OPERATION & MAINTENANCE MANUAL

Water Quality Bioslope

Manual prepared: March 2021

DFI No. D01421

Figure 1: DFI No. D01421, looking [cardinal direction]

1. Identification

Drainage Facility ID (DFI):	D01421
Facility Type:	Water Quality Bioslope
Construction Drawings:	(V-File Numbers) 54V-102
Location:	District: 4
	Highway No.: 031
	Mile Post: 6.39 to 6.26, Right

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: North

Figure 2: [Placeholder 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)
Bioslope	**682**	**2**

The slope of the facility is presented by a vertical distance (rise) followed by the horizontal distance (run).

Side Slope	Rise (feet)	Run (feet)
Bioslope	**1**	**6**

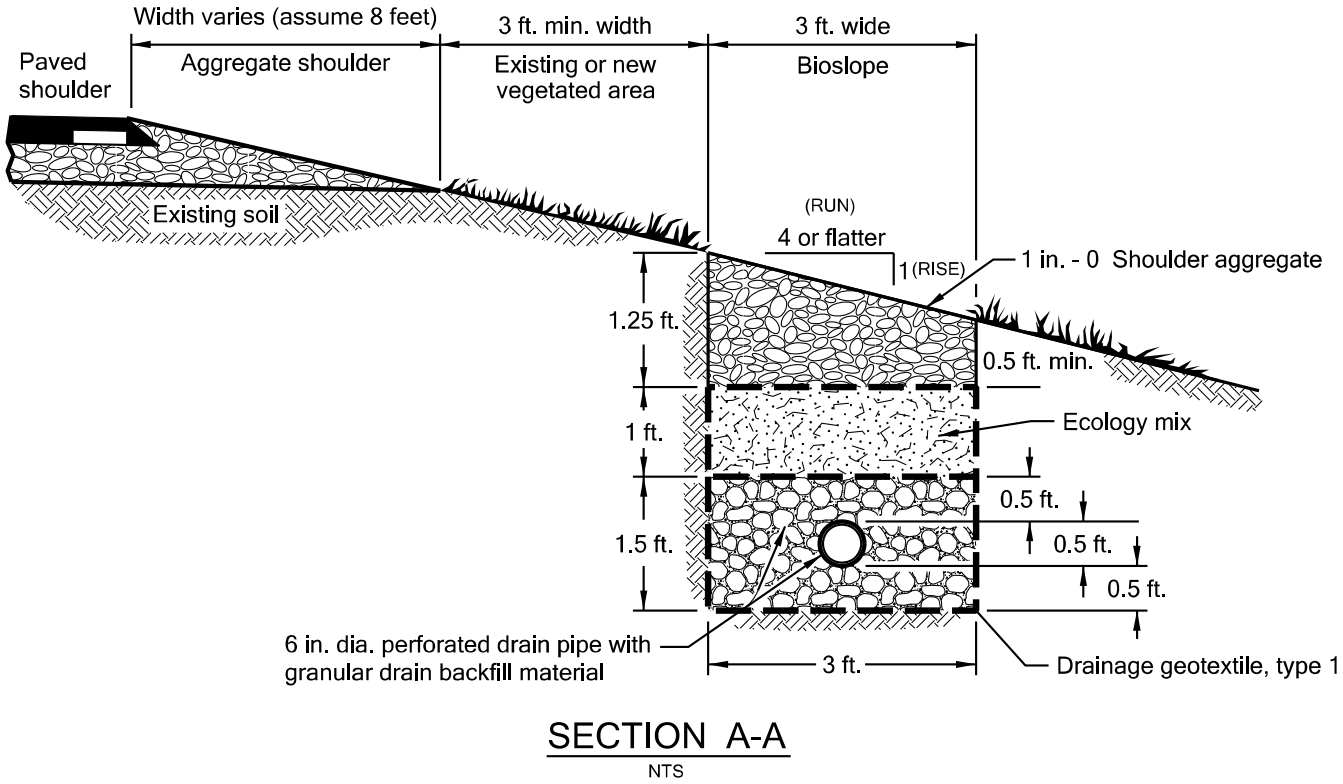

Figure 3: BioSlope Section

Site Specific Information: This facility is located on the north side of southbound US-20 between the edge of pavement and conveyance ditch adjacent to the railroad. The facility is west of the US-20 and NW Independence Hwy intersection.

