

OPERATION & MAINTENANCE MANUAL

Water Quality Filter Strip

Manual prepared: May 2019

DFI No. D01233



Figure 1: Future site of DFI No. D01233, looking North on US101

1. Identification

Drainage Facility ID (DFI): D01233
Facility Type: Water Quality Filter Strip
Construction Drawings: 1833680
Location: District: 4
Highway No.: 9
Mile Post: 137.23 to 137.28, LT

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. **NOTE: Mile posts are based off of the V-File, and may vary from TransGIS mile posts.**

Facility location type: **Roadway shoulder**

Flow direction: **East**

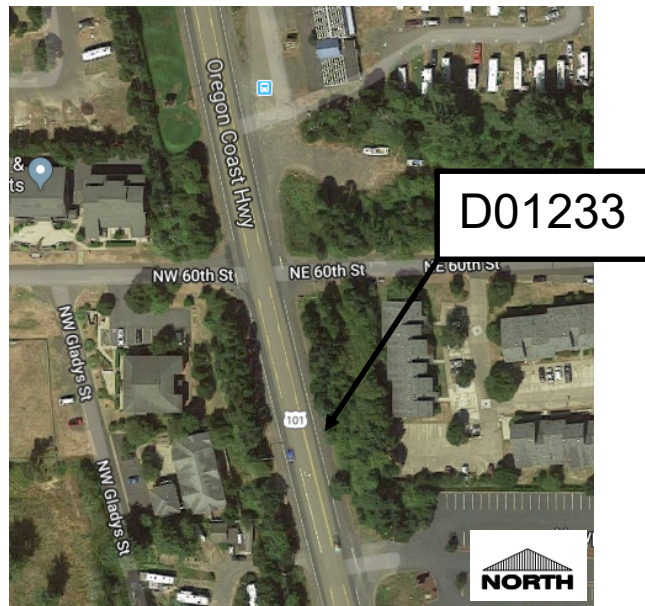


Figure 2: Facility location map

4. Facility Summary

The width is measured perpendicular to the edge of pavement and is equivalent to the flow length. The length is measured parallel to the edge of pavement and is equivalent to the length of the contributing impervious area.

The length and width of the applicable facility components are:

Component	Length (feet)	Width (feet)
Filter Strip	220	10

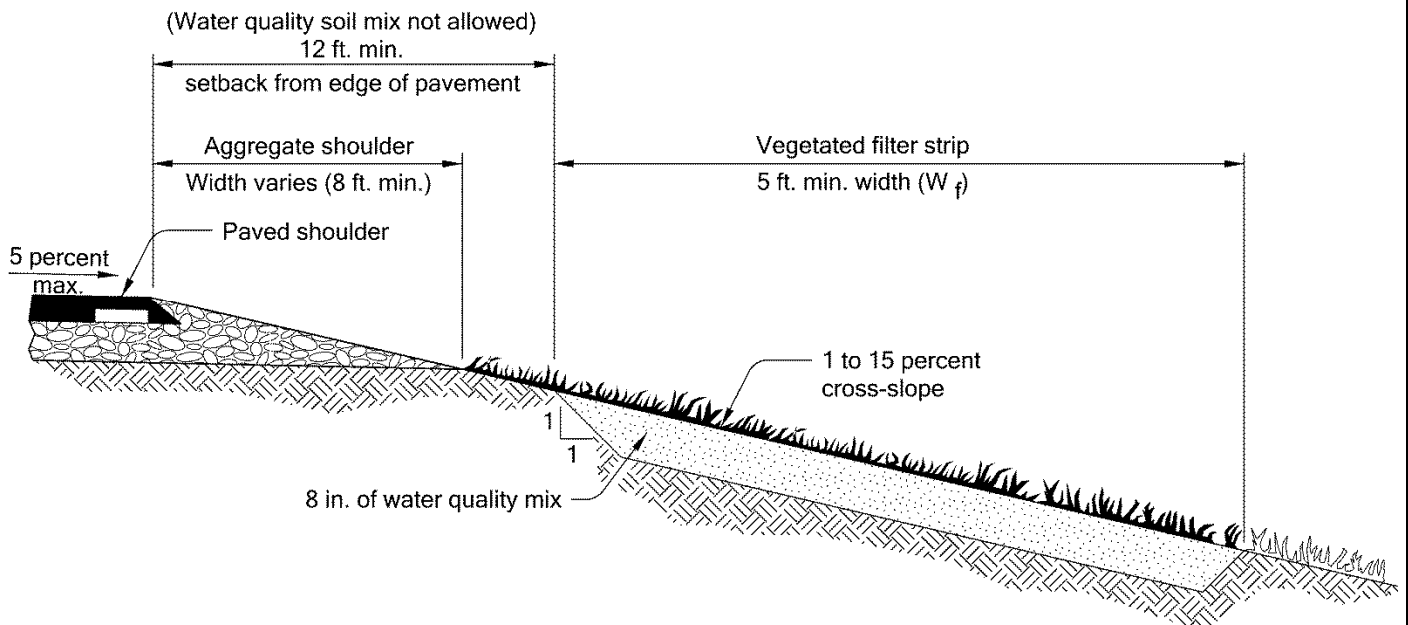


Figure 3: Filter Strip Section

The slope of the facility is presented by a vertical distance (rise) followed by the horizontal distance (run).

Side Slope	Rise (feet)	Run (feet)
Filter Strip	1	50

Site Specific Information: N/A

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 4: DFI No. D01233, looking North on US101

6. Operational Components / Maintenance Items

Classification and Standard Operational (Op) Plan:

This facility is classified as a:

<input checked="" type="checkbox"/> Filter Strip (Op Plan A)	<input type="checkbox"/> Bioslope (Op Plan B)
<p>A filter strip consists of a vegetated or media slope located parallel to the edge of pavement. It maintains sheet flow of stormwater runoff over the width of the strip.</p>	<p>A bioslope consists of a filter strip and treatment zone. It is a flow-through stormwater treatment facility located along roadside embankments.</p>
<p>A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A, B) are provided in the Standard Operation Manual.</p>	

See Appendix A for the site specific operational plan.

