OPERATION & MAINTENANCE MANUAL

Water Quality Filter Strip

Manual prepared: October 2018

DFI No. D00530

Figure 1: DFI No. D00530, looking west

1. Identification

Drainage Facility ID (DFI):	D00530
Facility Type:	Water Quality Filter Strip
Construction Drawings:	(V-File Numbers) 44V-016
Location:	District: 01
	Highway No.: 092
	Mile Post: 61.04-61.20, [beginning to end]

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: West

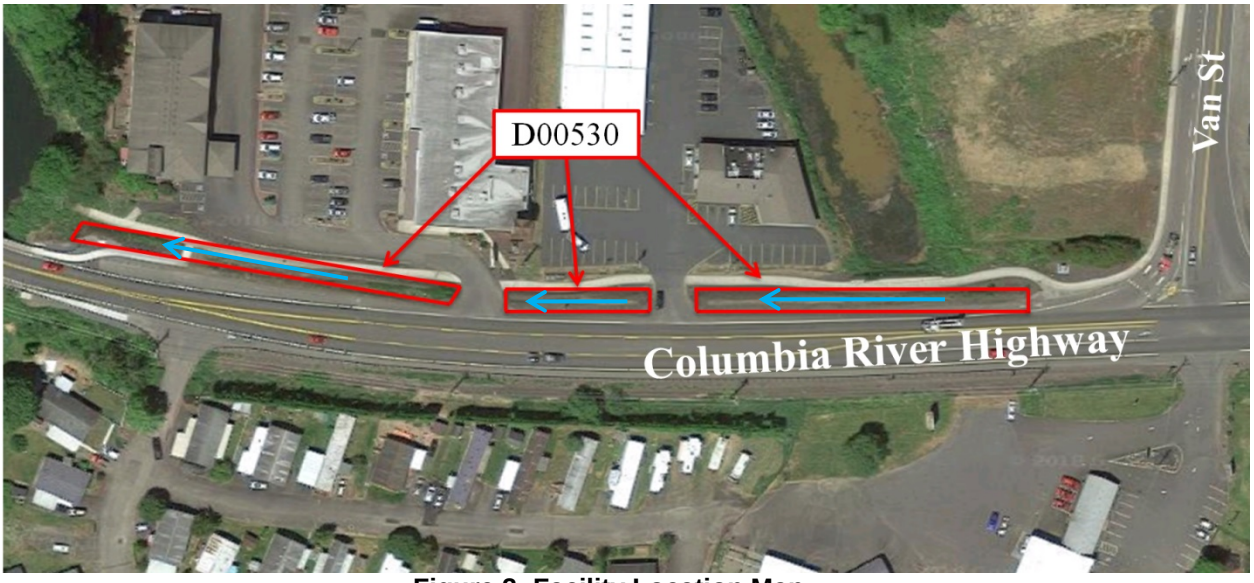


Figure 2: Facility Location Map

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	**575**	**4**

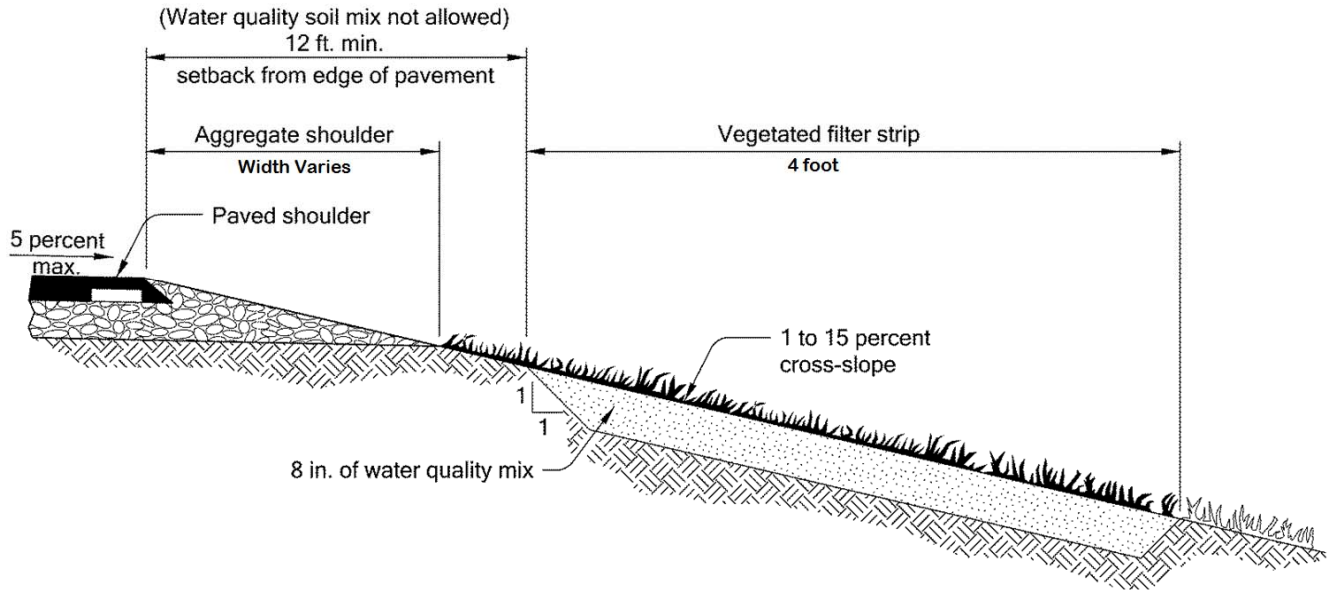


Figure 3: Filter Strip Section

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**	**4**

Site Specific Information: A water quality filter strip is a grassed sloped area located between pavement and a downslope conveyance system designed to treat stormwater runoff from highway pavement areas. It relies on maintaining sheet flow across vegetated and permeable ground which maximized stormwater contact with soil and vegetation. The media filter strip is designed to treat runoff from the water quality design storm for an area along Columbia River Highway that cannot be directed elsewhere. It is located on the north side of the highway, starting at mile point 61.04 and ending at 61.20. The drainage runs through a cut ditch that runs between the highway and the sidewalk, designed to infiltrate the water. There are pipes located underneath the driveways that connect filter strips. If an overflow occurs in extreme conditions, the stormwater would cross the sidewalk and flow down slope to the river (not ponding on the shoulder).

