STORMWATER OPERATION & MAINTENANCE MANUAL
for
OR 213: I-205 to Redland Road O'xing (Oregon City)
OR 213 Cascade Hwy MP 0.53
Clackamas County, Oregon

Stormwater Facility SW11
ODOT DFI No. D00528

May 10, 2011

EXPIRES: 06/30/12

Prepared By:
Benjamin P. Wewerka, PE

Reviewed By:
Jerome D. Lane, PE

OBEC CONSULTING ENGINEERS

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920 Country Club Road, Suite 100B
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TABLE OF CONTENTS

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Facility Identification

Stormwater management facility SW11 for the OR 213: I-205 to Redland Road O'xing (Oregon City) project, on Redland Road in the city of Oregon City, Clackamas County, Oregon, is a bio-slope constructed under project drawing number 44V-008 and assigned an Oregon Department of Transportation (ODOT) Drainage Facility Identification (DFI) number of D00528. The bio-slope is located at OR 213 mile post (MP) 0.53 on Redland Road along the northbound lanes between the intersections of OR 213 and Abernethy Road with Redland Road. Access to the bio-slope is via northbound Redland Road. A vicinity map is provided in Figure M1, and the access route is shown on Figure M2. ODOT is responsible for maintenance of the bio-slope.

Designer

This stormwater facility was designed for ODOT by OBEC Consulting Engineers as part of the OR 213: I-205 to Redland Road O'xing (Oregon City) Project. Contacts for the designer and ODOT are as follows:

Benjamin P. Wewerka, PE OBEC Consulting Engineers 920 Country Club Road, Suite 100B Eugene, OR 97401 541.683.6090 bwewerka@obec.com	Tom Weatherford Agency Project Manager ODOT Region 1 503.731.8238 Thomas.L.Weatherford@odot.state.or.us

Construction

This facility is part of the OR 213: I-205 to Redland Road O'xing (Oregon City) Project. Construction of the facility is expected to take place during 2011 and 2012.

System Overview

The drainage contributing to the bio-slope comes from Redland Road and the side slope immediately above the facility (see Figure M2). Runoff flows across the roadway, is captured by a drainage curb, and is directed to an inlet and then to the Redland Road side ditch. Runoff then enters the existing 18-inch culvert, and the water quality flows are diverted to the bio-slope at a diversion (split flow) manhole. Flows above the water quality event continue to flow through the 18-inch culvert to the unnamed tributary to Abernethy Creek. After leaving the

diversion manhole, the water quality event is directed to a flow spreader trench; here the runoff builds up and then spills over the edge of the flow spreader, flowing down over the bio-slope. Treatment is provided as runoff both flows over the vegetation and as it is infiltrated into the amended soils of the bio-slope. Once runoff has passed through the bio-slope it is collected in an underdrain and directed to the unnamed tributary to Abernethy Creek. The cross section of the bio-slope is shown in Figure M3 and the layout is detailed in Figure M4.

Overflow System

The bio-slope is a water quality treatment facility only and does not provide any detention. The facility is designed to treat runoff from 50 percent of the 2-year storm. The bio-slope is designed off-line and not designed to handle high flow events. If flows in excess of the water quality storm pass through the bio-slope, the facility is to be checked for erosion damage and any damaged grades or vegetation are to be repaired as necessary.

Maintenance Requirements

Maintenance for the water quality bio-slope shall be in accordance with the following table and schedule.

Maintenance Requirements for Bio-Slopes

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Sediment accumulation	Sediment depth exceeds 2 inches.	Sediment deposits removed, uneven areas are regraded, and bare areas are reseeded.
	Poor vegetation coverage	Grass is sparse or bare, or eroded patches occur in more than 10 percent of the vegetated filter strip area.	Poor grass growth is corrected and bare areas reseeded.
	Flow Spreader	Flow spreader uneven or clogged so that flows are not evenly distributed across bio-slope.	The spreader is cleaned and leveled so that flows are distributed evenly across top of bio-slope.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General (continued)	Vegetation growth	Grass becomes excessively tall (greater than 10 inches); nuisance weeds and other vegetation start to dominate.	Vegetation is mowed and nuisance vegetation removed so that flow is not impeded. Grass should be mowed to a height of 3 to 4 inches. Remove grass clippings. Noxious weeds are removed following state or local policies. Herbicides should not be used to control vegetation.
	Ecology mix failure	Low and medium flows are seen bypassing the bio-slope. Contact a Region Hydraulics Engineer to evaluate condition of bio-slope.	The ecology mix is excavated and replaced with a new mix that meets design standard.
	Excessive shading	Grass growth is poor due to lack of sunlight.	Overhanging limbs are trimmed. Brushy vegetation on adjacent slopes is removed.
	Trash and debris	Trash and debris have accumulated along the bio-slope.	Trash and debris are removed from bio-slope.

Adapted from Table 10 in the ODOT Water Quality Guidance document.

Schedule

Special

- Inspection and maintenance of bio-slope as needed (after first 24-hour rainfall greater than 0.50 inches).

Annual

- Inspection and maintenance of bio-slope as needed (prior to autumnal rains).

Hazardous Material Spill Operation

The bio-slope is a water quality treatment facility only and does not provide any detention. Any desire for the detention or containment of hazardous materials within the bio-slope will require blocking the downstream end of the underdrain outfall (see Figure M7).

