OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: November, 2021

DFI No. D01243

Figure 1: DFI No. D01243, looking east (existing condition)

Identification

Drainage Facility ID (DFI):	D01243
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 53V-068
Location:	District: 03
	Highway No.: 091
	Mile Post: 32.84 to 32.79, Lt.

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

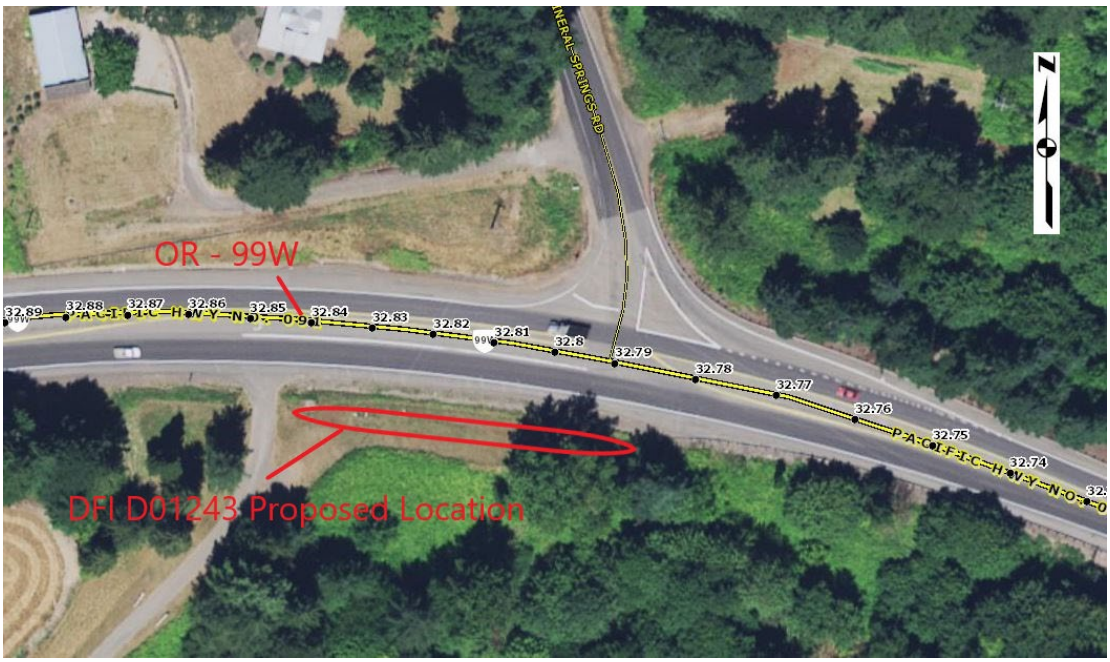


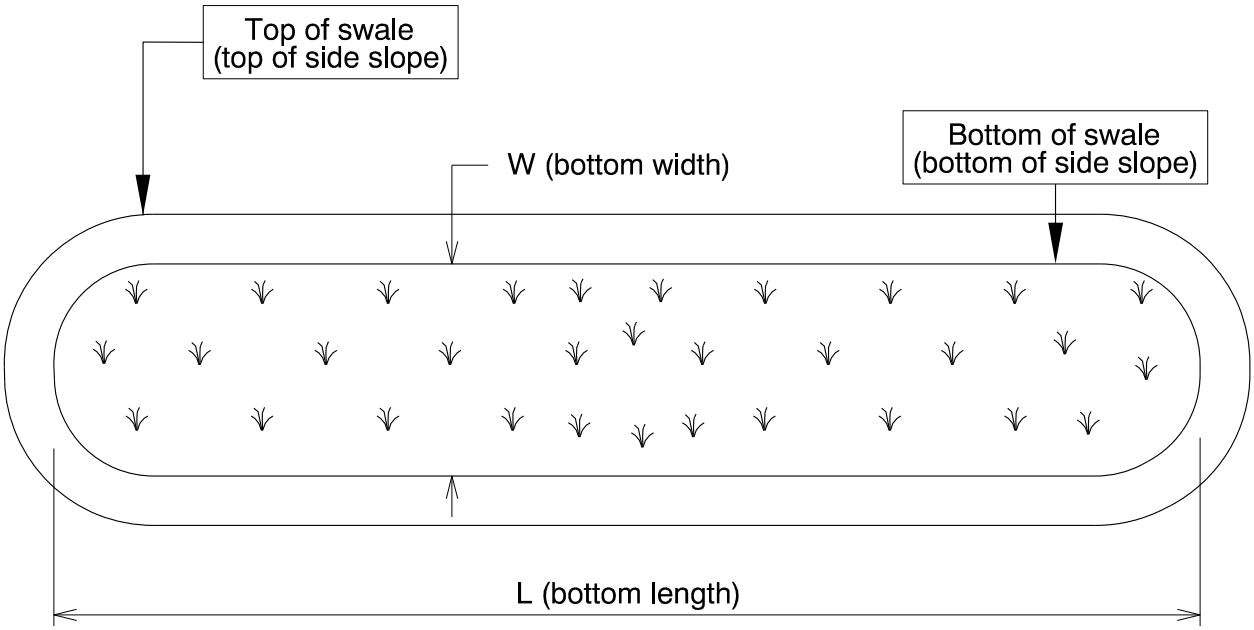
Figure 2: Facility location map

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:

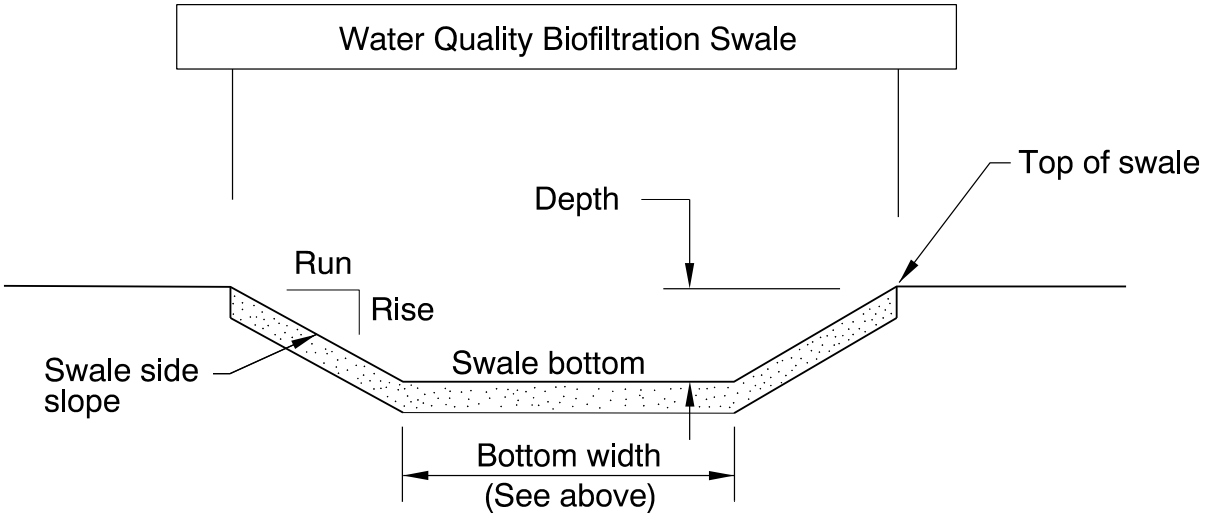
Bottom Length (feet)	Bottom Width (feet)
185	**5.5**


Top of swale
(top of side slope)
W (bottom width)
Bottom of swale
(bottom of side slope)
L (bottom length)

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)
1.67	**1**	**3**



Site Specific Information: The swale has a blended compost and topsoil mixture. There are three riprap flow spreaders every 50 feet along swale bottom.

4. Facility Access

Maintenance access to the facility:

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

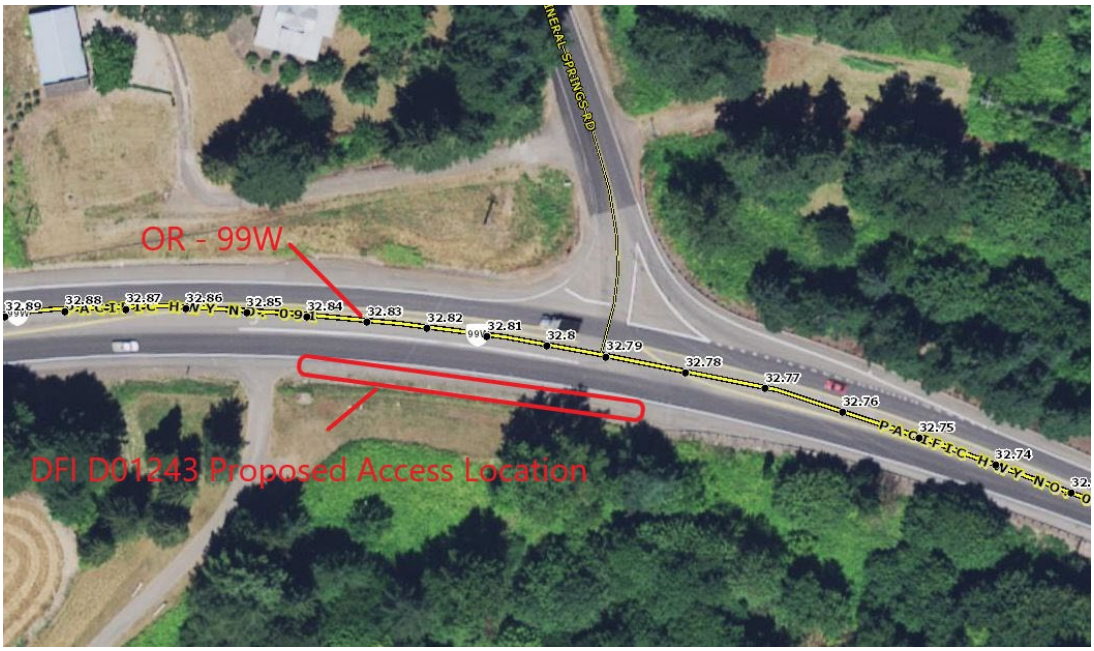


Figure 3: Facility access location

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 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**
Riprap flow spreader (every 50 feet along swale bottom)	☒	**S19**
Swale Outlet		
Catch basin with grate	☐	**S20**
Outlet Pipe (s)	☐	**S21**
Open channel outlet	☒	**S22**
Auxiliary Outlet: describe type	☐	**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

