OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: October 2018

DFI No. D00579

Figure 1: DFI No. D00579, looking northeast

Identification

Drainage Facility ID (DFI):	D00579
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 45V-038
Location:	District: 2B
	Highway No.: 123
	Mile Post: 12.56-12.59 (beginning-end; ramp alignment AF)

1. Manual Purpose

The purpose of this manual is to outline inspection needs and summarize maintenance actions.

2. 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.

Facility location type: Roadway shoulder

Flow direction: West

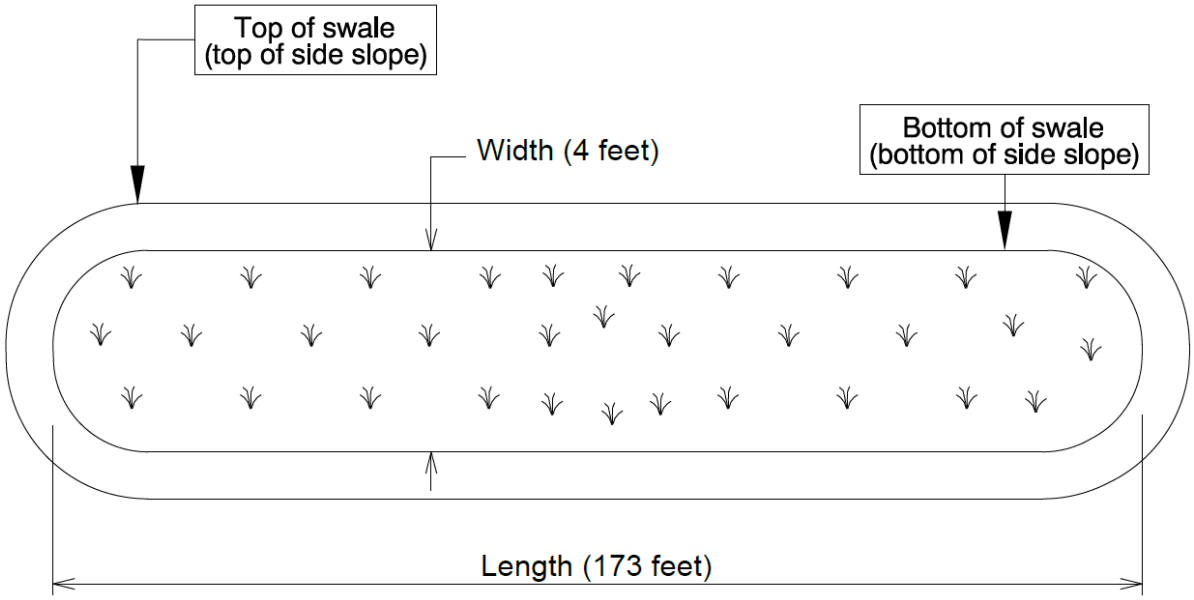
Figure 2: Facility location map

3. Facility Summary

The length and width of a swale is based on the bottom dimensions.

The bottom length and bottom width of the swale is:

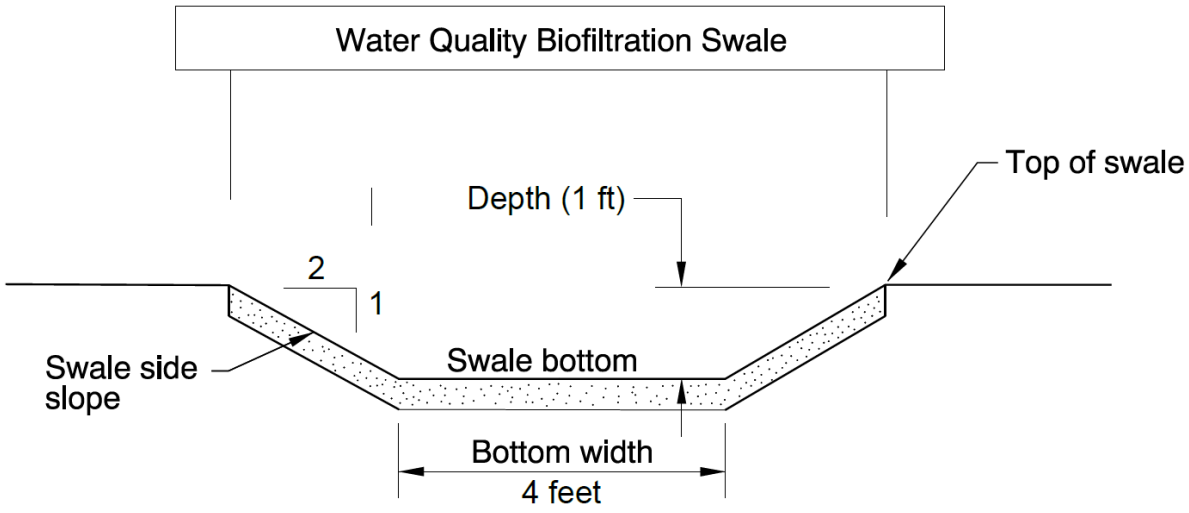
Bottom Length (feet)	Bottom Width (feet)
173	4



The depth of the swale is the vertical distance measured from the bottom of the swale to the top. The slope of the swale sides is presented by a vertical distance (rise) followed by the horizontal distance (run).

Depth and side slopes:

Depth (feet)	Rise (feet)	Run (feet)
1	1	2



Site Specific Information: The swale is located on the north side of NE 122nd Ave Connector. There is an access point on the south side of NE Sandy Ave that allows access to the swale.