Waste Material Handling

Material removed from the facility is defined as waste by the Department of Environmental Quality (DEQ) and, therefore, must be disposed of at a permitted waste management facility (i.e., landfill or incinerator) or managed, reused, or recycled according to DEQ waste rules.

Management of roadwaste and the rules that surround it are extremely complicated. ODOT has researched this subject and has posted a report offering detailed guidance at the ODOT Research Unit website: http://www.oregon.gov/ODOT/TD/TP_RES/ (see October 2000 – *Roadwaste Management – A Tool for Developing District Plans*).

Roadwaste materials can be contaminated with chemical pollutants such as heavy metals or hydrocarbons generated from highway vehicles. If clean-out material is sent to a permitted waste management facility (landfill or incinerator), the facility operator may require testing for specific pollutants, such as lead, before the material will be accepted for disposal.

Clean-out material that is being stockpiled or recycled should be identified if it is contaminated and at what levels. Chemical testing for total metals (lead, arsenic, cadmium, and chromium) and hydrocarbons (polycyclic aromatic hydrocarbons – PAHs) is usually adequate. However, be aware of other pollutants that might be present; and test accordingly (for example, a facility may have a history of heavy pesticide use, highway spills, etc.). All trash and litter must be removed and properly disposed of. In general, whenever placing roadwaste material ensure that it will not migrate or erode; and that it does not contain pollutants that will negatively impact adjacent land, waterways, or groundwater.

If you are planning to reuse clean-out material, DEQ will likely require a "solid waste letter of authorization" for final placement of the material. Typically, DEQ will help to ensure that proper permits and papers are obtained, required pollution testing is completed, and final placement of the material is appropriate.

Contact either of the following for more detailed information about management of this waste material:

ODOT Statewide HazMat Coordinator Jennie Armstrong 12600 SW 72nd Avenue, Suite 100 Tigard, OR 97223 503.229.5129 Jennie.ARMSTRONG@odot.state.or.us	DEQ Headquarters 811 SW 6th Avenue Portland, OR 97204 503. 229.5696

APPENDIX

Appendix Table of Contents

Appendix – Plans and Details

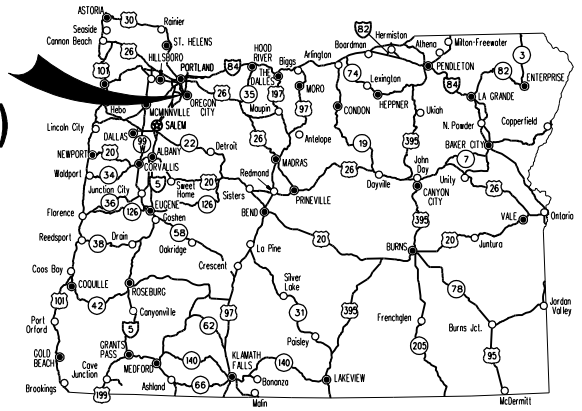
STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED PROJECT

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

OR213: I-205 - REDLAND ROAD O'XING. (OREGON CITY)

