OPERATION & MAINTENANCE MANUAL

DFI No. : D00351
Facility Type: Water Quality Biofiltration Swale

September, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00351**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 42V-004
Location:	District: 2C
	Highway No.: 002
	Mile Post: 38.81 / 38.83 (beg./end)]
	Description: This facility is located in the median between the east and westbound lanes of I-84 (Hwy 002), approximately two miles west of the Bonneville Dam. Access to the swale may be obtained from the eastbound lanes of I-84.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record:	Consultant Designer – Parsons Brinckerhoff, Inc., Constance Kratovil, P.E., 503-274-8772
Facility construction:	2009
Contractor:	Cascade Bridge, LLC Construction Company.

4. Storm Drain System and Facility Overview

A water quality swale is a flat-bottomed open channel designed to treat stormwater runoff from highway pavement areas. This type of facility is lined with grass. Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass.

This facility is located in the median between the east and westbound lanes of I-84 (Hwy 002), approximately two miles west of the Bonneville Dam. Access may be obtained from the eastbound lanes of I-84, and optionally from the westbound lanes where a maintenance access pad is found near an associated stormwater outfall.

A localized storm drain system conveys stormwater to the water quality facility, via an 18-inch storm pipe, and its facility inlet and flow spreader; see points A and C of the Operational Plan, Appendix A. Once in the swale the stormwater is treated as it flows in a westward direction toward the facility outlet at point B. The outlet is a grated inlet that collects any remaining treated flows and conveys them to an 18-inch storm pipe, leading to a stormwater outfall further down line to the west, and near the westbound lanes of I-84.

A. Maintenance equipment access:
Access to the swale may be obtained from the eastbound lanes of I-84. The shoulder width may be narrow and a guardrail is present here, however. Access to a stormwater outfall, associated with this facility, is obtained from the westbound lanes and a nearby maintenance access pad. However, the slope and vegetation between the outfall and the actual swale facility may make reaching the swale somewhat difficult.

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☒ Allowed (with limitations): A guardrail is present alongside the shoulder of the eastbound lanes of I-84 when accessing the swale facility.
☐ Not allowed

C. Special Features:

☐ Amended Soils
☐ Porous Pavers
☐ Liners
☐ Underdrains

Photo 1: Water Quality Biofiltration Swale, looking east at the facility inlet. I-84 is located to the right.

Photo 2: Water Quality Biofiltration Swale, looking west. I-84 is located to the left.

Photo 3: Water Quality Biofiltration Swale, looking west at the facility outlet. I-84 is located to the left.

5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking either the outlet structure or the 18-inch diameter outlet pipe located at the outlet of the water quality biofiltration swale. This pipe is noted as point B on the Operational Plan; Appendix A. Use of sandbags or a metal plate may more easily facilitate this effort.

6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

☐ Designed into facility

☒ Other, as noted below
An auxiliary outlet feature is not designed or provided for as part of this facility.

7. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☒ Table 3 (water quality biofiltration swales)
- ☐ Table 4 (water quality filter strips)
- ☐ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☐ Appendix C (proprietary structure)
- ☐ Special Maintenance requirements:

Note: Special maintenance Requirements Require Concurrence from ODOT SR Hydraulics Engineer.