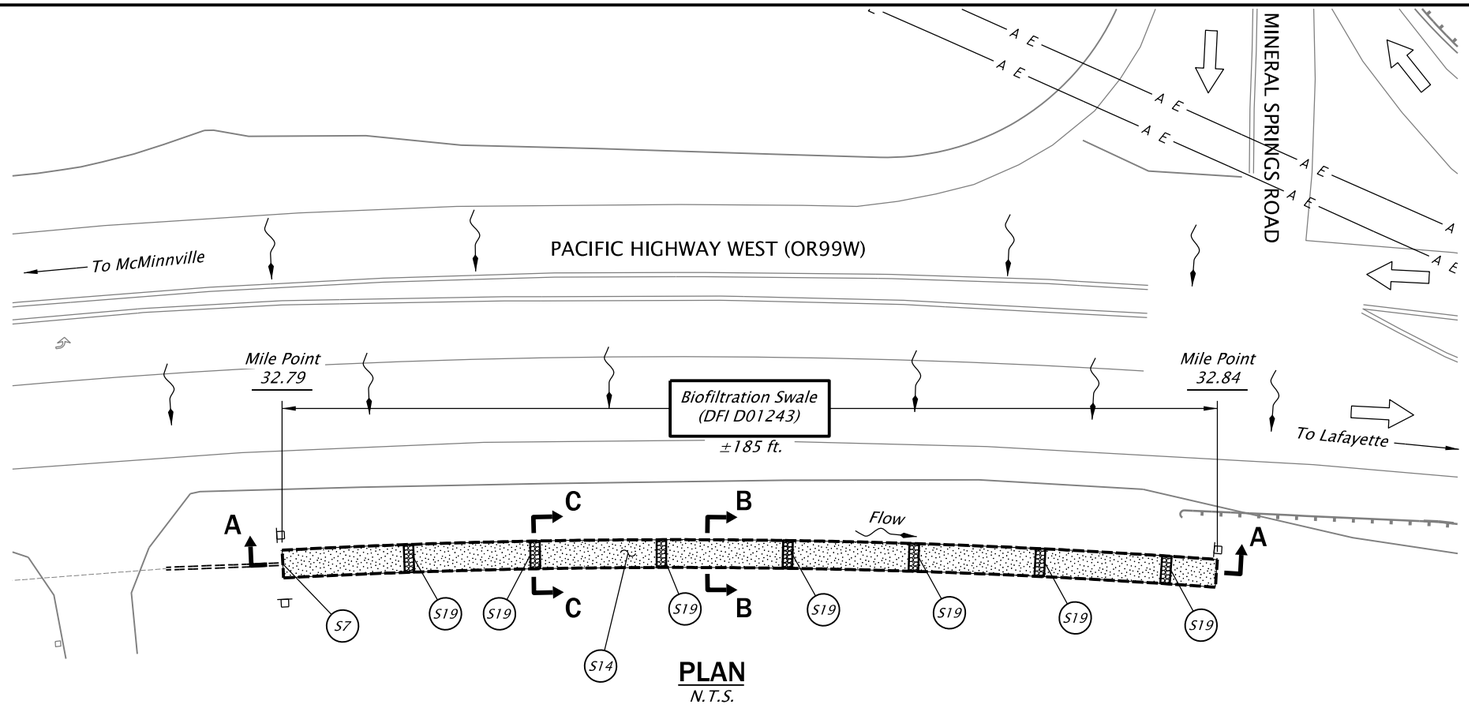
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Materials Management Coordinator	(503) 731-8493
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

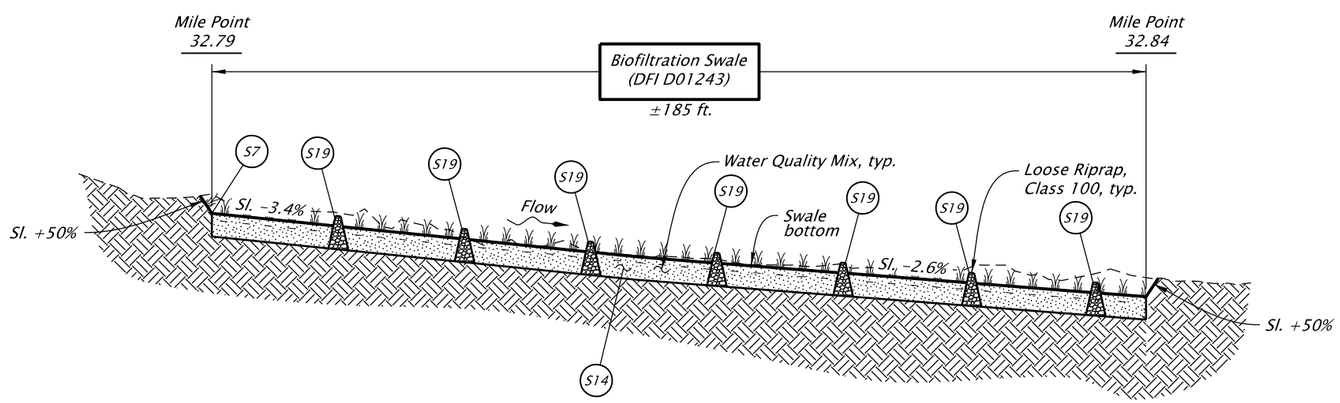
A Appendix A – Site Specific Operational Plan

Contents:

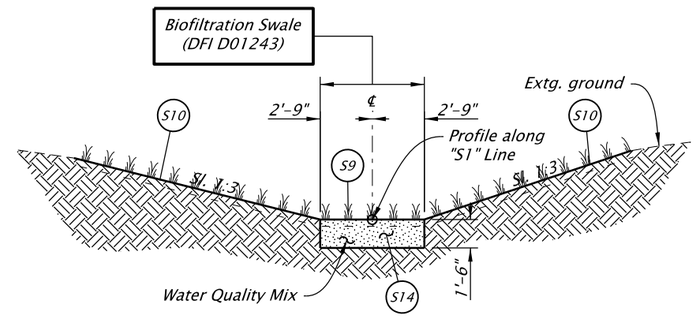
Operational Plan: DFI D01243



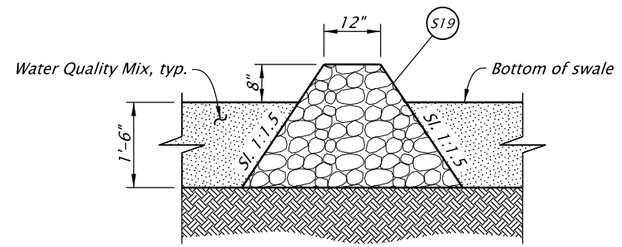
PLAN
N.T.S.