Facility Access

Maintenance access to the facility:

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

Figure 4: Four foot shoulder/bike lane, facing west from US30

5. 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 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 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: Facility Components		ID #
Facility Inlet		
Pavement Sheet Flow	☒	**B1**
Flow Spreader	☐	**B2**
Ground Cover		
Vegetated Slope	☐	**B3**
Aggregate Media Slope	☒	**B4**
Underground Components		
Water Quality Mix	☐	**B5**
Blended Topsoil and Compost	☒	**B6**
Granular Drain Backfill Material	☐	**B7**
Geotextile Fabric	☒	**B8**
Geocell Grid	☐	**B9**
Structures		
Curb/Berm	☐	**B10**
Check Dam	☐	**B11**
Cleanout	☐	**B12**
Facility Outlet		
Perforated Drain Pipe	☐	**B13**
Open Slope Outlet (**If overflow)**	☒	**B14**
Open Channel Outlet	☐	**B15**
Storm Drain Outlet Pipe	☐	**B16**
Outfall Type		
Waterbody (**R**iver/**L**ake/**O**cean)	☒ **R** ☐ **L** ☐ **O**	**B17**
Outfall Channel	☐	**B18**
Storm Drain System	☐	**B19**
Outfall Components		
Pervious Berm	☐	**B20**
Riprap Pad	☐	**B21**

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 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)

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

7. 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.

8. 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

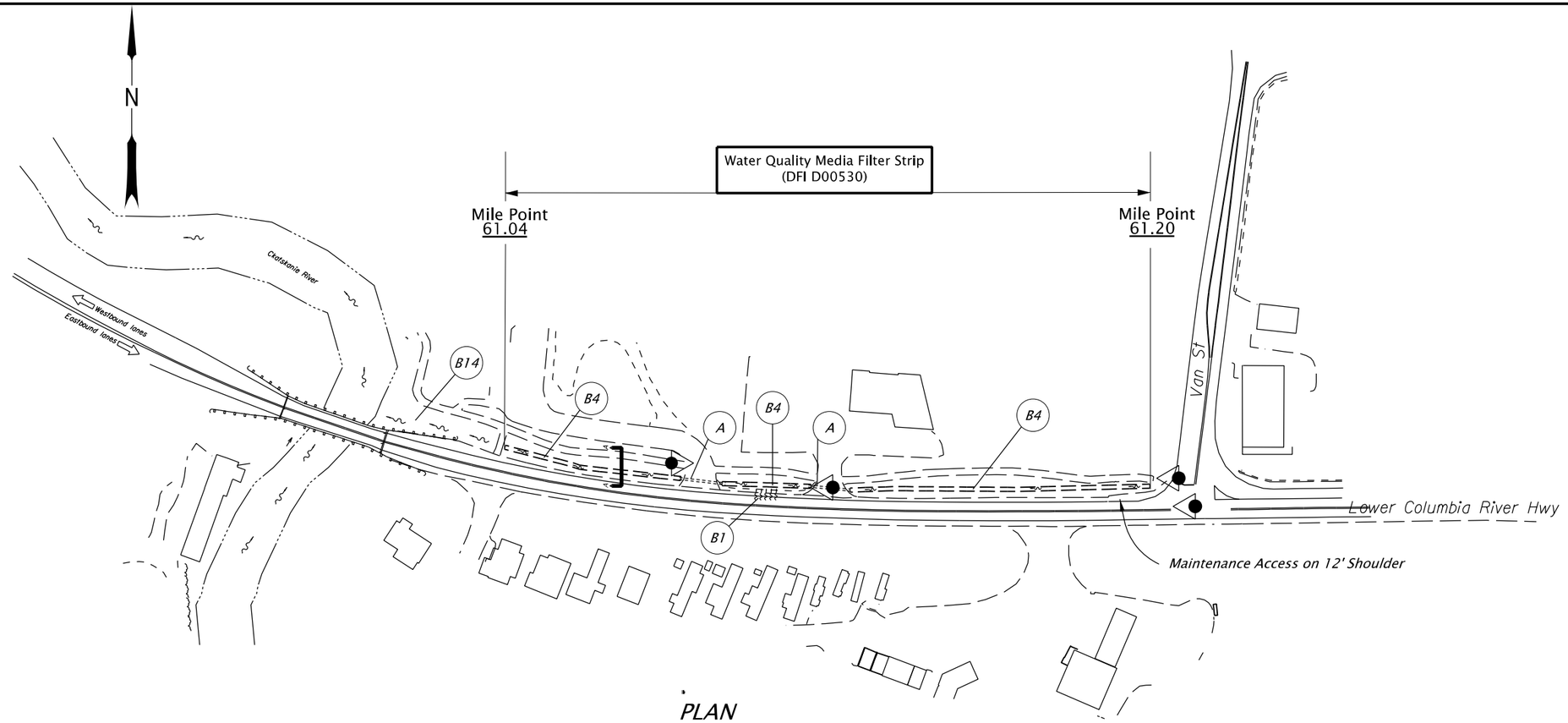
Contact any of the following for more detailed information about management of waste materials found on site:

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

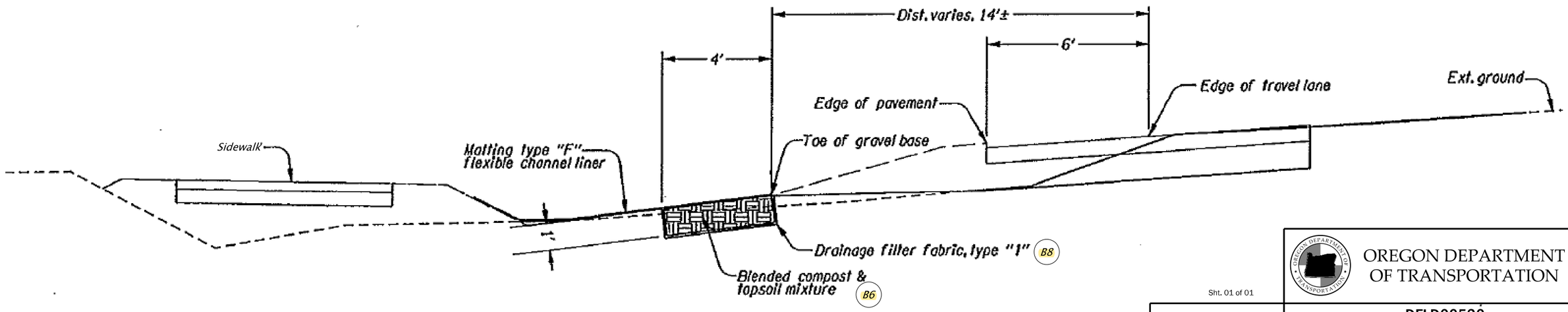
A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D00530



PLAN
N.T.S.



SECTION A-A
N.T.S.

Legend:

- Photograph Location/Direction
- A — 12" Culvert Pipe
- Media Filter Strip
- Storm Pipe (Facility)
- Water Flow Direction
- Traffic Flow Direction

Sht. 01 of 01

Prepared By:
Katrina Sepulveda

Drafted By:
Katrina Sepulveda

OREGON DEPARTMENT OF TRANSPORTATION

DFI D00530
MAINTENANCE DISTRICT 1 HWY 092
Water Quality Bioslope/Media Filter Strip
Lower Columbia River Hwy MP 61.04-61.20
Columbia County

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 44V-016

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

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

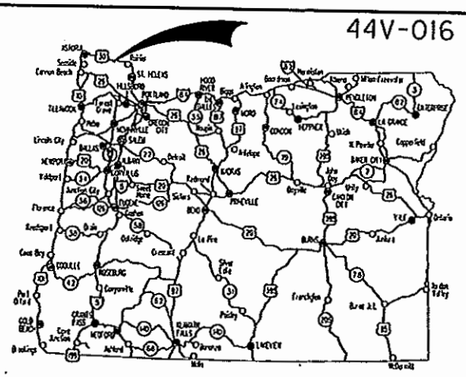
GRADING, DRAINAGE, STRUCTURE, PAVING, SIGNING & SIGNALS

US30: SWEDETOWN ROAD - JCT OR-47 SEC.