8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

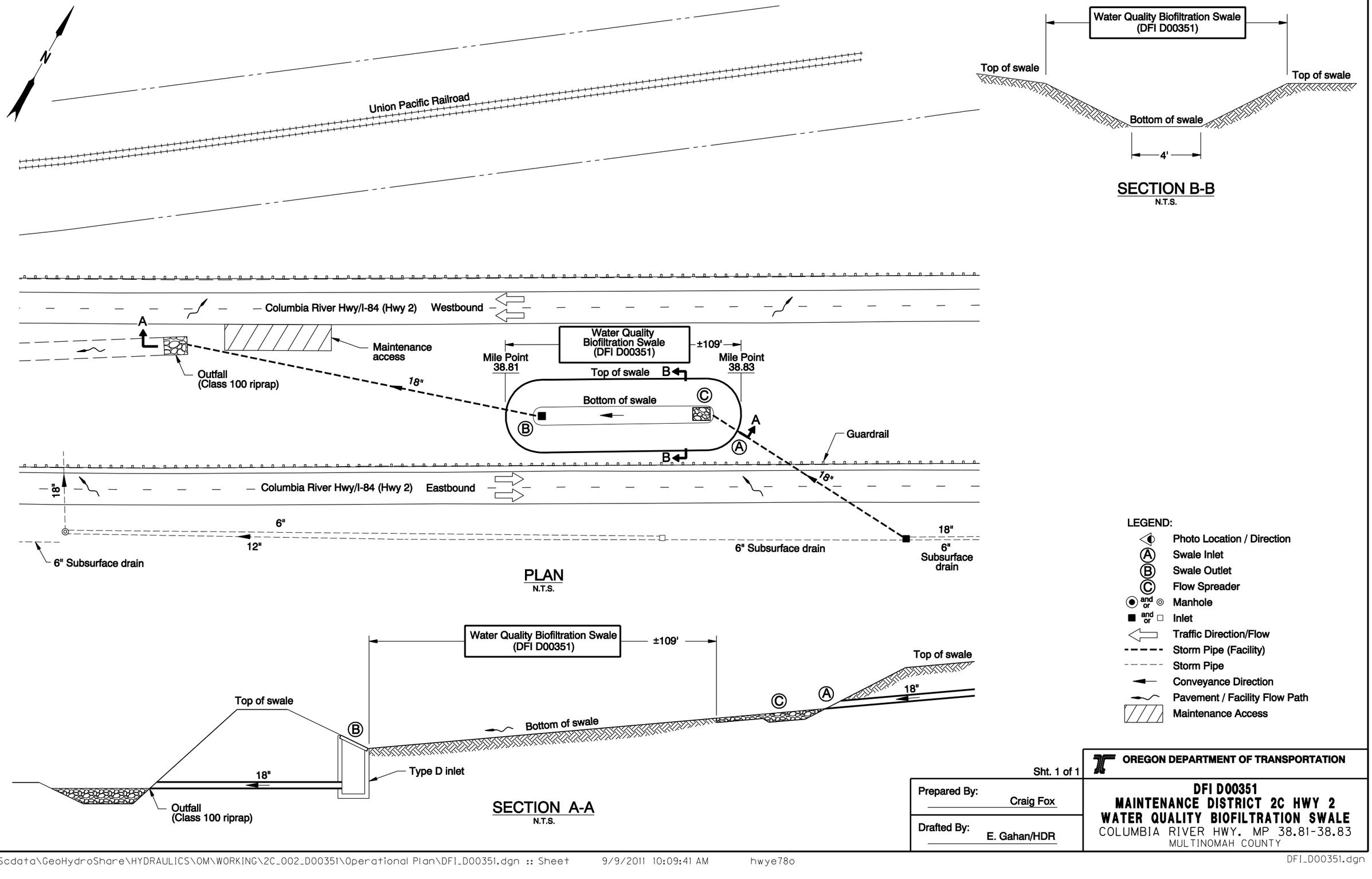
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

Appendix A

Content:

- **Operational Plan and Profile Drawing(s)**



SECTION B-B
N.T.S.

PLAN
N.T.S.

SECTION A-A
N.T.S.

LEGEND:

- Photo Location / Direction
- Swale Inlet
- Swale Outlet
- Flow Spreader
- Manhole
- Inlet
- Traffic Direction/Flow
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Maintenance Access

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Craig Fox

Drafted By: E. Gahan/HDR

DFI D00351
MAINTENANCE DISTRICT 2C HWY 2
WATER QUALITY BIOFILTRATION SWALE
COLUMBIA RIVER HWY. MP 38.81-38.83
MULTINOMAH COUNTY

Appendix B

Content:

- **ODOT Project Plan Sheets**
  - ***Cover/Title Sheet***
  - ***Water Quality/Detention Plan Sheets***
  - ***Other Details***

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

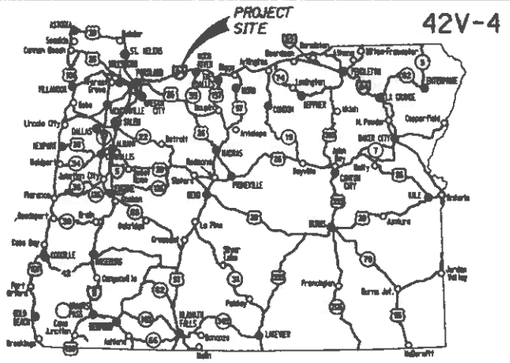
GRADING, DRAINAGE, STRUCTURES AND PAVING

