

OPERATION & MAINTENANCE MANUAL

DFI No.: D00397

**Facility Type: Water Quality Biofiltration
Swale**



MARCH, 2011

1. Identification

Drainage Facility ID (DFI): **D00397**
Facility Type: Water Quality Biofiltration Swale
Construction Drawings: (V-File Number) 41V-055
Location: District: 7
Highway No.: 045
Mile Post: 38.79 / 38.81 (beg./end)
Description: This facility is located on the southern side of OR38 (Hwy 045, Umpqua Highway). Access can be obtained from the eastbound shoulder of OR38.

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 Hydraulics Engineer (541) 957-3693

Or

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

3. Construction

Engineer of Record: Consultant Designer – T.Y. Lin International., Kevin Ducharme, P.E., 503-385-4200.

Facility construction: 2008
Contractor: Slayden Construction Group

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.

Stormwater is conveyed to the facility from a roadside ditch upstream from the water quality swale. Sheet flow from OR38 also contributes runoff directly to the swale. Refer to the Operational Plan in Appendix A for further information. Water conveyed into the swale undergoes treatment as it flows through the length of the channel. The treated water flows out of the swale and directly into Elk Creek.

A. Maintenance equipment access:

Maintenance crews can access the facility from the eastbound shoulder of OR38.

B. Heavy equipment access into facility:

- Allowed (no limitations)
- Allowed (with limitations)
- Not allowed

C. Special Features:

- Amended Soils
- Porous Pavers
- Liners
- Underdrains



Photo 1: Looking east, storm flow generated from OR38 on the left side of the picture contributes stormwater into the swale. Stormwater is flowing from the top of the picture towards the bottom of the picture.



Photo 2: Looking west, storm flow generated from OR38 on the right side of the picture contributes stormwater into the swale. Stormwater is flowing from the bottom of the picture towards Elk Creek at the top of the picture.



Photo 3: Looking east, storm flow generated from OR38 on the left side of the picture contributes stormwater into the swale. Stormwater is flowing from the top of the picture towards the bottom of the picture.

5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the flow path and outlet channel of the water quality biofiltration swale. Constructing a sandbag dam upstream from the swale outlet and riprap pad may help facilitate this process; see Photo 2.

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
There is no auxiliary outlet for 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:N/A

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>

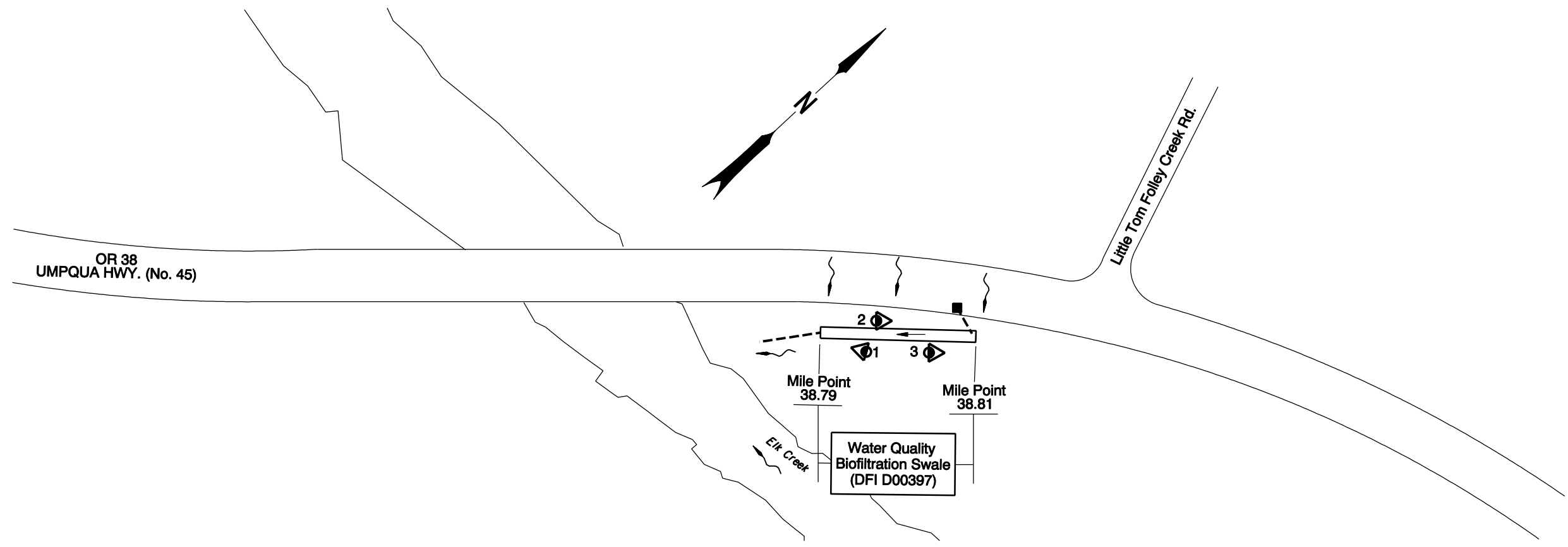
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(541) 957-3594
ODEQ Northwest Region Office	(503) 229-5263

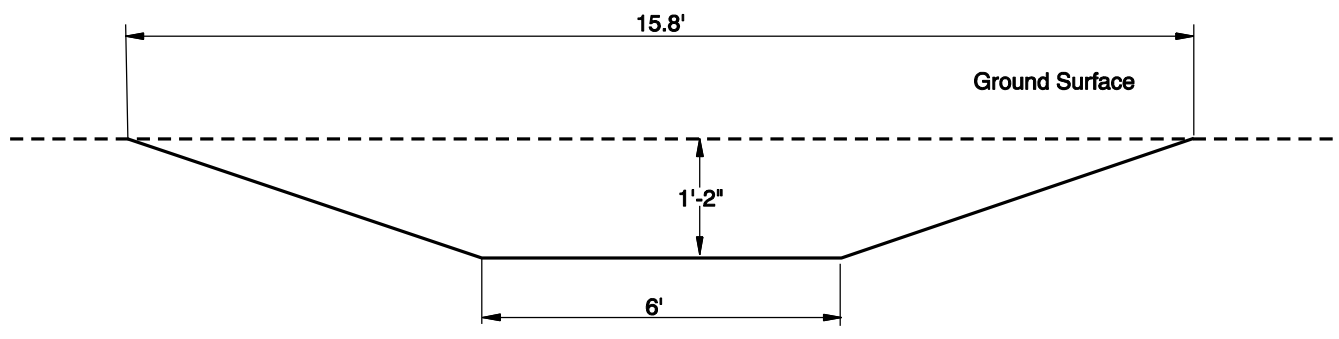
Appendix A

Content:

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



PLAN
N.T.S.