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.



SECTION C-C
N.T.S.

LEGEND:

- Photo Location / Direction
- S# — Facility component (see table 1 in O&M Manual)
- Storm pipe (facility)
- Adjacent storm pipe
- Conveyance direction
- Pavement / facility flow path
- Traffic flow direction

Note:
Slopes are shown as vertical to horizontal.

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Chris Carman

Drafted By: Michael Skelton

DFI D01243
MAINTENANCE DISTRICT 3 HWY 99W
BIOFILTRASTION SWALE
HIGHWAY MP 32.75
YAMHILL COUNTY

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 53V-068

53V-068

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
A01	Title Sheet
A02	Index Of Sheets Cont'd.
A03	Std. Drg. Nos.

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

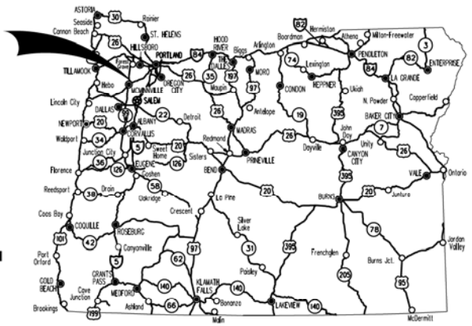
GRADING, DRAINAGE, STRUCTURES, PAVING, CURB RAMPS, SIGNING, ILLUMINATION, SIGNALS & ROADSIDE DEVELOPMENT

OR99W: MCDOUGALL JCT. - MCDONALD WAY SEC.

PACIFIC HIGHWAY WEST

YAMHILL COUNTY

OCTOBER 2020

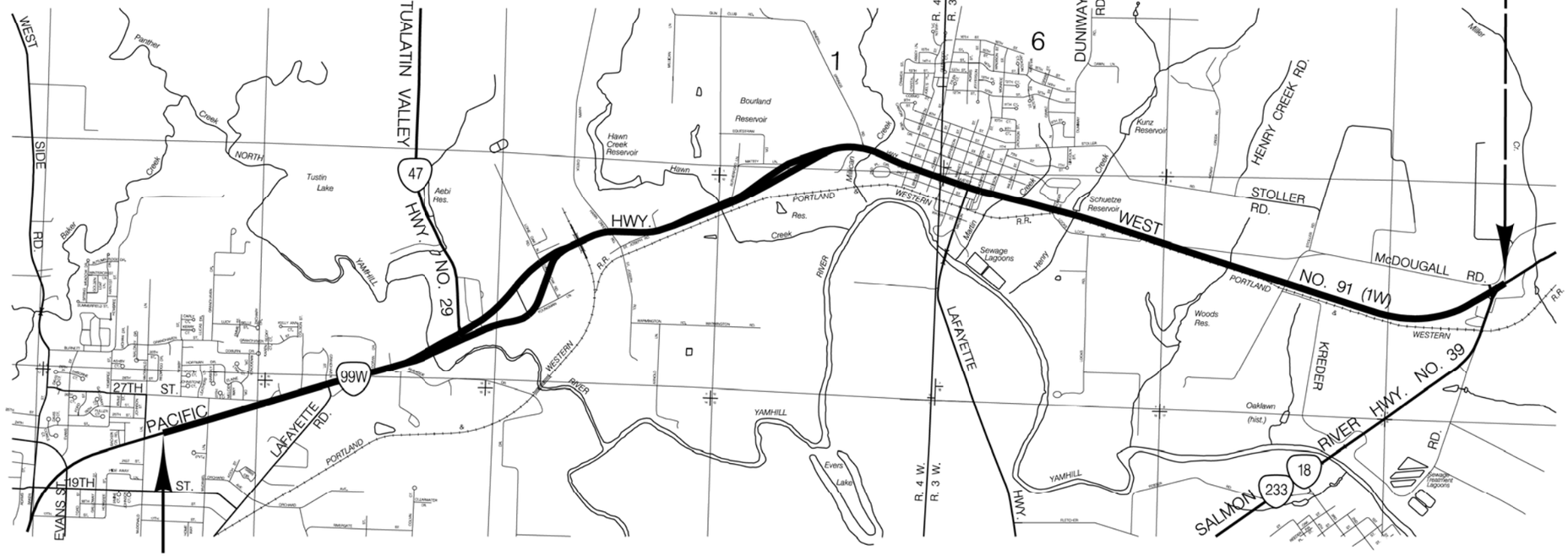


Overall Length Of Project - 6.25 Miles

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

END OF PROJECT

STA. "L2"344+30 (M.P. 30.07)



BEGINNING OF PROJECT

STA. "L1"11+80 (M.P. 36.32)

T. 4 S., R. 3 & 4 W., W.M.

OREGON TRANSPORTATION COMMISSION

Robert Van Brocklin	CHAIR
Alando Simpson	COMMISSIONER
Martin Callery	COMMISSIONER
Julie Brown	COMMISSIONER
Sharon Smith	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: Vidal T. Francis, P.E. Jul 31 2020 11:19 AM
Signature & date

Vidal T. Francis-R2 Tech Center Manager
Print name and title

Steven B Cooley Aug 21 2020 8:37 AM
Concurrence by ODOT Chief Engineer

OR99W: MCDOUGALL JCT. - MCDONALD WAY SEC.
PACIFIC HIGHWAY WEST
YAMHILL COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	S091(082)	A01