I-84: DODSON - TANNER CREEK BUNDLE 209

COLUMBIA RIVER HIGHWAY

MULTNOMAH COUNTY
MARCH 2009

REVISED AS CONSTRUCTED
10/01/10 CONTRACT C13985
PROJ. MGR. Tom Marzolf



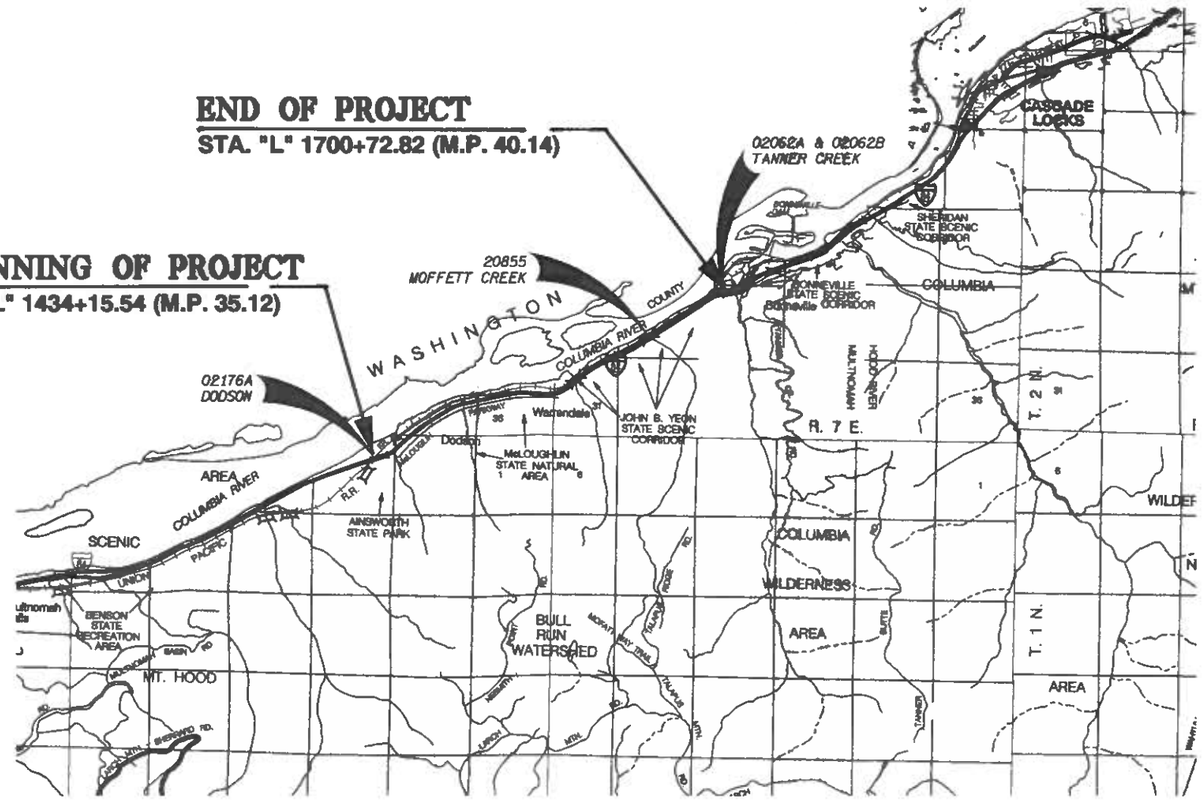
Overall Length of Project - 5.02 Mile

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

END OF PROJECT
STA. "L" 1700+72.82 (M.P. 40.14)

BEGINNING OF PROJECT
STA. "L" 1434+15.54 (M.P. 35.12)



T. 1 N., R. 6 E,
T. 2 N., R. 6 E,
T. 2 N., R. 7 E., W.M.

PB PARSONS BRINCKERHOFF
400 S.W. Sixth Ave, Portland, OR 97204

OTIA
OREGON TRANSPORTATION INVESTMENT ACT

OREGON TRANSPORTATION COMMISSION

Gail L. Achterman	CHAIR
Mike Nelson	VICE-CHAIR
Janice J. Wilson	COMMISSIONER
Alan Brown	COMMISSIONER
David Lohman	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

PLANS PREPARED FOR
ODOT
BY:
PB

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: Laura M. Edmundson
Signature

Laura M. Edmundson Vice President
Print name and title

Concurrence by ODOT Chief Engineer

I-84: DODSON - TANNER CREEK BUNDLE 209
COLUMBIA RIVER HIGHWAY
MULTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	X-IM-OTIA-S002(091)	1

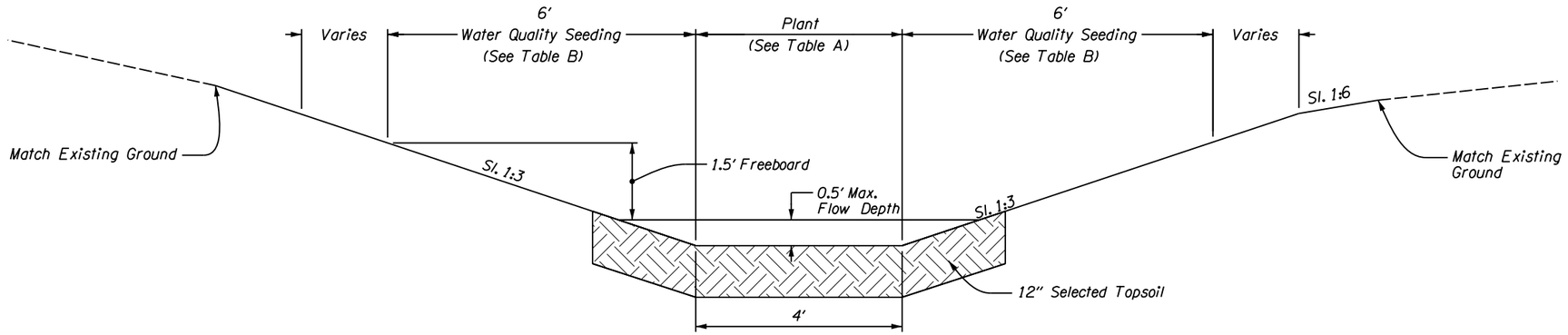
REVISED AS CONSTRUCTED
10/01/10 CONTRACT C13985