BIOSWALE SECTION
N.T.S.

- LEGEND:**
- Photo Location / Direction
 - Inlet
 - Storm Pipe (Facility)
 - Storm Pipe
 - Conveyance Direction
 - Pavement / Facility Flow Path

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: J. Carpenter

Drafted By: B. Shafer

DFI D00397
MAINTENANCE DISTRICT 7 HWY 045
WATER QUALITY BIOFILTRATION SWALE
UMPQUA HIGHWAY MP 38.79/38.81
DOUGLAS COUNTY

Appendix B

Content:

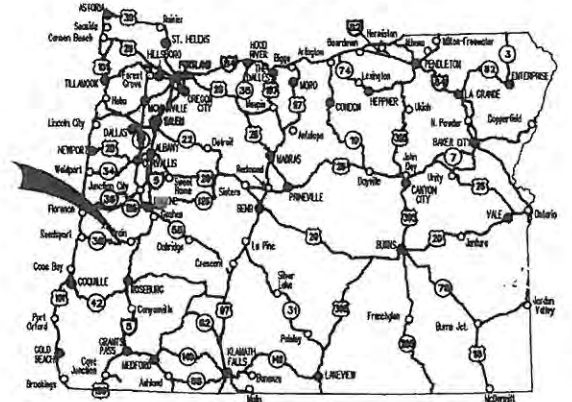
- **ODOT Project Plan Sheets**
 - *Cover/Title Sheet*
 - *Water Quality/Detention Plan Sheets*
 - *Other Details*

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED PROJECT

STRUCTURES, SIGNING & PAVING

OR38: ELK CREEK TO HARDCRABBLE CREEK DESIGN BUILD
BUNDLE 401

UMPQUA HIGHWAY (NO. 45)
DOUGLAS COUNTY
JANUARY 2008



Overall Length Of Project - 11.11 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) 232-1587.)



REVISED AS CONSTRUCTED
10-APR-2009 CONTRACT #13339
PROJ. MGR. John Ferguson P.E.

- OREGON TRANSPORTATION COMMISSION**
- Stuart Foster CHAIRMAN
 - Gail L. Achterman COMMISSIONER
 - Mike Nelson COMMISSIONER
 - Randall Pape COMMISSIONER
 - John Russell COMMISSIONER
 - Matthew Garrett DIRECTOR OF TRANSPORTATION



TYLIN INTERNATIONAL

ELK CREEK TO HARDCRABBLE DESIGN BUILD
UMPQUA HIGHWAY (NO. 45)
DOUGLAS COUNTY

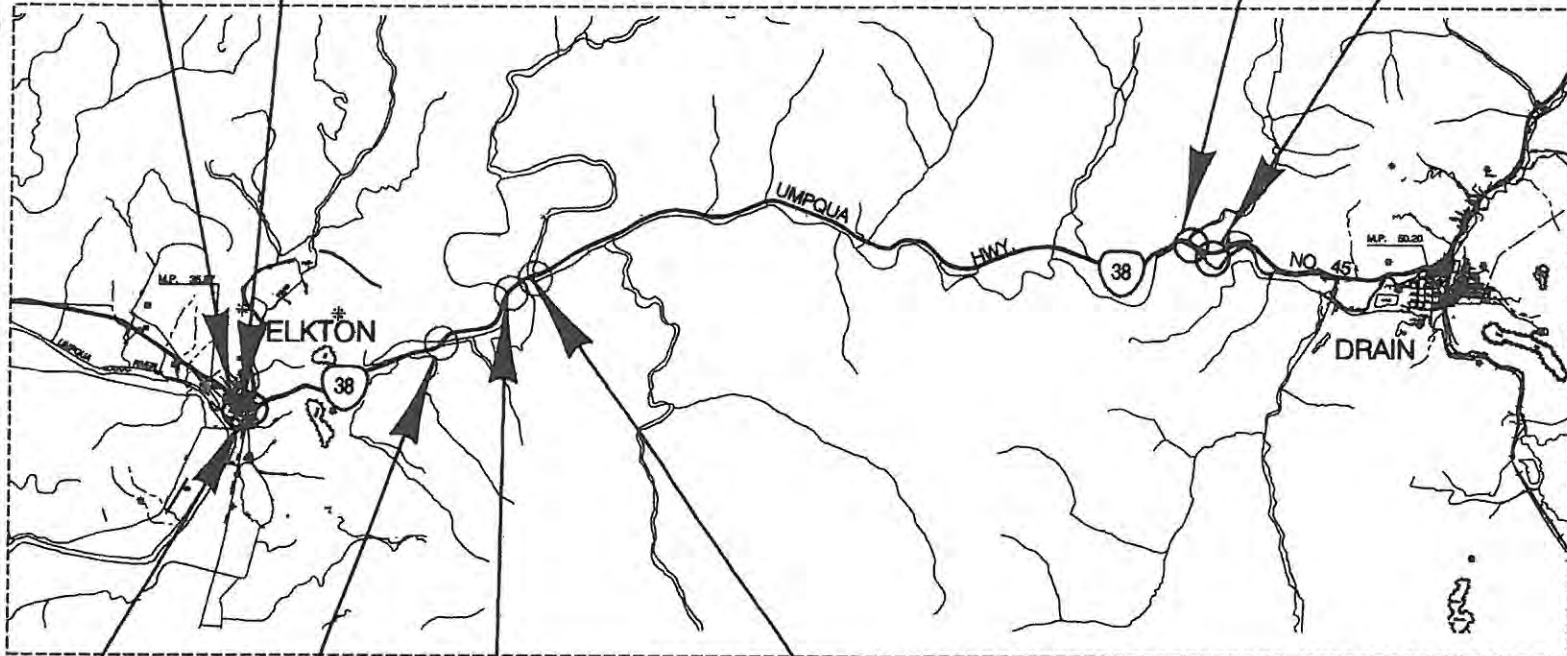
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	BSR-OTIA-S045(030)	1

Elk Creek Crossing #1 x2
01614 - Replacement (M.P. 36.39)

BEGINNING OF PROJECT
Sta.1063+00 (M.P. 36.39)

Hardscrabble Creek Crossing
01424 - Replacement (M.P. 47.50)

END OF PROJECT
Sta.1663+00 (M.P. 47.55)