5. Facility Access

Maintenance access to the facility:

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

Figure 3: [insert post construction facility access photo and caption text]

6. 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 and bioslopes 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 and Bioslopes (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/

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: Bioslope/Filter Strip Components		ID #
Facility Inlet		
Pavement Sheet Flow	☒	**B1**
Shoulder Aggregate	☒	**B2**
Ground Cover		
Vegetated Slope	☒	**B3**
Aggregate Media Slope	☐	**B4**
Underground Components		
Water Quality Mix	☐	**B5**
Ecology Mix	☒	**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	☐	**B14**
Open Channel Outlet	☒	**B15**
Storm Drain Outlet Pipe	☐	**B16**
Outfall Type		
Waterbody (**C**reek/**L**ake/**O**cean)	☐ **C** ☐ **L** ☐ **O**	**B17**
Outfall Channel	☐	**B18**
Storm Drain System	☒	**B19**
Outfall Components		
Pervious Berm	☐	**B20**
Riprap Pad	☐	**B21**

7. 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)
- Table 5 (Water Quality Bioslopes)

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

8. 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.

9. 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 D01421

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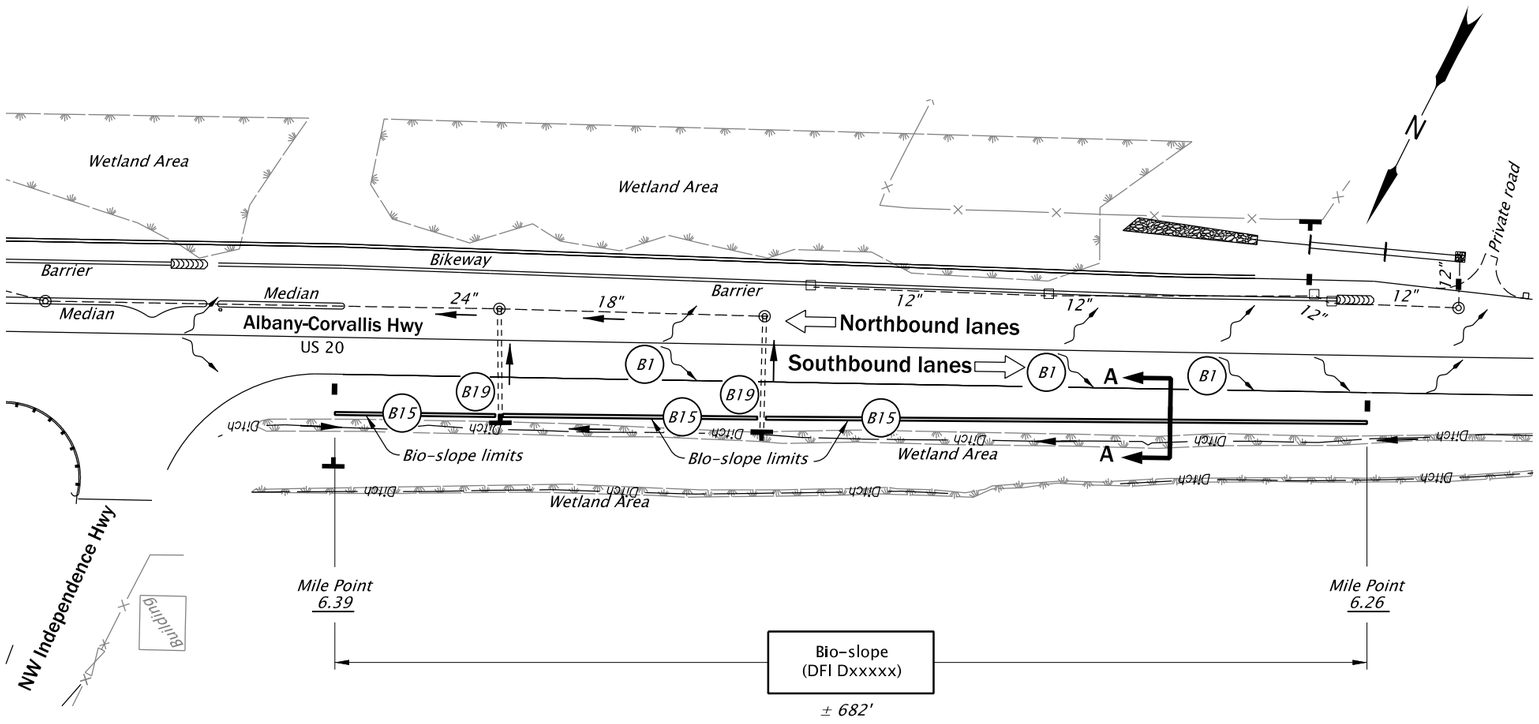
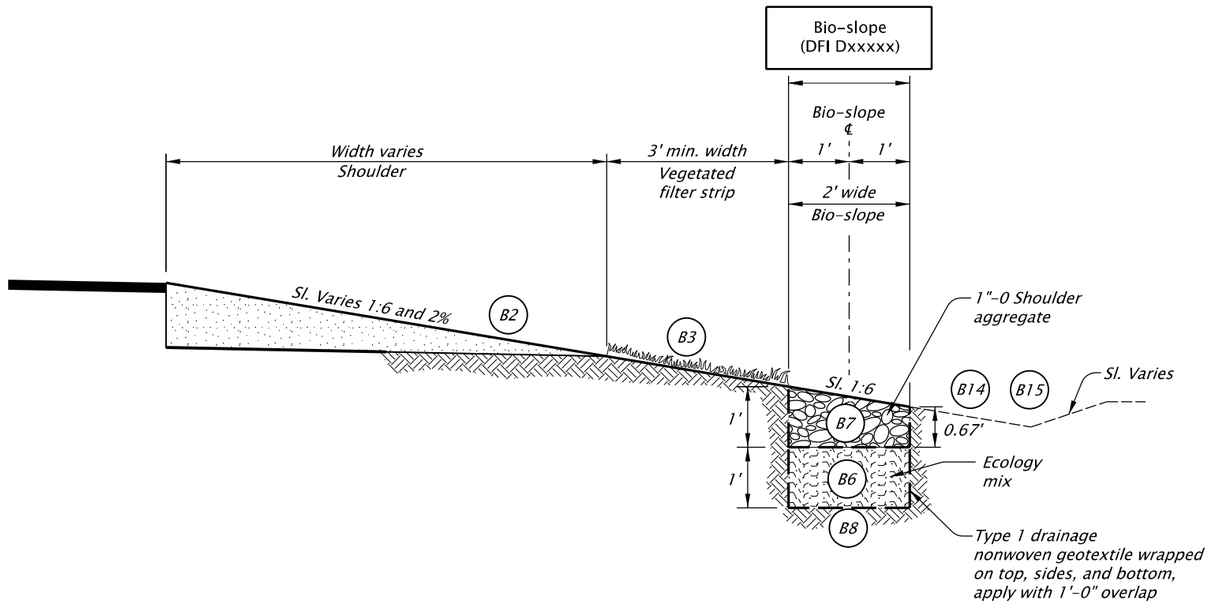
A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI Dxxxx