PE002740 000

INDEX OF SHEETS, CONT.	
SHEET NO.	DESCRIPTION
A04 Thru A06 Incl.	Curb Ramp Layout
A07, A08	Survey Control Data
ROADWAY DETAILS	
BA01 Thru BA08 Incl.	Typical Sections
BB01 Thru BB09 Incl.	Details
BC01	Curb Ramp Legend
BC02 Thru BC70 Incl.	Curb Ramp Details
BD01	Pipe Data Sheet
ROADWAY CONSTRUCTION	
C01	Alignment
C01A	General Construction
C02	Alignment
C02A	General Construction
C03	Alignment
C03A	General Construction
C03B	General Construction Notes
C04	Alignment
C04A	General Construction
C05	Alignment
C05A	General Construction
C05B	General Construction Notes
C06	Alignment
C06A	General Construction
C06B	General Construction Notes
C07	Alignment
C07A	General Construction
C07B	General Construction Notes
C08	Alignment
C08A	General Construction
C08B	General Construction Notes
C09	Alignment
C09A	General Construction
C10	Alignment
C10A	General Construction
C11 Thru C13 Incl.	General Construction
C13A	General Construction Notes
C14 Thru C27 Incl.	General Construction
C28	Alignment
C28A	General Construction
C28B	General Construction Notes
C28C	"L2" Profile
C29	Alignment
C29A	General Construction
C29B	General Construction Notes
C29C	"L2" Profile

INDEX OF SHEETS, CONT.	
SHEET NO.	DESCRIPTION
ROADWAY CONSTRUCTION CONTD	
C30	Alignment
C30A	General Construction
C30B	General Construction Notes
C30C	"L2" Profile
C31	Alignment
C31A	General Construction
C31B	General Construction Notes
C31C	"L2" Profile
C32 Thru C37 Incl.	General Construction
C38	Alignment
C38A	General Construction
C38B	"K" Profile
C39 & C40	General Construction
TRAFFIC CONTROL	
EA01 Thru EA04 Incl.	Traffic Control Details
EB01	Traffic Control Plan
EC01 Thru EC22 Incl.	Traffic Control Plan
ED01, ED02	Traffic Control Plan
EE01Thru EE08 Incl.	Traffic Control Plan
EF01Thru EF24 Incl.	Traffic Control Plan
ROADSIDE DEVELOPMENT	
FA01	Roadside Development Site Layout Plan
FA02 Thru FA14 Incl.	Roadside Development Planting Plan
FA15	Roadside Development Plant Schedule/Detail
EROSION CONTROL	
FB01 & FB02	Erosion And Sediment Control Site Layout Plan
FB03 Thru FB24 Incl.	Erosion And Sediment Control
HYDRAULIC	
HA01 & HA02	Stormwater

BRIDGE		
SHEET NO.	BDS DRAWING NO.	DESCRIPTION
STRUCTURE NO. 00441A		
J01	104682	Plan And Elevation
J02	104683	Construction Staging
J03	104684	CFRP Details
J04	104685	Bridge Rail Details

INDEX OF SHEETS, CONT.	
SHEET NO.	DESCRIPTION
SIGNS	
LA01 Thru LA23 Incl.	Signing Plan
LB01 Thru LB05 Incl.	Sign Details
LC01 Thru LC17 Incl.	Sign & Post Data Table
SIGNALS	
MA01	Legend
MB01	Temporary Signal Plan
MC01	Temporary Signal Plan
MD01	Temporary Signal Plan
ME01	Removal Plan
ME02	Existing Utilities
MF01	Removal Plan
MF02	Signal Plan
MF03	Detector Plan
MF04	Existing Utilities
MG01	Removal Plan
MG02	Signal Plan
MG03	Existing Utilities
MH01	Removal Plan
MH02	Signal Plan
MH03	Existing Utilities
MJ01	Signal Plan
MJ02	Existing Utilities
MK01Thru MK06 Incl.	Details
PERMANENT PAVEMENT MARKING	
QA01 Thru QA04 Incl.	Pavement Marking Details
QB01 Thru QB24 Incl.	Pavement Marking Plan

OREGON DEPARTMENT OF TRANSPORTATION

OR99W: MCDOUGALL JCT. - MCDONALD WAY SEC.
PACIFIC HIGHWAY WEST
YAMHILL COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	SEE SHEET A01	A02