CASCADE HWY. SOUTH

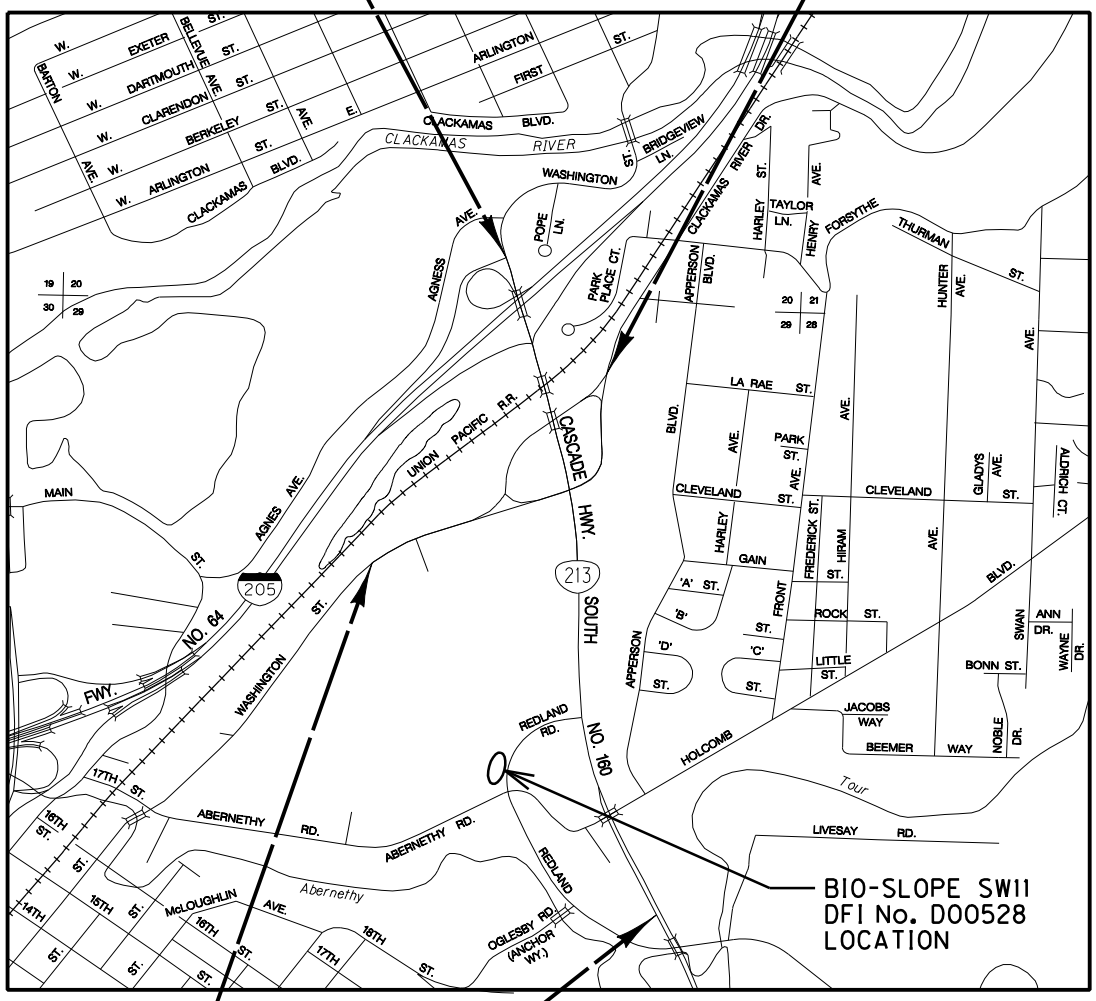
CLACKAMAS COUNTY
JANUARY 2011



Overall Length Of Project - 0.76 Miles

BEGINNING OF PROJECT
STA. "OR" 156+10 (HWY 64 M.P. 10.18)

BEGIN WORK
STA. "W" 258+26



END WORK
STA. "W" 293+78

END OF PROJECT
STA. "C" 96+00 (OR213 M.P. 0.57)

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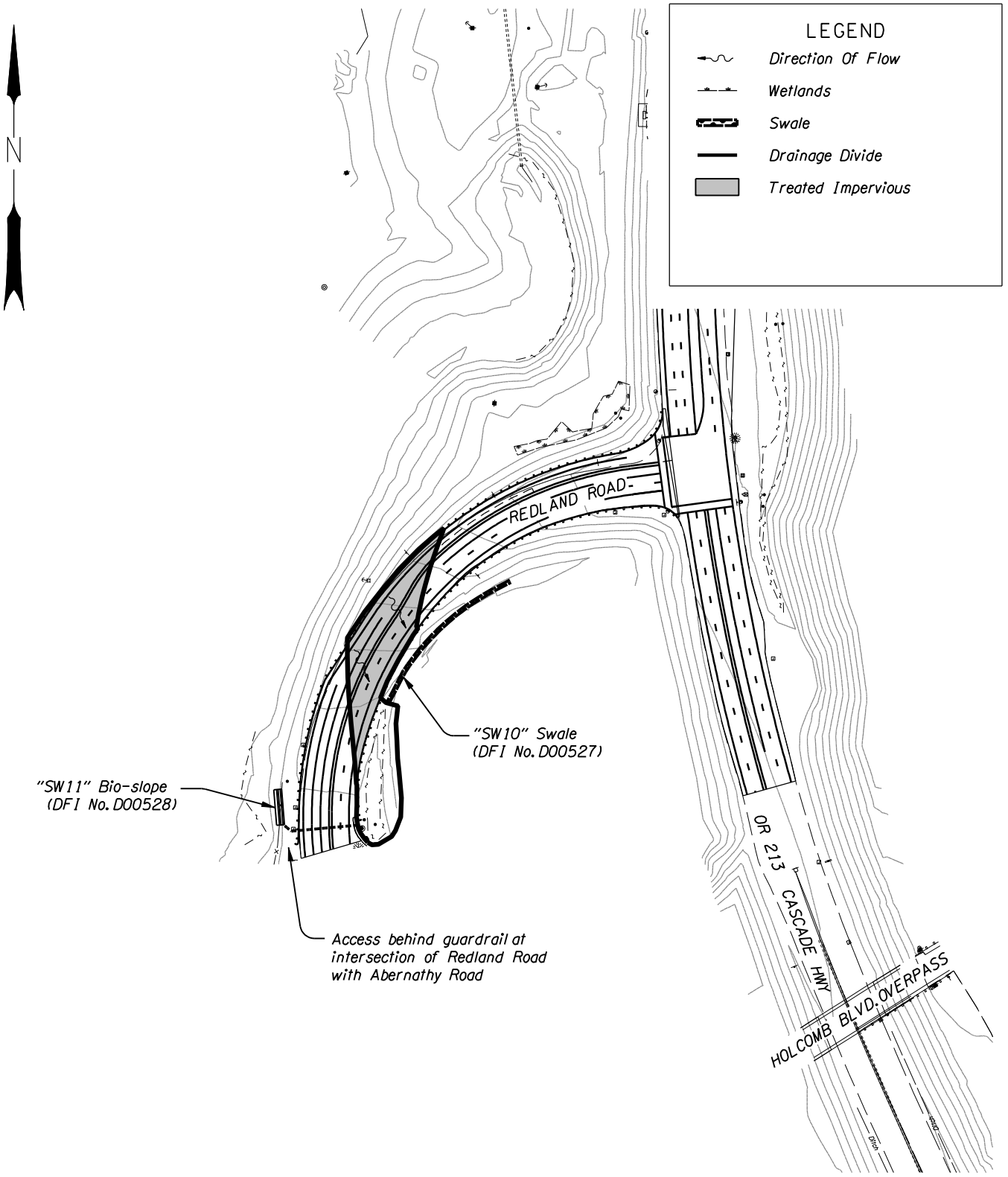
2235 MISSION STREET SE, SUITE 100 SALEM, OREGON 97302-1295
831 O'HARE PARKWAY MEDFORD, OREGON 97504-4005

