
*Green = End if Facility*

HWY: 001
M.P.: 249.38-249.42
UNIT FILE CODE: N/A
DFI/TSSU NO.: D01539

REGISTERED PROFESSIONAL ENGINEER
74328PE
OREGON
SEPT. 9, 2008
ATALIA SAMPSON RASKIN
RENEWS: 12-31-2024

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

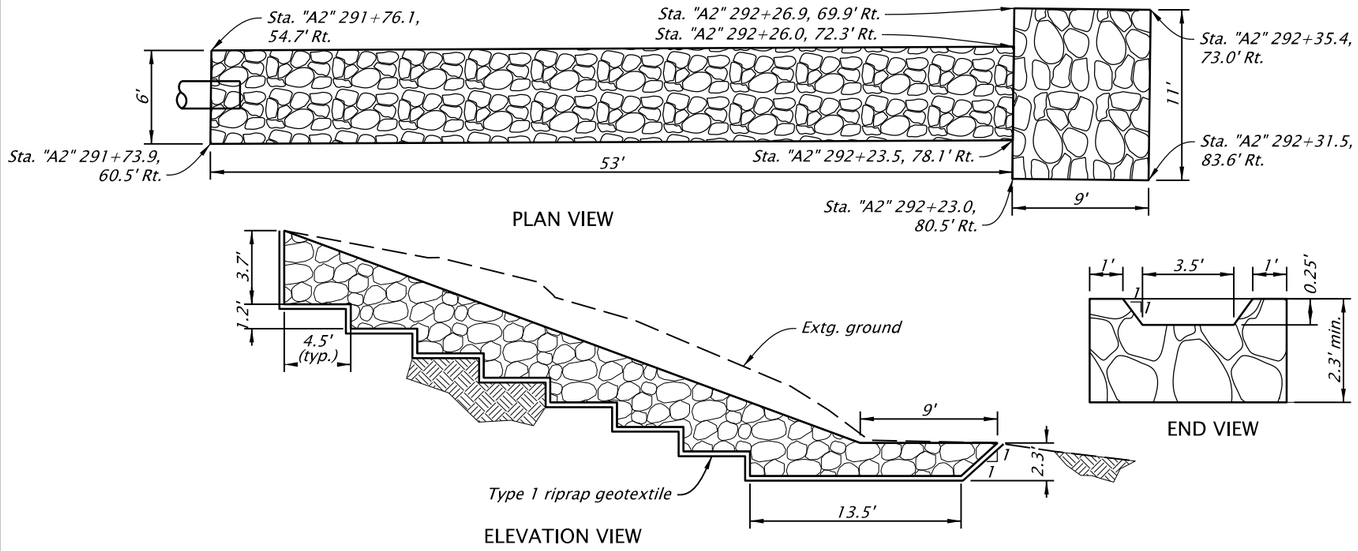
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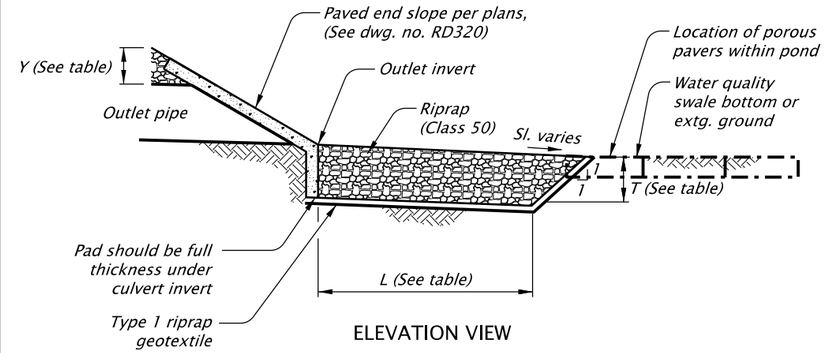
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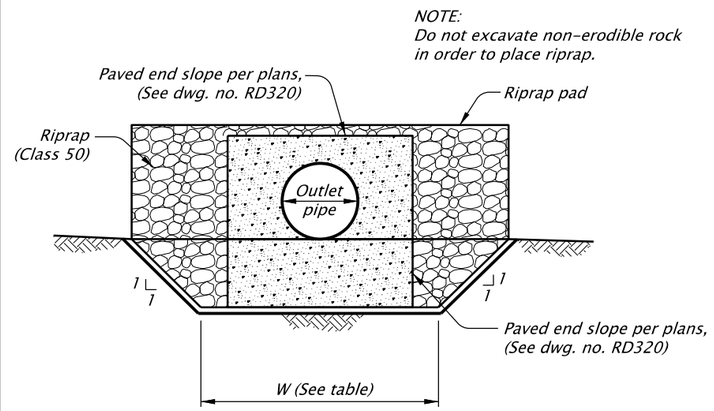
**STORMWATER PLAN**