4. Facility Access

Maintenance access to the facility:

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

Figure 3: Pull in access off of NE Sandy Blvd

5. Operational Components / Maintenance Items

Classification

This facility is classified as an:

☒ On-line Swale	☐ Off-line Swale
A swale that does not include a high flow bypass component; flow drains into and through the facility	**A swale that treats low/small flows and diverts high flows using a bypass component**

Bypass Component

This facility includes a high flow bypass component:

☒ No	☐ Yes
There is no bypass component. High flows drains into and through the facility	**There is a bypass component. Only low/small flows drain into the swale. High flows are diverted around the swale using a bypass component**

Operational Components

A swale has many components that assist with treatment, conveyance, and reducing flow velocity to minimize erosion. The components in use can vary depending if the facility was designed to operate on-line or off-line. 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 Biofiltration Swales (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/

Operational Plan

The applicable standard operational plan for this facility is:

☐ Operational Plan A	☒ Operational Plan B	☐ Operational Plan C
An on-line swale with roadside ditches	**An on-line swale with piped inlets and outlets**	**An off-line swale with a piped high flow bypass**
A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A, B, C) are provided in the Standard Operation Manual.		

See Appendix A for the site specific operational plan.

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: Swale Components		**ID #**
Manholes/Structures		
Pre-treatment manhole	☐	**S1**
Weir type flow splitter/flow splitter manhole	☐	**S2**
Orifice type flow splitter/flow splitter manhole	☐	**S3**
Standard manhole	☒	**S4**
Swale Inlet		
Pavement sheet flow	☐	**S5**
Inlet Pipe (s) (Type "D")	☐	**S6**
Open channel inlet	☒	**S7**
Riprap pad	☐	**S8**
Ground Cover		
Grass bottom	☒	**S9**
Grass side slopes	☒	**S10**
Granular drain rock	☐	**S11**
Plantings	☐	**S12**
Underground Components		
Geotextile fabric	☐	**S13**
Water quality mix	☒	**S14**
Perforated pipe	☐	**S15**
Porous pavers (access grid)	☐	**S16**
Flow Spreader		
Rock basin (used at inlet)	☐	**S17**
Anchored board (midpoint of swale or every 50 feet along swale bottom)	☐	**S18**
Other: Untreated Cedar Chips	☒	**S19**
Swale Outlet		
Catch basin with grate	☐	**S20**
Outlet Pipe (s)	☐	**S21**
Open channel outlet	☐	**S22**
Auxiliary Outlet: Type "D" Inlet	☒	**S23**
Outfall Type		
Waterbody (**C**reek/**L**ake/**O**cean)	☐ **C** ☐ **L** ☐**O**	**S24**
Ditch	☐	**S25**
Storm drain system	☒	**S26**
Outfall Components		
Riprap pad	☐	**S27**
Riprap bank protection	☐	**S28**

Figure 4: Swale and water inlet, looking northwest

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 swales:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities
- Table 3 (Maintenance of Water Quality or Biofiltration Swales): Contains maintenance information for swales

The *Blue Book* can be viewed at the following website:

http://www.oregon.gov/ODOT/Maintenance/Documents/blue_book.pdf

7. Limitations

Access grid installed:

☒ No	☐ Yes
There are no duty porous pavers installed in this swale	

Swales are designed to allow equipment access along the bottom. If an access grid is **NOT** installed, vehicles entering the swale 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.

Equipment wheels should be kept on the tops and side slopes. Mower arms may be run along the swale bottom.

8. Waste Material Handling

Material removed from the facility is defined as waste by the Department of Environmental Quality (DEQ). Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options:

http://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf

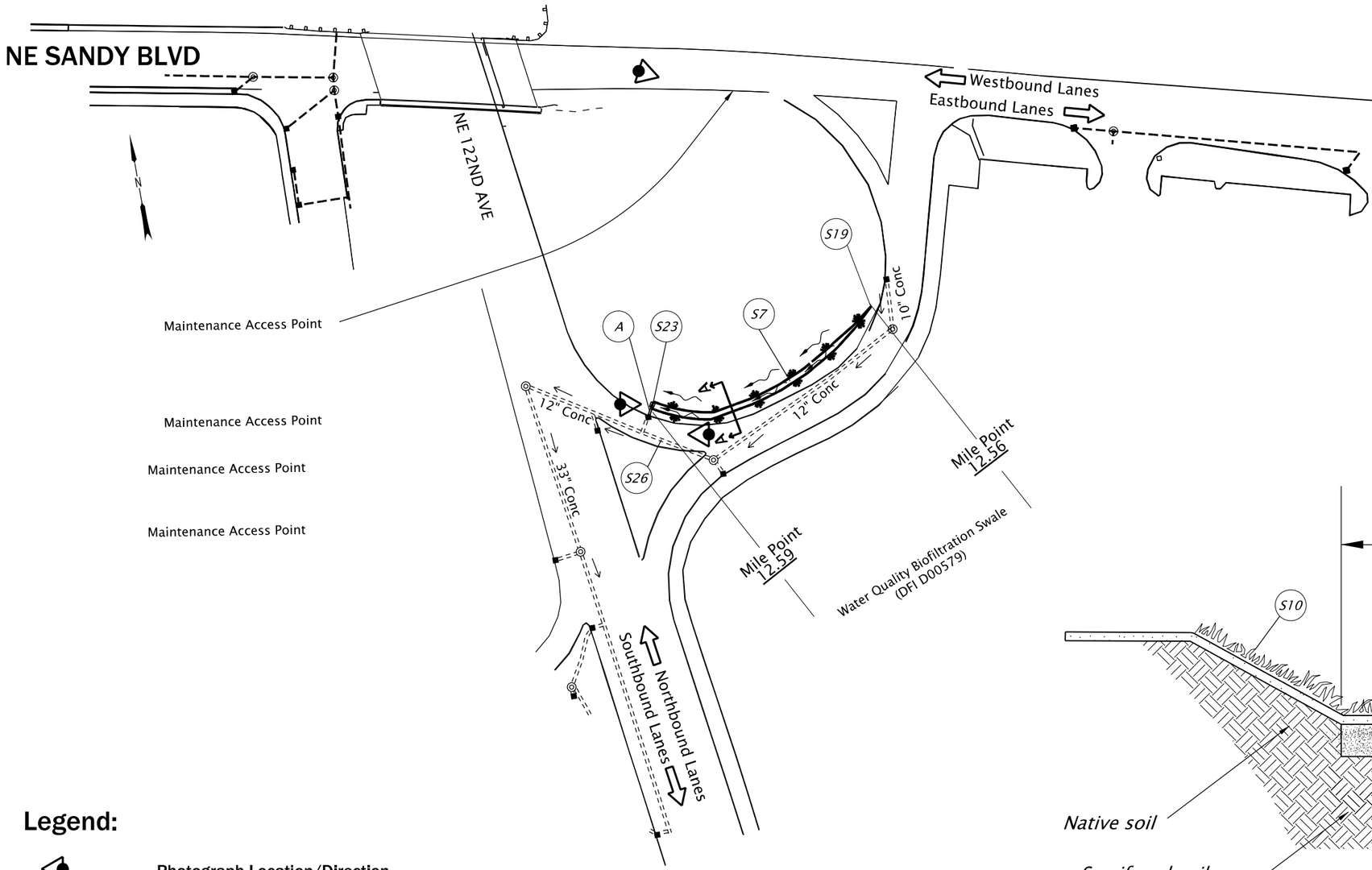
Contact any of the following for more detailed information about management of waste materials found on site:

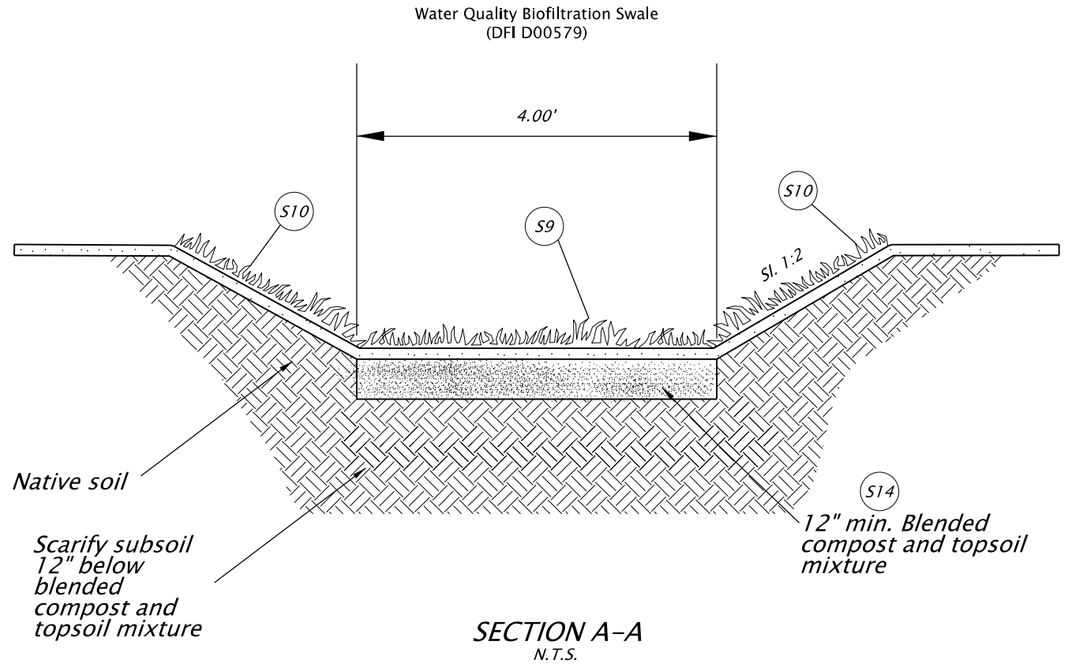
ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647
ODOT Region 3 Hazmat Coordinator	(541) 957-3594
ODOT Region 4 Hazmat Coordinator	(541) 388-6186
ODOT Region 5 Hazmat Coordinator	(541) 963-1590
ODEQ Northwest Region Office	(503) 229-5263

A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D00579





SECTION A-A
N.T.S.

Legend:

- Photograph Location/Direction
- A — 12" Sewer Pipe
- Storm Pipe
- Storm Pipe (Facility)
- Inlet
- Manhole
- Water Quality Swale
- Traffic Flow Direction
- Water Flow Direction

OREGON DEPARTMENT OF TRANSPORTATION

Sht. 01 of 01

Prepared By: Katrina Sepulveda

Drafted By: Katrina Sepulveda

DFI D00579
MAINTENANCE DISTRICT 2C HWY 123
Water Quality Biofiltration Swale
HIGHWAY MP 12.56-12.59
Multnomah County