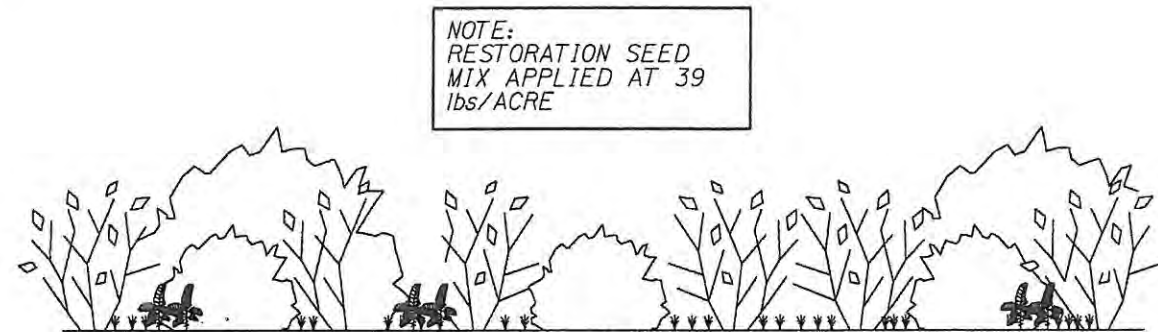
OR38 - OR138
Intersection Upgrade

Elk Creek Crossing #2
01601 - Replacement (M.P. 38.76)

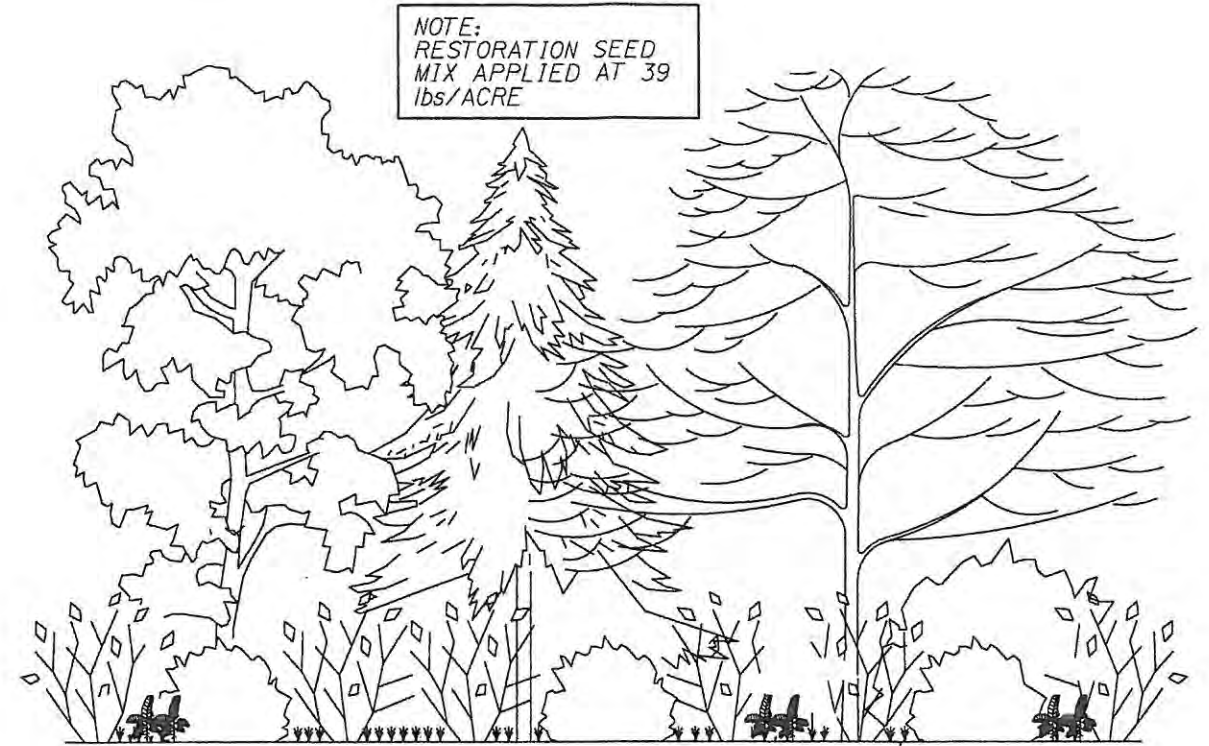
Elk Creek Crossing #4
01406 - Replacement (M.P. 39.97)

Elk Creek Crossing #3
01465 - Replacement (M.P. 39.64)