PLAN
Not to Scale



SECTION A-A
Not to Scale

LEGEND

- Photo location / direction
- X# — Facility component (see Table 1 in O&M Manual)
- Manhole (and or)
- Inlet (and or)
- Storm pipe (Facility)
- Storm pipe
- Bio-slope boundary
- Conveyance direction
- Pavement / facility flow path
- Traffic flow direction

DAVID EVANS AND ASSOCIATES INC.
2100 S River Parkway
Portland Oregon 97201
Phone: 503.223.6663

Sht. # of ##

Prepared By: Mike Rice

Drafted By: Edita Bogusławski

DFI D#####
MAINTENANCE DISTRICT # HWY 20
BIO-SLOPE
ALBANY-CORVALLIS HIGHWAY MP 6.26 - 6.39
BENTON COUNTY

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 54V-102

54V-102

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
A01	*Title Sheet*
A02	*Index Of Sheets Cont.*

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

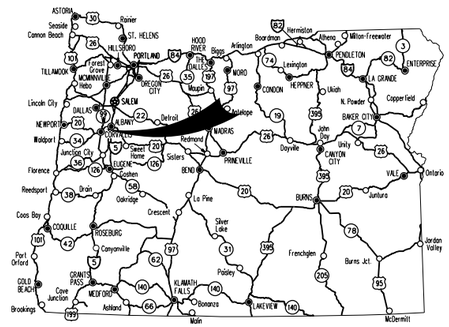
PLANS FOR PROPOSED PROJECT

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

US20: SAFETY UPGRADES (ALBANY TO CORVALLIS) SEC.