TABLE A

WETLAND PLANTS, PLUGS - BOTTOM GROUNDLAYER PLANTS				
SCIENTIFIC NAME	COMMON NAME	SIZE AND DESCRIPTION	DENSITY	QUANTITY
Carex Densa	*Dense Sedge*	*Plugs*	*2/sq.ft.*	*984*
Eleocharis Palustris	*Creeping Spikerush*	*Plugs*	*2/sq.ft.*	*984*
Juncus Tenuis	*Poverty Rush*	*Plugs*	*2/sq.ft.*	*984*
Mimulus Guttatus	*Yellow Monkeyflower*	*Plugs*	*2/sq.ft.*	*984*

TABLE B

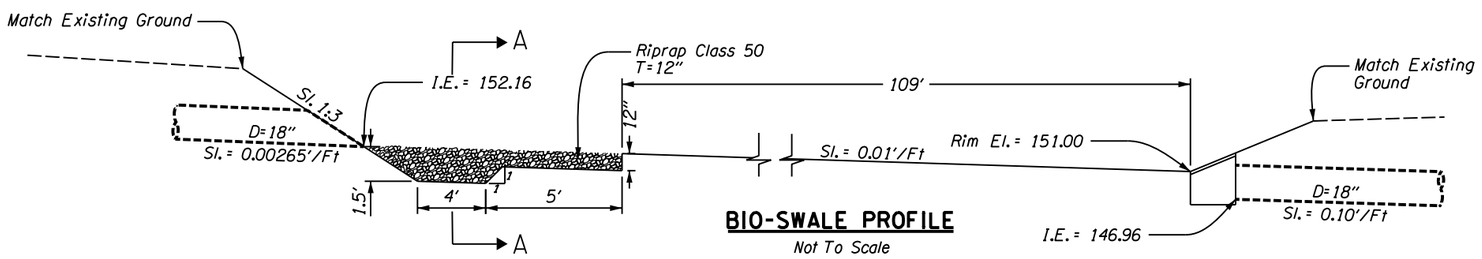
WATER QUALITY SEEDING - SIDE SLOPE GROUNDLAYER PLANTS		
SCIENTIFIC NAME	COMMON NAME	PLS (lb/acre) (% PURITY X % GERMINATION) = AMOUNT (minimum) (minimum) Aplic. rate(lb/acre)
Deschampsia caespitosa	*HairGrass*	*.27*
Bromus carinatus	*California Brome*	*4.75*
Elymus glaucus	*Blue Wildrye*	*2.55*
Festuca rubra	*Red Fescue*	*.65*
Sitanion hystrix	*Squirrel-tail*	*2.10*
Glyceria occidentalis	*Mannagrass*	*.65*
Agrostis exarata	*Spikegrass*	*.02*
Total		*11.00*



NOTES:
1. See Sheet 3A For Plan.

TYPICAL BIO-SWALE SECTION

Not To Scale



BIO-SWALE PROFILE

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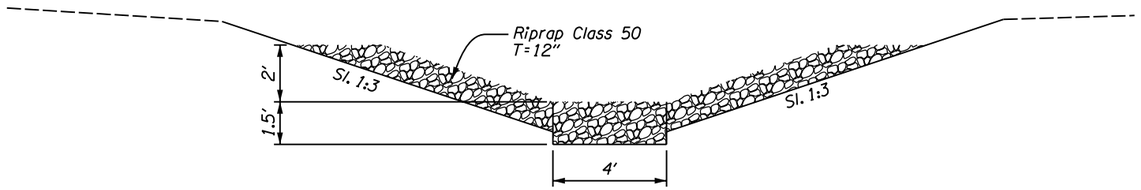


SECTION A-A

Not To Scale

OREGON DEPARTMENT OF TRANSPORTATION

PB PARSONS BRINCKERHOFF
400 S.W. Sixth Ave, Portland, OR 97204

REGISTERED PROFESSIONAL ENGINEER
19037PE
OREGON
JAN 21, 1992
CONSTANCE L. KRATOVIL

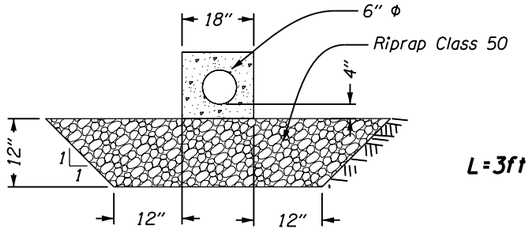
RENEWAL DATE: 06-30-2011

I-84: DODSON - TANNER CREEK BUNDLE 209
COLUMBIA RIVER HIGHWAY
MULTNOMAH COUNTY

Design Team Leader - LAURA AMUNDSON
Designed By - LUCY CASTRILLON
Drafted By - ANTHONY O'DONNELL