LOWER COLUMBIA RIVER HIGHWAY

COLUMBIA COUNTY
JANUARY 2011

44V-016



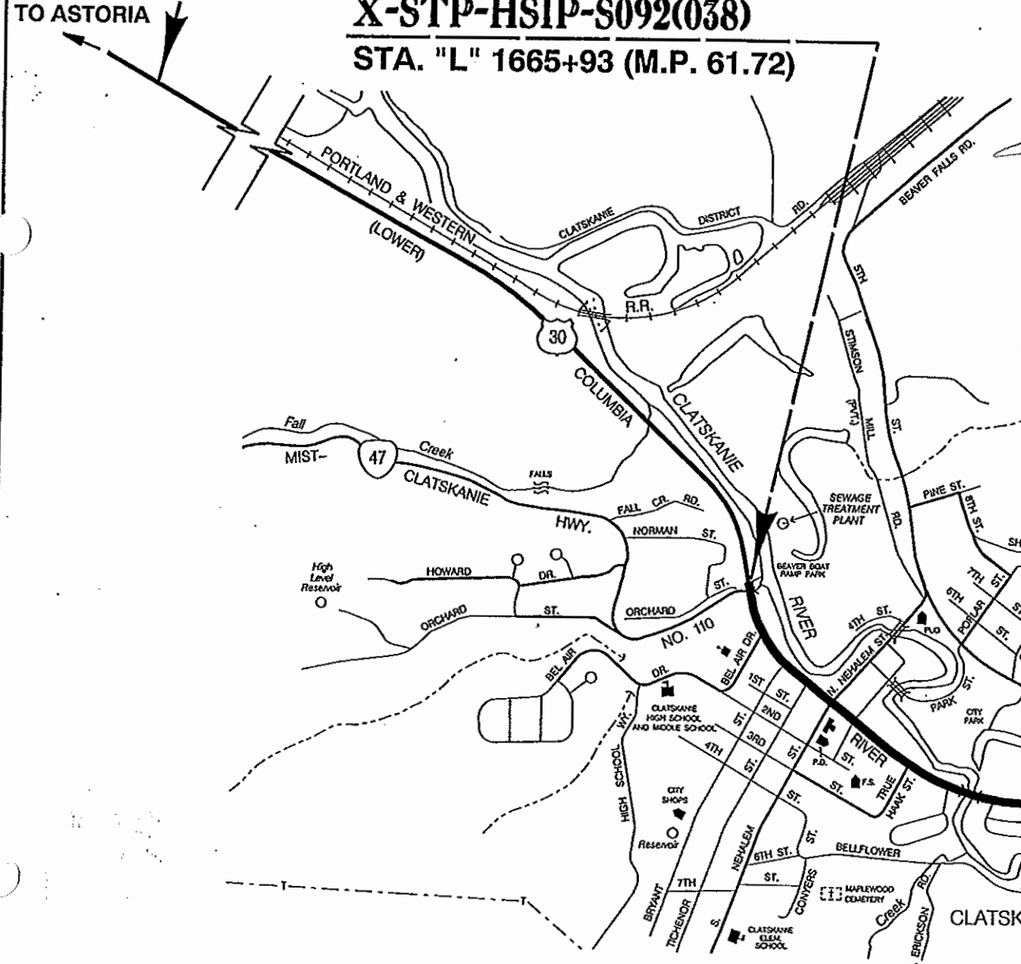
Overall Length Of Project - 0.83 Miles

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

BEGINNING OF CONTRACT
STA. "L" 362+85 (M.P. 69.95)

BEGINNING OF PROJECT
X-STP-HSIP-S092(038)
STA. "L" 1665+93 (M.P. 61.72)



FOR "AS-CONSTRUCTED"

REGISTERED PROFESSIONAL ENGINEER
14932
OREGON
JULY 25, 1979
PAUL DOUGLAS CHRISTIANSEN

EXPIRES: 12-31-2013

NOT REVISED AS CONSTRUCTED
6/11/12 CONTRACT 14305

END OF PROJECT
X-STP-HSIP-S092(038)
STA. "L" 1709+90 (M.P. 60.89)

END OF CONTRACT
STA. "L" 1718+00 (M.P. 60.74)

OREGON TRANSPORTATION COMMISSION

Gail Achterman	CHAIR
Michael Nelson	VICE-CHAIR
Mary Olson	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.

Approving Authority: Naveen Chandra
Naveen G. Chandra, P.E.
Project Delivery Manager, Region 1

Concurrence by ODOT Chief Engineer

US30: SWEDETOWN ROAD - JCT OR-47 SEC.
LOWER COLUMBIA RIVER HIGHWAY
COLUMBIA COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	X-STP-HSIP-S092(038)	1

PE45911001

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INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
2, 2A Thru 2A-5	Typical Sections
2B Thru 2B-17	Details
2D	Pipe Data Sheet
3	Alignment & General Construction
① 3(Rev)	Alignment & General Construction
3A	Drainage & Utilities
4	Alignment & General Construction
4A	Drainage & Utilities
5	Alignment & General Construction
5A	Drainage & Utilities
6	Alignment & General Construction
6A	Drainage & Utilities
7	Alignment & General Construction
7A	Drainage & Utilities
8	Alignment
9	Alignment & General Construction
	GEO/HYDRO
GA Thru GA-9	Erosion Control Plan
GC Thru GC-3	Reinforced Soil Slope Plan
GJ Thru GJ-5	Pipe Profiles & Water Quality Details
① GN Thru GN-11	Roadside Development Plan
	BRIDGE
84041	Plan & Elevation
	PERMANENT PAVEMENT MARKINGS
ST Thru ST-6	Striping Plan
	PERMANENT SIGNING
S-12305 Thru S-12325	Signing Plan
	TRAFFIC SIGNALS
15877 Thru 15882	Traffic Signals Plan

Standard Drg. Nos.

RD140	- Roadway Cross Slopes Superelevated Sections
RD150	- Slope Rounding
RD300	- Trench Backfill, Bedding, Pipe Zone And Mult. Installations
RD302	- Street Cut
① RD316	- Sloped Ends For Metal Pipe
RD318	- Sloped Ends For Concrete Pipe
RD364, RD366	- Concrete Inlets
RD380, RD384, RD386	- Pipe Fill Height Tables
RD400, RD405, RD415, RD440, RD450	- Guardrail
RD610	- Asphalt Pavement Details
RD700, RD701	- Curbs
RD706	- Traffic Separators And Transitions
RD710	- Accessible Route Islands
RD715	- Approaches And Non-Sidewalk Driveways
RD720	- Sidewalks
RD725	- Separated Sidewalk Driveways or Alleys
RD730, RD735	- Curb Line Sidewalk Driveways or Alleys
RD755	- Sidewalk Ramp Details
RD756, RD757	- Sidewalk Ramp Placement
RD759	- Truncated Dome Detectable Warning Surface Details And Locations
RD770, RD771	- Pedestrian Handrail
RD1000	- Construction Entrances
RD1005	- Check Dams
RD1010	- Inlet Protection
RD1040	- Sediment Fence
RD1055	- Matting