OR213: I-205 - REDLAND ROAD O'XING. (OREGON CITY)
CASCADE HWY. SOUTH
CLACKAMAS COUNTY

FEDERAL HIGHWAY ADMINISTRATION
OREGON DIVISION

VICINITY MAP



Scale 1" = 200'

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OR213: I-205 - REDLAND ROAD O'XING. (OREGON CITY)

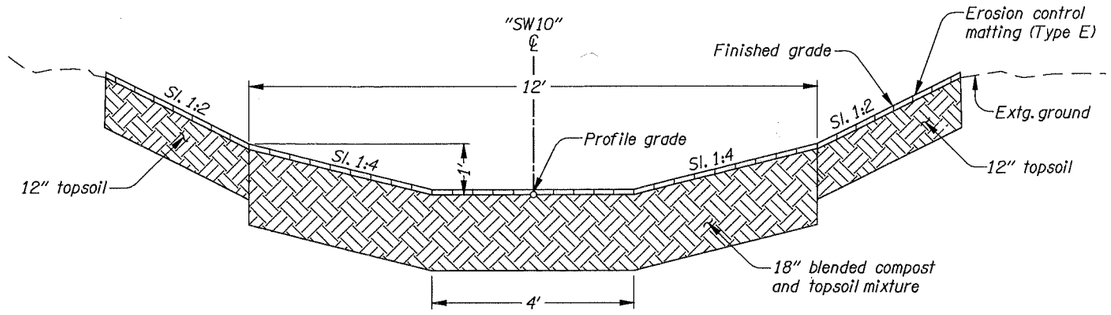
CASCADE HWY. SOUTH

CLACKAMAS COUNTY

DRAINAGE AREA MAP
BIO-SLOPE "SW11"
DFI NO. D00528

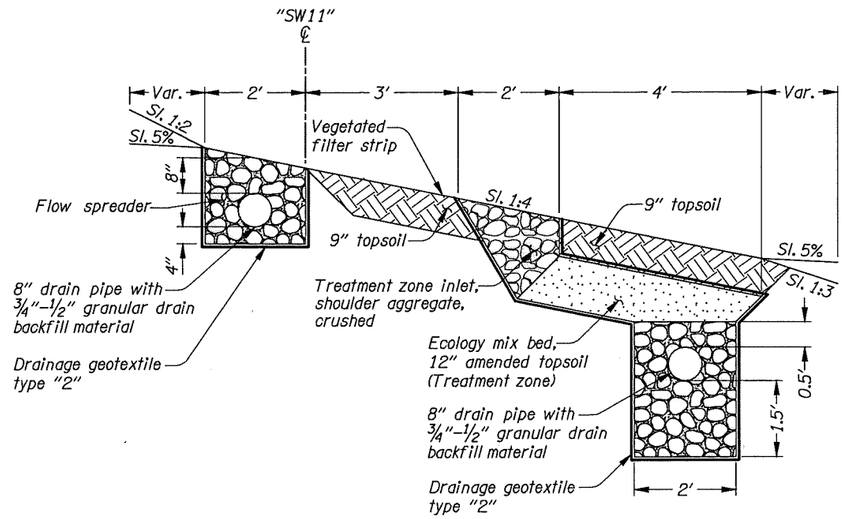
SHEET NO. 1

M2



WATER QUALITY SWALE TYPICAL SECTION "SW10"

(Sta. "SW10" 0+00 to Sta. "SW10" 2+47.20)



BIO-SLOPE TYPICAL SECTION "SW11"

(Sta. "SW11" 0+04.05 to Sta. "SW11" 0+54.05)

DEDUCTIVE ALTERNATE

REGISTERED PROFESSIONAL ENGINEER
79131
OREGON
JUNE 14, 2007
BENJAMIN P. WEWERKA

EXPIRES: 06/30/12

CI 08-010

OREGON DEPARTMENT OF TRANSPORTATION

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OR213: I-205 - REDLAND ROAD O'XING. (OREGON CITY)