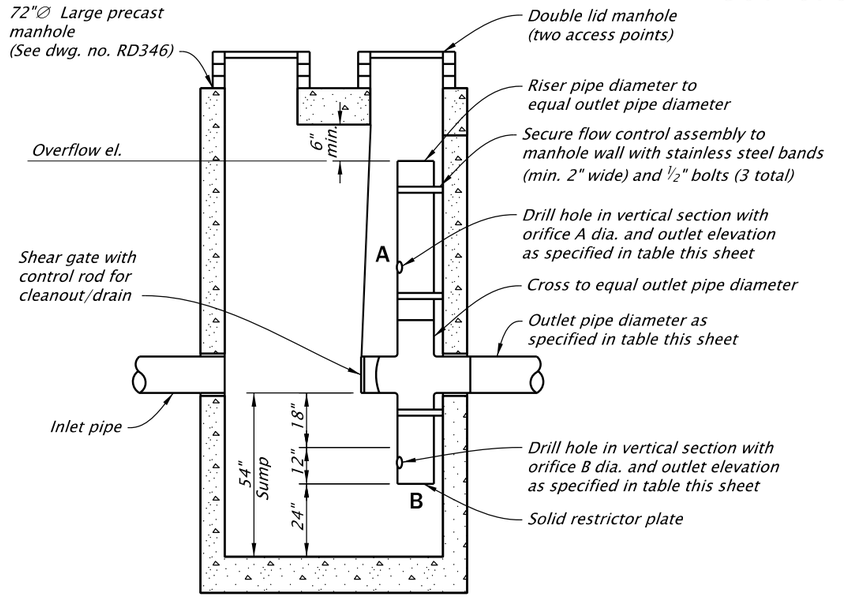
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## CHANNEL OUTFALL