TM200	- Sign Installation Details
TM204	- Flag Board Mounting Details
TM212	- Signing Details
TM221, TM222	- Milepost Marker Details
TM223	- Directional Sign Layout
TM460	- Vehicle Signal Details
TM465	- Overhead Sign, Fire Preemption & Photoelectronic Details
TM467	- Ped. Signal And Ped. Push Button Details
TM475	- Loop Details
TM480	- Loop Entrance Details
TM485	- Service Cabinets And Service Cabinet Wiring Details
TM500, TM501, TM502, TM503	- Pavement Marking Standard Details
TM515	- Raised Pavement Markers
TM517	- Recessed Pavement Markers
TM522	- Durable Pavement Markings
TM525	- Turn Arrow Marking Details
TM530	- Intersection Pavement Markings
TM560, TM561	- Freeway Exit Ramp Pavement Markings
TM570	- Traffic Delineators
TM571	- Traffic Delineators Steel Post Details
TM576	- Traffic Delineator Installation
TM635	- Breakaway Sign & Luminaire Supports
TM670	- Wood Post Sign Supports
TM671	- 3 Second Gust Wind Speed Isotach
TM676	- Sign Attachments
TM677	- Sign Mounts
TM681, TM687, TM688	- Square Tube Sign Supports
TM800	- Tables, Abrupt Edge And PCMS Details
TM810	- Temporary Reflective Pavement Markers
TM820	- Temporary Barricades
TM821	- Temporary Sign Supports
TM840, TM841, TM842	- Closure Details
TM843	- Intersection Details
TM850	- 2-Lane, 2 Way Roadways
TM851, TM852	- Non-Freeway Multi-Lane Sections
BR286	- Retrofit For Steel Handrail With Sidewalk

R/W map No. 11B-03-25

No.	DATE	REVISIONS	BY
①	01-05-11	New sheets, 3(Rev) and GN-11 added	L.A.K.
		Added RD316 to list	L.A.K.

REVISED AS CONSTRUCTED

6/11/12 CONTRACT 14305

Paul Christiansen Project Manager DATE: 6/11/12

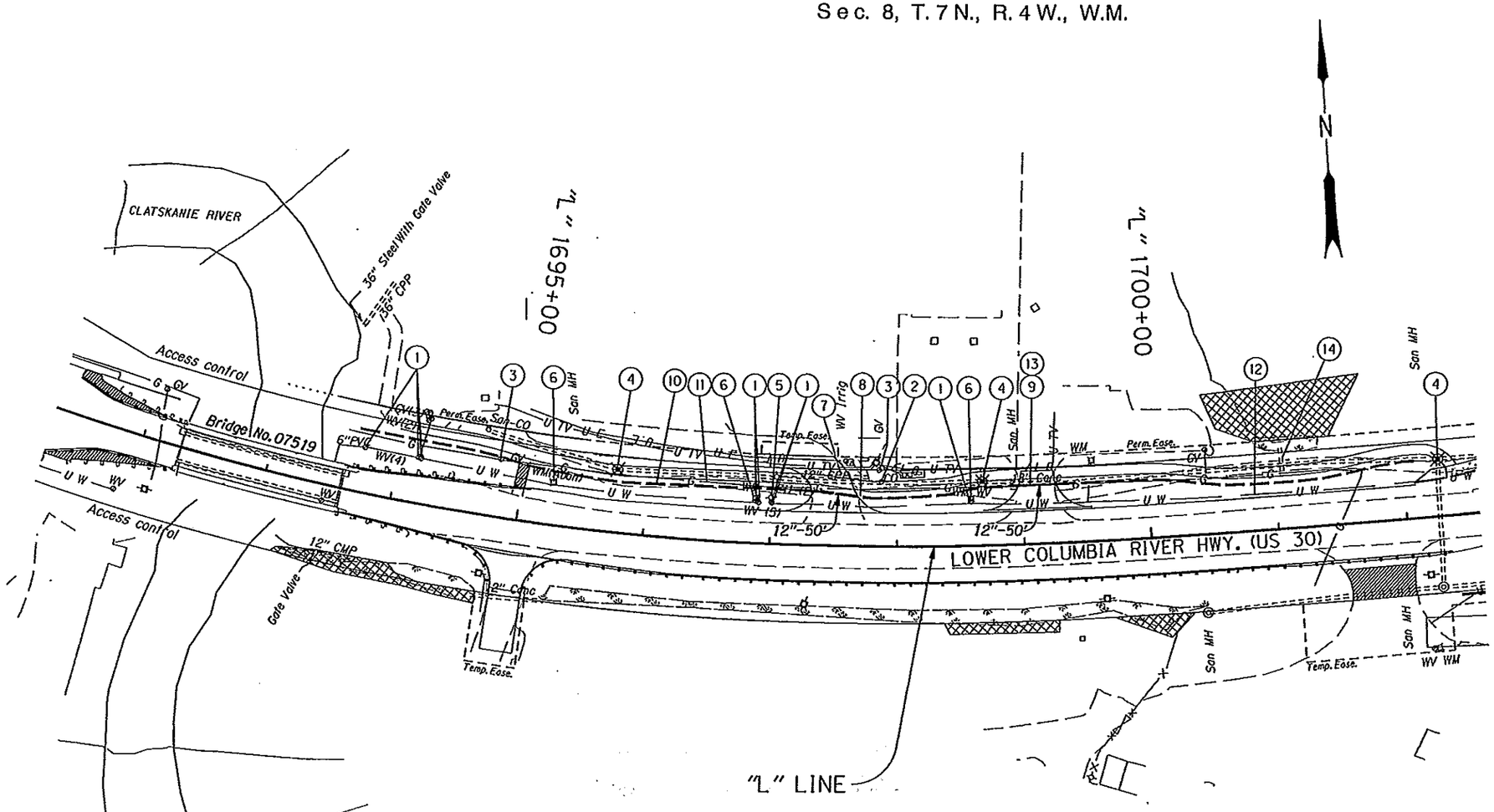
US30: SWEDETOWN ROAD - JCT OR-47 SEC.
LOWER COLUMBIA RIVER HIGHWAY
COLUMBIA COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	X-STP-HSIP-S092(038)	1A

Standard Drawings located on the web at:
http://www.oregon.gov/ODOT/HWY/ENGSERVICES/standard_drawings_home.shtml

Sec. 8, T. 7 N., R. 4 W., W.M.

