OPERATION & MAINTENANCE MANUAL

Water Quality Bioslope

Manual prepared: February 2019

DFI No. D01220

Figure 1: DFI No. D01220, looking south

1. Identification

Drainage Facility ID (DFI):	D01220
Facility Type:	Water Quality Bioslope/Media Filter Drain (MFD)
Construction Drawings:	(V-File Numbers) 43V-086
Location:	District: 2B Highway No.: 047 Mile Post: 65.36 to 65.50, [Right side]

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

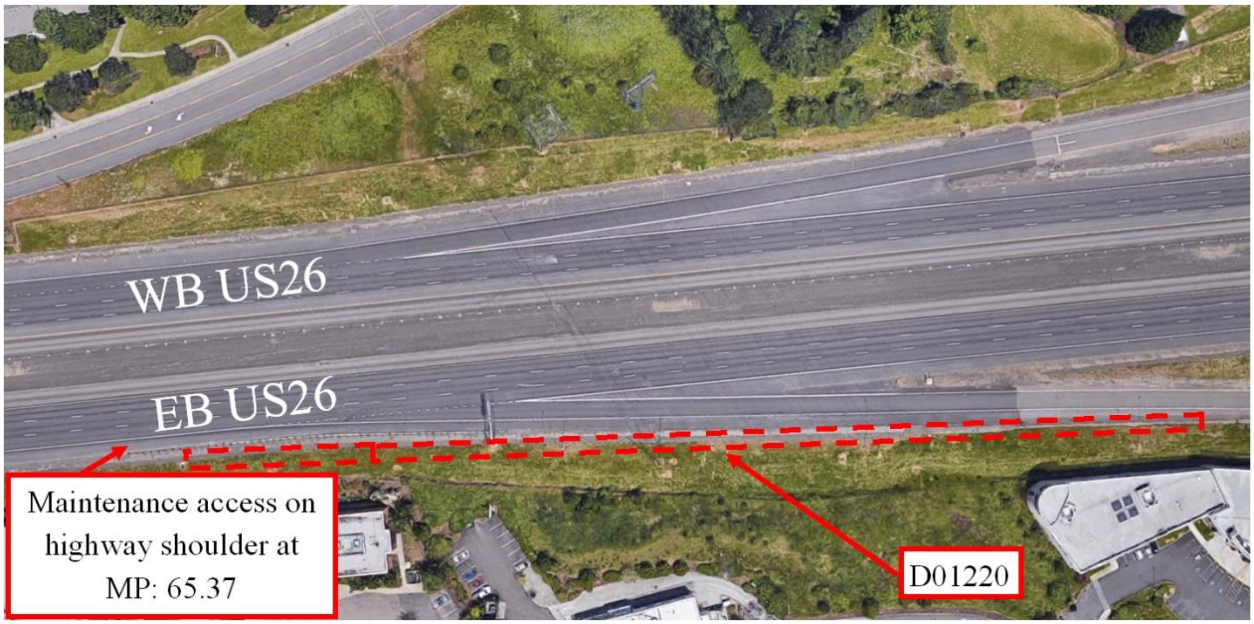


Figure 2: Facility map

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)
Type 1	**396**	**8**
Type 2	**320**	**8**

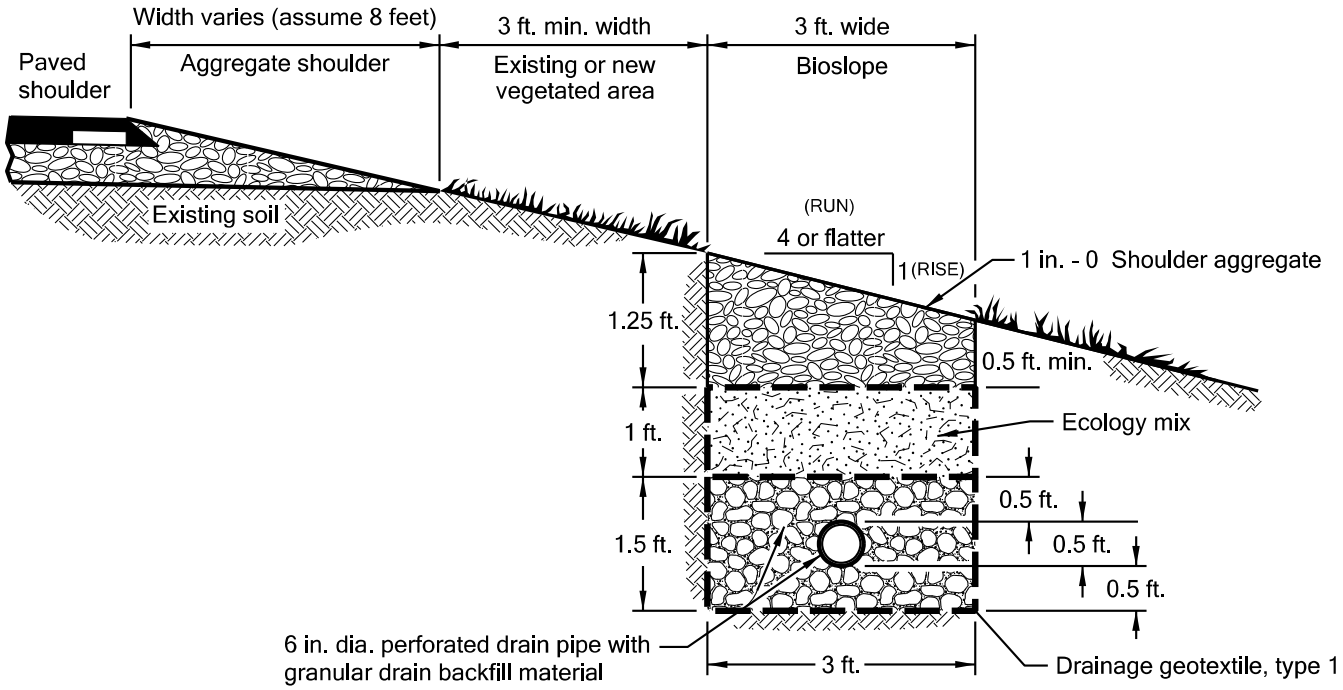


Figure 3: Bioslope Section (Typical)