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 45V-038

45V-038

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, PAVING, PAVEMENT MARKERS, SIGNING, SIGNALS & ROADSIDE DEVELOPMENT

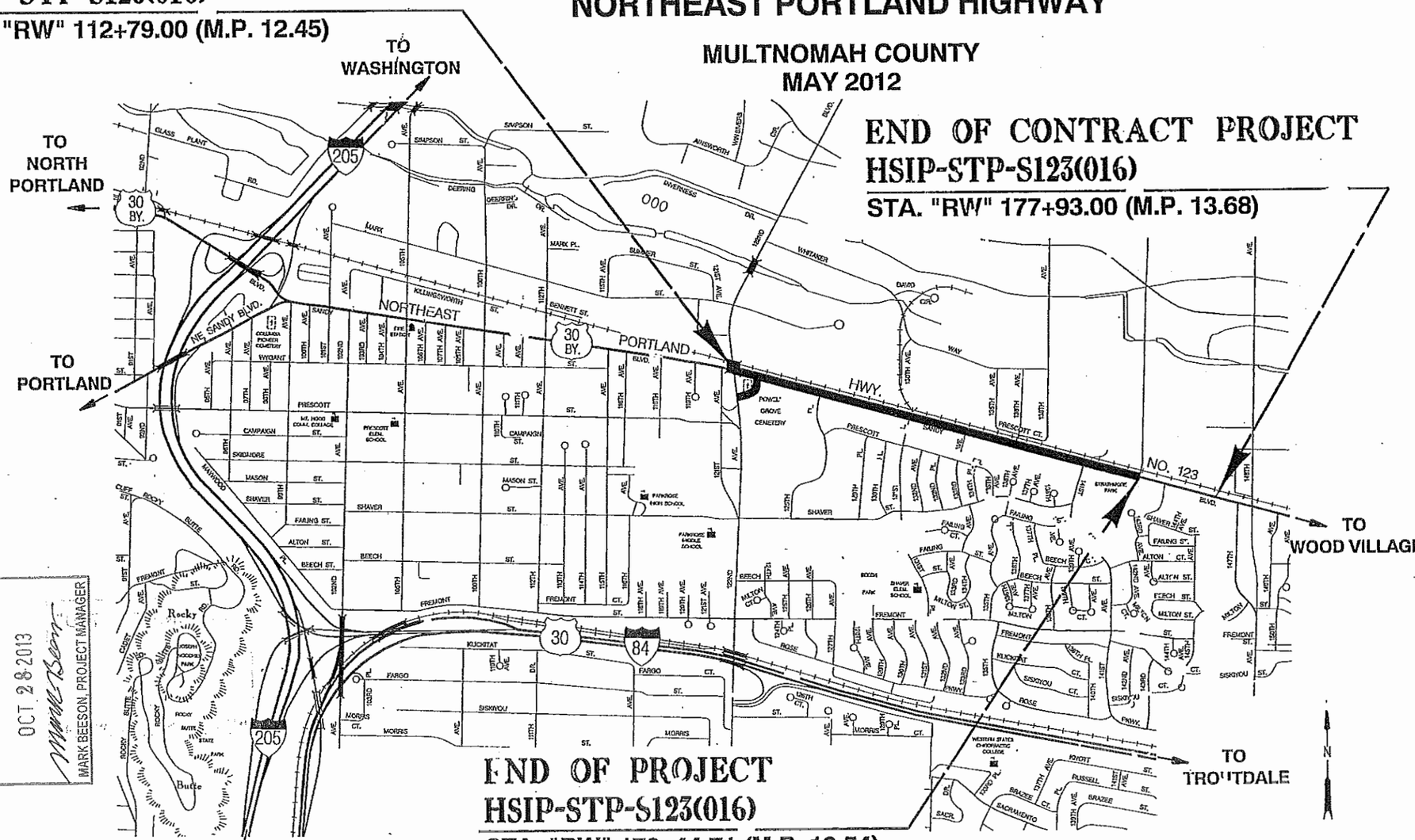
US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.

NORTHEAST PORTLAND HIGHWAY

MULTNOMAH COUNTY
MAY 2012

BEGINNING OF PROJECT & CONTRACT PROJECT
HSIP-STP-S123(016)
STA. "RW" 112+79.00 (M.P. 12.45)

END OF CONTRACT PROJECT
HSIP-STP-S123(016)
STA. "RW" 177+93.00 (M.P. 13.68)



"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

END OF PROJECT
HSIP-STP-S123(016)
STA. "RW" 170+44.71 (M.P. 13.54)

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

Overall Length Of Project - 1.09 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

Pat Egan	CHAIR
Mary F. Olson	COMMISSIONER
David Lohman	COMMISSIONER
Mark Frohnmayer	COMMISSIONER
Tammy Baney	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 G. Chandra
Naveen G. Chandra, P.E.
Project Delivery Manager, Region 1

Concurrence by ODOT Chief Engineer

US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	HSIP-STP-S123(016)	1

PE001435 000

INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
2, 2A, 2A-2 thru 2A-5	Typical Sections
2B, 2B-2 thru 2B-8	Details
2C, 2C-2 Thru 2C-5	Traffic Control Plans
2D	Pipe Data Sheet
3	General Construction
3A & 3A-2	Drainage & Utilities
3B	Profile
4	General Construction
4A & 4A-2	Drainage & Utilities
4B	Profile
5	General Construction
5A & 5A-2	Drainage & Utilities
5B	Profile
6	General Construction
6A & 6A-2	Drainage & Utilities
7	General Construction
7A & 7A-2	Drainage & Utilities
7B	Profile
8	General Construction
8A	Drainage & Utilities
GEO/HYDRO	
GA, GA-2 Thru GA-10	Erosion Control
GB & GB-2	Geotechnical Data
GM	Mandatory Disposal Site
ROADSIDE DEVELOPMENT	
GN, GN-2 & GN-3	Details
GN-4 Thru GN-8	Roadside Development Plans
PERMANENT PAVEMENT MARKINGS	
ST, ST-2 Thru ST-5 Incl.	Striping Plans
PERMANENT SIGNING	
S-13094 Thru S-13104	Permanent Signing

INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
	TRAFFIC SIGNALS
16463	Legend
16464	Removal Plan
16465	Signal Plan
16466	Detector Plan
16467	Existing Utilities
16468	Removal Plan
16469	Signal Plan
16470	Detector Plan
16471	Existing Utilities
16472	Interconnect Plan
16473	Flashing Beacon Plan
16474	Existing Utilities
16475	Details
16476	Details
16494	Details
16495	Details

Standard Drg. Nos.