RIPRAP DESIGN TABLE

| CALLOUT NOTE | PIPE DIAMETER | LENGTH (L) | WIDTH (W) | DEPTH (T) | DEPTH (Y) (ABOVE PIPE) |
|---|---|---|---|---|---|
| Sht. C05B, note #2 | 18" | 28' | 7.5' | 2.3' | 1' |
| Sht. C05B, note #11 | Manhole | 6' | 7.5' | 2.3' | 1' |
| Sht. C05B, note #15 | 18" | 6' | 7.5' | 2.3' | 1' |
| Sht. C09B, note #1 | 12" | 4' | 5' | 2.3' | 1' |
| Sht. C09B, note #4 | 18" | 6' | 7.5' | 2.3' | 1' |
| Sht. C09B, note #14 | 18" | 6' | 7.5' | 2.3' | 1' |
| Sht. C09B, note #16 | Manhole | 6' | 7.5' | 2.3' | 1' |
| Sht. C09B, note #20 | Channel | 17' | 4' | 2.3' | - |
| Sht. C11C, note #10 | 36" | 12' | 15' | 2.3' | 1' |
| Sht. C11C, note #12 | 36" | 24' | 15' | 2.3' | 1' |
| Sht. C15C, note #3 | 12" | 4' | 5' | 2.3' | 1' |
| Sht. C15C, note #6 | 18" | 6' | 7.5' | 2.3' | 1' |
| Sht. C15C, note #9 | 18" | 6' | 7.5' | 2.3' | 1' |
| Sht. C15C, note #11 | 12" | 4' | 5' | 2.3' | 1' |
| Sht. C15C, note #20 | 8" | 4' | 5' | 2.3' | 1' |
| Sht. C15C, note #21 | 18" | 5' | 6' | 2.3' | 1' |
| Sht. C15C, note #25 | Channel | 31' | 25' | 2.3' | - |
| Sht. C15C, note #31 | 24" | 10' | 8' | 2.3' | 1' |
| Sht. C16B, note #6 | 12" | 4' | 5' | 2.3' | 1' |
| Sht. C16B, note #8 | 12" | 4' | 5' | 2.3' | 1' |
| Sht. C16B, note #13 | 12" | 4' | 5' | 2.3' | 1' |
| Sht. C16B, note #20 | 12" | 4' | 5' | 2.3' | 1' |
| Sht. C16B, note #27 | 18" | 6' | 7.5' | 2.3' | 1' |
| Sht. C16B, note #28 | 24" | 8" | 10' | 2.3' | 1' |
| Sht. D01C, note #8 | 12" | 4' | 5' | 2.3' | 1' |
| Sht. D01C, note #31 | 12" | 4' | 5' | 2.3' | 1' |
| Sht. D02C, note #1 | 18" | 6' | 7.5' | 2.3' | 1' |
| Sht. D02C, note #15 | 24" | 8" | 10' | 2.3' | 1' |
| Sht. D03B, note #4 | 12" | 4' | 5' | 2.3' | 1' |

## RIPRAP BASINS

*FLOW CONTROL STRUCTURE DATA*

| | C05C | C09B | C11C | C15C | C16B | D01C | D02C |
|---|---|---|---|---|---|---|---|
| Diameter of Manhole (In.) | 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| F.L (In) | 399.00 | 379.80 | 436.57 | 481.90 | 500.50 | 450.00 | 445.63 |
| F.L (Out) | 398.80 | 379.60 | 436.37 | 481.80 | 500.30 | 449.80 | 445.43 |
| Outlet Pipe Diameter (In.) | 18 | 24 | 36 | 18 | 12 | 12 | 12 |
| Number of Orifice | 2 | 2 | 2 | 2 | 1 | 2 | 2 |
| Orifice A Elevation | 407.00 | 387.25 | 443.90 | 486.00 | - | 457.45 | 460.50 |
| Diameter of Orifice A (In.) | 5.5 | 8.7 | 6.0 | 6.0 | - | 1.5 | 6.0 |
| Orifice B Outlet Elevation | 397.80 | 378.60 | 435.37 | 480.80 | 499.30 | 452.44 | 454.43 |
| Diameter of Orifice B (In.) | 1.0 | 6.4 | 12.0 | 7.2 | 2.5 | 1.2 | 1.2 |
| Overflow Elevation | 407.90 | 389.25 | 445.55 | 486.75 | 506.95 | 458.88 | 461.40 |
| Rim Elevation | 409.80 | 391.20 | 448.89 | 489.89 | 509.34 | 463.28 | 463.33 |

## FLOW CONTROL STRUCTURE

*Not to Scale*

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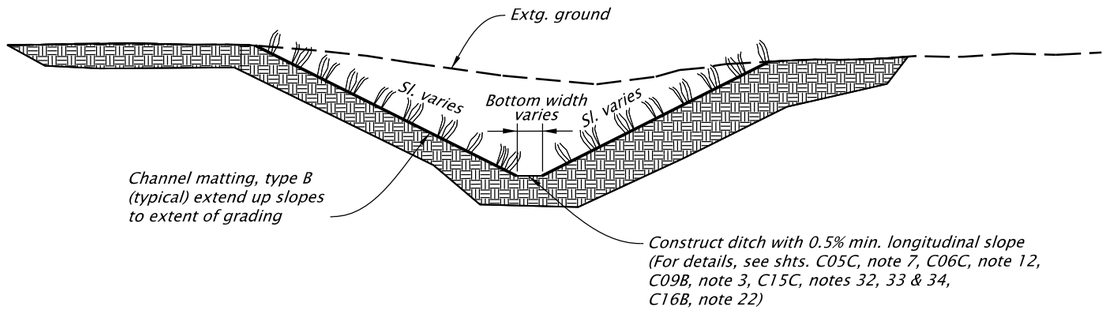
**I-5: KUEBLER BLVD. TO DELANEY RD. WIDENING SEC.**
PACIFIC HIGHWAY
MARION COUNTY