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

Side Slope	Rise (feet)	Run (feet)
Type 1	**1**	**6**
Type 2	**1**	**6**

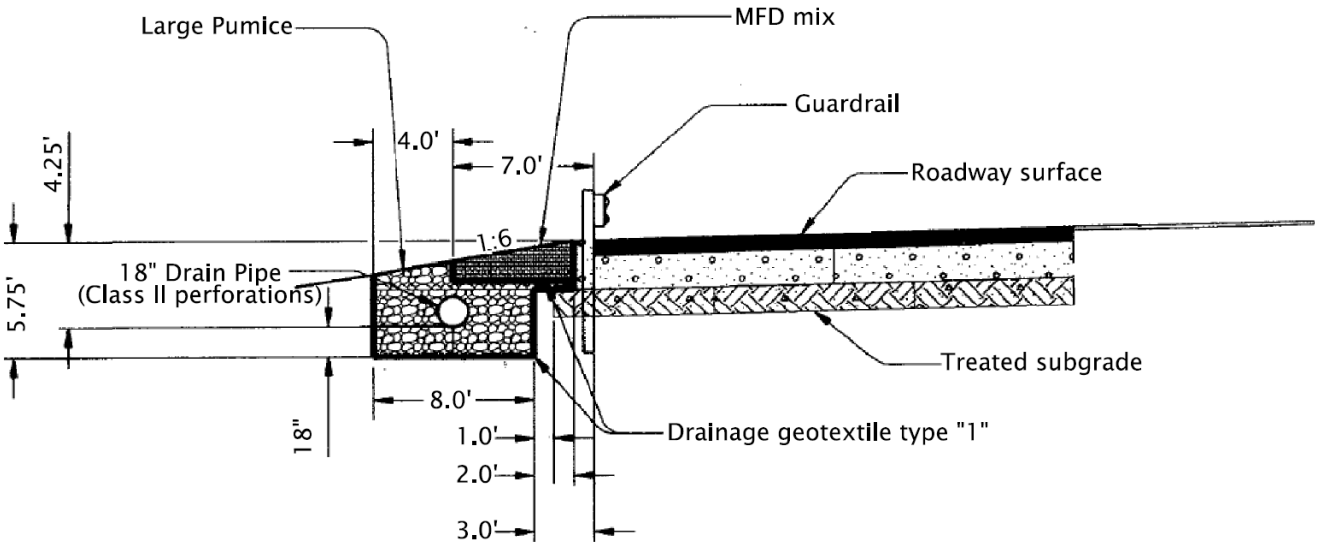


Figure 4: Type 2 Bioslope with slope configuration (No vegetated area/zone)

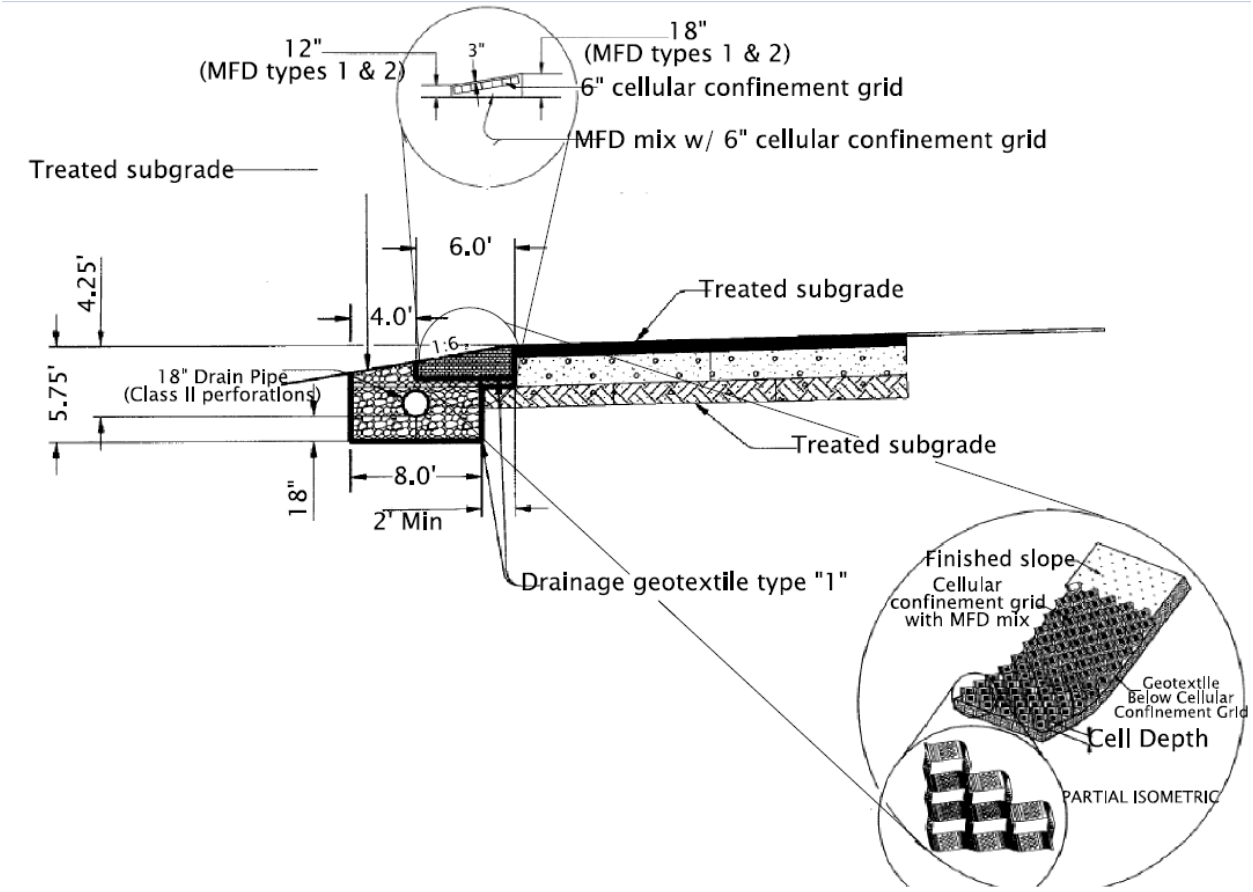


Figure 5: Type "1" Bioslope with slope configuration (No vegetated area/zone)

Site Specific Information: There are two types of bioslopes within this one water quality facility. The Type 2 bioslope is 320 feet long from mile points 65.37 – 65.42. Type 2 has a guardrail in place and no confinement grid (See Figure 4). The Type 1 bioslope is 396 feet from mile points 65.42 – 65.50 (See Figure 5). The water flows through the facility and out into a drain pipe. The water then flows through D01222 and ultimately into Willow Creek.