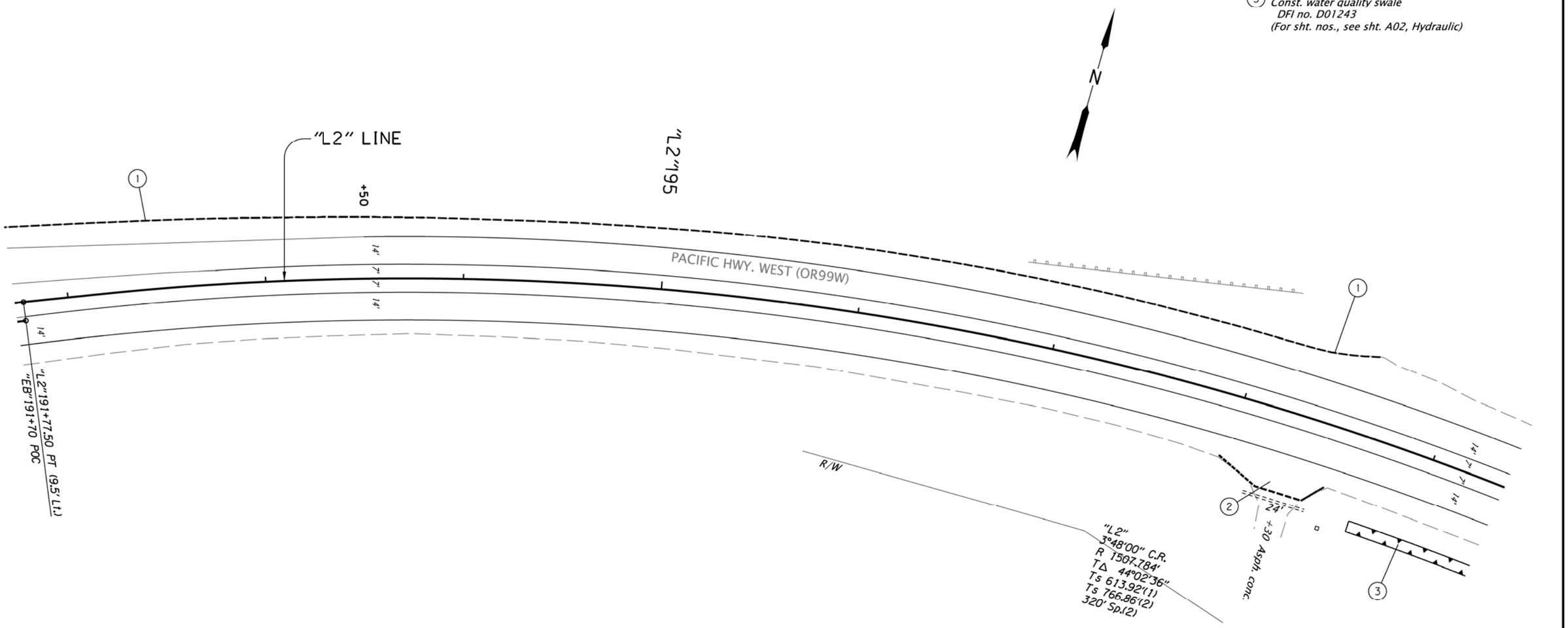
53V-068

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

1 *See sht. C25, note 1*
Remove extg. conc. curb
Const. standard curb

2 *Pave appr.*
(For details, see sht. BB03)

3 *Const. water quality swale*
DFI no. D01243
(For sht. nos., see sht. A02, Hydraulic)



REGISTERED PROFESSIONAL ENGINEER
58,879
Digitally Signed Aug 3 2020 2:38 PM
OREGON
JULY 13, 2004
DERRYL D. JAMES
RENEWS: 06-30-2021

OREGON DEPARTMENT OF TRANSPORTATION

OR99W: MCDOUGALL JCT. - MCDONALD WAY SEC.
PACIFIC HIGHWAY WEST
YAMHILL COUNTY

Designer: Kathy Fry | Reviewer: Derryl James
Drafter: Charlotte Gerken | Checker: N/A

GENERAL CONSTRUCTION | SHEET NO. C26

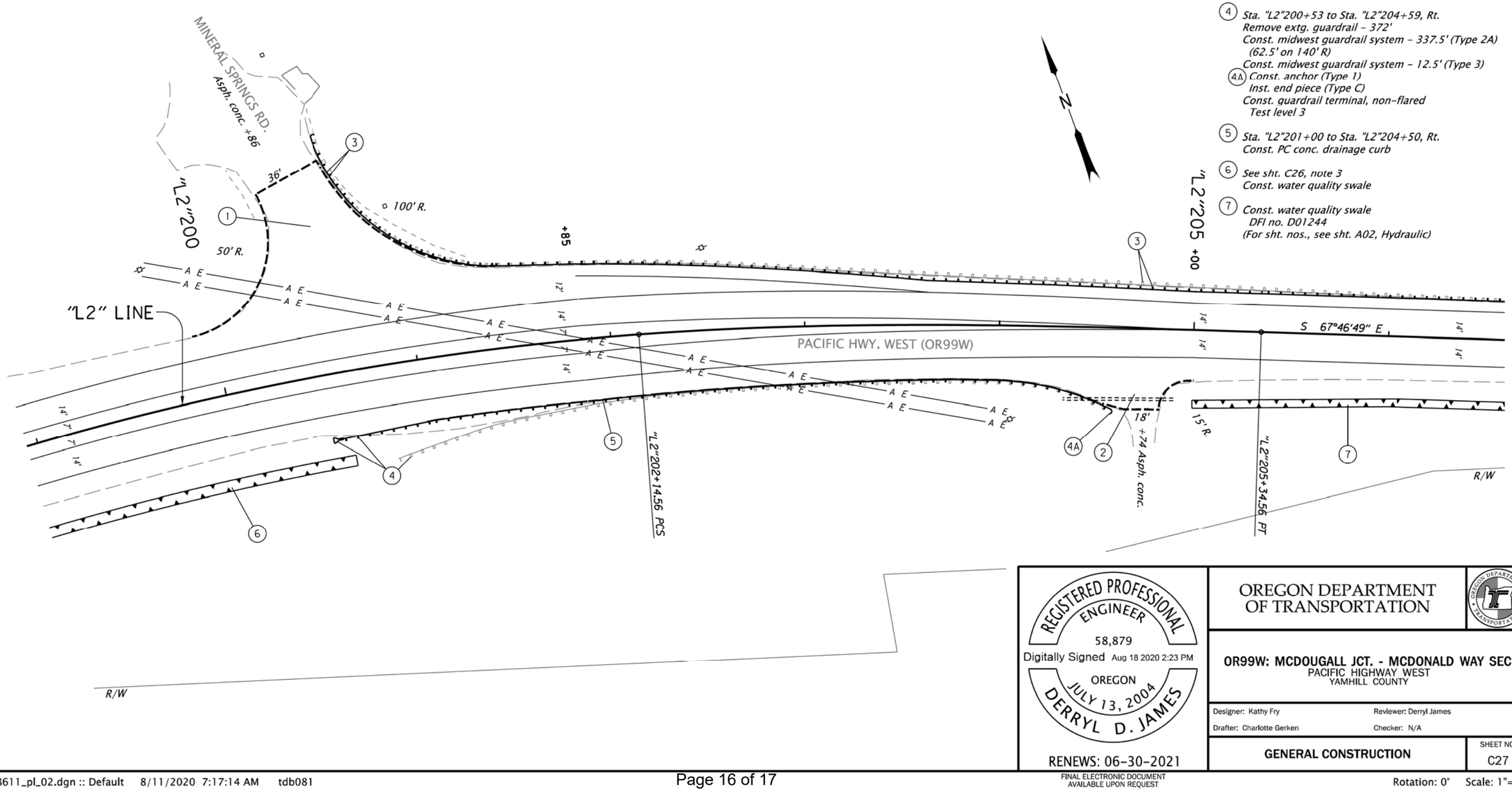
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 0° Scale: 1"=50'