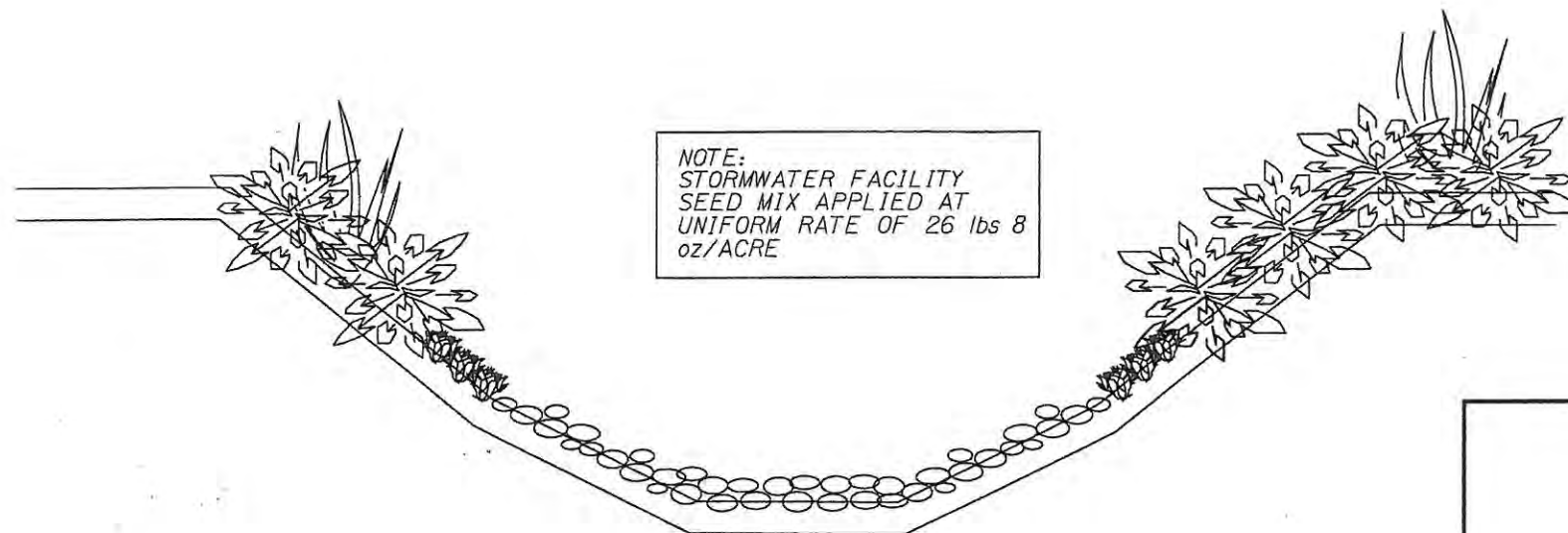




TYPICAL RESTORATION PLANTING AREA TYPE 1 CROSS-SECTION
SEE SHEET GN-4



TYPICAL RESTORATION PLANTING AREA TYPE 2 CROSS-SECTION
SEE SHEET GN-5



TYPICAL BIOSWALE CROSS-SECTION

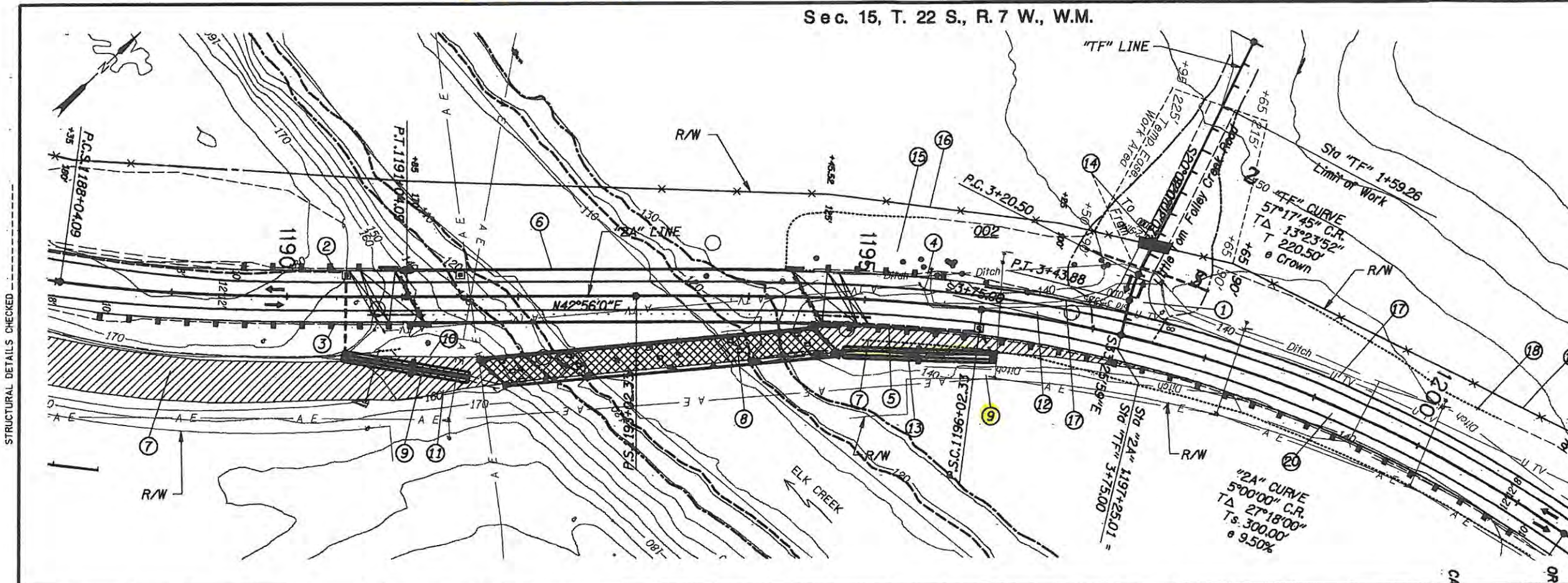
REVISED AS CONSTRUCTED
18-Feb-2010 CONTRACT C13319

		OREGON DEPARTMENT OF TRANSPORTATION REGION 3 TECHNICAL SERVICES
		ELK CREEK TO HARDSCRABBLE DESIGN BUILD BUNDLE 401 HIGHWAY 45 DOUGLAS COUNTY Design Team Leader - Frank Groznik Designed By - Morgan Holen and Elisabeth Bowers Drafted By - Don James and Fouad El-Gharabli
PLANTING DETAILS		SHEET NO. GN-6

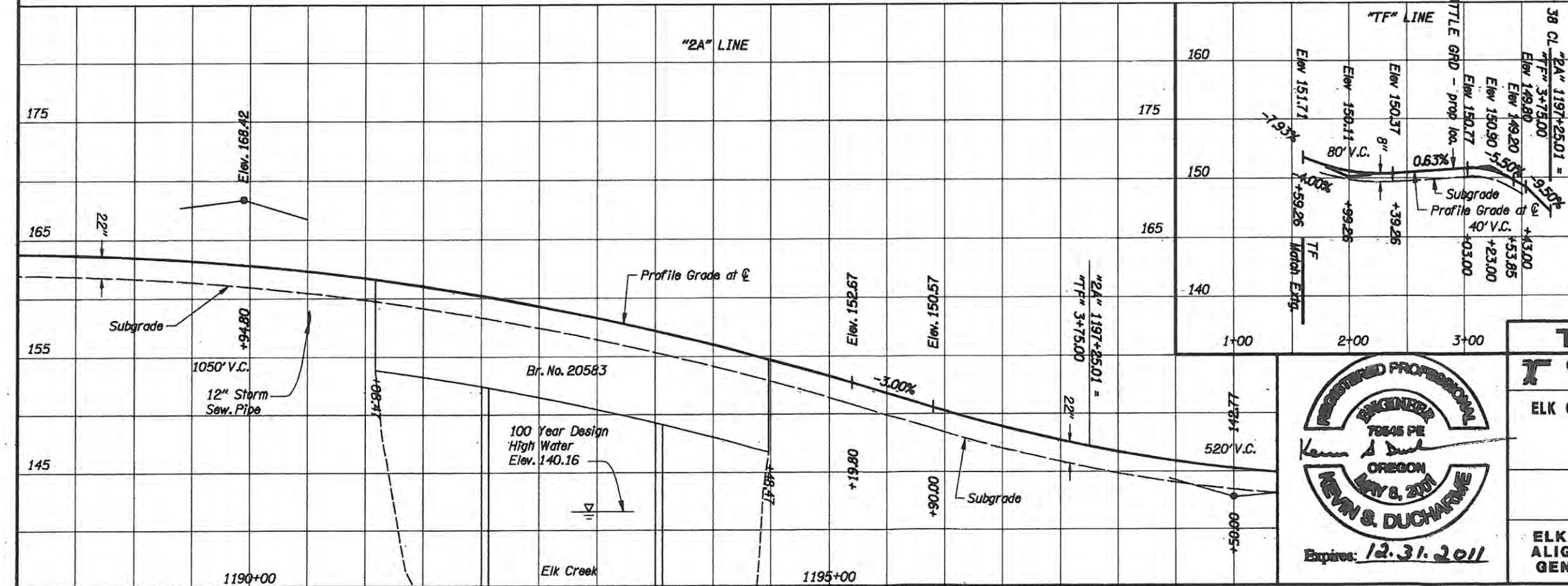
Crossing #2

Sec. 15, T. 22 S., R. 7 W., W.M.