RD140 – Roadway Cross Slopes Superelevated Sections
RD150 – Slope Rounding

RD300 – Trench Backfill, Bedding, Pipe Zone And Mult. Installations
RD302 – Street Cut
RD312 – Subsurface Drain
RD336, RD338, RD342 – Manholes
RD344, RD346
RD356 – Manhole Cover & Frames
RD360 – Manhole Frame Adjustment
RD362 – Sanitary Cleanout
RD370 – Concrete Inlets
RD380, RD386, RD388 – Pipe Fill Height Tables
RD390
RD399 – Stormwater Treatment and Storage Facility Field Markers

RD400, RD405, RD410, RD415, RD420, RD425, RD430, RD435, RD440, RD445, RD450, RD470 – Guardrail

RD610 – Asphalt Pavement Details

RD700, RD701 – Curbs
RD705 – Islands
RD710 – Accessible Route Islands
RD715 – Approaches And Non-Sidewalk Driveways
RD720 – Sidewalks
RD725 – Separated Sidewalk Driveways or Alleys
RD735 – Curb Line Sidewalk Driveways or Alleys
RD755 – Sidewalk Ramp Details
RD759 – Truncated Dome Detectable Warning Surface Details And Locations

RD1000 – Construction Entrances
RD1015 – Inlet Protection
RD1040 – Sediment Fence

BR270 – Rail Transition From Flex Beam Rail To Curb & Parapet Rail

TM204 – Details
TM211 – Sign Bracing Detail

TM457 – Vehicle, Ped. Signal & Push Button Mounting Details
TM458 – Pedestrian Ramp Placement Details
TM462 – Adjustable Signal Head Mounting Details
TM465 – Overhead Sign, Fire Preemption & Photoelectronic Details

TM500, TM501, TM503 – Pavement Marking Standard Details
TM505 – Rail Crossing Pavement Markings
TM520, TM521 – Durable Pavement Markings
TM525 – Turn Arrow Marking Details
TM530 – Intersection Pavement Markings
TM539 – Median And Left Turn Channelization Details
TM560, TM561 – Alignment Layout
TM570 – Traffic Delineators
TM571 – Traffic Delineators Steel Post Details
TM576 – Traffic Delineator Installation

TM670 – Wood Post Sign Supports
TM671 – 3 Second Gust Wind Speed Isotach
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
TM844 – Temporary Pedestrian Access Routing
TM850 – 2-Lane, 2 Way Roadways
TM851 – Non-Freeway Multi-Lane Sections

R/W Map No. 11B-05-0025

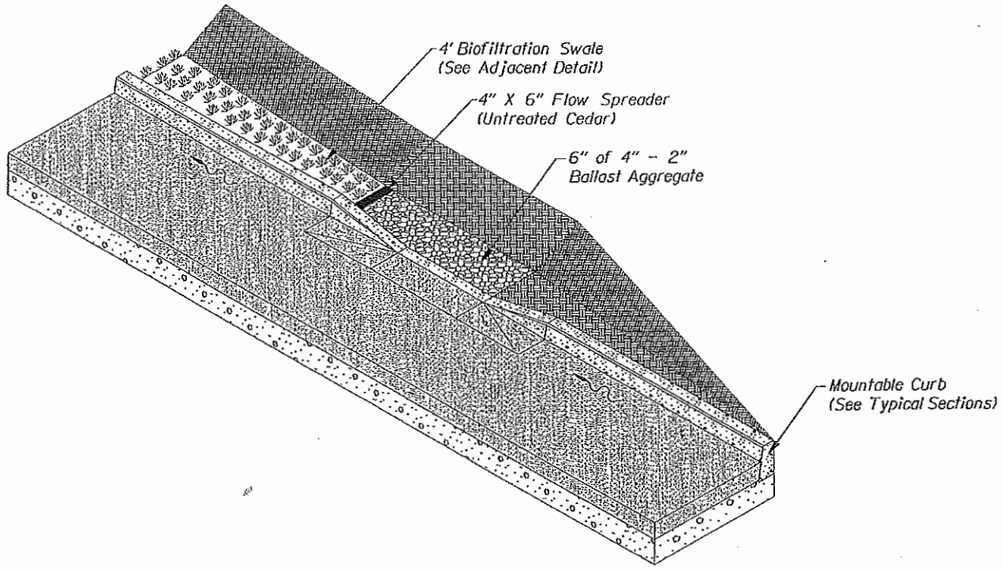
"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

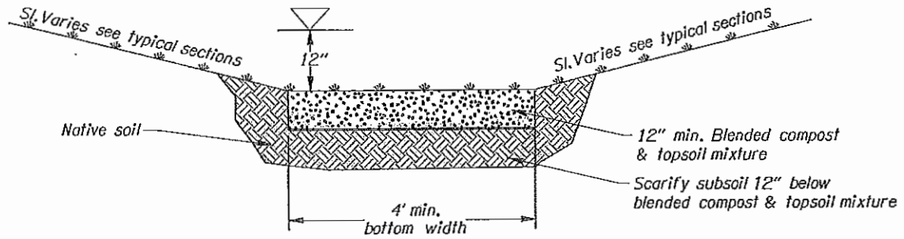
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	HSIP-STP-S123(016)	1A

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

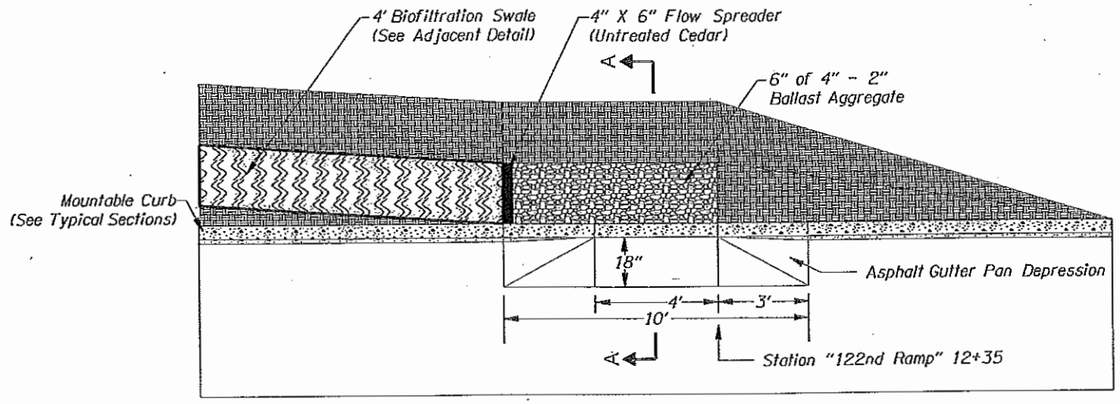
45V-038



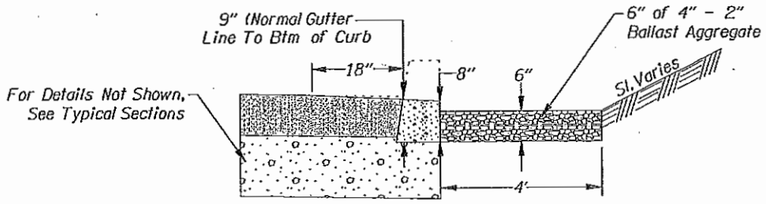
CURB CUT INLET FOR BIOFILTRATION SWALE
Isometric View
Not to scale