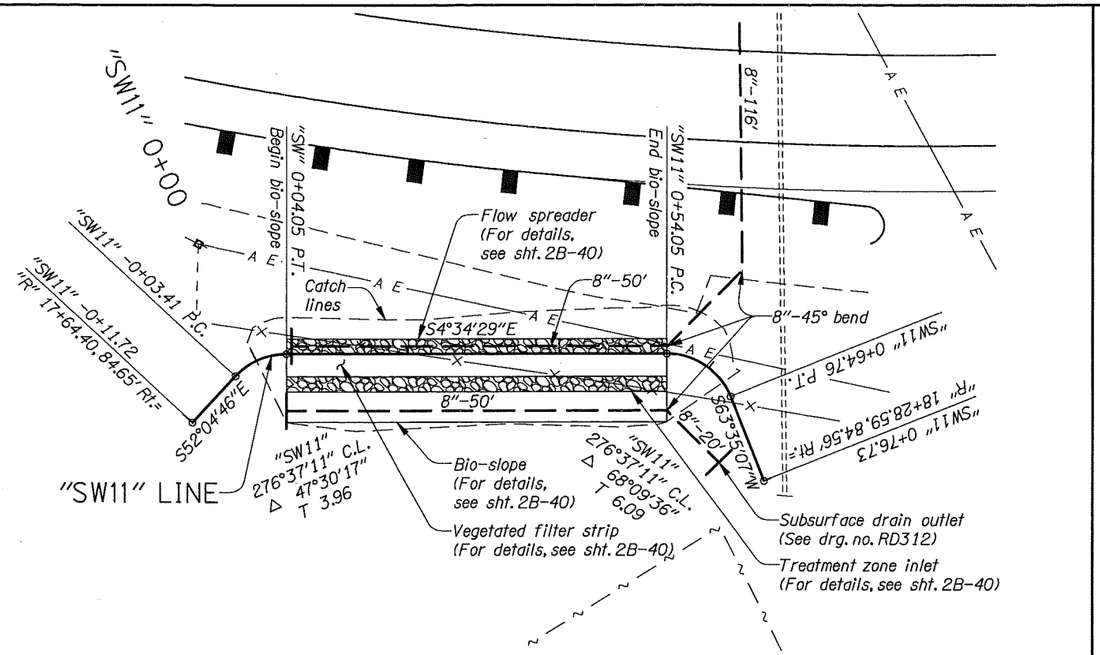
CASCADE HWY. SOUTH

CLACKAMAS COUNTY

Design Team Leader - Jerry Lane
Designed By - Ben Wewerka
Drafted By - Mathew Bunde

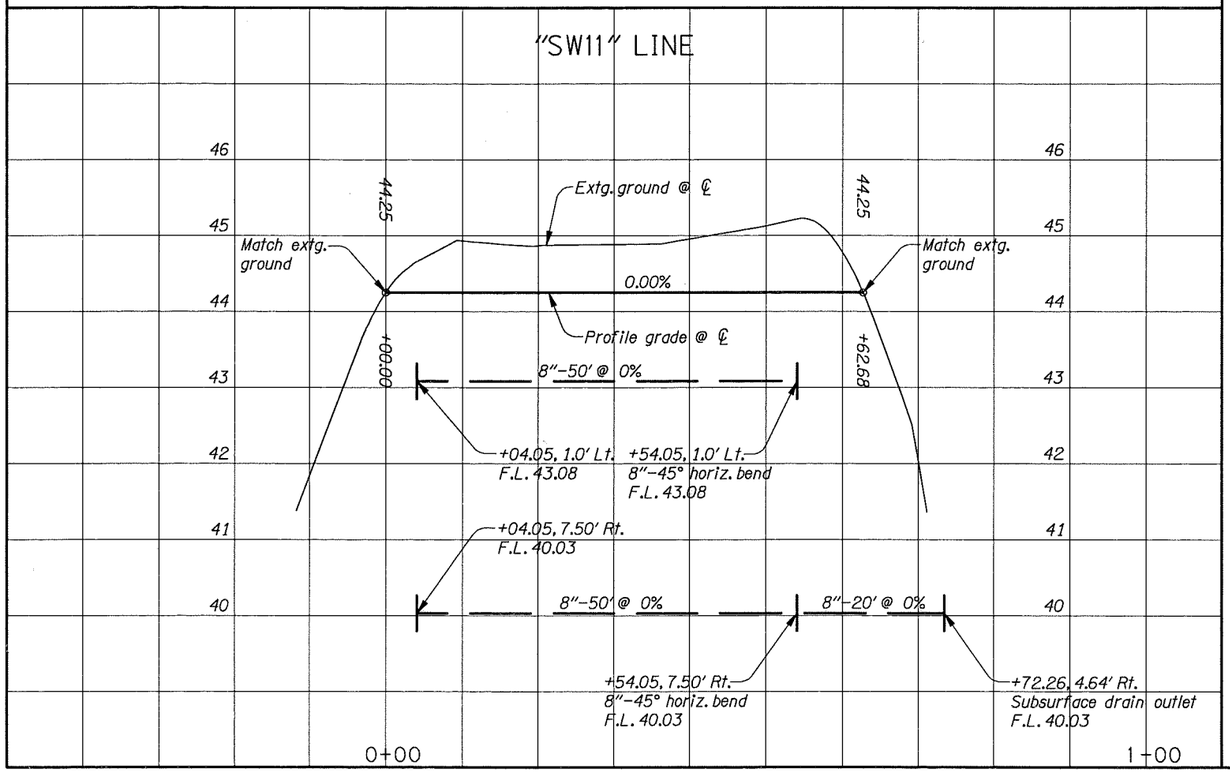
DETAILS

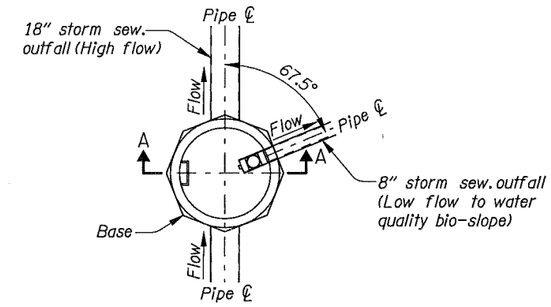
SHEET NO. 2B-40



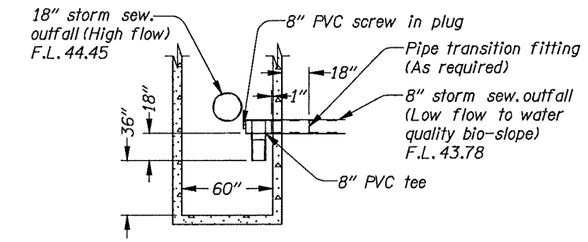
"SW11" ALIGNMENT PLAN
(For location see sht. 10A, note 5)