41V-55



CONSTRUCTION NOTES
See Sheet 6A-2 For Construction Notes.



- LEGEND**
- Toe of Slope
 - Top of Cut
 - New Guardrail
 - A.F.O. Aerial Fiber Line
 - A.E. Aerial Electrical Line
 - B.F.O. Buried Fiber Optic Line
 - ▨▨▨▨ Pavement Removal
 - ▩▩▩▩ Bridge Removal



TYLIN INTERNATIONAL
OREGON DEPARTMENT OF TRANSPORTATION
 REGION 3 TECHNICAL SERVICES
ELK CREEK TO HARDSCRABBLE DESIGN BUILD BUNDLE 401 SECTION
 HIGHWAY 45
 DOUGLAS COUNTY
 Design Team Leader - KSD
 Designed By - DWB
 Drafted By - TSK
ELK CREEK CROSSING #2
ALIGNMENT, PROFILE AND
GENERAL CONSTRUCTION

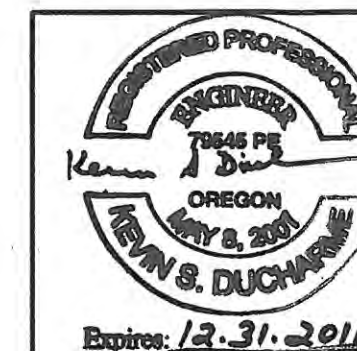
SHEET NO. 6A

CONSTRUCTION NOTES (See Sheet 6A For General Construction Plan)

- ① Construct Connection To Little Tom Folley Creek Road. Pavement Limit To Extend 30' From OR38 Edge of Pavement (See Std. Dwg. RD715)
- ② Sta. "2A" 1189+49.81, Lt To Sta. "2A" 1190+93.78, Lt
Const. Guardrail - 18.4688' (Std. Transition Concrete Bridge Rail To Guardrail)
-12.5' (Type 3)
-75' (Type 2A)
-37.5' (Non-Flared Energy Absorbing Terminal).
(See Drgs. BR203, RD400, RD405, RD420, RD440)
- ③ Sta. "2A" 1188+40.83, Rt To Sta. "2A" 1191+19.50, Rt
Const. Guardrail - 18.4688' (Std. Transition Concrete Bridge Rail To Guardrail)
-12.5' (Type 3)
-212.5' (Type 2A)
-37.5' (Non-Flared Energy Absorbing Terminal).
(See Drgs. BR203, RD400, RD405, RD420, RD440)
- ④ Sta. "2A" 1194+36.83, Lt To Sta. "2A" 1195+77.84, Lt
Const. Guardrail - 18.4688' (Std. Transition Concrete Bridge Rail To Guardrail)
-12.5' (Type 3)
-75' (Type 2A)
-37.5' (Non-Flared Energy Absorbing Terminal).
(See Drgs. BR203, RD400, RD405, RD420, RD440)
- ⑤ Sta. "2A" 1194+64.15, Rt To Sta. "2A" 1201+20.14, Rt
Const. Guardrail - 18.4688' (Std. Transition Concrete Bridge Rail To Guardrail)
-12.5' (Type 3)
-577.5' (Type 2A)
-37.5' (Non-Flared Energy Absorbing Terminal)*.
(See Drgs. BR203, RD400*, RD405, RD420, RD440)
* Use Alternative Grading per 2002 AASHTO Roadside Design Guide, Fig. 8.2
- ⑥ Construct Bridge No. 20583.
- ⑦ Obliterate Roadway Section
- ⑧ Remove Existing Bridge No. 01601
- ⑨ Construct Stormwater Treatment Facility (See Sheets GJ-5 And GJ-6 For Details)
- ⑩ Sta. "2A" 1190+84.48, Rt To Sta. "2A" 1191+70.24, Rt
Remove Extg. Guardrail - 86'
- ⑪ Sta. "2A" 1190+95.50, Rt To Sta. "2A" 1191+89.62, Rt
Remove Extg. Guardrail - 94'
- ⑫ Sta. "2A" 1194+53.22, Rt To Sta. "2A" 1196+81.73, Lt
Remove Extg. Guardrail - 229'
- ⑬ Sta. "2A" 1194+74.54, Rt To Sta. "2A" 1195+60.01, Rt
Remove Extg. Guardrail - 85'
- ⑭ Relocate Extg. Cattle Crossing (Field Locate)
- ⑮ Sta. "2A" 1194+05.19, Lt To Sta. "TF" 2+96.44, Rt
Remove Extg. Fence - 337'

- ⑯ Sta. "2A" 1192+91.86, Lt To Sta. "2A" 1197+19.85, Lt
Const. Fence - Connect To Extg. Fence At Ends.
(See Std. Dwg. RDB10)
- ⑰ Existing Buried Fiber Optic Lines - Relocated By Others.
- ⑱ See Sheet No. 6A-3 Note 5
- ⑲ See Sheet No. 6A-3 Note 6
- ⑳ Construct Full Depth Pavement Section

REVISED AS CONSTRUCTED
10-APR-2009 CONTRACT #13339



TYLIN INTERNATIONAL	
OREGON DEPARTMENT OF TRANSPORTATION	
ELK CREEK TO HARDSCRABBLE DESIGN BUILD BUNDLE 401 SECTION	
HIGHWAY 45 DOUGLAS COUNTY	
Design Team Leader - KSD Designed By - DWB Drafted By - TSK	
ELK CREEK CROSSING #2 GENERAL CONSTRUCTION	SHEET NO. 6A-2