44V-016



(1) Adjust water valve box - 10
(By others)

(2) Adjust sanitary clean out (By others)

(3) Adjust gas valve - 2
(By others)

(4) Adjust sanitary manhole to grade - 3

(5) Adjust fire hydrant
(By others)

(6) Adjust water meter - 3
(By others)

(7) Sta. "L" 1697+08.5, 54.4' Lt.
Remove culvert pipe - 70'

(8) Sta. "L" 1697+03.5, 40.2' Lt.
Inst. 12" ductile iron culvert pipe - 50'
5' depth
With sloped ends per MFG. recomendations

(9) Sta. "L" 1698+81.8, 49.7' Lt.
Remove culvert pipe - 56'

(10) Sta. "L" 1693+67.7, 49.6' Lt. to
Sta. "L" 1702+16.0, 40.7' Lt.
Const. Media Filter Embankment - 1803 lf.
Ditch exc. 190 cu.yd.
Blended compost and topsoil mexture - 190 cu.yd.
Drainage geotextile type "1" - 715 sq.yd.
Permanent seeding, mix no. "1" - 0.24 ac.
Mattinge type "F" flexible channel liner - 1230 sq.yd.
(For details, see sht. GJ-3 & GJ-5)

(11) Sta. "L" 1692+25 to Sta. "L" 1701+75
Relocate gas line (By others)

(12) Sta. "L" 1699+75 to Sta. "L" 1702+35
Relocate water line
(By others)

(13) Sta. "L" 1698+25.6, 46.4' Lt.
Inst. 12" ductile iron culvert pipe - 50'
5' depth
With sloped ends per MFG. recomendations

(14) Sta. "L" 1701+05.8, 41.8' Lt.
Remove storm sewer pipe - 22'

Wetland - No work area

REVISED AS CONSTRUCTED
6/11/12 CONTRACT 14305
DATE: 6-11-12
Paul Christiansen Project Manager

REGISTERED PROFESSIONAL ENGINEER
788[illegible]PE
OREGON
JAN 9, 2007
EDWARD P. FOLTYN
RENEWS: 12-31-2011

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - Geo/Hydro/HazMat Unit

US30: SWEDETOWN ROAD - JCT OR-47 SEC.
LOWER COLUMBIA RIVER HIGHWAY
COLUMBIA COUNTY

Reviewed by - Bruce Council
Designed by - Ed Foltyn
Drafted by - Charlotte Gerken

DRAINAGE & UTILITIES

SHEET NO. 6A

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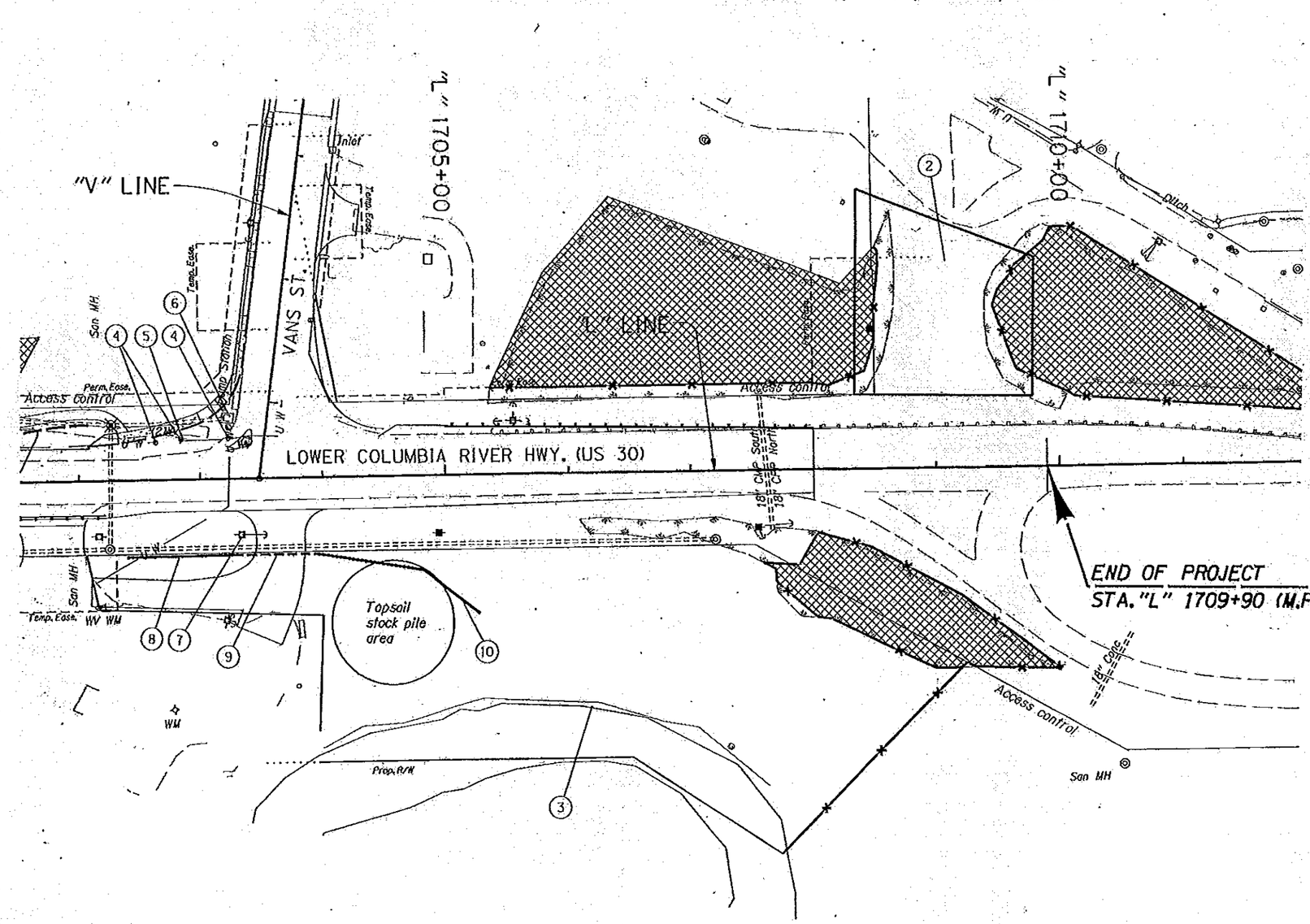
Sec. 8 & 9, T. 7 N., R. 4 W., W.M.