ALBANY-CORVALLIS HIGHWAY

BENTON COUNTY
SEPTEMBER 2021



Overall Length Of Project – 2.2 Miles

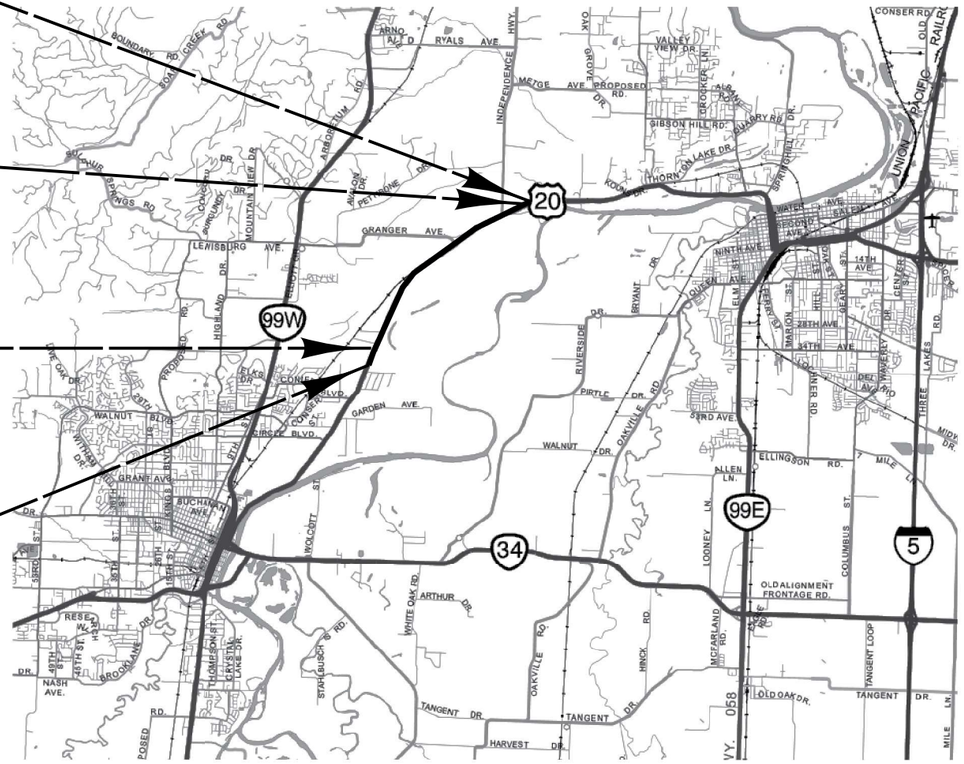
ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0001 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center (Note: The Telephone Number For The Oregon Utility Notification Center Is (503) 232-1987).

BEGINNING OF CONTRACT
STA. "E2" 1187+04.6 (MP 7.04)

BEGINNING OF PROJECT
STA. "E2" 1188+49.5 (MP 7.01)