DETAILS

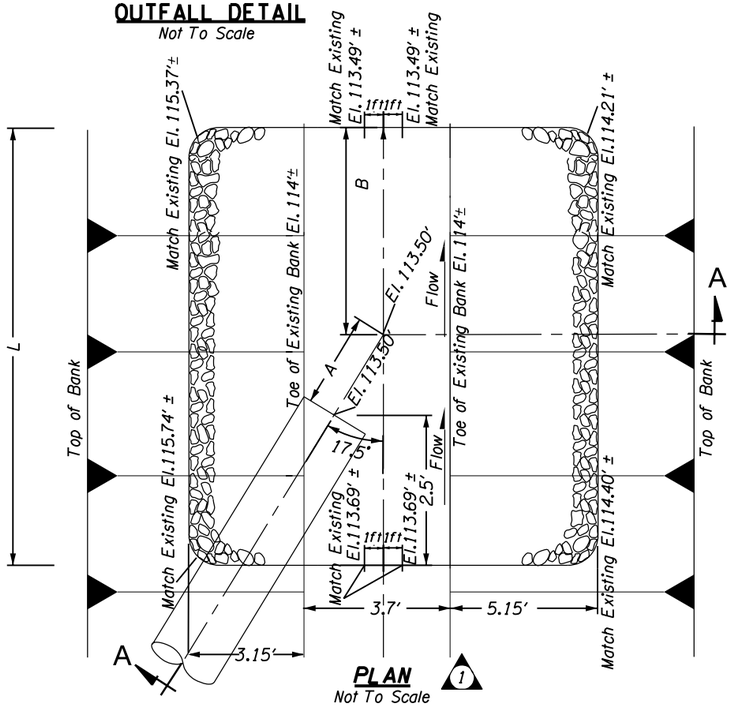
SHEET NO. 2B



L=3ft

STA. "LE" 1622+50.00 And STA. "LE" 1636+16.00

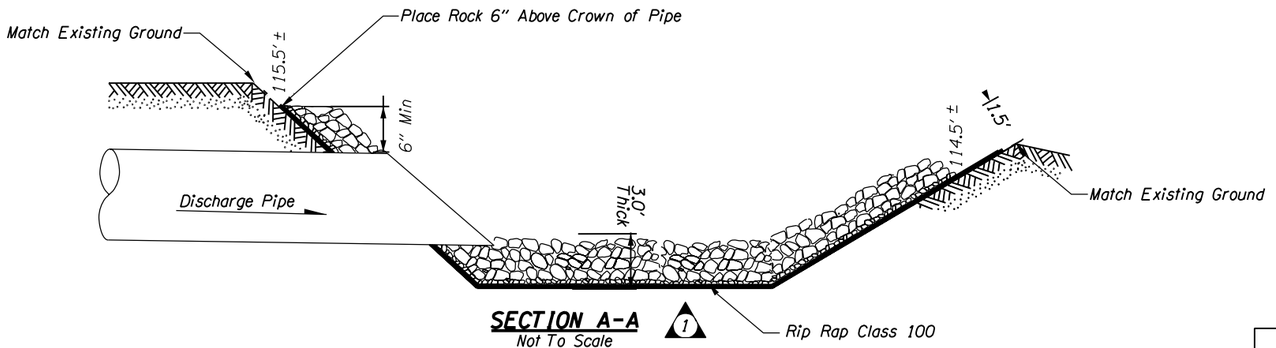
OUTFALL DETAIL
Not To Scale



PLAN 1
Not To Scale

Required Dimensions	
"A"	4 Ft.
"B"	14 Ft. Min.
"L"	20.5 Ft. Min.

1

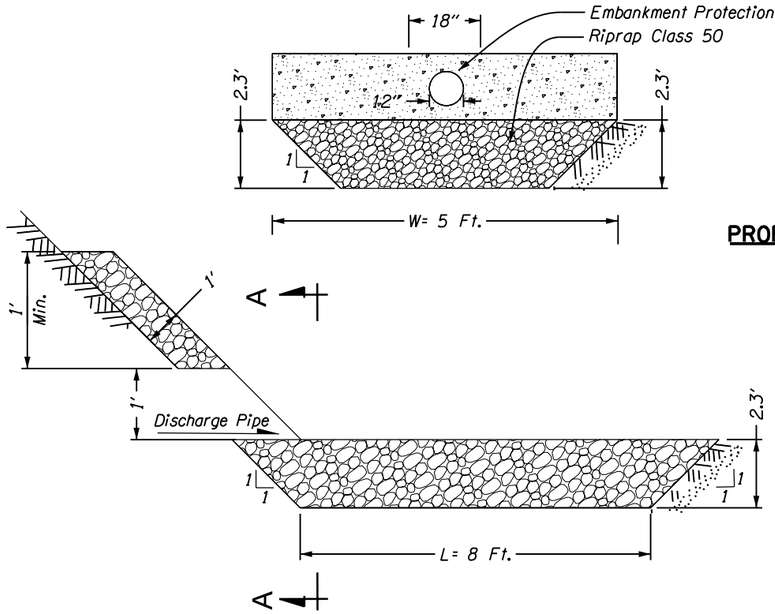


SECTION A-A 1
Not To Scale

STA "LE" 1627+12.19,123.29' LT

PIPE/CULVERT OUTFALL DISCHARGE PROTECTION

SECTION A-A



PROFILE

RIPRAP OUTFALL AT STA 1642+80, 69.5' RT.
Not To Scale

REVISIONS

1	*Revised 02-25-2010 Modified Pipe/Culvert Outfall Discharge Protection*

REGISTERED PROFESSIONAL ENGINEER
19037PE
OREGON
JAN 21, 1992
CONSTANCE L. KRATOVIL
RENEWAL DATE: 06-30-2011

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MULTNOMAH COUNTY

Design Team Leader - LAURA AMUNDSON
Designed By - LUCY CASTRILLON
Drafted By - ANTHONY O'DONNELL