44V-016



(1) Not used

(2) Sta. "L" 1709+00, Lt.
Excavate exlg. ramp
General exc. - 3500 cu.yd.
(For grading and landscape details, see sht. GN-9)

(3) Sta. "L" 1705+00, Rt. to Sta. "L" 1708+00, Rt.
General exc. - 2600 cu.yd.
Extra for selected topsoil material - 1095 sq.yd.
(For grading and landscape details, see sht. GN-7)

(4) Adjust water valve box - 3
(By others)

(5) Relocate hydrant (By others)

(6) Relocate sanitary pumping station (By others)

(7) Relocate power pole & guy anchor
(By others)

(1) (8) Sta. "L" 1702+38, 61.7' Rt. to
Sta. "L" 1703+30, 62.3' Rt.
Const. 4' wide bottom ditch
Ditch exc. - 30 cu.yd.
Water quality seeding - 0.04 ac.
Matting type "F" flexible channel liner - 220 sq.yd.
(For details, see sht. GJ-2 & GJ-3)

(9) Sta. "L" 1705+30, 62.3' Rt. to
Sta. "L" 1703+90, 62.3' Rt.
Const. 12" culvert pipe - 60.0'
With sloped ends per MFG. recommendations

(1) (10) Sta. "L" 1703+90, 62.3' Rt. to
Sta. "L" 1705+32, 116.5' Rt.
Const. 4' wide bottom ditch
Ditch exc. - 213 cu.yd.
Water quality seeding - 0.13 ac.
Matting type "F" flexible channel liner - 610 sq.yd.
(For details, see sht. GJ-2 & GJ-3)

Wetland - No work area

REVISED AS CONSTRUCTED
6/1/12 CONTRACT 14305
DATE: 6-1-12
Paul Christiansen Project Manager

REGISTERED PROFESSIONAL ENGINEER
78814PE
Edward P. Foltyn
OREGON
JAN 9, 2001
EDWARD P. FOLTYN
RENEWS: 12-31-2011

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - Geo/Hydro/HazMat Unit

US30: SWEDETOWN ROAD - JCT OR-47 SEC.
LOWER COLUMBIA RIVER HIGHWAY
COLUMBIA COUNTY

Reviewed by - Bruce Council
Designed by - Ed Foltyn
Drafted by - Charlotte Gerken

DRAINAGE & UTILITIES

SHEET NO. 7A

No.	DATE	REVISIONS	BY
1	01-03-11	Edited note	E.P.F.