Operational Components

Filter strips and bioslopes have many components that assist with treatment, conveyance, and infiltration of stormwater runoff. The components in use can vary depending on the facility design. 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 Filter Strips and Bioslopes (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/>

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: Bioslope/Filter Strip Components		ID #
Facility Inlet		
Pavement Sheet Flow	<input checked="" type="checkbox"/>	B1
Aggregate Shoulder (Flow Spreader)	<input checked="" type="checkbox"/>	B2
Ground Cover		
Vegetated Slope	<input checked="" type="checkbox"/>	B3
Aggregate Media Slope	<input type="checkbox"/>	B4
Underground Components		
Water Quality Mix	<input checked="" type="checkbox"/>	B5
Ecology Mix	<input type="checkbox"/>	B6
Granular Drain Backfill Material	<input type="checkbox"/>	B7
Geotextile Fabric	<input type="checkbox"/>	B8
Geocell Grid	<input type="checkbox"/>	B9
Structures		
Curb/Berm	<input type="checkbox"/>	B10
Check Dam	<input type="checkbox"/>	B11
Cleanout	<input type="checkbox"/>	B12
Facility Outlet		
Perforated Drain Pipe	<input type="checkbox"/>	B13
Open Slope Outlet	<input type="checkbox"/>	B14
Open Channel Outlet (Ditch)	<input checked="" type="checkbox"/>	B15
Storm Drain Outlet Pipe	<input type="checkbox"/>	B16
Outfall Type		
Waterbody (Creek/Lake/Ocean)	<input type="checkbox"/> C	B17
	<input type="checkbox"/> L	
	<input type="checkbox"/> O	
Outfall Channel	<input type="checkbox"/>	B18
Storm Drain System	<input checked="" type="checkbox"/>	B19
Outfall Components		
Pervious Berm	<input type="checkbox"/>	B20
Riprap Pad	<input type="checkbox"/>	B21

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 filter strips and bioslopes:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities
- Table 4 (Water Quality Filter Strips)
- Table 5 (Water Quality Bioslopes)

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

Filter strips and bioslopes are NOT designed to allow the use of heavy equipment. Vehicles entering the facility 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.

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>

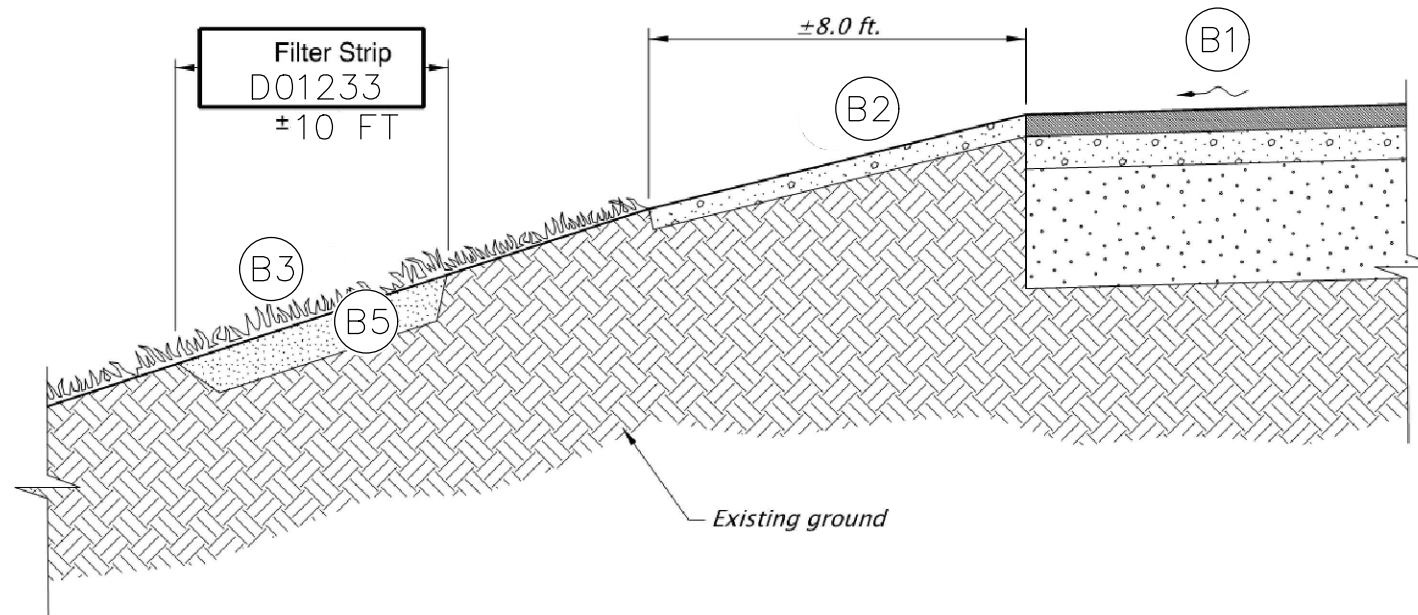
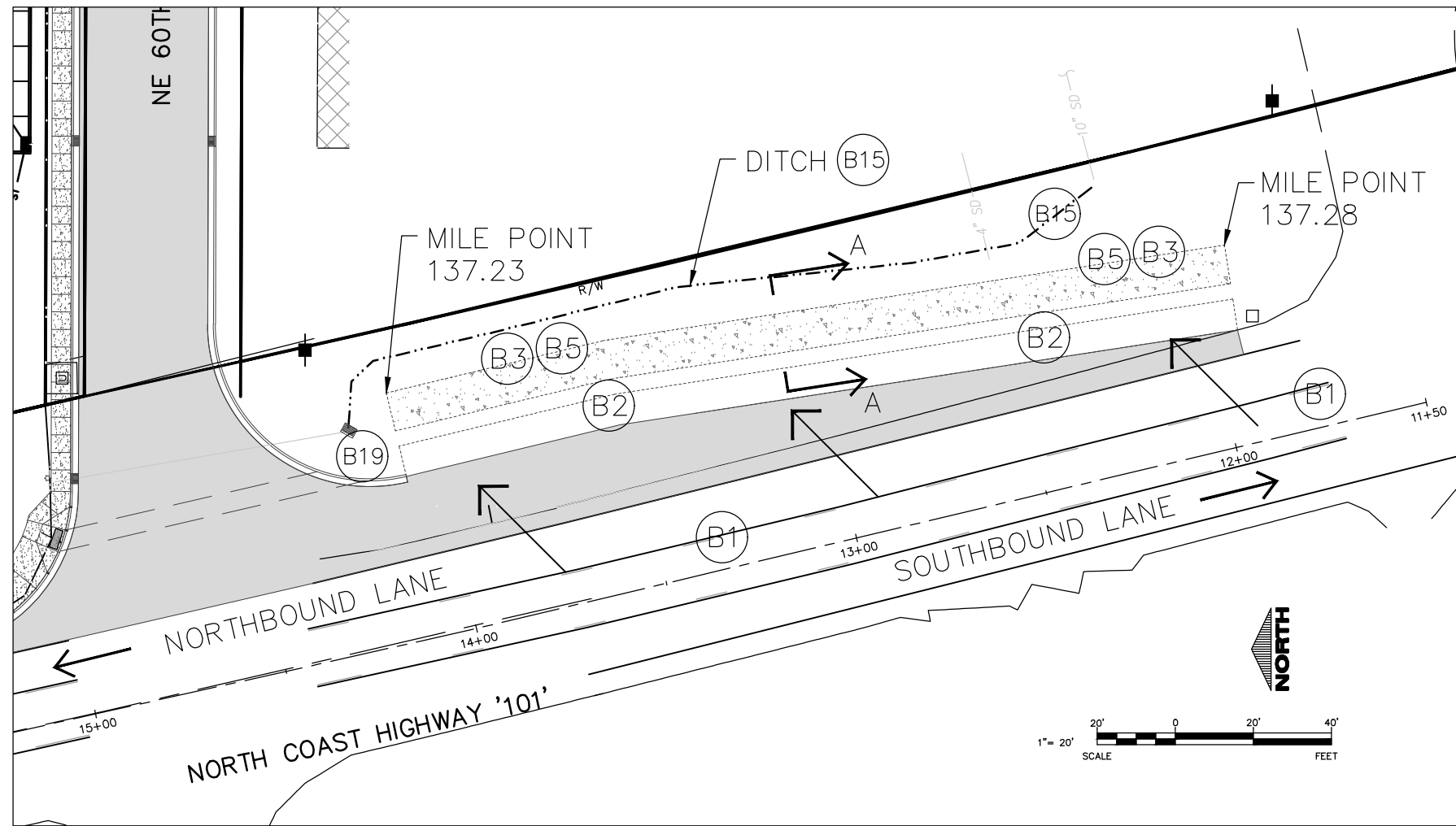
Contact any of the following for more detailed information about management of waste materials found on site:

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 D01233



SECTION A-A

PROJECT INFORMATION

FILTER STRIP MAINTENANCE
NE 60TH STREET AND HWY 101
 NE 60TH STREET • NEWPORT, OR 97365

PROFESSIONAL SEAL

JOB NUMBER

1833680

SHEET NUMBER

O&M

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project: N/A

PUBLIC ROAD IMPROVEMENTS FOR: NE 60TH STREET AND HWY 101 NEWPORT, OREGON

LEGEND

• 1000.00	PROPOSED SPOT ELEVATIONS (FLOW LINE OF CURB UNLESS OTHERWISE SPECIFIED)	— — — — —	PROPOSED DITCH CENTER LINE
• 1000.00 EG	EXISTING GRADE SPOT ELEVATIONS	— ST —	PROPOSED STORM SEWER AND MANHOLE
⊙	PROPOSED WATER VALVE IN BOX	— G —	EXISTING UNDERGROUND GAS LINE
⊙	PROPOSED ROUND CATCH BASIN	— — — — —	PROPOSED CURB AND GUTTER
■	PROPOSED CURB/DITCH INLET	— — — — —	EXISTING CURB AND GUTTER
→	PROPOSED DRAINAGE FLOW	— — — — —	GRADING/SEEDING LIMITS
⊥	PROPOSED SIGN	— 800 —	PROPOSED GROUND CONTOUR
⊕	CENTER LINE		
⊞	INLET PROTECTION		

SURVEY LEGEND

— 155 —	PROPERTY LINE	⊙	SIGN
— — — — —	CONTOUR LINE	○	CLEAN OUT
— SD —	ASPHALT LINE	⊙	AREA DRAIN
— WW —	CULVERT PIPE	⊞	CATCH BASIN
— W —	WASTE WATER LINE	⊞	WASTE WATER MANHOLE
— T —	WATER LINE	⊞	EVERGREEN TREE
— F —	COMMUNICATION LINE	⊞	DECIDUOUS TREE
— G —	FIBER OPTICS LINE	⊞	GRAVEL
— — — — —	GAS LINE	⊞	LANDSCAPE AREA
— — — — —	BOTTOM OF DITCH	⊞	BUILDING
— — — — —	TOP OF BANK	⊞	STRUCTURAL POLE
— — — — —	EASEMENT LINE	⊞	DENSE VEGETATION
MB	MAIL BOX		
EM	ELECTRIC METER		
E	ELECTRIC RISER		
U	UNKNOWN UTILITY		
WR	COMMUNICATION RISER		
⊞	WATER METER		
⊞	VALVE		
⊞	FIRE HYDRANT		
⊞	POWER POLE		
	POWER POLE w/ ARM		
	GUY WIRE		
	LIGHT POLE		

CIVIL SHEET INDEX

SHEET	SHEET TITLE
T1	CIVIL COVER AND LOCATION SHEET
D1	EXISTING SITE AND DEMOLITION PLAN
G1	OVERALL GRADING AND EROSION CONTROL PLAN
R1	NE 60TH STREET PLAN AND PROFILE
R2	HWY 101 ROAD PLAN
U1	NE 60TH STREET UTILITY PLAN AND PROFILE
DT1	CITY OF NEWPORT STREET DETAILS
DT2	CITY OF NEWPORT UTILITY DETAILS
DT3A	OREGON DOT RAMP GRADING DETAILS
DT3B	OREGON DOT DETAILS
DT4	OREGON DOT DETAILS
DT5	OREGON DOT DETAILS
DT6	OREGON DOT DETAILS
DT7	OREGON DOT DETAILS