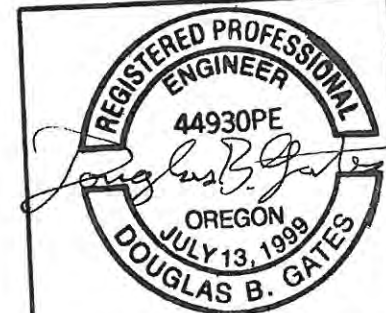
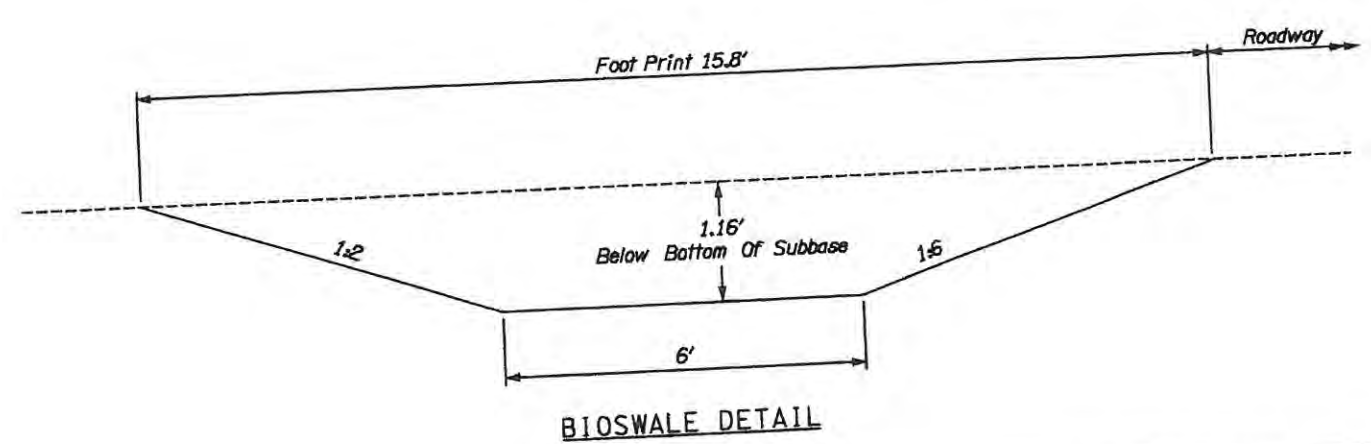
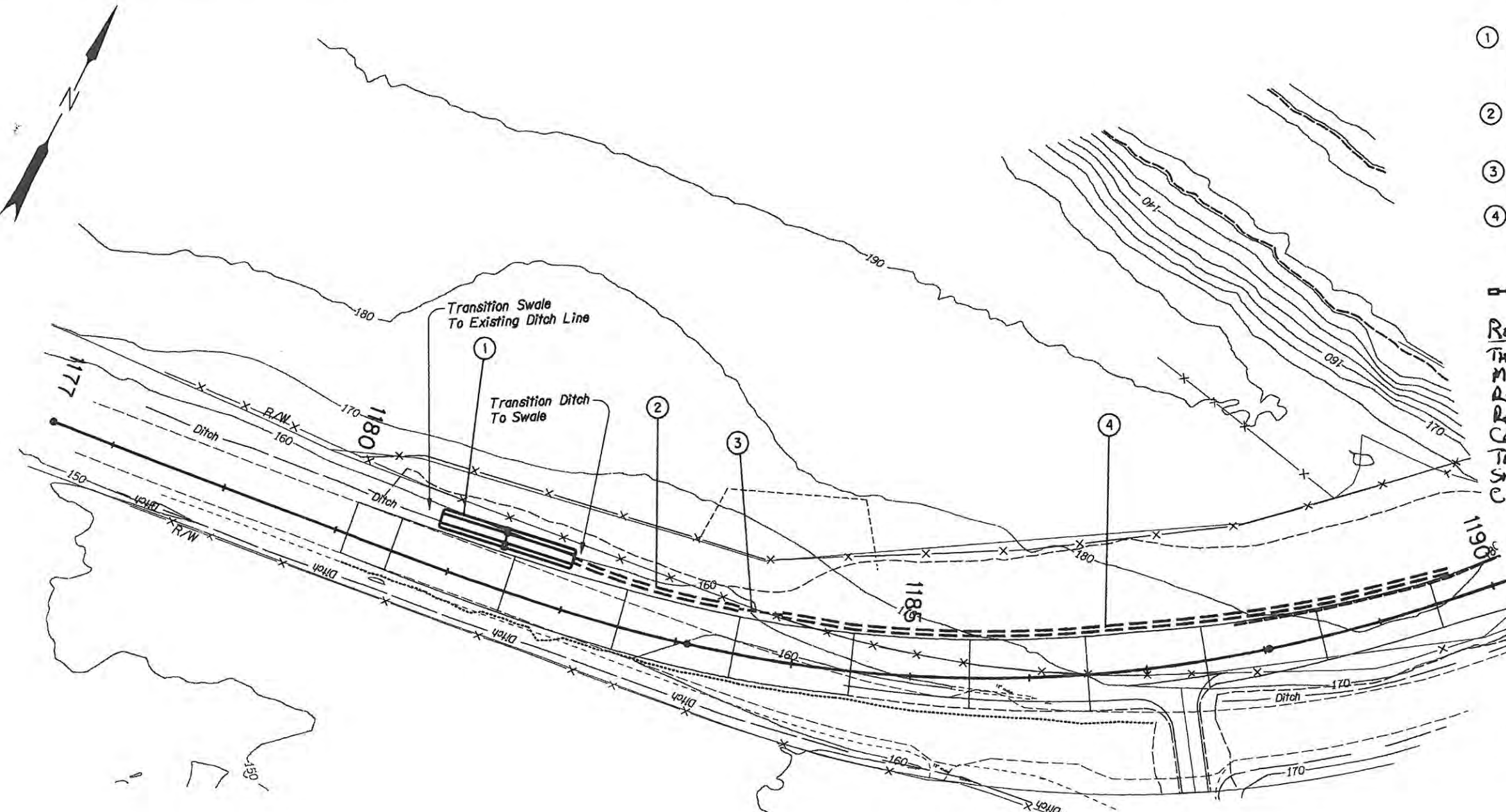
- ① Const. 116'x15.8' Water Quality Swale At 0.5% Longitudinal Slope (For Detail See This Sheet) And Special Specifications. Place Check Dams On 50' Centers.
- ② Const. V-Shaped Grass Lined Ditch - Length = 145', 1:6 Foreslope, 1:3 Backslope Depth 1.1' Below Subbase.
- ③ Replace 21" Access Road Culvert. Length = 40', Slope = 0.5%
- ④ Const. V-Shaped Grass Lined Ditch - Length = 565', 1:6 Foreslope, 1:3 Backslope. Depth Varies From 0.5' Below Subbase At Sta. 1189+50 To 0.9' Below Subbase At Sta. 1184+00

▣ Check Dam

RECORD DRAWING

THIS RECORD DRAWING DOCUMENTS FIELD MODIFICATIONS TO THE ORIGINAL DESIGN REPORT BY OTHERS. IT DOES NOT REPRESENT A FIELD REVIEW OF CONSTRUCTION ACTIVITIES PROVIDED BY THE DESIGN ENGINEER. THE INFORMATION SHOWN HAS NOT BEEN VERIFIED FOR COMPLETENESS OR ACCURACY.