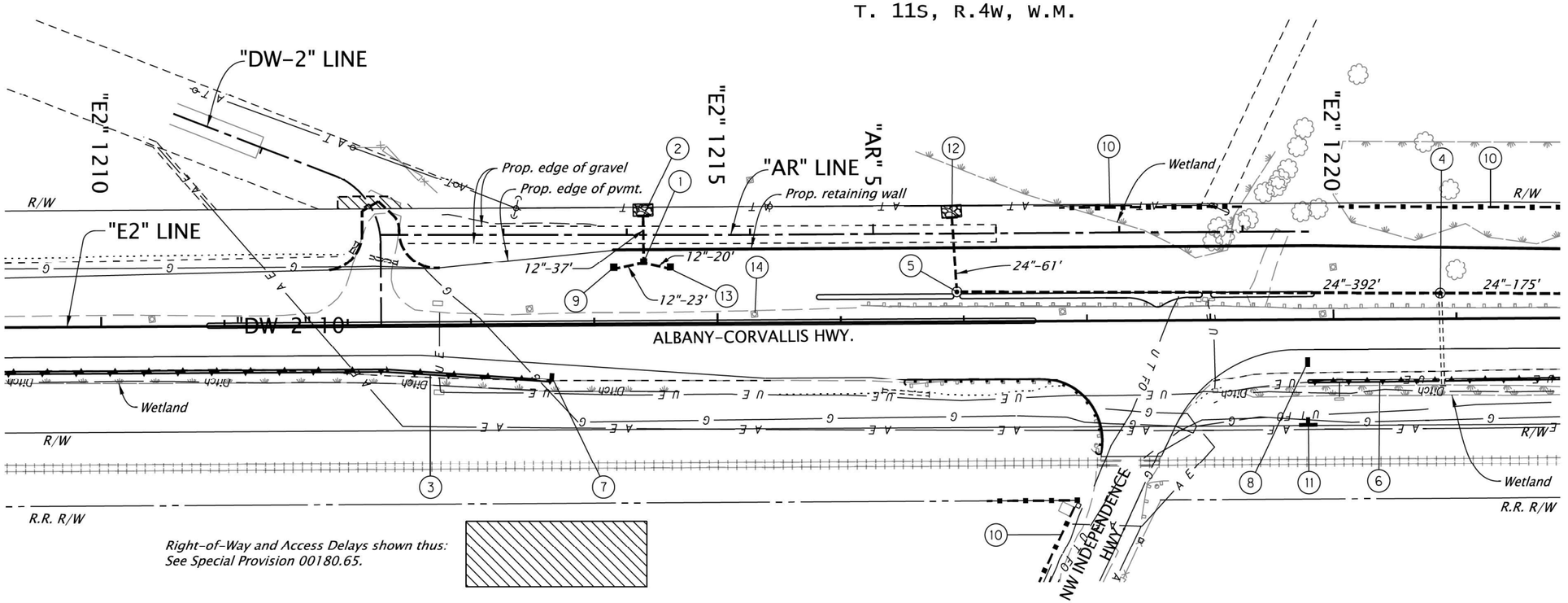
END OF PROJECT
STA. "E2" 1303+30.3 (MP 4.81)

END OF CONTRACT
STA. "E2" 1314+20.1 (MP 4.62)