TO OBTAIN LOCATION OF PARTICIPANTS' UNDERGROUND FACILITIES BEFORE YOU DIG IN OREGON

CALL UTILITY NOTIFICATION CENTER
811 OR 1-800-332-2344

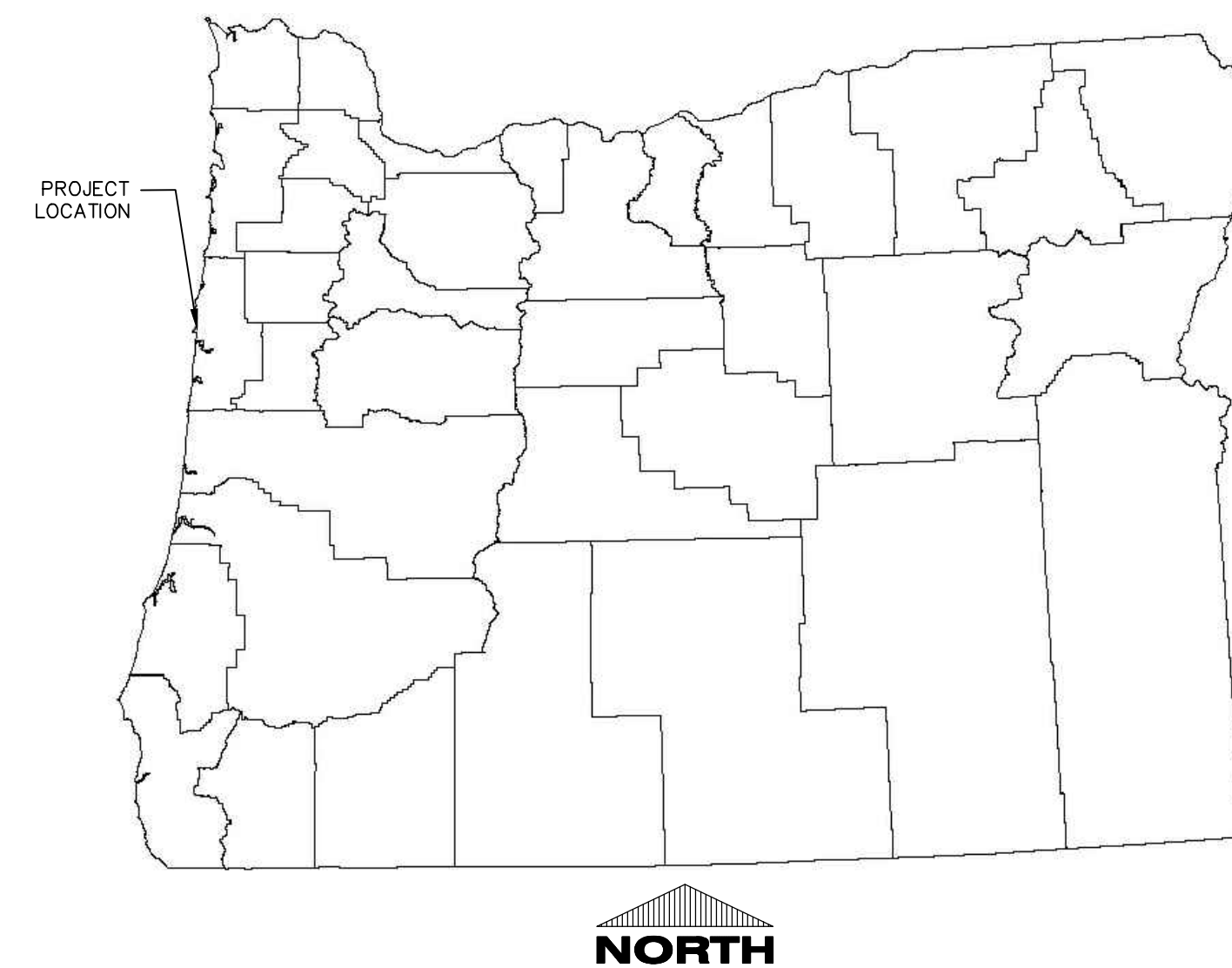
OREGON LAW
REQUIRES MINIMUM OF 2 WORK DAYS
NOTICE BEFORE YOU EXCAVATE

PLAN SPECIFICATIONS

THE WORK SHOWN IN THE RIGHT-OF-WAY OF STATE HIGHWAY 101 IN THIS PLAN SET SHALL BE DONE IN ACCORDANCE WITH THE CURRENT OREGON STANDARD SPECIFICATIONS OR ODOT APPROVED MANUAL OF THE OREGON DEPARTMENT OF TRANSPORTATION.

THE WORK SHOWN IN THE RIGHT-OF-WAY OF NE 60TH STREET IN THE CITY OF NEWPORT, OREGON SHALL CONFORM TO THE CITY OF NEWPORT GENERAL SPECIFICATIONS AND STANDARD DETAIL PLATES FOR STREET AND UTILITY CONSTRUCTION.

PROJECT LOCATION MAP



CITY OF NEWPORT



GENERAL PROJECT NOTES

- CITY
- DEVELOPER TO OBTAIN TEMPORARY CONSTRUCTION EASEMENTS FOR GRADING LIMITS ON NEIGHBORING PROPERTY TO SOUTH PRIOR TO CONSTRUCTION.
 - PROVIDE ACCESS TO EXISTING DRIVEWAYS ON NE 60TH STREET AT ALL TIMES DURING CONSTRUCTION.
 - ALL DRIVEWAYS AND CURB CUTS TO BE CONSTRUCTED ACCORDING TO LOCAL ORDINANCES. CONTRACTOR TO OBTAIN ALL NECESSARY PERMITS.
- ODOT
- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL WORK IN ROW PERMITS.
 - NO HWY 101 ROAD CLOSURES WILL BE PERMITTED FROM 6-9AM AND 4-7PM MONDAY THROUGH FRIDAY OR 12PM FRIDAY TO 7PM SUNDAY.
 - ALL CUTS IN PAVEMENT SHALL BE FULL DEPTH SAW CUTS. A MINIMUM COMPACTED THICKNESS OF 4" OR MATCH EXISTING, WHICHEVER IS GREATER. PAVEMENT TO BE COMPACTED IN 2" LIFTS.
 - CUT AREAS SHALL BE COLD PATCHED AT THE END OF THE WORKDAY AND PATCH MAINTAINED. COLD PATCH AREAS SHALL BE HOT PATCHED WITHIN 10 DAYS. ALL COLD PATCH TO BE EXCAVATED PRIOR TO HOT PATCH RESTORATION.
 - PAVEMENT GRINDING SHALL CONFORM TO STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, COLD PLANE PAVEMENT REMOVAL. PAVEMENT SURFACE SHALL BE UNIFORMLY MILLED USING EQUIPMENT THAT IS CAPABLE OF ACCURATELY ESTABLISHING PROFILE GRADES WITHIN A TOLERANCE OF 1/8" (6mm) BY REFERENCE FROM EITHER THE EXISTING PAVEMENT OR INDEPENDENT GRADE CONTROL.
 - ASPHALT EMULSION TACK COAT SHALL BE USED TO SEAL THE ASPHALT TO THE EDGES OF THE EXISTING ASPHALT. ALL CUT AREAS SHALL BE SEALED WITH AN ODOT APPROVED POLYMER ASPHALT SEALANT.
 - ALL EXISTING PAVEMENT MARKINGS AND LEGENDS ARE TO BE RESTORED WITH LIKE KIND.
 - APPLICANT SHALL ACCEPT RESPONSIBILITY FOR PAVEMENT STRESS OR SETTLEMENT OF THE "T"-CUT RESTORATION SECTION FOR A PERIOD OF 2 YEARS.
 - DEVELOPER SHALL ACQUIRE ALL NECESSARY EASEMENTS.
 - CONTRACTOR SHALL ACQUIRE WORK IN ROW PERMITS FROM CITY PRIOR TO BEGINNING WORK IN ROW.