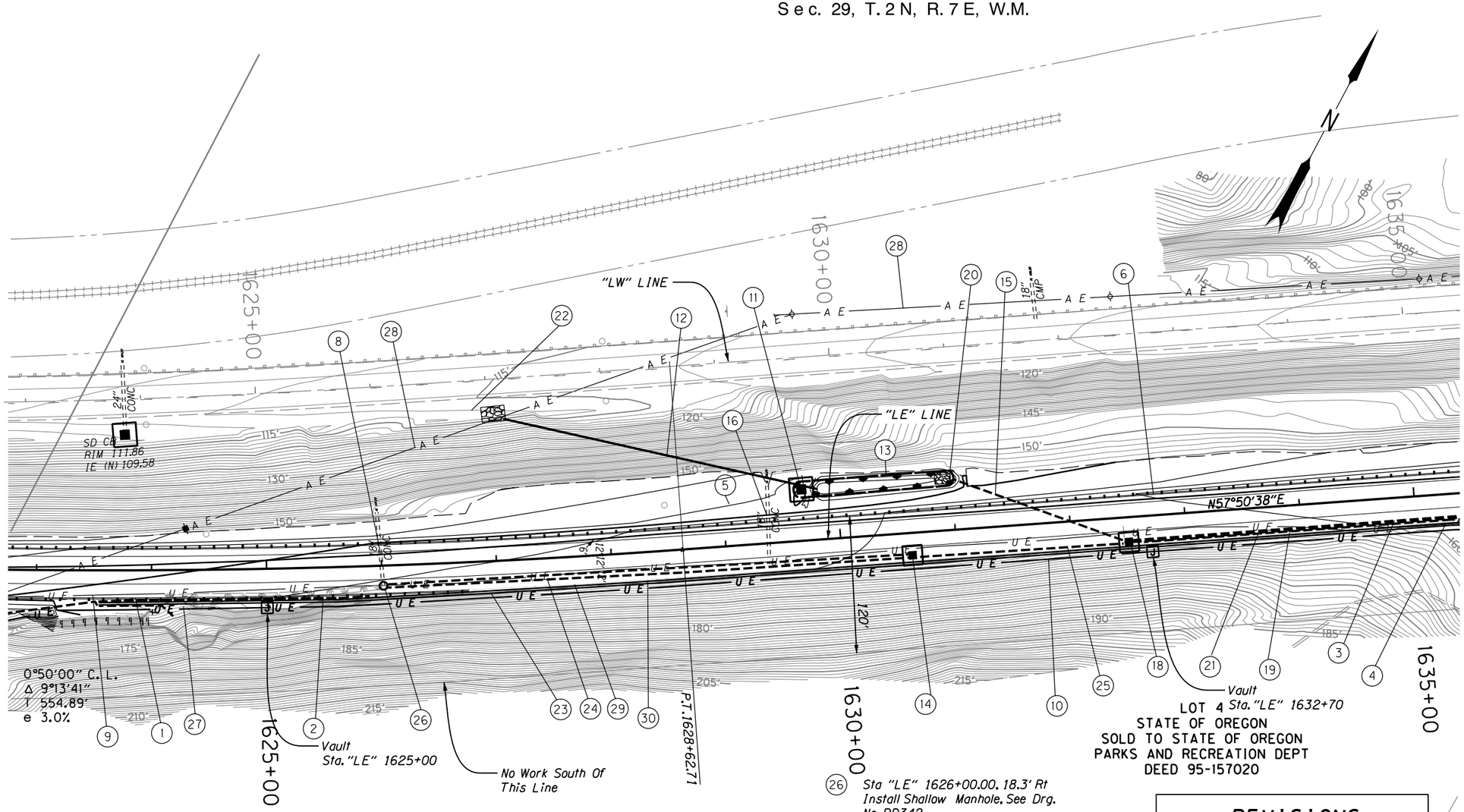
DETAILS

SHEET NO. 2B-5

Sec. 29, T. 2 N, R. 7 E, W.M.

42V-4

REVISED AS CONSTRUCTED
10/01/10 CONTRACT C13985



(2) *See Sheet 3, Note 4*

(3) *Sta. "LE" 1634+55, 18.9' Rt. To*
Sta. "LE" 1636+84, 4.8' Rt.
Remove Extg. Guardrail - 230'

(4) *Sta. "LE" 1635+36.63, 24.0' Rt. To*
Sta. "LE" 1636+57.29, 24.0' Rt.
Const. Conc. Barrier To Weatherized Guardrail Transition To Type 4 Weatherized Guardrail, Double Thkn. 2-0.105"Thick Elements" - 18.75'. See Sheet 2B-4
Construct Type 4 Weatherized Guardrail, Double Thkn. 2-0.105"Thick Elements"- 87.5'
Const. Weatherized Guardrail Transition To Bridge Rail - 18.84'
See Structure No. 20855 Dwg. No. 80526.