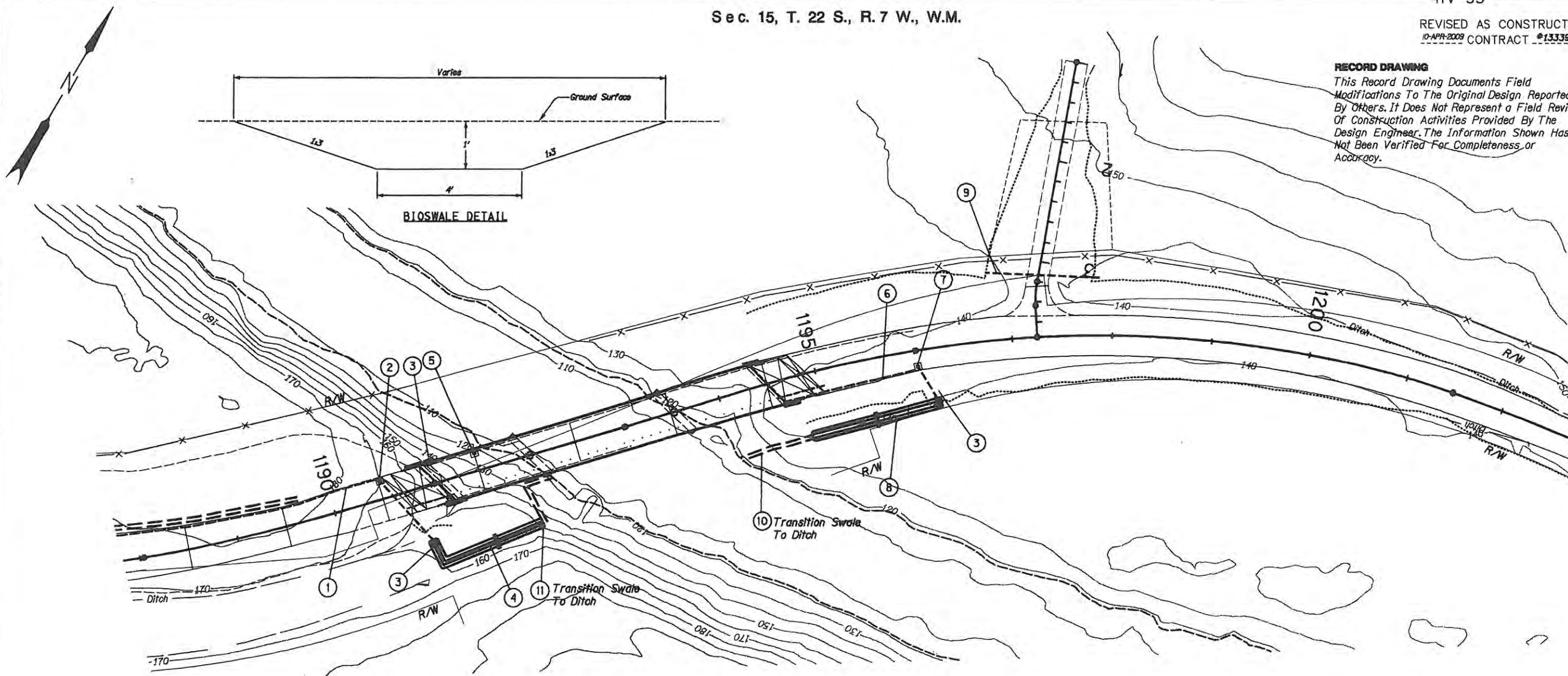
NOTE:
Final Locations And Elevations Will Be Based On The Final Site Grading Plan. The Final Grading Plan Must Be Checked For Compatibility With Stormwater Design Features Prior To Construction. Accordingly, Design Features May Need To Be Modified And Other Design Features May Need To Be Added.



Parametrix	
OREGON DEPARTMENT OF TRANSPORTATION	
ELK CREEK TO HARDSCRABBLE DESIGN BUILD BUNDLE 401 SECTION	
HIGHWAY 45 DOUGLAS COUNTY	
Design Team Leader - Randy Reeve Designed By - Douglas Gates Drafted By - Paula Morgan	
ELK CREEK BRIDGE 1601 (CROSSING NO.2) WEST SIDE STORM WATER MANAGEMENT	SHEET NO. GJ-5

RECORD DRAWING

This Record Drawing Documents Field Modifications To The Original Design Reported By Others. It Does Not Represent A Field Review Of Construction Activities Provided By The Design Engineer. The Information Shown Has Not Been Verified For Completeness or Accuracy.



- ① Sta. 1187+50 To Sta. 1190+50
Const. Drainage Curb
(See Drg. No. RD700)
- ② Const. Storm Water Inlet Type G-2
(See Drg. No. RD364)
Inst. 12" Dia. Storm Sew. Pipe - 84 Lf.
(Min. Slope = 0.0044)
Rim EI = 161.8'
Invert EI = 158.0'
- ③ Const. Class 50 Rock Pad
At Outfall 4'x5', 2.3' Deep
- ④ Southwest Swale:
Const. 106'x9.6' Water Quality Swale At 1%
Longitudinal Slope, Check Dams At 50'
Centers, 90° Elbow at 25'
- ⑤ Const. Bridge Deck Inlet
(See NEENAH Foundry Co. R-3940)
- ⑥ Sta. 1194+64.78 To Sta. 1196+00
Const. Drainage Curb
(See Drg. No. RD700)
- ⑦ Const. Storm Water Inlet Type G-2
(See Drg. No. RD364)
Inst. 12" Dia. Storm Sew. Pipe (PE) - 40 Lf.
(Min. Slope = 0.0044)
Rim EI = 148.4'
Invert EI = 144.6'
- ⑧ Southeast Swale:
Const. 126'x10' Water Quality Swale At 1%
Longitudinal Slope, Check Dams At 50' Centers
- ⑨ Const. 24" Dia. Culvert 115 Lf.
Install To Maintain Positive Flow
To The West Min. Slope = 0.2%
- ⑩ Const. Swale Outfall
Trapezoidal Ditch, 1' Base, 1:3 Side Slopes,
Grouted Class 100 Rip Rap, 1' Depth (Top Of
Rip Rap)