Designer: Atalia Raskin
Drafter: Christine Benavidez
Reviewer: Natalie Newcomer
Checker: Atalia Raskin

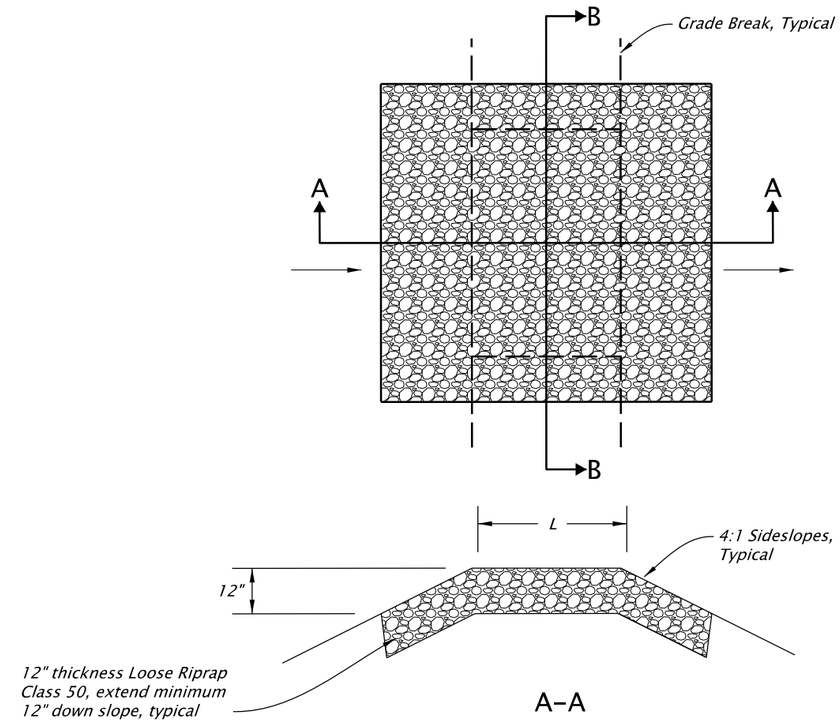
**DETAILS**

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HA19

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## DRAINAGE DITCH

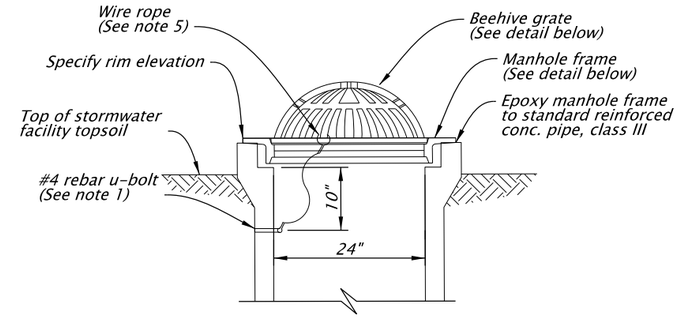


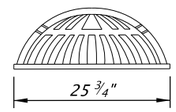

## SPILLWAY DETAIL

*Not To Scale*

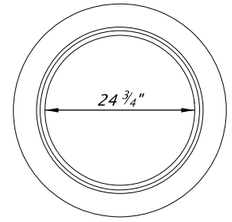
*SPILLWAY DIMENSIONS*

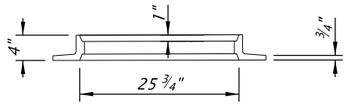
| SPILLWAY | L (ft) | W (ft) |
|---|---|---|
| Retention Pond D01537 | 8' | 5' |
| Bioretention Pond D01538 | 3' | 32' |
| Bioretention Pond D01539 | 4' | 23' |
| Bioretention Pond D01540 | 2' | 23' |