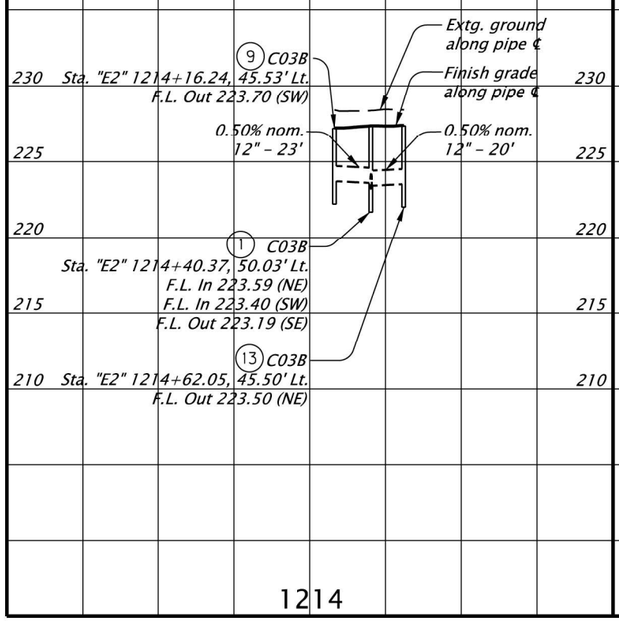

20
99W
99E
34
5
BOUNDARY RD.
COAL CREEK RD.
RYALS AVE.
INDEPENDENCE HWY.
MEYER AVE.
PROPOSED RD.
OAK GROVE DR.
VALLEY VIEW DR.
CROOKER LN.
SIBSON HILL RD.
DAIRY RD.
UNION PACIFIC RAILROAD
CONSER RD.
OLD RAILROAD
ARBORETUM RD.
PETERSON DR.
AVERY DR.
FOUNTAIN RELEASE DR.
ORCHARD DR.
ARBOR DR.
BUCHANAN LN.
SPRINGS RD.
LEWISBURG AVE.
GRANGER AVE.
HIGHLAND DR.
PROPOSED RD.
CONSER BLVD.
CIRCLE BLVD.
GARDEN AVE.
WALNUT BLVD.
WITHROW DR.
OLIVE DR.
GRANT AVE.
BUCHANAN AVE.
MCCLOUD ST.
WHITE OAK DR.
ARTHUR DR.
STAKEBOSCH RD.
OAKVILLE RD.
HINKLE RD.
MCFARLAND RD.
OLD ALIGNMENT FRONTAGE RD.
TANGENT DR.
TANGENT LOOP
HARVEST DR.
OLD OAK DR.
NASH AVE.
ROSEMARY DR.
THOMPSON ST.
CRYSTAL LAKE DR.
RESEARCH DR.
NINTH AVE.
WATER AVE.
CALIFORNIA AVE.
14TH AVE.
29TH AVE.
35TH AVE.
36TH AVE.
DIXON ST.
ELM ST.
MARION ST.
HILL ST.
OREGON ST.
CENTRAL BLVD.
RIVERSIDE DR.
BRYANT DR.
PIRTLE DR.
DANVILLE RD.
3RD AVE.
ELLINGSON RD.
ALLEN LN.
LOONEY LN.
COLUMBUS ST.
MAPLE LN.
MAPLEWOOD DR.
KNOLLWOOD DR.
THREE LADIES LN.
MILE LN.
MIDWAY DR.
SPRINGHILL DR.
SHADOW VIEW DR.
SUNSET DR.
ORCHARD HEIGHTS DR.
CRESTVIEW DR.
ROSEMARY DR.
ROSEMARY LN.
ROSEMARY CT.
ROSEMARY PL.
ROSEMARY WAY.
ROSEMARY TER.
ROSEMARY CIR.
ROSEMARY PKWY.
ROSEMARY BLVD.
ROSEMARY AVE.
ROSEMARY ST.
ROSEMARY RD