The facility is a modified version of the typical bioslope (Figure 3). The main difference is the exclusion of a vegetation area between the edge of pavement and the bioslope section. This was developed as a result of right of way limitations, and in some locations, the prohibitive costs of moving adjacent high voltage line and frontage road.

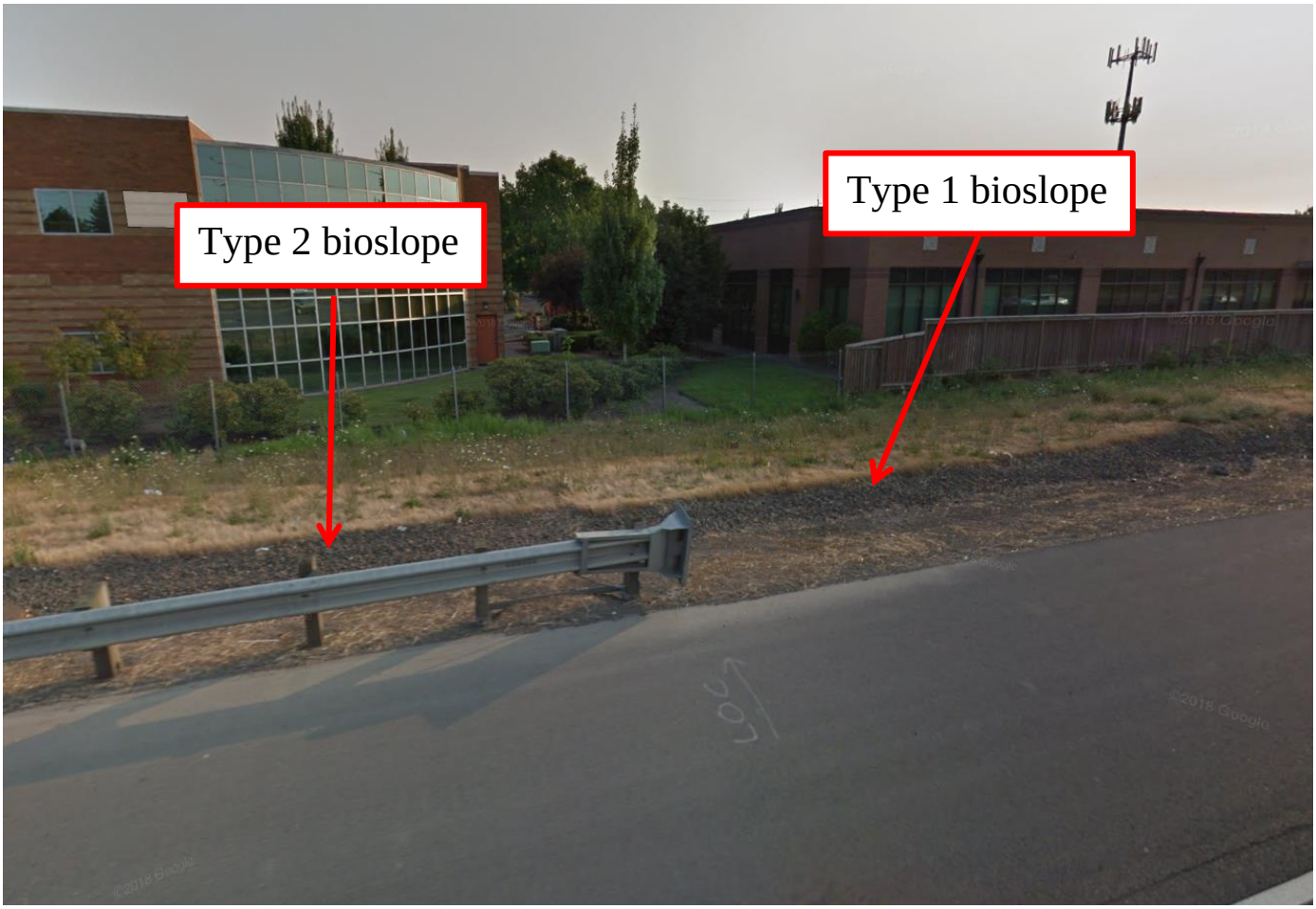


Figure 6: Type 1 and 2 bioslopes

5. Facility Access

Maintenance access to the facility:

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

Figure 7: Maintenance Access

6. Operational Components / Maintenance Items

Classification and Standard Operational (Op) Plan:

This facility is classified as a:

☐ Filter Strip (Op Plan A)	☒ Bioslope (Op Plan B)
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.	A bioslope consists of a filter strip and treatment zone. It is a flow-through stormwater treatment facility located along roadside embankments.
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.	

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 February 2019) outlines facility operation, typical footprint configuration, and component definitions and details. A link to the manual is attached to the feature marker in 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	☒	**B1**
Flow Spreader	☐	**B2**
Ground Cover		
Vegetated Slope	☐	**B3**
Large Pumice	☒	**B4**
Underground Components		
Water Quality Mix	☐	**B5**
Ecology Mix	☒	**B6**
Granular Drain Backfill Material	☒	**B7**
Geotextile Fabric	☒	**B8**
Cellular Confinement Grid	☒	**B9**
Structures		
Curb/Berm	☐	**B10**
Check Dam	☐	**B11**
Cleanout	☐	**B12**
Facility Outlet		
Perforated Drain Pipe	☒	**B13**
Open Slope Outlet	☐	**B14**
Open Channel Outlet	☐	**B15**
Storm Drain Outlet Pipe	☒	**B16**
Outfall Type		
Waterbody (**C**reek/**L**ake/**O**cean)	☐ **C** ☐ **L** ☐ **O**	**B17**
Outfall Channel	☐	**B18**
Storm Drain System	☒	**B19**
Outfall Components		
Pervious Berm	☐	**B20**
Riprap Pad	☐	**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