R_K18611_pl_02.dgn :: Default 8/3/2020 11:12:23 AM tdb081

53V-068

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



1 *Pave street connection*
(For details, see sht. BB03)

2 *Pave appr.*
(For details, see sht. BB03)

3 *Sta. "L2"200+65 to Sta. "L2"208+12, Lt.*
Remove extg. guardrail – 756'
Const. midwest guardrail system – 737.5' (Type 2A)
(125' on 100' R)
Const. midwest guardrail system – 12.5' (Type 3)
Flare rate=0, W=1', E=0
Const. anchor (Type 1)
Inst. end piece (Type C)

4 *Sta. "L2"200+53 to Sta. "L2"204+59, Rt.*
Remove extg. guardrail – 372'
Const. midwest guardrail system – 337.5' (Type 2A)
(62.5' on 140' R)
Const. midwest guardrail system – 12.5' (Type 3)
4A *Const. anchor (Type 1)*
Inst. end piece (Type C)
Const. guardrail terminal, non-flared
Test level 3

5 *Sta. "L2"201+00 to Sta. "L2"204+50, Rt.*
Const. PC conc. drainage curb

6 *See sht. C26, note 3*
Const. water quality swale

7 *Const. water quality swale*
DFI no. D01244
(For sht. nos., see sht. A02, Hydraulic)

REGISTERED PROFESSIONAL ENGINEER
58,879
Digitally Signed Aug 18 2020 2:23 PM
OREGON
JULY 13, 2004
DERRYL D. JAMES
RENEWS: 06-30-2021