SCALE IN FEET
10 5 0 10 20 30 40





60" MANHOLE



SECTION A-A

DIVERSION MANHOLE
(For details not shown, see drg. nos. RD340 & RD346)

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CASCADE HWY. SOUTH
CLACKAMAS COUNTY

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Drafted By - Mathew Bunde

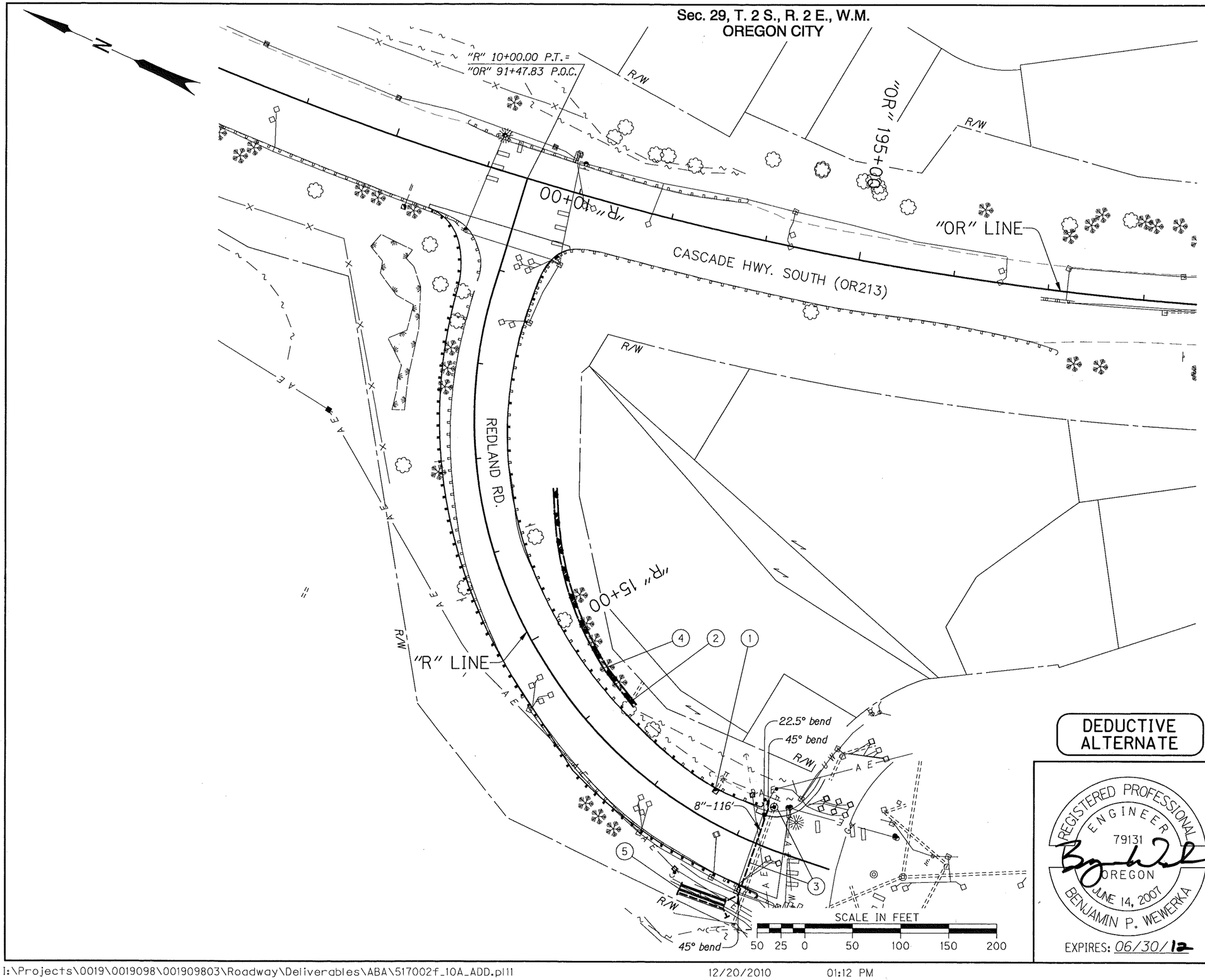
DETAILS

SHEET NO. 2B-42

File No. 23438

Sec. 29, T. 2 S., R. 2 E., W.M.
OREGON CITY

44V-008



(1) *Adjust inlet*

(2) *Remove pipe - 4'*

(3) *Sta. "R" 18+24.64, 42.29' Lt.*
Const. split flow manhole
Const. manhole over extg. sew.
Inst. 8" storm sew. pipe - 116'
5' depth
Trench resurf. - 32 sq. yd.
Trench resurf. - grass/misc. landscaping - 17 sq. yd.
(For details, see sht. 2B-42)