(5) *See Sheet 3, Note 1*

(6) *See Sheet 3, Note 2*

(8) *Sta. "LE" 1626+00.00, 18.30' Rt*
Connect Shallow Manhole to Existing 18" Concrete Culvert.

(10) *See Sheet 3, Note 10*

(11) *Sta. "LE" 1629+83.00, 44.0' Lt.*
Install Ditch Inlet Type D
I.E. (18" Out) = 148.50 NW

(1) (12) *Sta. "LE" 1627+12.19, 123.29' Lt. To*
Sta. "LE" 1629+83.00, 44.0' Lt.
Install 18" Stormpipe - 282'
10' Depth s = 0.125'/Ft

(13) *Sta. "LE" 1629+71.75, 44.0' Lt.*
Sta. "LE" 1631+13.12, 44.0' Lt. To
Const. Bioswale - 109'
s = 0.01'/Ft Exc. 361 c.y.
Topsoil = 32 c.y.

(14) *Sta. "LE" 1630+62.80, 22.9' Rt.*
Install Manhole With Inlet Type G-2
I.E. (12" out) = 153.29 SW
I.E. (6" in) = 153.96 NE
I.E. (6" out) = 153.96 SW
See Sheet 2B-2

(15) *Sta. "LE" 1632+57.00, 22.9' Rt. To*
Sta. "LE" 1631+00.38, 44.0' Lt.
Install 18" Concrete culvert - 166'
5' Depth s = 0.00265'/Ft

(16) *Sta. "LE" 1629+37*
Plug And Abandon Existing 18" Concrete Culvert

(18) *Sta. "LE" 1632+57, 22.9' Rt.*
Install Concrete Inlet Type G2
I.E. (18" out) = 152.60 W
I.E. (18" in) = 152.62 NE

(19) *Sta. "LE" 1632+57, 22.9' Rt. To*
Sta. "LE" 1636+57, 22.9' Rt.
Install 18" Stormpipe - 400'
5' Depth s = 0.00315'/Ft

(20) *Sta. "LE" 1631+00, 44.0' Lt.*
Construct Riprap Class 50
5.0 c.y. See Sheet 2B

(21) *Sta. "LE" 1632+59.00, 23.5' Rt. To*
Sta. "LE" 1636+16.00, 40.0' Rt.
Construct 6" Subsurface Drain. - 357'
5' Depth s=0.0040'/Ft

(1) (22) *Sta. "LE" 1627+12.19, 123.29' Lt.*
Const. Outfall. See Sheet 2B-5
Riprap Class 100 18c.y.

(23) *Sta "LE" 1626+00.00, 19.5' Rt*
Sta "LE" 1630+62.80, 23.5' Rt
Construct 6" Subsurface Drain-462.8'
5' Depth s=0.0040'/Ft

(24) *Sta "LE" 1626+00.00, 17.6' Rt*
To Sta "LE" 1630+62.80, 22.4' Rt
Install 12" Stormpipe - 462.8'
5' Depth s=0.0040'/Ft

(25) *Sta "LE" 1630+62.80, 24.1' Rt To*
Sta "LE" 1632+55.80, 24.15' Rt
Construct 6" Subsurface Drain - 193'
See Drg. RD312
5' Depth s=0.0040'/Ft

(26) *Sta "LE" 1626+00.00, 18.3' Rt*
Install Shallow Manhole, See Drg. No. RD342

I.E. (6" Out) = 152.11 SW
I.E. (12" In) = 151.44 NE
I.E. (6" In) = 152.11 NE

(27) *See Sheet 3, Note 14*

(28) *See Sheet 3, Note 12*

(29) *Sta. "LE" 1626+74.79, 24' Rt. To*
Sta. "LE" 1635+36.63, 24' Rt.
Construct Cast-in-place Conc. Shoulder Barrier, Narrow Base. See Sheet 2B-3 And Drg. No. RD505

(30) *Sta. "LE" 1626+74.79, Rt. To*
Sta. "LE" 1635+36.63, Rt.
Construct Type 5 Traffic Delineators At 50' Spacing - 15 Each

REVISIONS

1	Revised 02-25-2010 Updated Notes 12 and 22

REGISTERED PROFESSIONAL ENGINEER
19037PE
OREGON
JAN 21, 1992
CONSTANCE L. KRATOVIL
RENEWAL DATE: 06-30-2011

OREGON DEPARTMENT OF TRANSPORTATION

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400 S.W. Sixth Ave, Portland, OR 97204

I-84: DODSON - TANNER CREEK BUNDLE 209
COLUMBIA RIVER HIGHWAY
MULTNOMAH COUNTY

Design Team Leader - LAURA AMUNDSON
Designed By - LUCY CASTRILLON & CORY BURLINGAME
Drafted By - ANTHONY O'DONNELL