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PROJECT INFORMATION

PUBLIC ROAD IMPROVEMENTS
NE 60TH STREET AND HWY 101
NE 60TH STREET • NEWPORT, OR 97365

PROFESSIONAL SEAL

SHEET DATES

ISSUE DATE MAR. 1, 2019

REVISIONS

NO.	DATE	DESCRIPTION

JOB NUMBER

1833680

SHEET NUMBER

T1

PROJECT INFORMATION

**PUBLIC ROAD IMPROVEMENTS
 NE 60TH STREET AND HWY 101
 NE 60TH STREET • NEWPORT, OR 97365**

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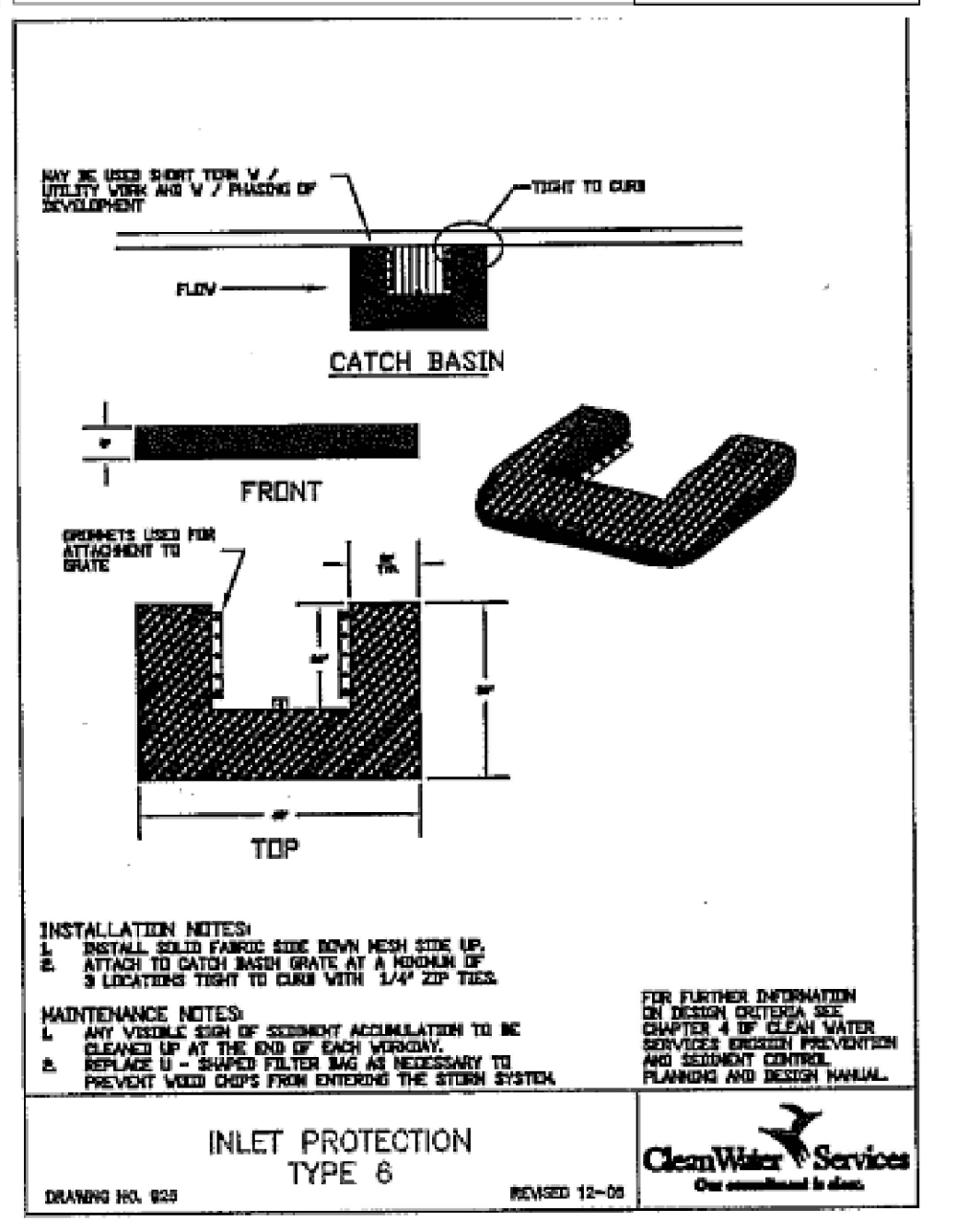
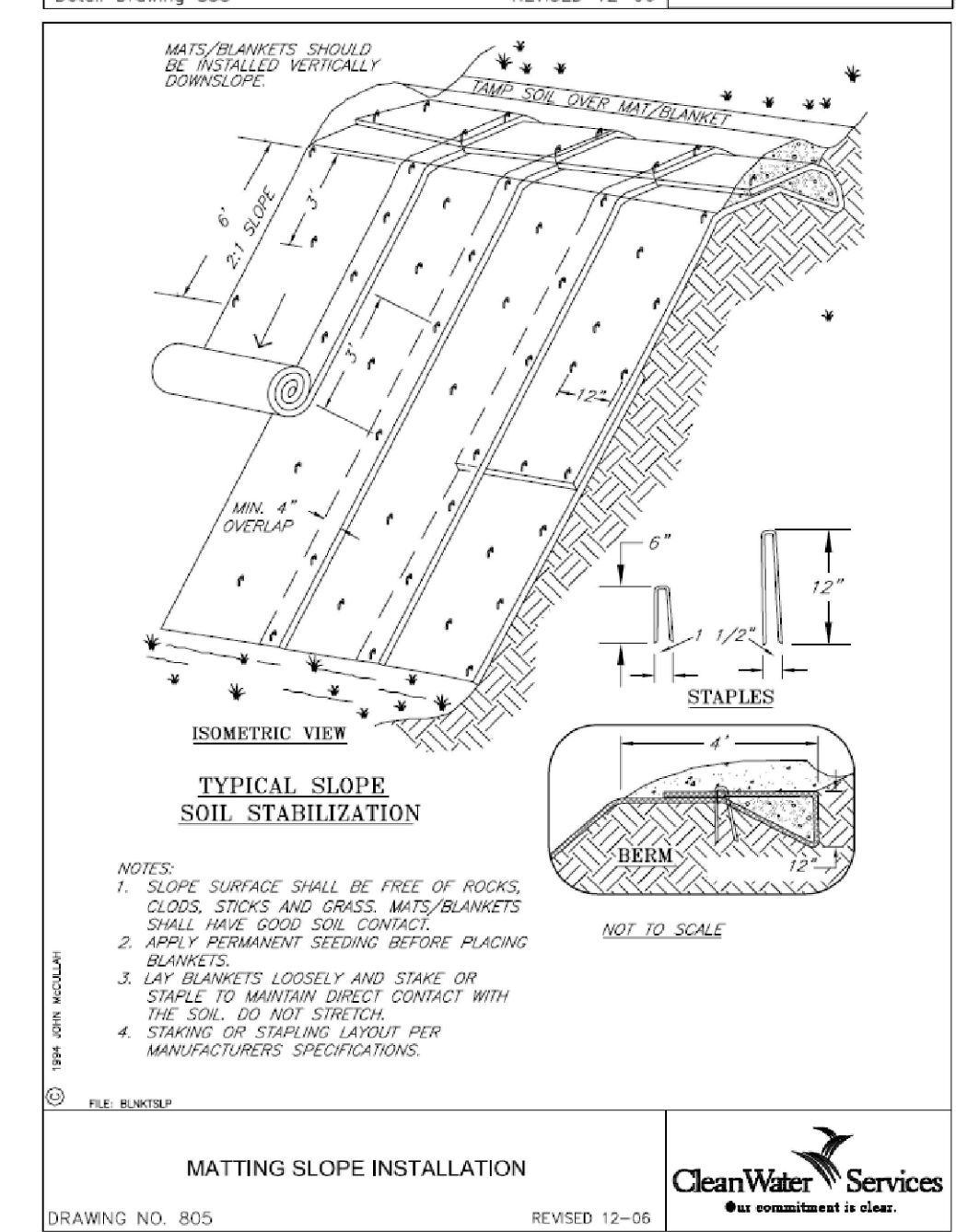
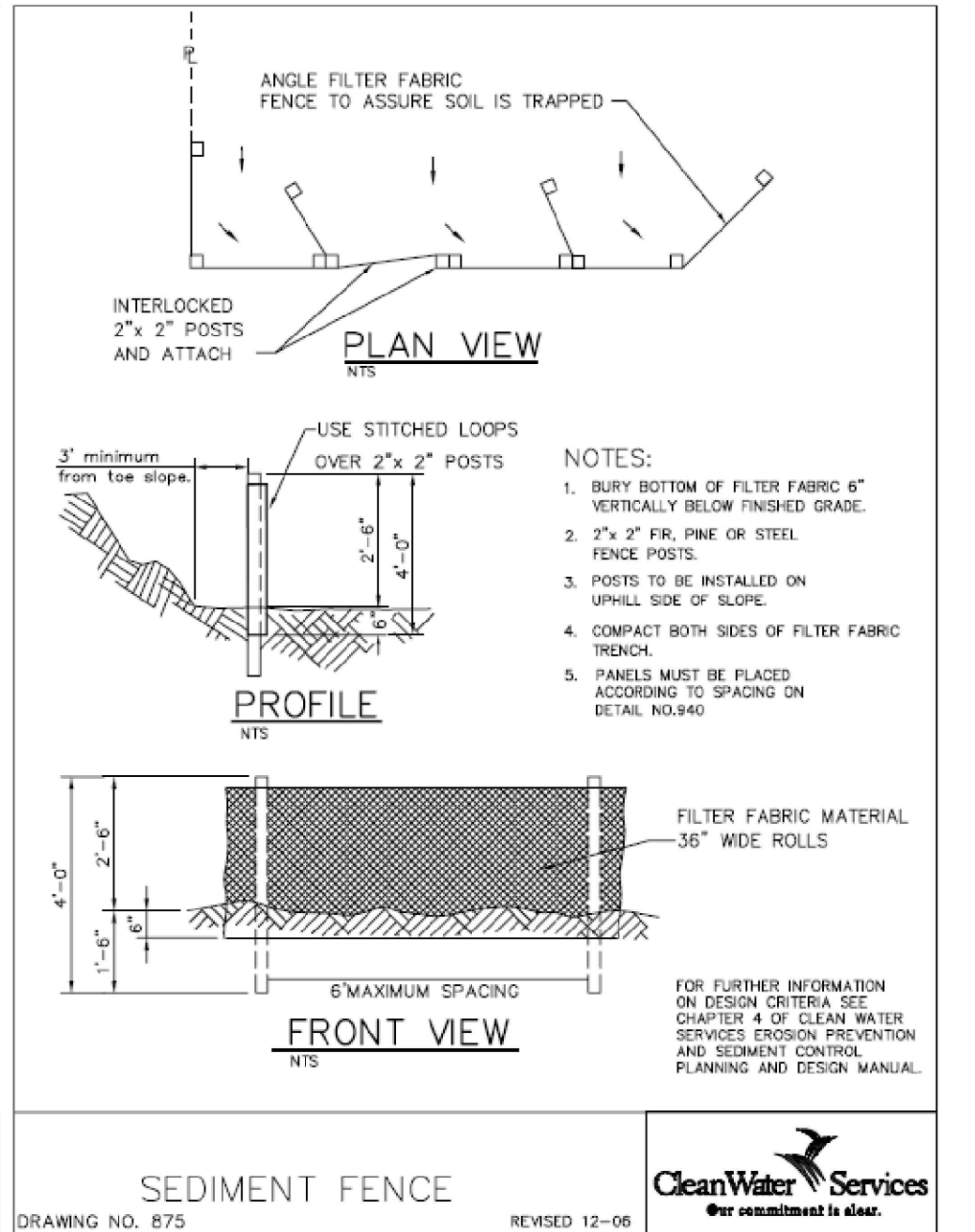
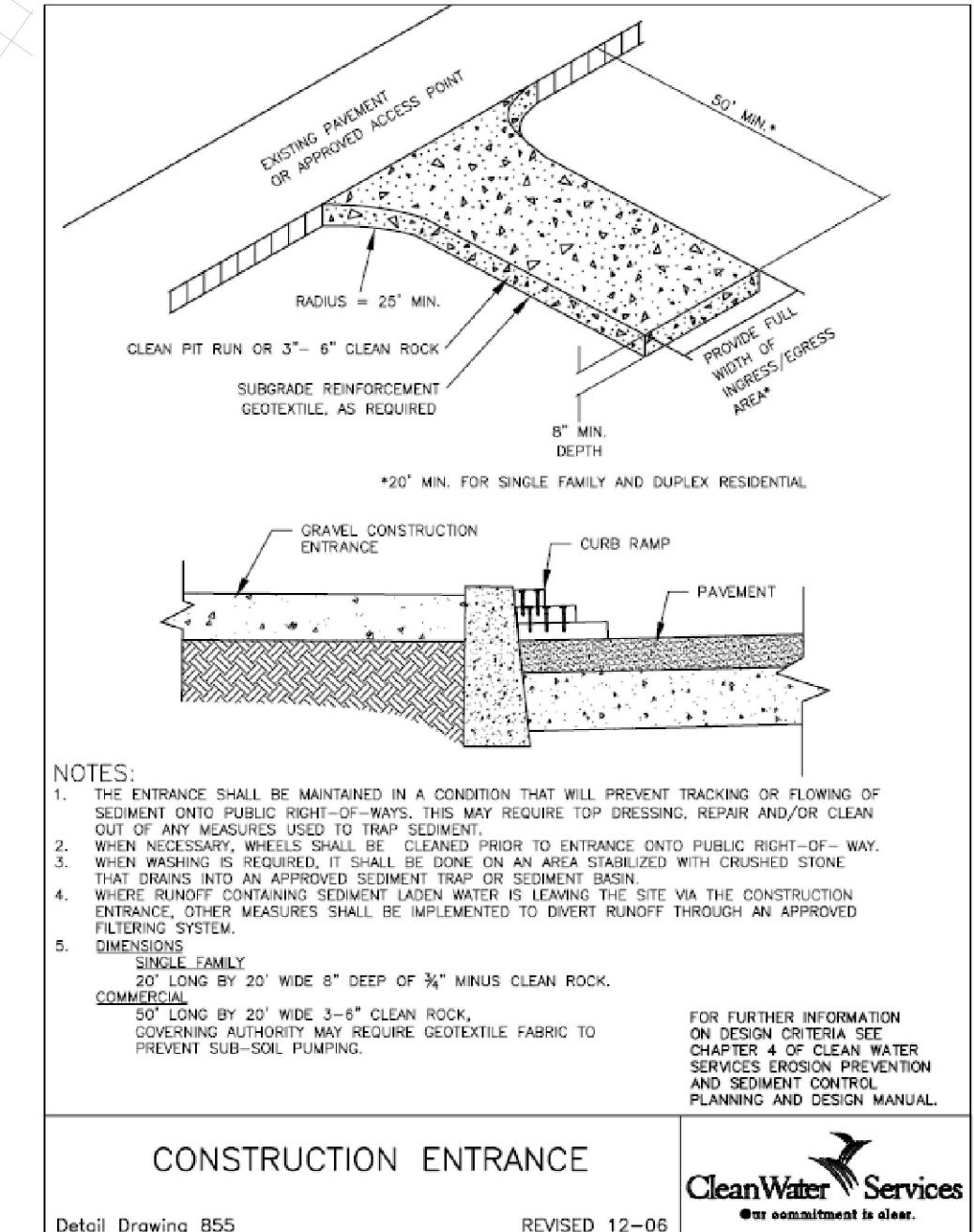
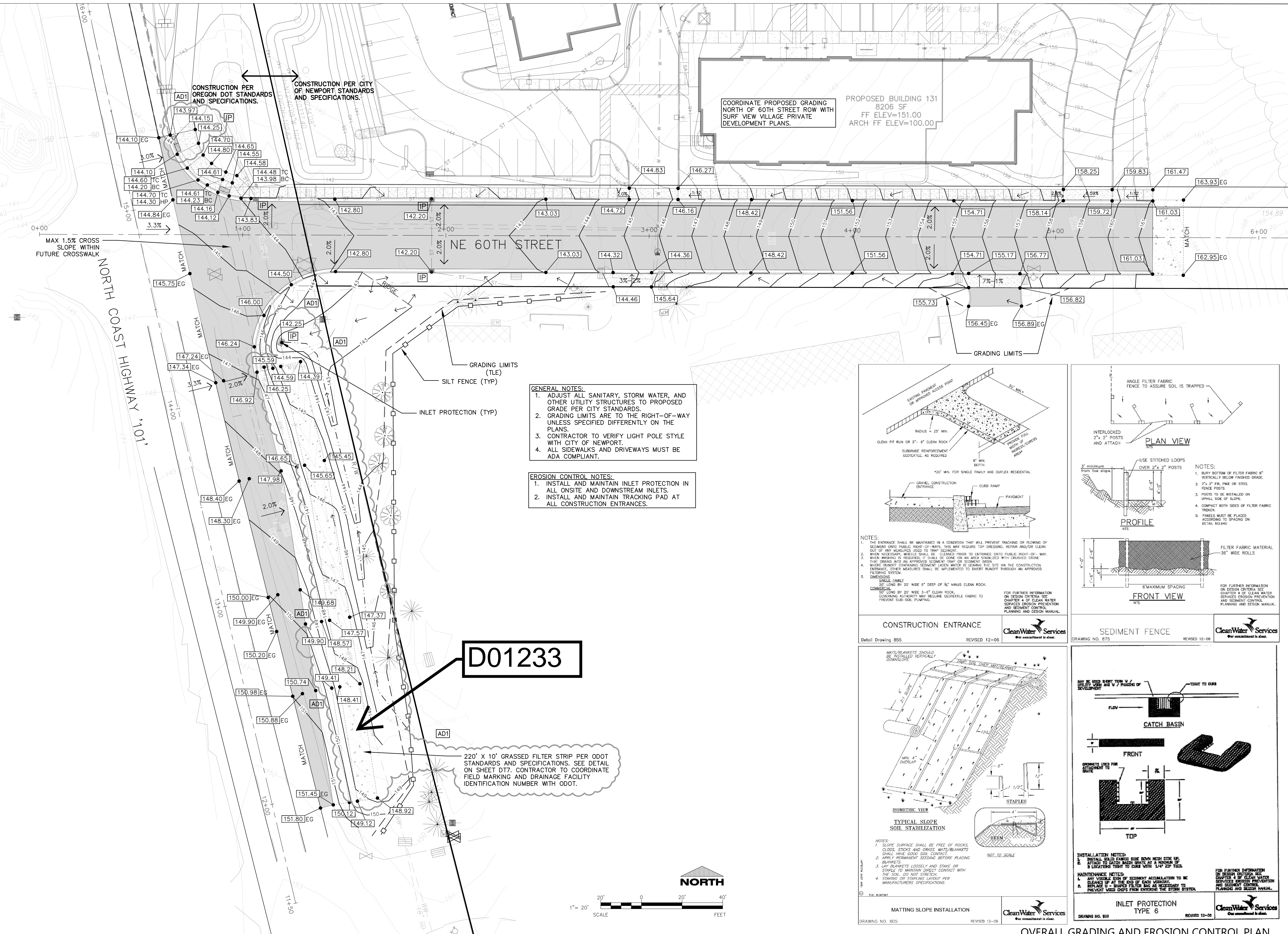
AD1 APR. 22, 2019