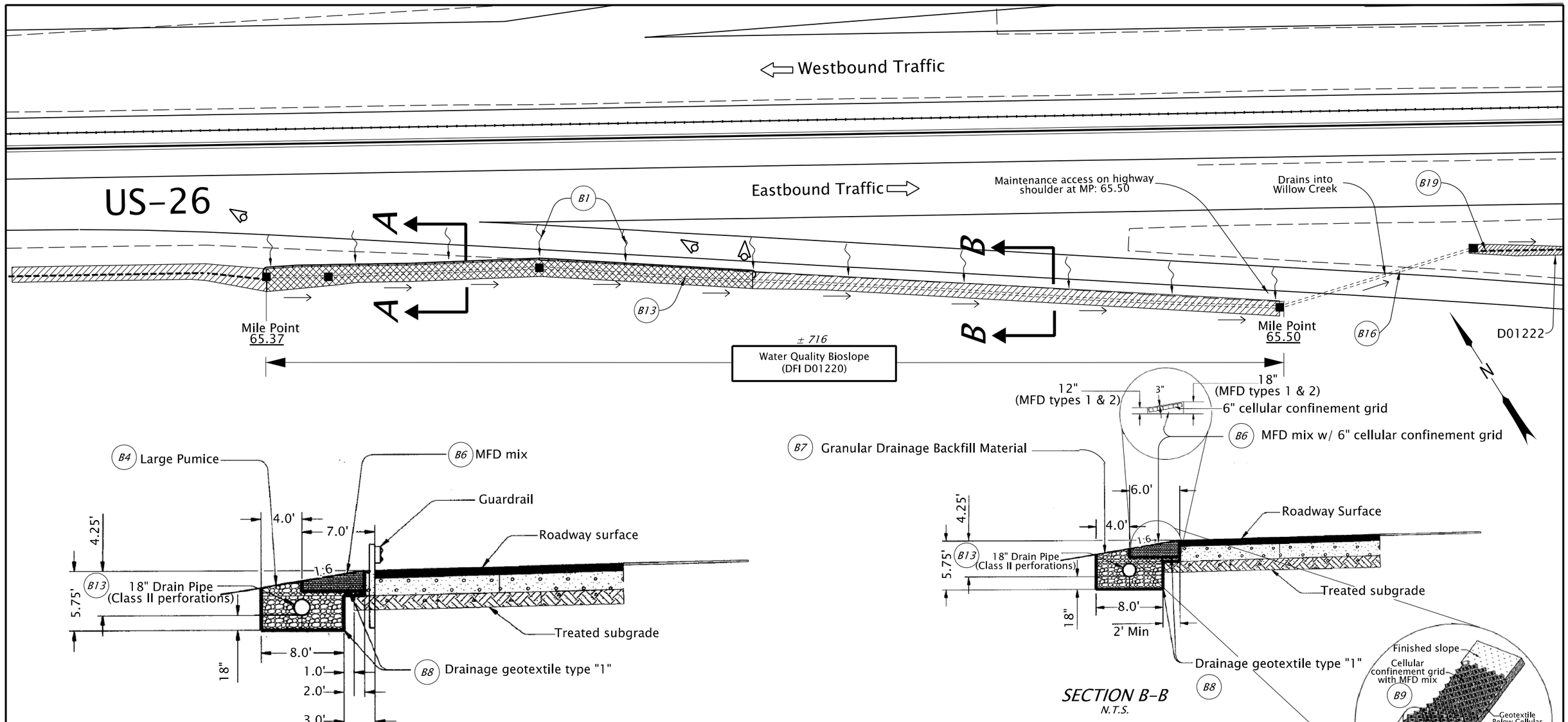
Contact any of the following for more detailed information about management of waste materials found on site:

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 D01220



SECTION A–A
N.T.S.

SECTION B–B
N.T.S.

*Section A–A is a type "2" bioslope and is 320 ft long from MP: 65.37 – 65.42

*Section B–B is a type "1" bioslope and is 396 ft long from MP: 65.42 – 65.50

LEGEND

- Inlet
- Manhole
- Water Conveyence Direction
- Water Flow Direction
- Traffic Flow Direction
- Type "2" Bioslope
- Type "1" Bioslope
- Pipe (Facility)
- Pipe (Not part of Facility)
- Photo Location/Direction

Sht. 01 of 01

Prepared By: Katrina Sepulveda

Drafted By: Katrina Sepulveda

OREGON DEPARTMENT OF TRANSPORTATION

DFI D01220
MAINTENANCE DISTRICT 2B HWY 047
Water Quality Bioslope
Sunset Highway MP 65.36 - 65.50
Washington County

D01220_Bioslope.dgn :: Default 5/31/2019 1:02:59 PM hwym18g

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 43V-086

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd.
1A-2	Std. Drg. Nos.