(4) *Sta. "R" 13+45.58, 77.18' Lt. to*
Sta. "R" 16+25.45, 47.67' Lt.
Const. water quality swale "SW10"
Const. check dams
Inst. matting (Type E)
Blended compost & topsoil
Topsoil - 98 cu. yd.
Dt. exc. - 614 cu. yd.
(For details see shts. 2B-40 & 2B-41)

(5) *Sta. "R" 17+66.57, 72.3' Rt. to*
Sta. "R" 18+27.43, 68.4' Rt.
Const. water quality bio-slope "SW11"
Inst. 8" drain pipe
5' depth
Drainage geotextile type "2"
Const. subsurface drain outlet
Ecology mix
Topsoil - 10 cu. yd.
Gen. exc. - 55 cu. yd.
(For details, see shts. 2B-40 & 2B-42)

CI 08-010

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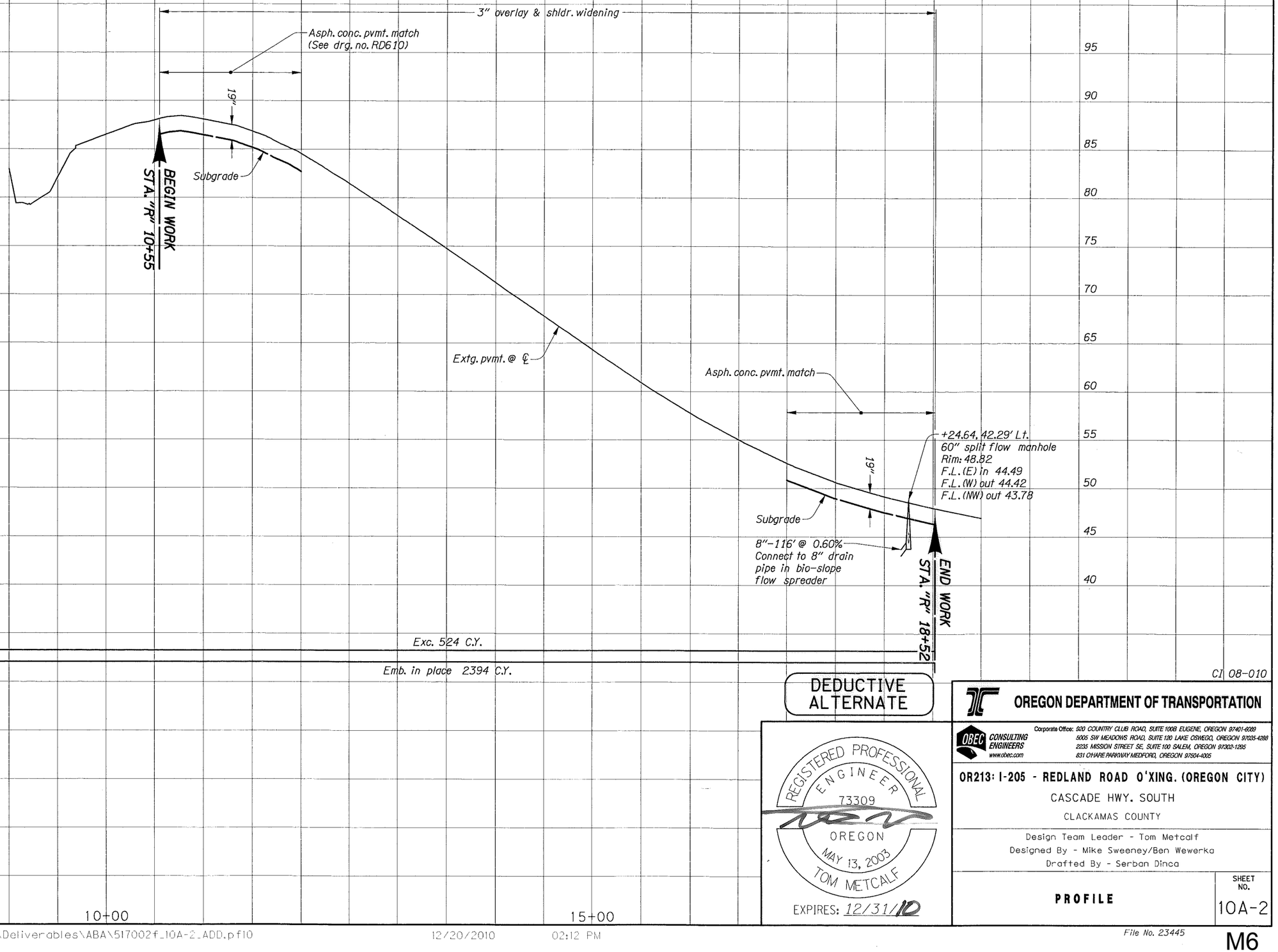
CASCADE HWY. SOUTH
CLACKAMAS COUNTY

Design Team Leader - Jerry Lane
Designed By - Ben Wewerka
Drafted By - Serban Dinca