JOB NUMBER

1833680

SHEET NUMBER

G1



PROJECT INFORMATION

PUBLIC ROAD IMPROVEMENTS
NE 60TH STREET AND HWY 101
NE 60TH STREET • NEWPORT, OR 97365

PROFESSIONAL SEAL

SHEET DATES

ISSUE DATE **MAR. 1, 2019**

REVISIONS

JOB NUMBER

1833680

SHEET NUMBER

DT7

BI-DIRECTIONAL RECESSED PAVEMENT MARKER DETAIL

MONO-DIRECTIONAL RECESSED PAVEMENT MARKER DETAIL

SECTION A - A

SECTION A - A

LEGEND

- Bi-directional yellow marker reflects yellow both left and right in this symbol
- Mono-directional crystal white marker reflects white to the left in this symbol

Accompanied by dwgs. TMS17, TMS18

CALC. BOOK NO. N/A

BASELINE REPORT DATE 07/01/2015

OREGON STANDARD DRAWINGS

RECESSED PAVEMENT MARKERS

DATE 2018

REVISION DESCRIPTION

Effective Date: December 01, 2018 - May 31, 2019

TMS17

SINGLE POST ELEVATION

TWO POST ELEVATION

THREE POST ELEVATION

PERMANENT PERFORATED STEEL SQUARE TUBE TABLE

Square Tube Size	(X * Y * Z) in R ¹ - Maximum 3 Second Gust Wind Speed (TM671)								
	85 MPH			95 MPH			105 or 110 MPH		
	Number of Posts	Number of Posts	Number of Posts	Number of Posts	Number of Posts	Number of Posts	Number of Posts	Number of Posts	
2" - 12 ga.	79	158	237	63	126	189	57	114	171
2 1/2" - 12 ga.	136	272	408	109	218	327	98	196	294
2 3/4" - 10 ga.	163	326	495	132	264	396	119	238	357
2 3/4" & 2 1/2" - 12 ga.	231	462	693	185	370	555	167	334	501

TEMPORARY PERFORATED STEEL SQUARE TUBE TABLE

Square Tube Size	(X * Y * Z) in R ¹ - Maximum 3 Second Gust Wind Speed (TM671)								
	85 MPH			95 MPH			105 or 110 MPH		
	Number of Posts	Number of Posts	Number of Posts	Number of Posts	Number of Posts	Number of Posts	Number of Posts	Number of Posts	
2" - 12 ga.	125	250	375	100	200	300	90	180	270
2 1/2" - 12 ga.	215	430	645	172	344	516	155	310	465
2 3/4" - 10 ga.	261	522	783	209	418	627	189	378	567
2 3/4" & 2 1/2" - 12 ga.	364	728	1092	292	584	876	262	524	789

BASE REQUIREMENTS

1. Anchor - See Drawing TM687 for PSST anchor foundation details.
2. Slip - See Drawing TM688 for PSST slip base foundation details.
3. N/A - Do not use this option.

Accompanied by dwgs. TM200, TM671, TM687, TM688, TM689, TM822

CALC. BOOK NO. 5752

BASELINE REPORT DATE 10-JUL-2017

OREGON STANDARD DRAWINGS

PERFORATED STEEL SQUARE TUBE (PSST) SIGN SUPPORT INSTALLATION

DATE 2018

REVISION DESCRIPTION

Effective Date: June 1, 2019 - November 30, 2019

TM681

2" ANCHOR DETAIL

2" OPTIONAL ANCHOR DETAIL

2 1/2" ANCHOR DETAIL

PLAN

General Notes:

- Material grade for base hardware connection shall be according to the manufacturer's recommendation and based on crash testing.
- Anchor steel shall be hot dipped galvanized or approved equal.
- Footing concrete shall be Commercial Grade Concrete (fc = 3000 psi) per Specification 00446. The CCC mixture may be accepted at the site of placement according to 00440.14.
- The estimated concrete volume is .09 cubic yards.

Accompanied by dwgs. TM681, TM688

CALC. BOOK NO. 5752

BASELINE REPORT DATE 06-JAN-2012

OREGON STANDARD DRAWINGS

PERFORATED STEEL SQUARE TUBE (PSST) ANCHOR FOUNDATION

DATE 2018

REVISION DESCRIPTION

Effective Date: June 1, 2019 - November 30, 2019

TM687

14-B-18

Biofiltration Facilities

PLAN VIEW

SECTION A-A

Figure 7 Grassed Filter Strip

ODOT Hydraulics Manual

April 2014