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

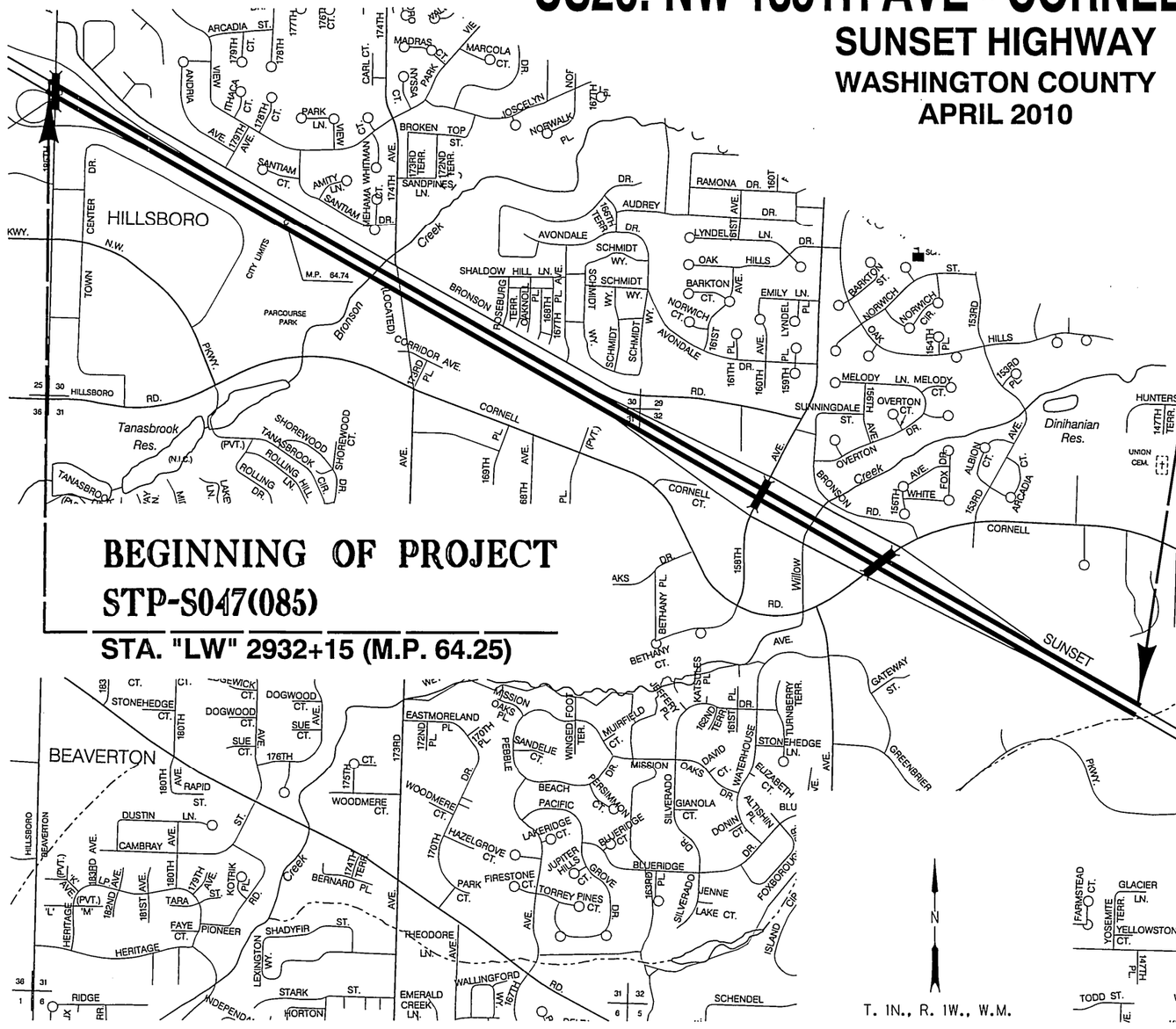
GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS & ROADSIDE DEVELOPMENT

US26: NW 185TH AVE - CORNELL ROAD SEC.

SUNSET HIGHWAY

WASHINGTON COUNTY

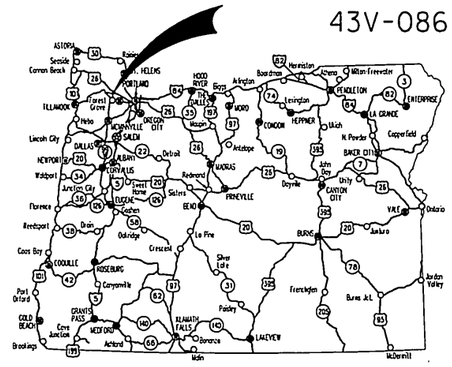
APRIL 2010



BEGINNING OF PROJECT
STP-S047(085)
STA. "LW" 2932+15 (M.P. 64.25)

END OF PROJECT
STP-S047(085)
STA. "LW" 3042+00 (M.P.66.35)

T. 1N., R. 1W., W.M.



Overall Length Of Site - 2.10 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.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

OREGON TRANSPORTATION COMMISSION

Gail Achterman	CHAIR
Michael Nelson	VICE-CHAIR
Janice Wilson	COMMISSIONER
Alan Brown	COMMISSIONER
David Lohman	COMMISSIONER
Matthew L. Garrett	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.

By: _____ Signature & date 2/5/10

Naveen G. Chandra P.E. - R1 Project Delivery Manager

Print name and title

_____

Concurrence by ODOT Chief Engineer

US26: NW 185TH AVE - CORNELL ROAD SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STP-S047(085)	1

43V-086

INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
2, 2A, 2A-2 Thru 2A-16	Typical Sections
2B, 2B-2 Thru 2B-3	Details
2C, 2C-2 Thru 2C-24	Traffic Control Plans
2C-25 Thru 2C-31	Detour Plan
2D, 2D-2	Pipe Data Sheet
3	Alignment
3A	General Construction
3B	Drainage & Utilities
3C	Drainage Profile
4	Alignment
4A	General Construction
4B	Drainage & Utilities
4C	Drainage Profile
5	Alignment
5A	General Construction
5B	Drainage & Utilities
5C	Drainage Profile
6	Alignment
6A	General Construction
6B	Drainage & Utilities
6C	Drainage Profile
7	Alignment
7A	General Construction
7B	Drainage & Utilities
6C	Drainage Profile
8	Alignment
8A	General Construction
8B	Drainage & Utilities
8C	Drainage Profile
9	Alignment
9A	General Construction
9B	Drainage & Utilities
9C	Drainage Profile
10	Alignment
10A	General Construction
10B	Drainage & Utilities
10C	Drainage Profile
11	Alignment
11A	General Construction
11B	Drainage & Utilities
11C	Drainage Profile
12	Alignment
12A	General Construction
12B	Drainage & Utilities
12C	Drainage Profile

INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
PERMANENT PAVEMENT MARKERS	
ST	Striping Details
ST-2 Thru ST-11 Incl.	Striping Plan
GEO/HYDRO	
GA, GA-2 Thru GA-11 Incl.	Erosion Control Plan
GA-12 Thru GA-15 Incl.	Erosion Control Details

DRAWING NO.	SHEET NO.	DESCRIPTION
83488	GB	Geotechnical Data
83495	GB-2	Geotechnical Data
83498	GB-3	Geotechnical Data
83499	GB-4	Geotechnical Data
BRIDGE NO. 21329 - NORTH RETAINING WALL		
83489	GC	Retaining Wall Plan & Profile
83490	GC-2	Retaining Wall Plan & Profile
83491	GC-3	Retaining Wall Plan & Profile
83492	GC-4	Retaining Wall Plan & Profile
BRIDGE NO. 21328 - SOUTH RETAINING WALL		
83496	GC-5	Retaining Wall Plan & Profile
83493	GC-6	North Retaining Wall Details
83494	GC-7	South Retaining Wall Details
83497	GC-8	Retaining Wall Details
	GJ, GJ-2 Thru GJ-3	Water Quality Details