4' BIOFILTRATION SWALE
Not to scale



CURB CUT INLET FOR BIOFILTRATION SWALE
Top View
Not to scale



SECTION A-A
Top View
Not to scale

"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

REGISTERED PROFESSIONAL ENGINEER
74492PE
OREGON
JAN. 13, 2009
JERED W. CARPENTER
EXPIRES: 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - GEO/HYDRO/HAZMAT UNIT

US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Reviewed By - Ed Foltyn
Designed By - Jered Carpenter
Drafted By - Billy Shofer

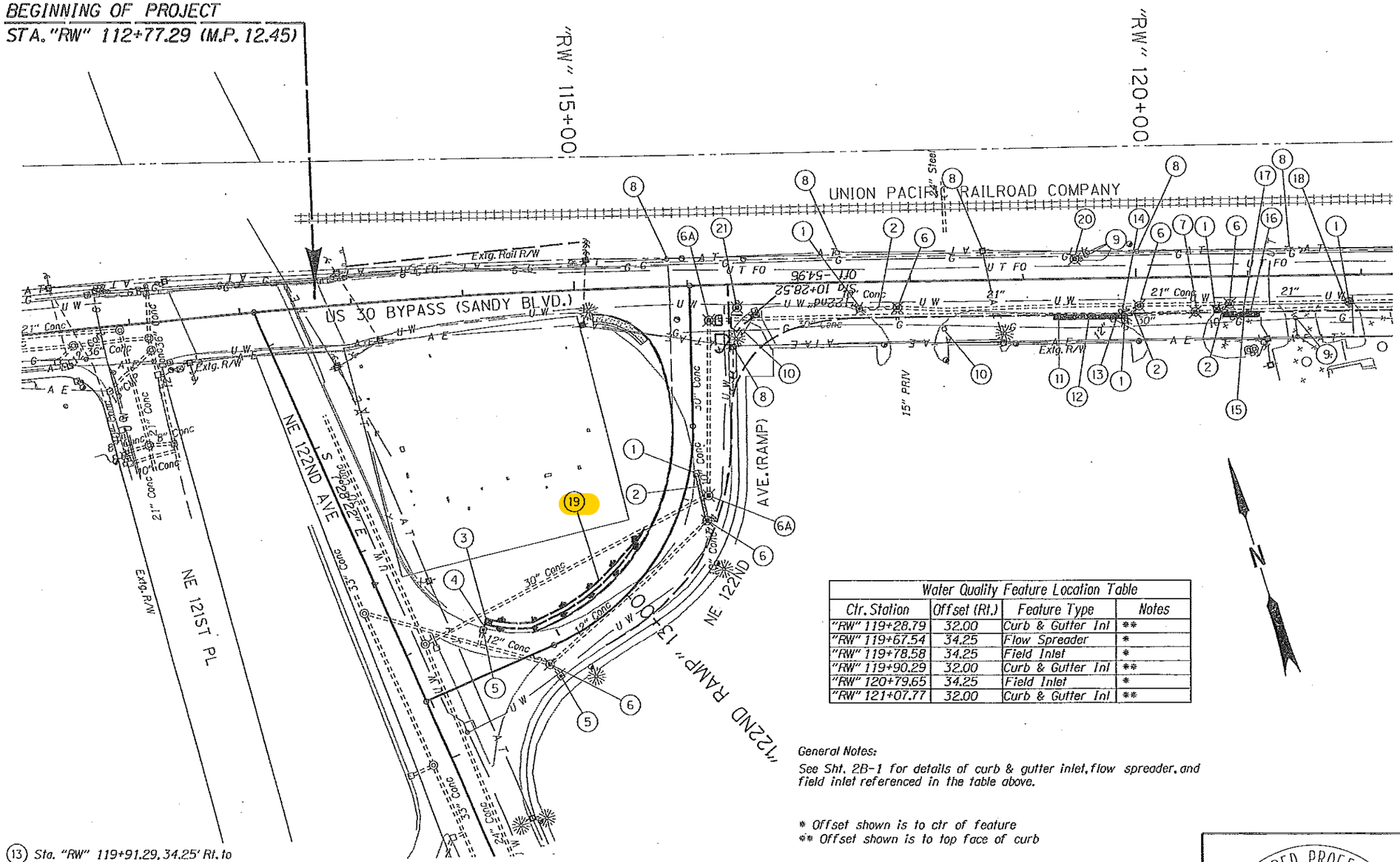
DETAILS

SHEET NO. 2B-8

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

45V-038

BEGINNING OF PROJECT
STA. "RW" 112+77.29 (M.P. 12.45)



Water Quality Feature Location Table			
Ctr. Station	Offset (Rt.)	Feature Type	Notes
"RW" 119+28.79	32.00	Curb & Gutter Inl	**
"RW" 119+67.54	34.25	Flow Spreader	*
"RW" 119+78.58	34.25	Field Inlet	*
"RW" 119+90.29	32.00	Curb & Gutter Inl	**
"RW" 120+79.65	34.25	Field Inlet	*
"RW" 121+07.77	32.00	Curb & Gutter Inl	**

General Notes:
See Sht. 2B-1 for details of curb & gutter inlet, flow spreader, and field inlet referenced in the table above.