BEEHIVE GRATE




REVERSIBLE MANHOLE FRAME

*NOTES:*

1. *Secure grate in place with 54" of wire rope.*
   *Loop ends of wire rope around u-bolt and grate.*
   *Crimp each end of wire rope with 3" overlap.*
2. *Drill 2" deep holes into pipe and epoxy #4 rebar u-bolt (2"x 4") in holes.*
3. *Grate to be cast iron, ASTM A48 CL30.*
4. *Size inlet based on calculated flows and manufacturers recommendations.*
5. *Wire rope between 1/8"-3/16" diameter, stainless steel, 7 strands of 19 wires.*
6. *Frame and beehive grate, Neenah Foundry type 2560, or approved equal.*
7. *Type 3 frame - steel (modified) will be required for retrofit of beehive grate.*
8. *See dwg. no. RD378 for inlet base details.*

## FIELD INLET (MODIFIED) (WITH BEEHIVE GRATE)

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RENEWS: 12-31-2024

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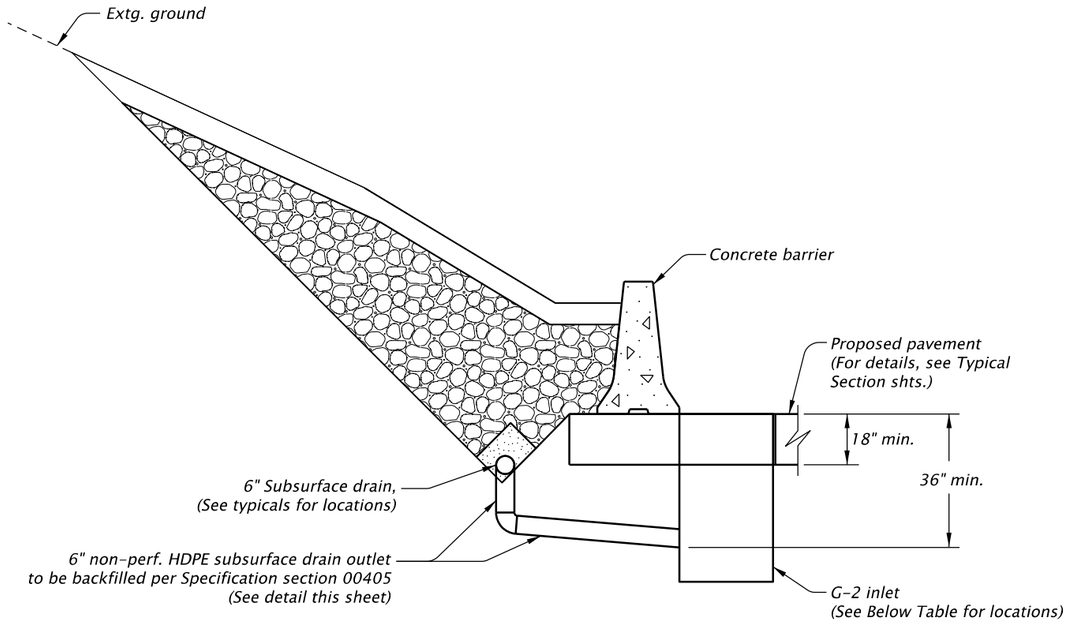
**I-5: KUEBLER BLVD. TO DELANEY RD. WIDENING SEC.**
PACIFIC HIGHWAY
MARION COUNTY