ROADSIDE DEVELOPMENT	
GN, GN-2 Thru GN-8	Roadside Development Details
GN-9 Thru GN-12	Roadside Development Plan

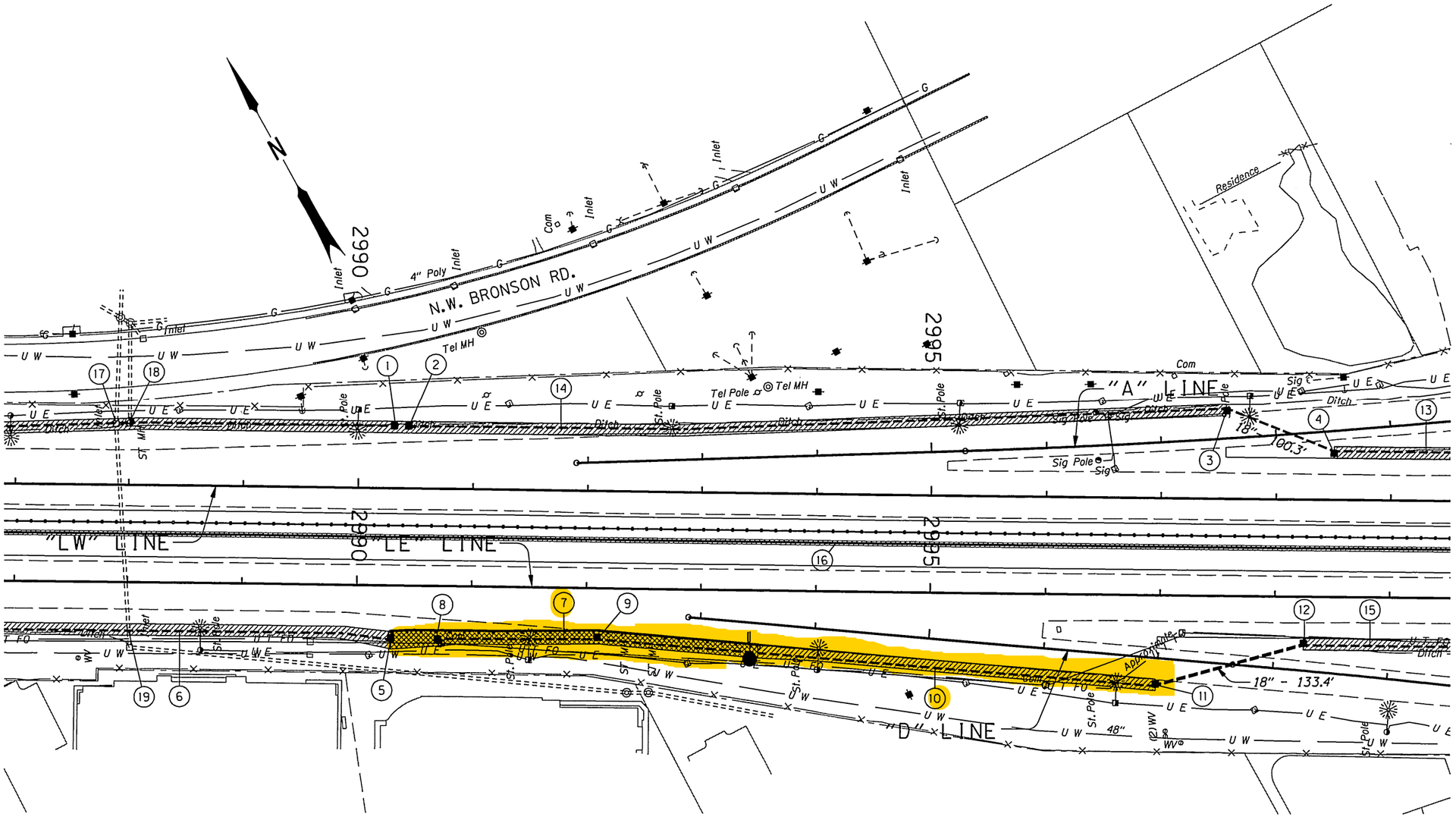
INDEX OF SHEETS, CONT'D.

DRAWING NO.	DESCRIPTION
PERMANENT SIGNING	
S-11907 Thru S-11925 Incl	Sign Installation Plan
S-11926 Thru S-11935 Incl.	Sign Details
S-11936 Thru S-11944 Incl.	Sign Post & Data Table
ILLUMINATION	
I-1688 Thru I-1698 Incl.	Illumination Plan
I-1699	Illumination Details
TRAFFIC SIGNALS	
ITS-889 Thru ITS-895 Incl.	Communication Plan
15564 Thru 15568 Incl.	Ramp Meter Plan
15569	Ramp Meter Details
AUTOMATED TRAFFIC RECORDER #34-010	
TDS-485	Base Mounted Service Cabinet
TDS-34-010A	Traffic Recorder Plan Legend
TDS-34-010B	Traffic Recorder Loop Details
SIGN SUPPORTS	
BRIDGE NO. 08404A - NW MURRAY BLVD.	
83409	Plan, Elevation & Section
83410	Details
BRIDGE NO. 08910A - NW CORNELL RD.	
83411	Plan, Elevation & Section
BRIDGE NO. 16966 - NW BETHANY BLVD.	
83412	Plan, Elevation & Section
CANTILEVER SIGN STRUCTURES	
S-11945	Plan & Elevation

US26: NW 185TH AVE - CORNELL ROAD SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STP-S047(085)	1A

43V-086



(1) Sta. "LW" 2990+33.76, 54.00 Lt.
Const. type "PVC" inlet
(For details, see sht. GJ-2)

(2) Sta. "LW" 2990+46.20, 54.00 Lt.
Const. type "PVC" inlet
(For details, see sht. GJ-2)

(3) Sta. "LW" 2997+56.47, 78.10 Lt.
Const. type "PVC" inlet
Inst. 18" sew. pipe - 100.3'
5'depth
Trench resurf. - 46 sq.yd.
(For details, see sht. GJ-2)