DRAINAGE AND UTILITIES

SHEET NO. 10A

"R" LINE



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EXPIRES: 12/31/10

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CASCADE HWY. SOUTH

CLACKAMAS COUNTY

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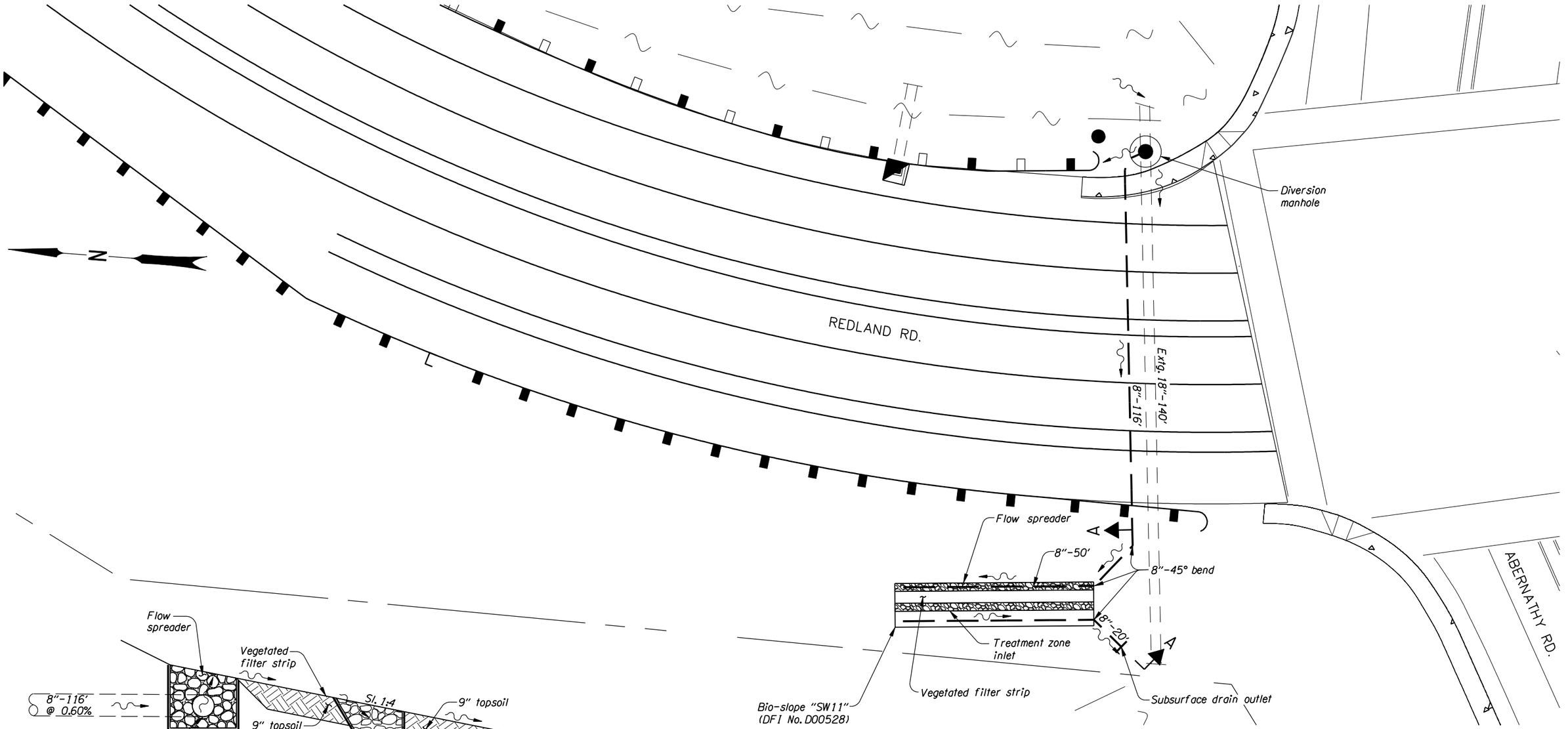
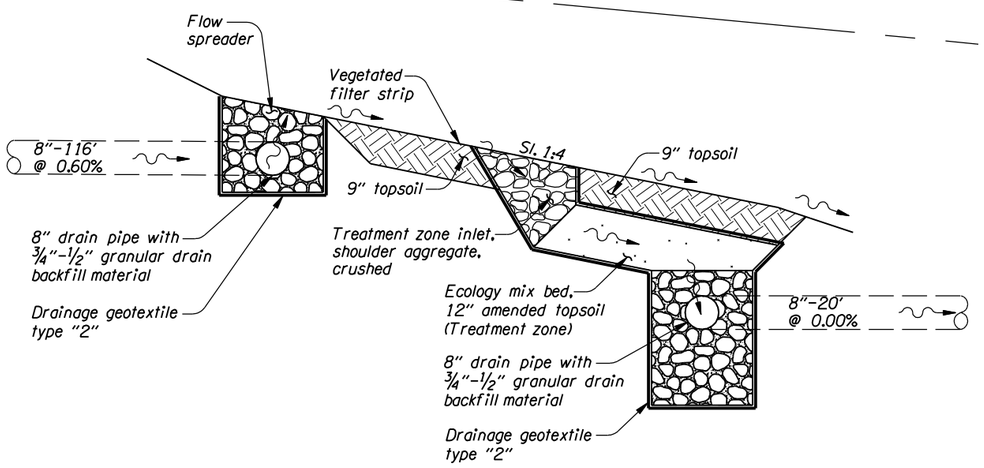
Designed By - Mike Sweeney/Ben Wewerka
Drafted By - Serban Dinca

PROFILE

SHEET NO. 10A-2





SECTION A-A

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OR213: I-205 - REDLAND ROAD O'XING. (OREGON CITY)

CASCADE HWY. SOUTH

CLACKAMAS COUNTY

OPERATION DRAWING
BIO-SLOPE "SW11"
DFI NO. D00528

SHEET NO. 1