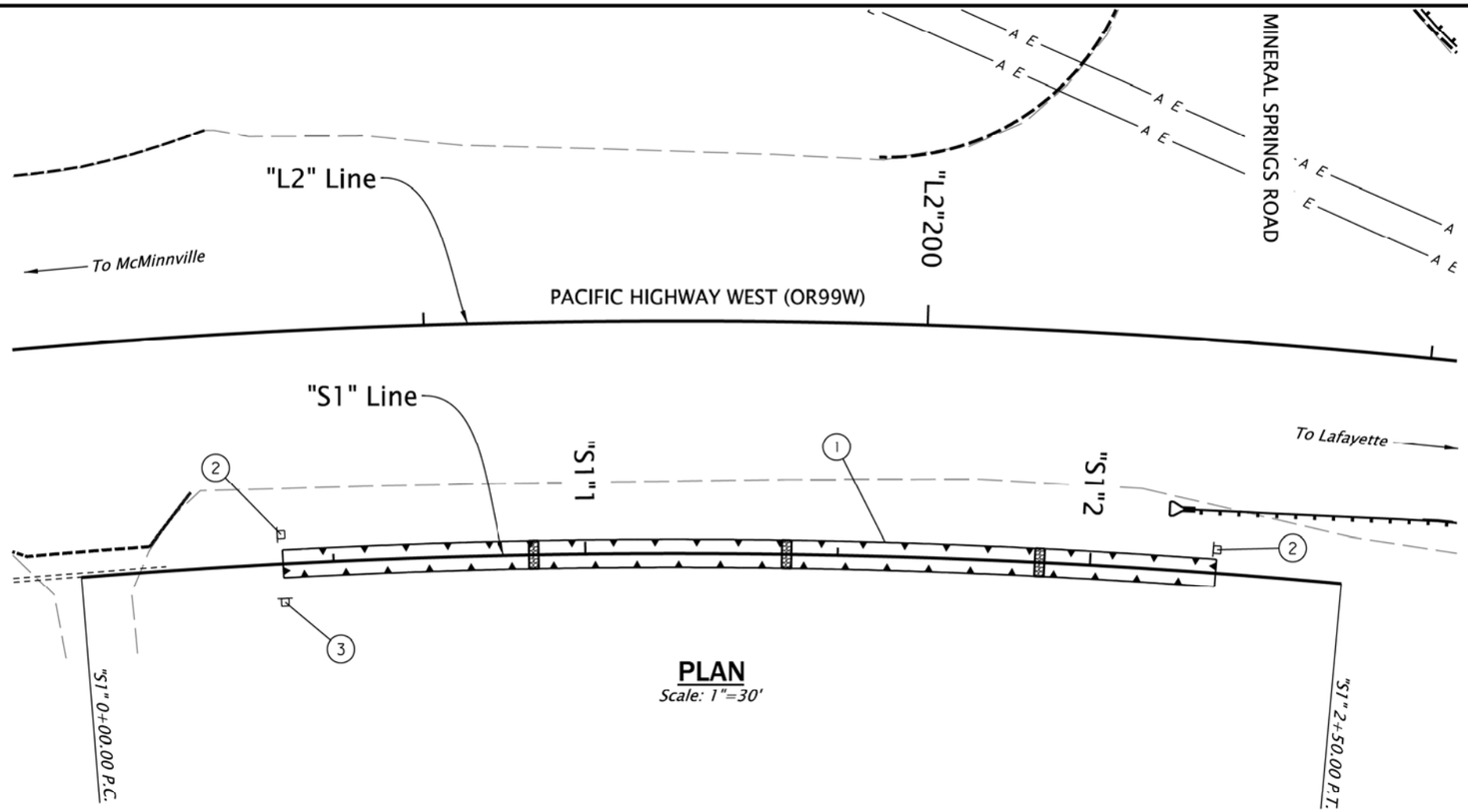
OREGON DEPARTMENT OF TRANSPORTATION

OR99W: MCDOUGALL JCT. - MCDONALD WAY SEC.
PACIFIC HIGHWAY WEST
YAMHILL COUNTY

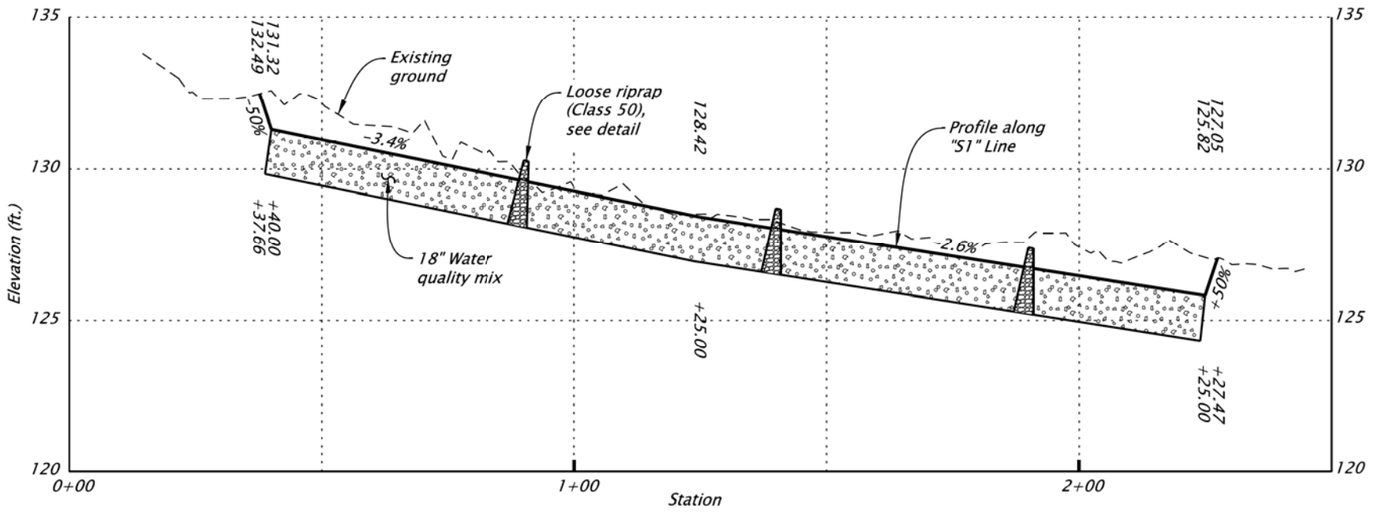
Designer: Kathy Fry | Reviewer: Derryl James
Drafter: Charlotte Gerken | Checker: N/A

GENERAL CONSTRUCTION | SHEET NO. C27

53V-068

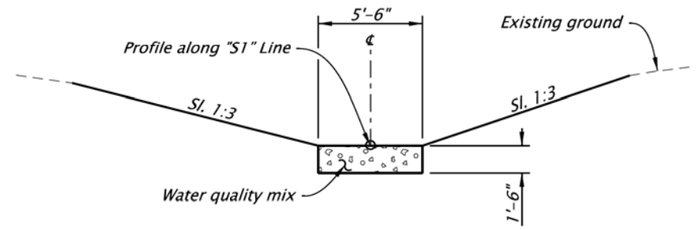


PLAN
Scale: 1"=30'

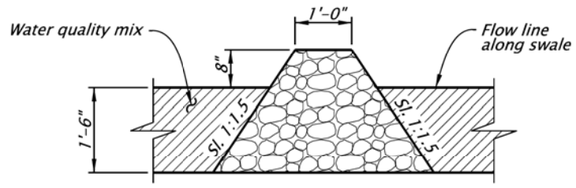


PROFILE ALONG "S1" LINE
Horiz. Scale: 1"=30'
Vert. Scale: 1"=5'

1. *Sta. "S2" 0+40 to Sta. "S2" 2+25*
   Construct water quality swale
   DFI No. D01243
   General excavation – 57 cu. yd.
   Water quality mix – 57 cu. yd.
   Loose riprap (Class 50) – 15 cu. yd.
2. *Install Type S1 marker – 2*
   See dwg. no. RD399
3. *Install Type S2 marker – 1*
   See dwg. no. RD399



Sta. "S1" 0+40 to Sta. "S1" 2+25
Scale: 1/8"=1'-0"



RIPRAP DETAIL
Scale: 3/8"=1'-0"

Note:
Slopes are shown as vertical to horizontal.

REGISTERED PROFESSIONAL ENGINEER
17,807
Digitally Signed Aug 4 2020 12:49 PM
OREGON
JULY 25, 1995
CHRIS CARMAN
RENEWS: 12-31-2021

OREGON DEPARTMENT OF TRANSPORTATION

OR99W: MCDOUGALL JCT. - MCDONALD WAY SEC.
PACIFIC HIGHWAY WEST
YAMHILL COUNTY

HWY: OR99W	Designer: Chris Carman
M.P.: 000	Reviewer: Ramiro Perez
COUNTY: Yamhill	Drafter: Jeff Coon
DFI/TSSU NO.: D01243	Checker: N/A
STORMWATER	SHEET NO.: HA01

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

H_K18611_stpl_01 :: Default 7/1/2020 5:31:07 PM tdb081

Rotation: 353.9137° Scale: 1"=30'