(4) Sta. "LW" 2998+50.00, 42.00 Lt.
Const. type "PVC" inlet
(For details, see sht. GJ-2)

(5) Sta. "LE" 2990+29.96, 40.00 Rt.
Const. type "PVC" inlet
(For details, see sht. GJ-2)

(6) See sht. 7B note 4
Const. MFD

(7) Sta. "LE" 2990+30.00
to Sta. "LE" 2993+50.00
Const. MFD - 320' (Type 2)
(For details, see sht. GJ)

(8) Sta. "LE" 2990+67.92, 46.00 Rt.
Const. type "PVC" inlet
(For details, see sht. GJ-2)

(9) Sta. "LE" 2992+09.50, 43.62 Rt.
Const. type "PVC" inlet
(For details, see sht. GJ-2)

(10) Sta. "LE" 2993+50.00
to Sta. "LE" 2996+96.77
Const. MFD - 347' (Type 1)
(For details, see sht. GJ)

(11) Sta. "LE" 2996+96.77, 78.68 Rt.
Const. type "PVC" inlet
Inst. 18" sew. pipe - 133.4'
5'depth
Trench resurf. - 60 sq.yd.
(For details, see sht. GJ-2)

(12) Sta. "LE" 2998+25.10, 42.11 Rt.
Const. type "PVC" inlet
(For details, see sht. GJ-2)

Adjust manhole shown thus:
Remove manhole shown thus:
Adjust inlet shown thus:
Remove inlet shown thus:
Plug and abandon pipe shown thus:

Maintain minimum 6 foot clearance between edge of existing 48" dia. waterline and all excavations.

Protect and preserve existing waterlines.

(13) Sta. "LW" 2998+50.01
to Sta. "LW" 3007+13.05
Const. MFD - 863' (Type 1)
(For details, see sht. GJ)

(14) See sht. 6B note 15
Const. MFD

(15) Sta. "LE" 2998+25.00
to Sta. "LE" 3025+50.00
Const. MFD - 2725' (Type 1)
(For details, see sht. GJ)

(16) See sht. 3B, note 8
Const. median ditch

(17) Sta. "LE" 2987+88.55 Lt.
Route drain pipe around extg. inlet
using eccentric reducer and 12" drain pipe or adjust drain pipe alignment or as directed by Engineer

(18) Sta. "LW" 2988+00.00 Lt.
Route drain pipe around extg. MH
using eccentric reducer and 12" drain pipe or adjust drain pipe alignment or as directed by Engineer

(19) Sta. "LE" 2988+01.80 Rt.
Route drain pipe over extg. sew. pipe
using eccentric reducer and 12" drain pipe or adjust drain pipe alignment or as directed by Engineer

REGISTERED PROFESSIONAL ENGINEER
17,573
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER

RENEWAL DATE: 6-30-2011

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - GEO/HYDRO UNIT

US26: NW 185TH AVE - CORNELL ROAD SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Reviewed By - Bruce Council
Designed By - Dan Gunther
Drafted By - Dan Gunther

DRAINAGE & UTILITIES

SHEET NO. 8B

43V-086

"LW" LINE

8B (1)
Sta. 2990+33.76, 54.00 Lt.
F.L. 231.42 Out (NW)

8B (2)
Sta. 2990+46.20, 54.00 Lt.
F.L. 231.45 Out (SE)

Finish grade @ ℄ "LW"

8B (3)
Sta. 2997+56.47, 78.10 Lt. Inlet
F.L. 227.15 In (NW)
F.L. 227.15 Out (SE)

8B (4)
Sta. 2998+50.00, 42.00 Lt. Inlet
F.L. 225.97 In (NW)
F.L. 225.97 Out (SE)

0.96%
18" - 100.3'

240 235 230 225 220

2990+00 2995+00 3000+00

"LE" LINE

8B (5)
Sta. 2990+29.96, 40.00 Rt.
F.L. 230.60 Out (NW)

Finish grade @ ℄ "LE"

8B (8)
Sta. 2990+67.92, 46.00 Rt.
F.L. 230.60 Out (SE)

8B (9)
Sta. 2992+09.50, 43.62 Rt.
F.L. 230.4 In (NW)
F.L. 230.4 Out (SE)

8B (11)
Sta. 2996+96.77, 78.68 Rt. Inlet
F.L. 227.17 In (NW)
F.L. 227.17 Out (E)

8B (12)
Sta. 2998+25.10, 42.11 Rt.
F.L. 225.57 In (W)
F.L. 225.57 Out (SE)

0.83%
18" - 133.4'

240 235 230 225 220 215

to: Bronson Creek

To: Willow Creek

2990+00 2995+00 3000+00

REGISTERED PROFESSIONAL ENGINEER
17,573
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER