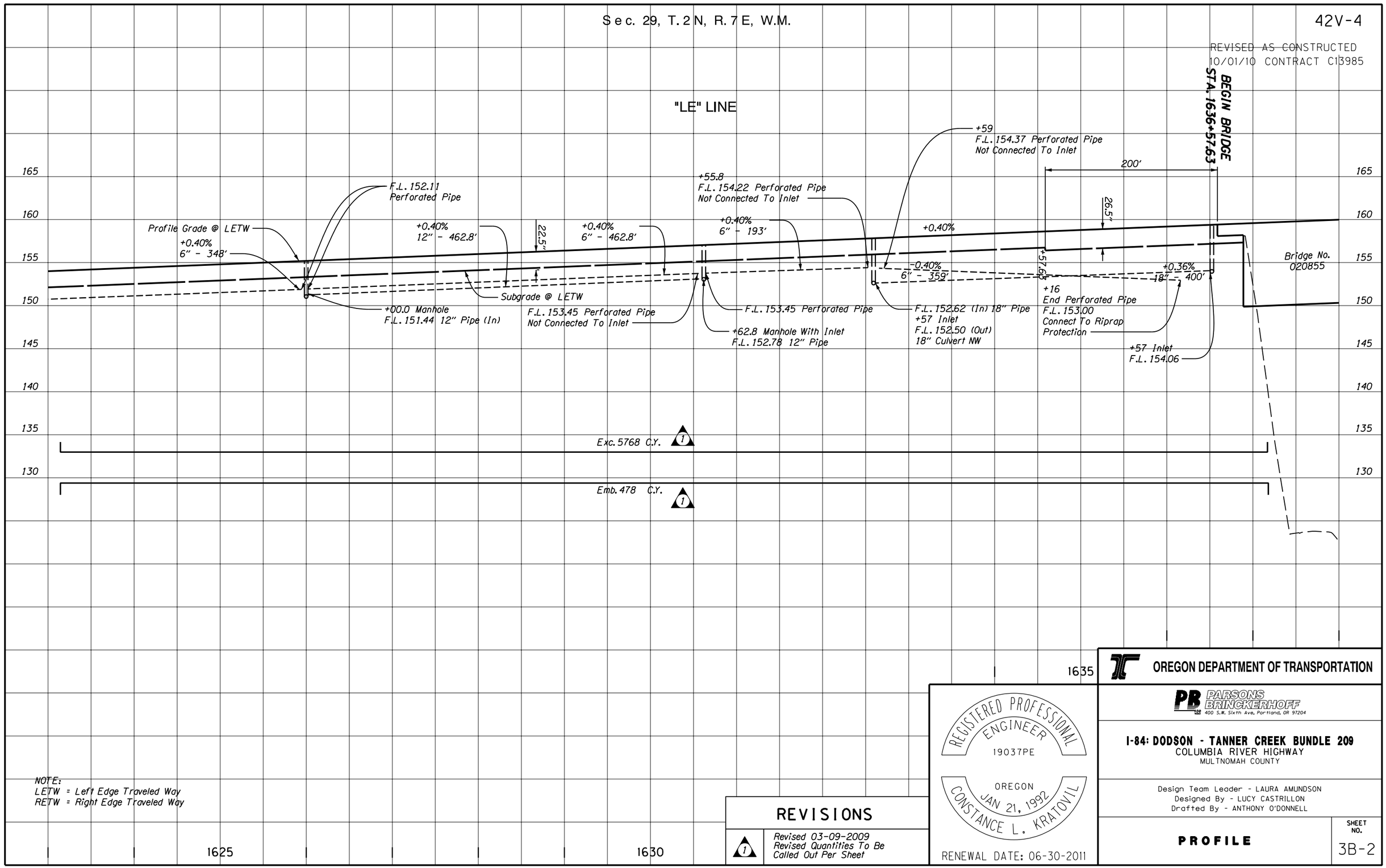
ALIGNMENT AND GENERAL CONSTRUCTION

SHEET NO. 3A

Sec. 29, T. 2 N, R. 7 E, W.M.

42V-4

REVISED AS CONSTRUCTED
10/01/10 CONTRACT C13985



NOTE:
LETW = Left Edge Traveled Way
RETW = Right Edge Traveled Way

REVISIONS	
1	Revised 03-09-2009 Revised Quantities To Be Called Out Per Sheet

REGISTERED PROFESSIONAL ENGINEER
19037PE
OREGON
JAN 21, 1992
CONSTANCE L. KRATOVIL
RENEWAL DATE: 06-30-2011

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COLUMBIA RIVER HIGHWAY
MULTNOMAH COUNTY

Design Team Leader - LAURA AMUNDSON
Designed By - LUCY CASTRILLON
Drafted By - ANTHONY O'DONNELL

PROFILE

SHEET NO. 3B-2

K:\80342S1\CADD\As-Constructed-drawings\CIVIL-SHEETS\14031F.PF2 :: Default 2/16/2011 9:53:37 AM odonnella