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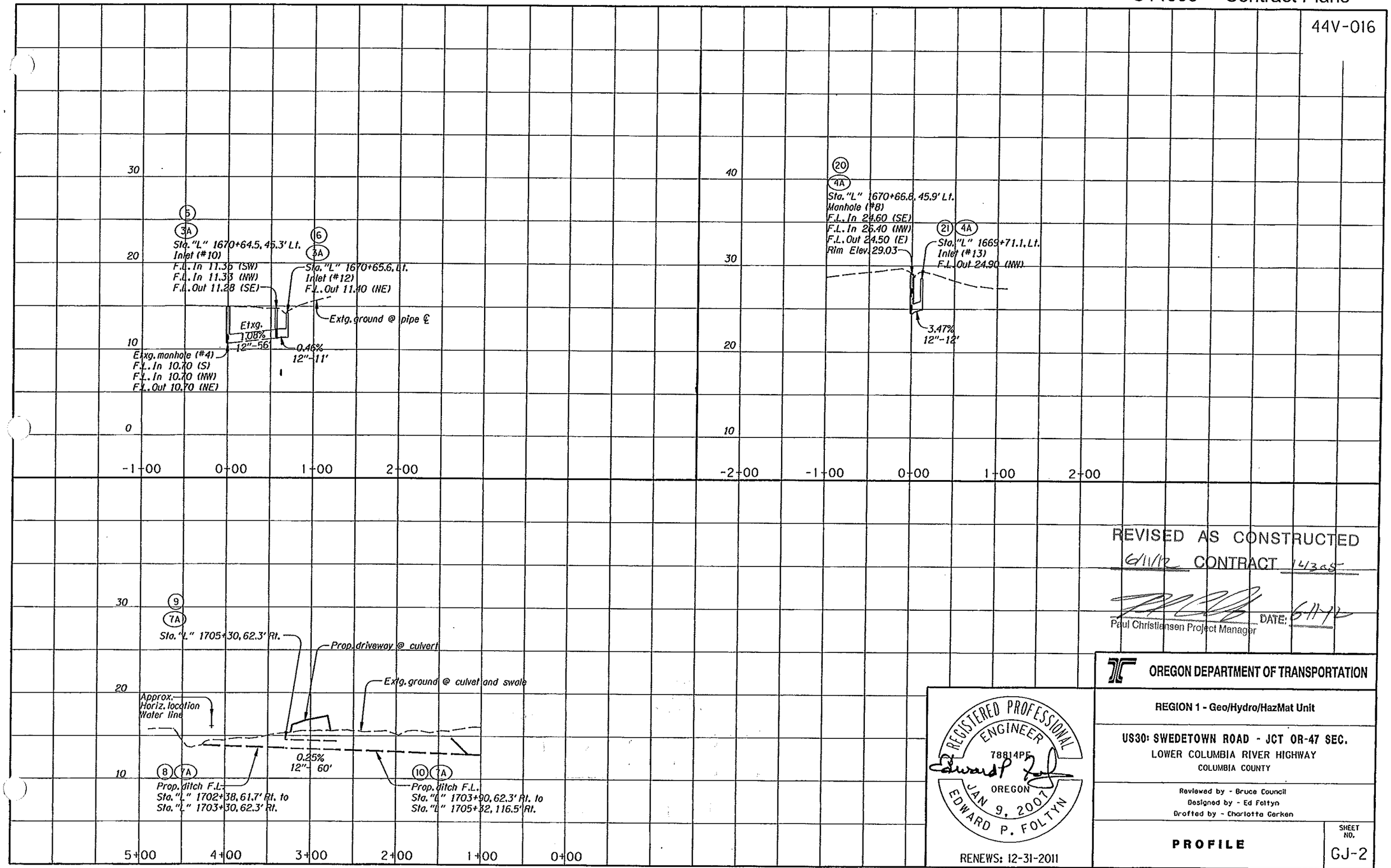

REVISED AS CONSTRUCTED
6/11/12 CONTRACT 14305

Paul Christiansen Project Manager DATE: 6/11/12

REGISTERED PROFESSIONAL ENGINEER
78814PE
OREGON
JAN 9, 2007
EDWARD P. FOLTYN
RENEWS: 12-31-2011

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - Geo/Hydro/HazMat Unit

US30: SWEDETOWN ROAD - JCT OR-47 SEC.
LOWER COLUMBIA RIVER HIGHWAY
COLUMBIA COUNTY

Reviewed by - Bruce Council
Designed by - Ed Foltyn
Drafted by - Charlotte Gerken

PROFILE

SHEET NO. GJ-2

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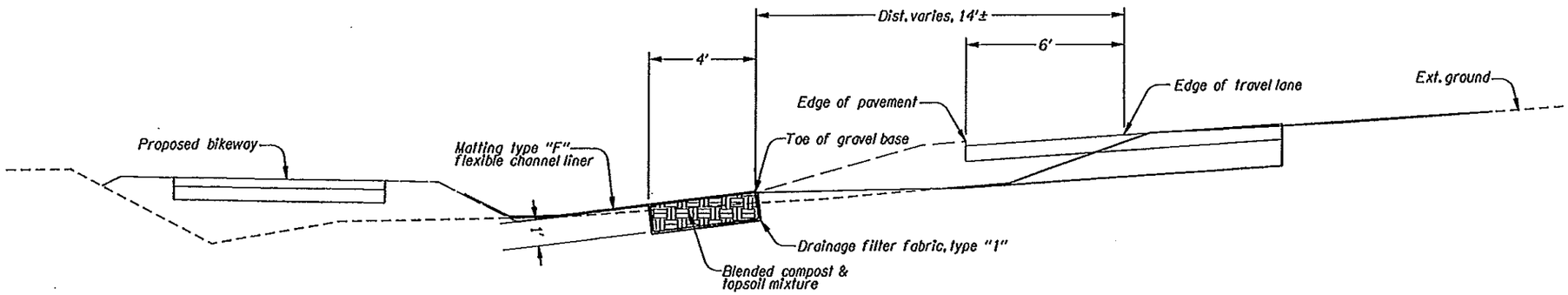
MEDIA FILTER EMBANKMENT

44V-016



X-SECTION

"L" 1693+67.7, 49.6' Lt. to Sta. "L" 1697+03.5, 40.2' Lt.
"L" 1697+76.6, 40.0' Lt. to Sta. "L" 1698+87.5, 46.2' Lt.
"L" 1699+36.1, 46.3' Lt. to Sta. "L" 1702+16.0, 40.7' Lt.

REVISED AS CONSTRUCTED
CONTRACT 14305
DATE: 6-11-12
Paul Christiansen Project Manager

REGISTERED PROFESSIONAL ENGINEER
7881 RE
OREGON
JAN 9, 2007
EDWARD P. FOLTYN
RENEWS: 12-31-2011

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - Geo/Hydro/HazMat Unit

US30: SWEDETOWN ROAD - JCT OR-47 SEC.
LOWER COLUMBIA RIVER HIGHWAY
COLUMBIA COUNTY

Reviewed by - Bruce Council
Designed by - Ed Foltyn
Drafted by - Charlotte Gerken

DETAILS

SHEET NO. GJ-5