RENEWAL DATE: 6-30-2011

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - GEO/HYDRO UNIT

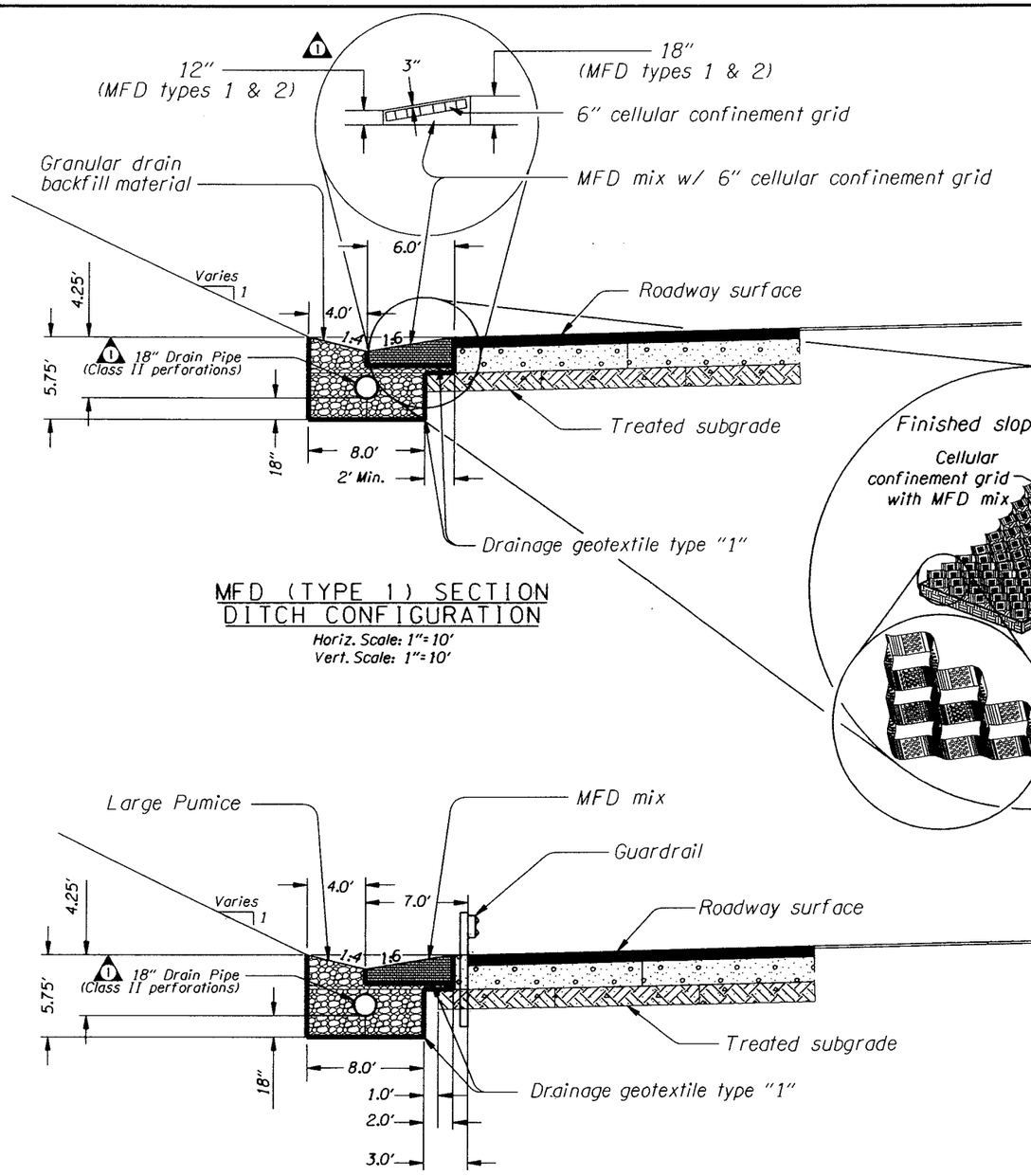
US26: NW 185TH AVE - CORNELL ROAD SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Reviewed By - Bruce Council
Designed By - Dan Gunther
Drafted By - Dan Gunther

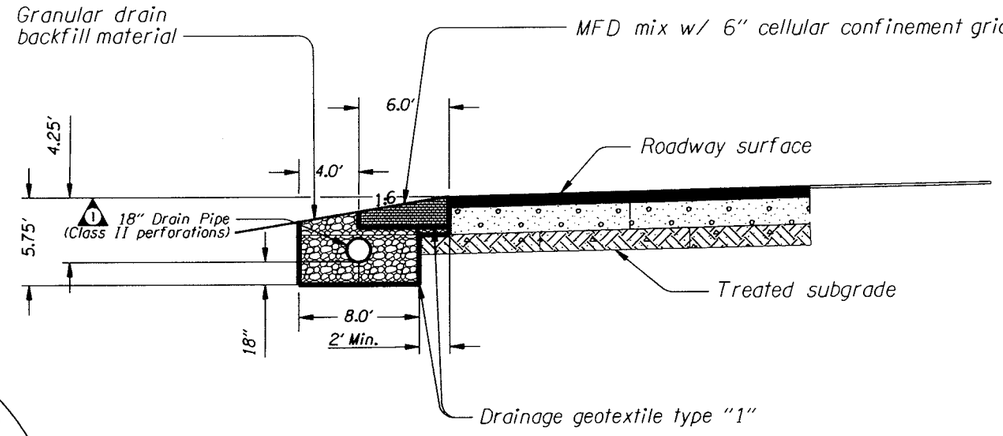
DRAINAGE PROFILE

SHEET NO. 8C

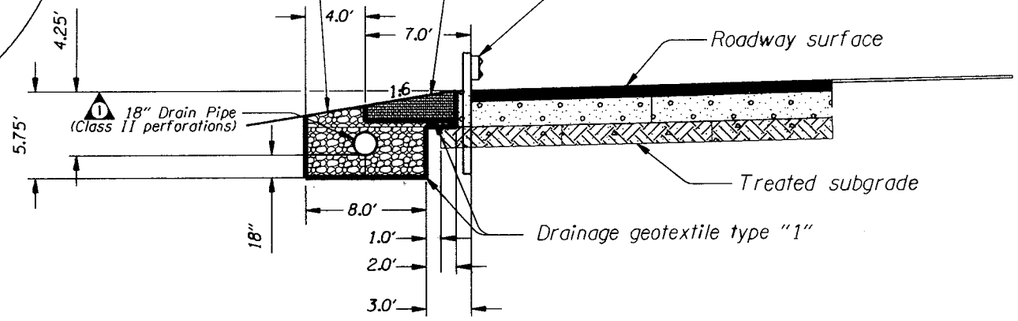
43V-086



MFD (TYPE 1) SECTION
DITCH CONFIGURATION
Horiz. Scale: 1"=10'
Vert. Scale: 1"=10'



MFD (TYPE 1) SECTION
SLOPE CONFIGURATION
Horiz. Scale: 1"=10'
Vert. Scale: 1"=10'



MFD (TYPE 2) SECTION
SLOPE CONFIGURATION
Horiz. Scale: 1"=10'
Vert. Scale: 1"=10'

MFD (TYPE 2) SECTION
DITCH CONFIGURATION
Horiz. Scale: 1"=10'
Vert. Scale: 1"=10'

No.	DATE	REVISIONS	BY
1	04-01-10	Added drawing insert	D.C.G.
1	04-01-10	Added pipe callout	D.C.G.

REGISTERED PROFESSIONAL ENGINEER
17,573
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER
RENEWAL DATE: 6-30-2011

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - GEO/HYDRO UNIT

US26: NW 185TH AVE - CORNELL ROAD SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Reviewed By - Bruce Council
Designed By - Dan Gunther
Drafted By - Dan Gunther

WATER QUALITY DETAILS

SHEET NO. GJ