- ⑪ Const. Swale Outfall
Trapezoidal Ditch, 1' Base, 1:3 Side Slopes,
Grouted Class 100 Rip Rap, 1' Depth
(Top Of Rip Rdp)

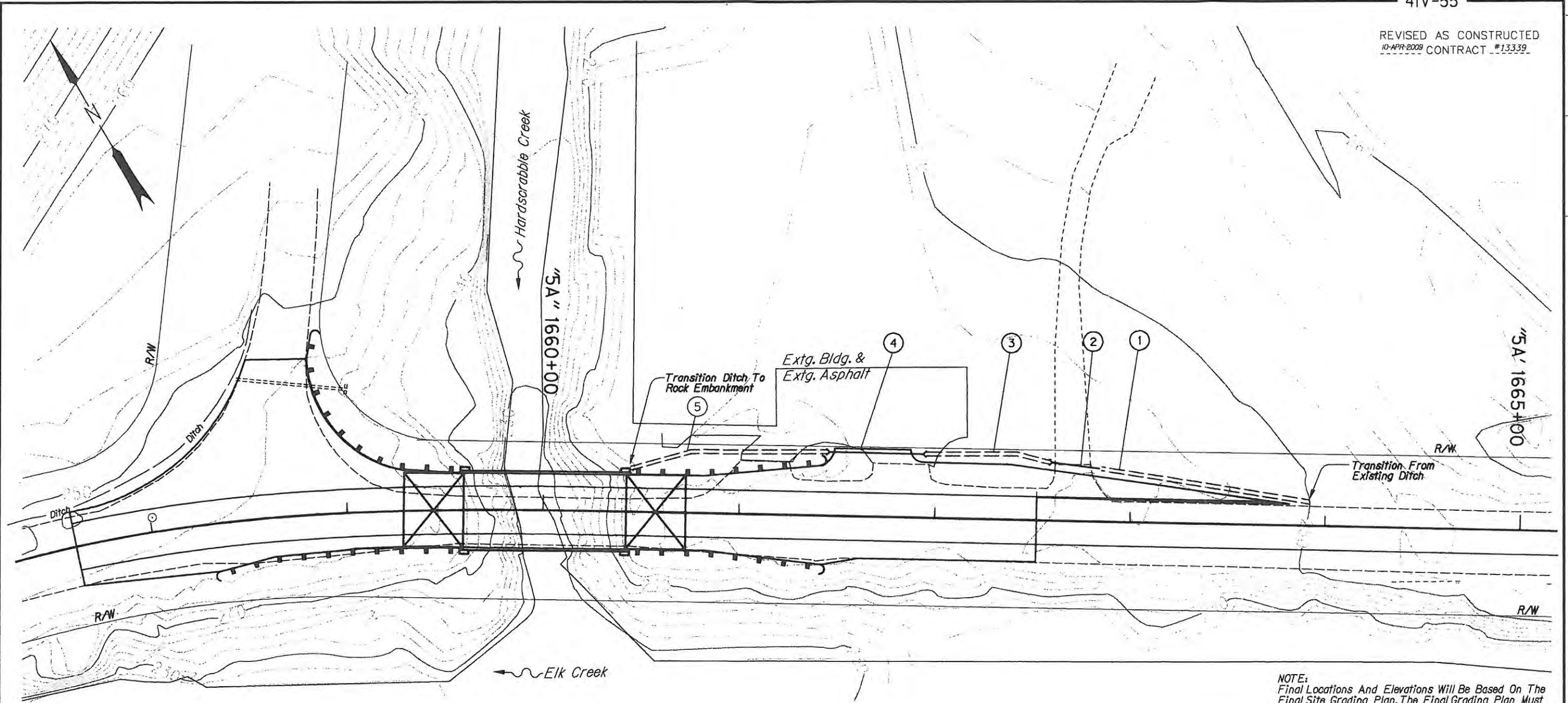
== Check Dam

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Final Site Grading Plan. The Final Grading Plan Must Be
Checked For Compatibility With Stormwater Design
Features Prior To Construction. Accordingly, Design
Features May Need To Be Modified And Other Design
Features May Need To Be Added.



EXPIRATION DATE: 6/30/11

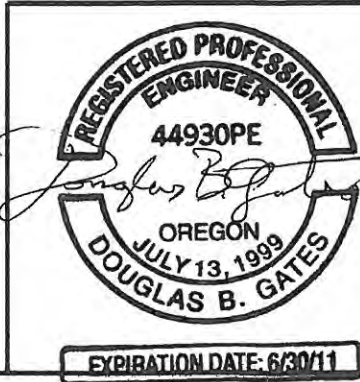
Parametrix	
OREGON DEPARTMENT OF TRANSPORTATION	
ELK CREEK TO HARDCRABBLE DESIGN BUILD BUNDLE 401 SECTION	
HIGHWAY 45 DOUGLAS COUNTY	
Design Team Leader - Randy Reeve Designed By - Douglas Gates Drafted By - Paula Morgan	
ELK CREEK BRIDGE 1001 (CROSSING NO. 2) EAST SIDE STORM WATER MANAGEMENT	SHEET NO. GJ-6



- ① Const. V-shaped Grass Lined Ditch- Length = 110'
Ditch Depth = Min 7" Below Subgrade.
Freeboard = Min 6"
1:3 Side Slopes, Longitudinal Slope = 0.7% Min
- ② Replace 12" Access Road Culvert.
Length = 25', Slope = 0.7%
- ③ Const. V-shaped Grass Lined Ditch- Length = 64'
Freeboard = Min 6"
1:3 Side Slopes, Longitudinal Slope = 0.7% Min
- ④ Const. 12" Access Road Culvert,
Length = 50', Slope = 0.7%
- ⑤ Const. V-shaped Grass Lined Ditch- Length = 100'
Freeboard = Min 6"
1:3 Side Slopes, Longitudinal Slope = 0.7% Min

RECORD DRAWING
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OREGON DEPARTMENT OF TRANSPORTATION	
ELK CREEK TO HARDCRABBLE DESIGN BUILD BUNDLE 401 SECTION	
HIGHWAY 45 DOUGLAS COUNTY	
Design Team Leader - Randy Reeve Designed By - Jake Hofeld Drafted By - P. Morgan	
PROPOSED STORMWATER MANAGEMENT PLAN	SHEET NO. GJ-7