* Offset shown is to ctr of feature
** Offset shown is to top face of curb

Abandoned pipe shown thus

(1) Remove Inlet - 5

(2) Abandon pipe - 108'

(3) Sta. "122nd" 14+26.48, 43.86' Rt.
Const. Type "D" inlet
(See dwg. no. RD370)

(4) Sta. "122nd Ramp" 14+26.48, 43.86' Rt. to
Sta. "122nd Ramp" 14+31.57, 37.68' Rt.
Inst. 12" sewer pipe - 8" 8.9'
10' depth
Connect to extg. inlet

(5) Adjust inlet - 2

(6) Minor adjust manhole - 5
(See dwg. no. RD360)

(6A) Minor adjust manhole - 2
(By others)

(7) Relocate sanitary manhole
(By others)

(8) Relocate utility poles - 6
(By others)

(9) Adjust gas valve box - 5

(10) Relocate riser - 2
(By others)

(11) Sta. "RW" 119+27.29 to Sta. "RW" 119+91.79
Const. water quality planter strip - 28.7 sq. yds.
(Drainage facility ID# D00580)
(For details, see shts. 2B & 2B-2)

(12) Sta. "RW" 119+27.80, 34.00' Rt. to
Sta. "RW" 119+78.58, 34.25' Rt.
Inst. 6" drain pipe - 51'
5' depth
(For details see shts. 2B & 2B-2)

(13) Sta. "RW" 119+91.29, 34.25' Rt. to
Sta. "RW" 119+78.58, 34.25' Rt
Inst. 6" drain pipe - 13'
5' depth
(For details see shts. 2B & 2B-2)

(14) Sta. "RW" 119+78.58, 34.25' Rt. to
Sta. "RW" 120+02.68, 25.08' Rt
Inst. 12" sew pipe - 26'
5' depth
connect to extg. manhole

(15) Sta. "RW" 120+77.40 to Sta. "RW" 121+09.27
Const. water quality planter strip - 14.2 sq. yds.
(Drainage facility ID# D00581)
(For details, see shts. 2B & 2B-2))

(16) Sta. "RW" 120+79.65, 34.25' Rt. to
Sta. "RW" 121+08.77, 34.25' Rt
Inst. 6" drain pipe - 29'
(For details see shts. 2B & 2B-2)

(17) Sta. "RW" 120+79.65, 34.25' Rt. to
Sta. "RW" 120+83.28, 24.63' Rt
Inst. 12" sew pipe - 10'
10' depth
Connect to extg. manhole

(18) Sta. "RW" 121+89.02, 24.07' Rt.
Const. manhole over extg. storm sewer
(See dwg. no. RD336)

(19) Const. bio-swale - 173 ft.
Install stormwater treatment markers
(Drainage facility ID# D00579)
(For details see sht. 2B-8 and RD399)

(20) Minor adjust communication manhole

(21) Relocate waterline access vault
(By others)

"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

REGISTERED PROFESSIONAL ENGINEER
74492PE
OREGON
JAN. 13, 2009
JERED W. CARPENTER
EXPIRES: 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