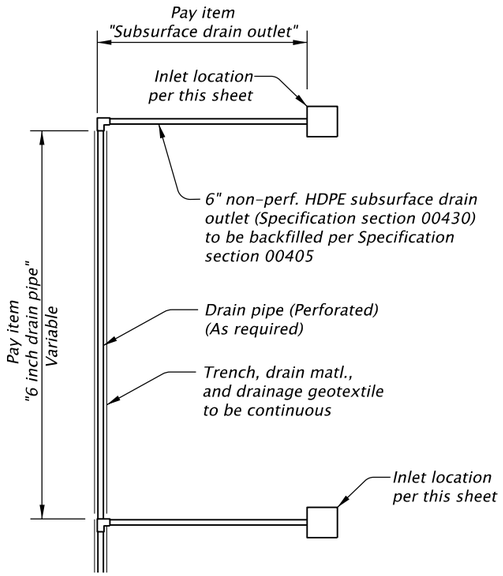
Designer: Atalia Raskin | Reviewer: Natalie Newcomer
Drafter: Christine Benavidez | Checker: Atalia Raskin

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## BACKFILLED BARRIER

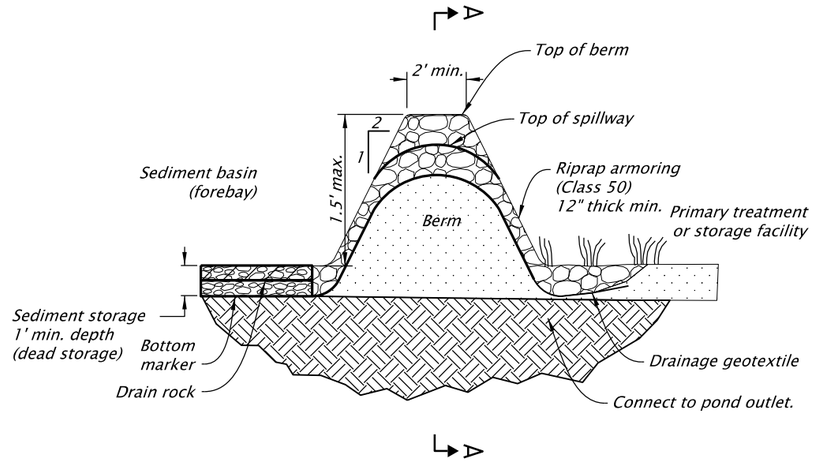
*(For details not shown, see sht. BB01)*

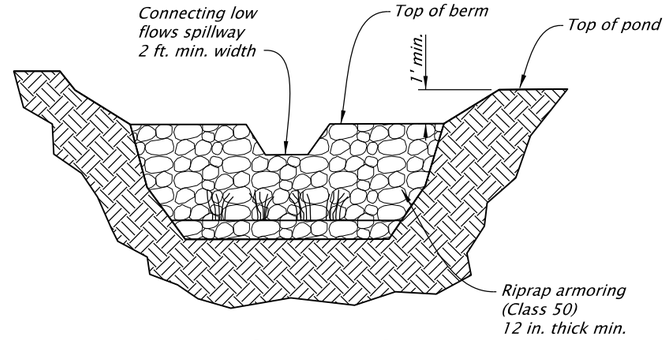
RETAINING BARRIER
INLET LOCATIONS

| Inlet Station | Barrier or Curb |
|---|---|
| "SB" 479+60.4 | Barrier |
| "SB" 480+51.2 | Barrier |
| "SB" 483+17.3 | Barrier |
| "SB" 489+70.6 | Barrier |
| "SB" 496+30.1 | Barrier |
| "SB" 500+18.7 | Barrier |
| "SB" 506+37.6 | Barrier |
| "SB" 512+07.4 | Barrier |

*NOTES:*
1. *Slope drain pipe to drain toward outlet, 1% min.*
2. *Connect perforated drain pipe to G-2 inlet drainage structure, as shown, with 6" dia. non-perforated drain pipe.*

## SUBSURFACE DRAIN INSTALLATION




## Section A-A

## BERM

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PACIFIC HIGHWAY
MARION COUNTY

Designer: Atalia Raskin | Reviewer: Natalie Newcomer
Drafter: Christine Benavidez | Checker: Atalia Raskin

**DETAILS** | SHEET NO. HA21

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# C Appendix C – Manufacturer's Operation & Maintenance Manuals

This appendix contains the Operation & Maintenance Manual for any proprietary structures.