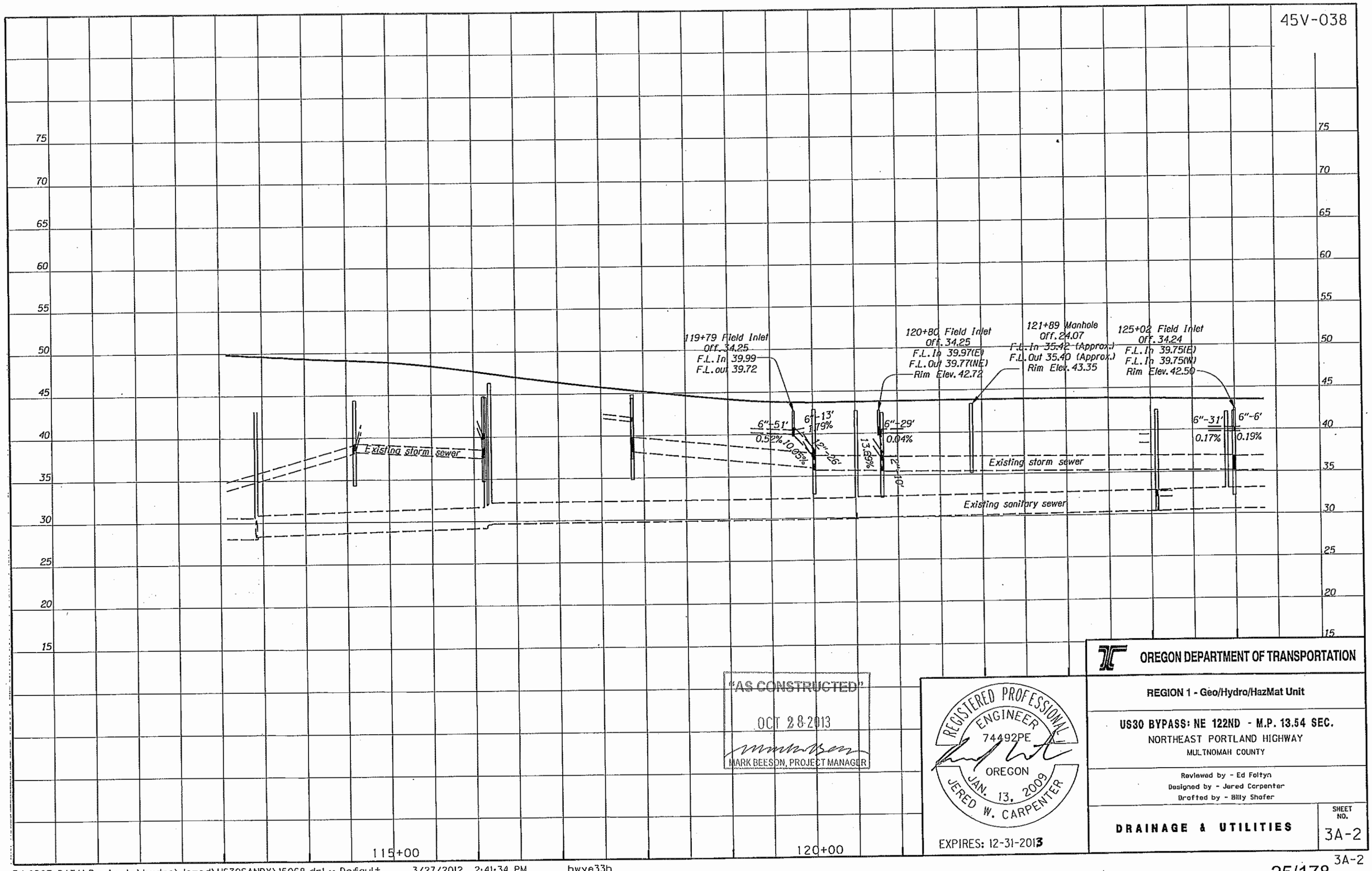
REGION 1 - Geo/Hydro/HazMat Unit

US30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Reviewed by - Ed Foltyn
Designed by - Jered Carpenter
Drafted by - Billy Shafer

DRAINAGE & UTILITIES

SHEET NO. 3A



"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

REGISTERED PROFESSIONAL ENGINEER
74492PE
OREGON
JAN. 13, 2009
JERED W. CARPENTER
EXPIRES: 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

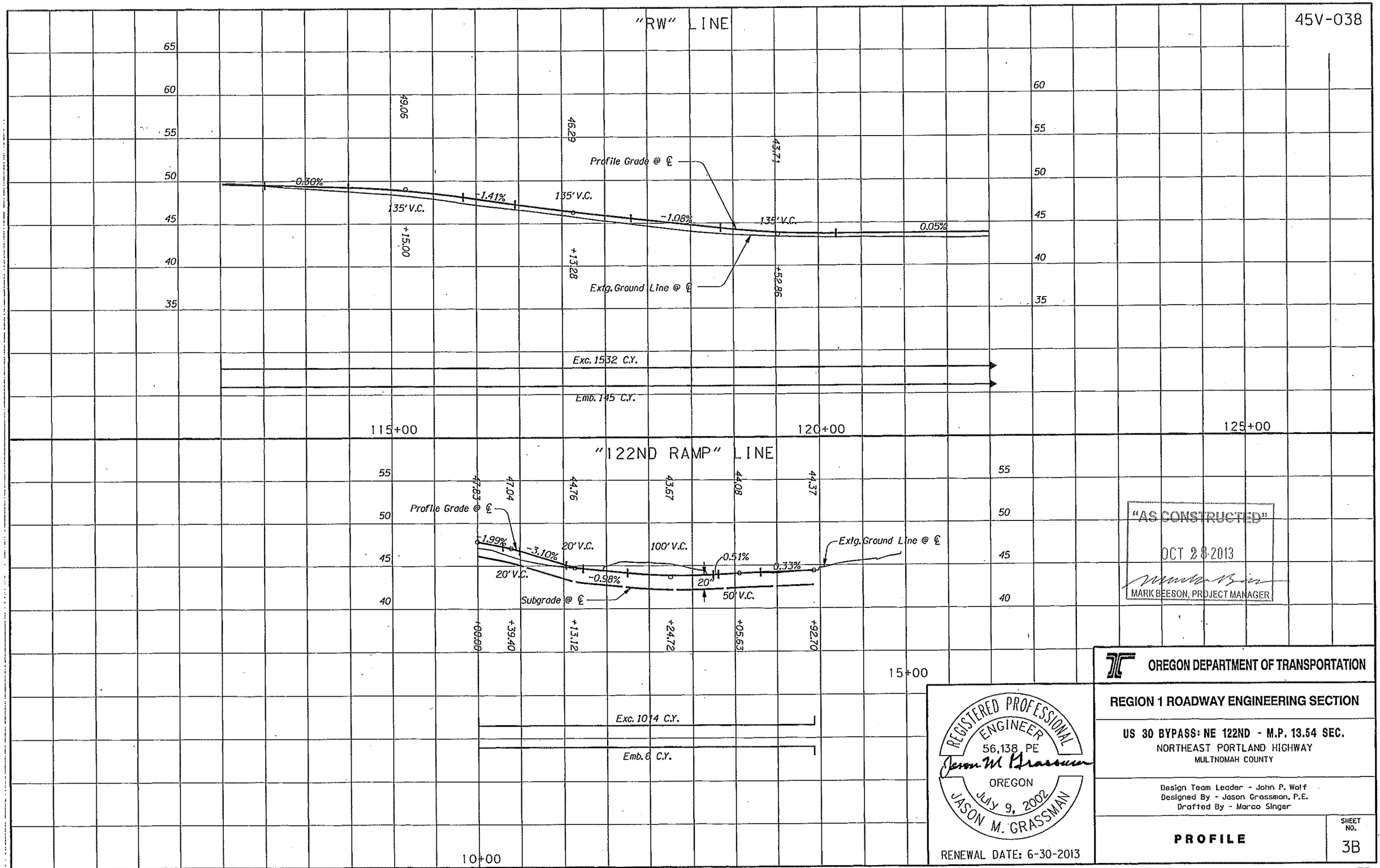
REGION 1 - Geo/Hydro/HazMat Unit

US30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Reviewed by - Ed Foltyn
Designed by - Jered Carpenter
Drafted by - Billy Shafer

DRAINAGE & UTILITIES

SHEET NO. 3A-2



"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

REGISTERED PROFESSIONAL ENGINEER
56,138 PE
OREGON
July 9, 2002
JASON M. GRASSMAN
RENEWAL DATE: 6-30-2013

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 ROADWAY ENGINEERING SECTION

US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Design Team Leader - John P. Wolf
Designed By - Jason Grassman, P.E.
Drafted By - Marco Singer

PROFILE

SHEET NO. 3B