54V-102

T. 11S, R.4W, W.M.

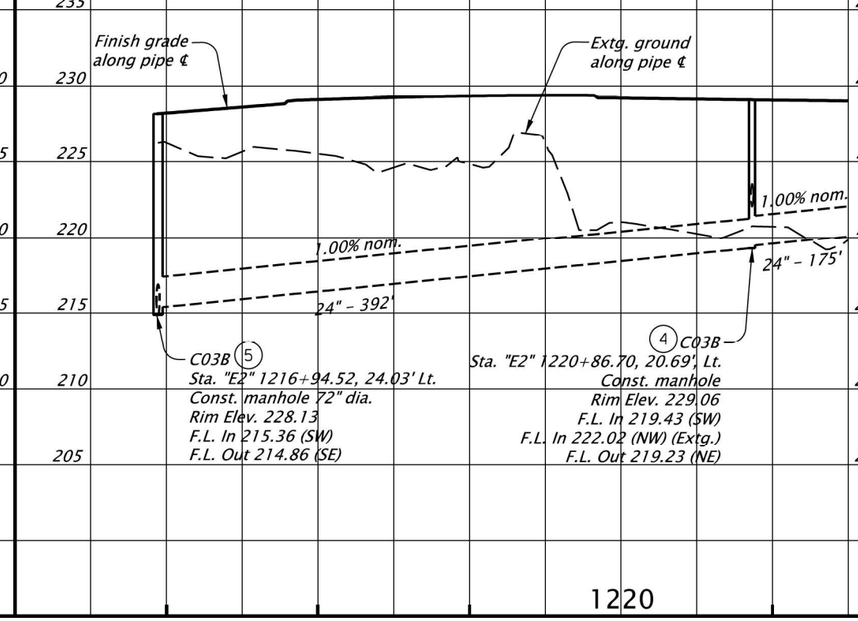


PROFILE ALONG PIPE ℄ Sta. "E2" 1214+16.24



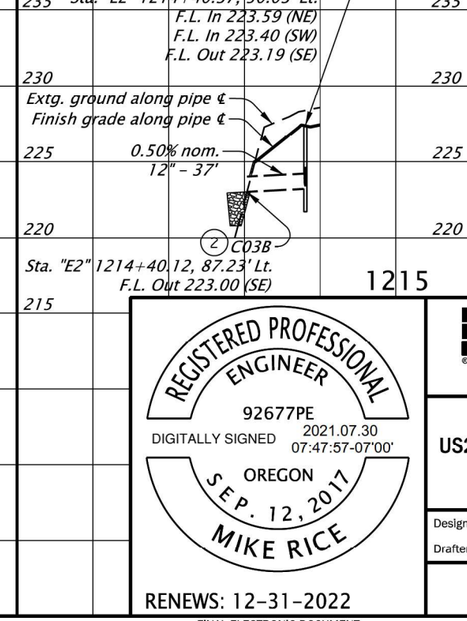
1214

PROFILE ALONG PIPE ℄ Sta. "E2" 1216+94.52 TO 1221+50



1220

PROFILE ALONG PIPE ℄ Sta. "E2" 1214+40.37



1215

LEGEND

Plug and abandon extg. pipe shown thus: ▭▭▭

REGISTERED PROFESSIONAL ENGINEER
92677PE
DIGITALLY SIGNED 2021.07.30 07:47:57-07'00'
OREGON
SEP. 12, 2017
MIKE RICE
RENEWS: 12-31-2022

DAVID EVANS AND ASSOCIATES INC.
2100 S River Parkway
Portland Oregon 97201
Phone: 503.223.6663

OREGON DEPARTMENT OF TRANSPORTATION

US20: SAFETY UPGRADES (ALBANY TO CORVALLIS) SEC.
ALBANY - CORVALLIS HIGHWAY
BENTON COUNTY

Designer: Mike Rice | Reviewer: Mike Rice
Drafter: Edita Boguslawski | Checker: Julie McCaskill

DRAINAGE & UTILITIES

SHEET NO. C03B

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 209.2458° Scale: 1"=100'

(1) *Sta. "E2" 1214+40.37, 50.03' Lt.*
Const. type "G-2" inlet w/ 1.5' sump
Inst. 12" storm sew. pipe - 23'
5' depth
Inst. 12" storm sew. pipe - 20'
5' depth
(See drg. nos. RD300, RD364, RD365, RD386, & RD390)

(2) *Sta. "E2" 1214+40.12, 87.23' Lt.*
Inst. 12" storm sew. pipe - 37'
5' depth
Const. sloped end
Const. riprap basin
(For details, see sht. HA05)
(See drg. no. RD317)

(3) *See sht. C02B, note 2*
Const. bio-slope - D01420

(4) *Sta. "E2" 1220+86.70, 20.69' Lt.*
Const. manhole 60" dia.
Connect to extg. culv.
Inst. 24" storm sew. pipe - 175'
10' depth
(See drg. nos. RD335, RD336, RD344, RD345, RD346, & RD356)

(5) *Sta. "E2" 1216+94.52, 24.03' Lt.*
Const. manhole 72" dia.
Inst. 24" storm sew. pipe - 392'
20' depth

(6) *Sta. "E2" 1219+79, Rt. to Sta. "E2" 1226+61, Rt.*
Const. bio-slope - D01421
(For details, see shts. HA06 & HA07)

(7) *Sta. "E2" 1215+64.95, 43.11' Rt.*
Inst. drainage facility ID marker, Type S1

(8) *Sta. "E2" 1219+78.87, 34.36' Rt.*
Inst. drainage facility ID marker, Type S1

(9) *Sta. "E2" 1214+16.24,45.53' Lt.*
Const. type "G-2" inlet w/ 1.5' sump

(10) *No work zone.*
See sht. C03A, note 12

(11) *Sta. "E2" 1219+78.87, 85.30' Rt.*
Inst. drainage facility ID marker, Type S2
DFI no. D01421
MP 6.39

(12) *Sta. "E2" 1216+90.88, 84.60' Lt.*
Inst. 24" storm sew. pipe - 61', Sl.=1.48%
20' depth
Const. sloped end
Const. riprap basin
(For details, see sht. HA05)

(13) *Sta. "E2" 1214+62.05,45.50' Lt.*
Const. type "G-2" inlet w/ 1.5' sump

(14) *Sta. "E2" 1215+30.02, 7.26' Lt.*
Abandon monitoring well

REGISTERED PROFESSIONAL ENGINEER
92677PE
DIGITALLY SIGNED 2021.07.23 10:05:09-07'00'
OREGON
SEP. 12, 2017
MIKE RICE
RENEWS: 12-31-2022

DAVID EVANS AND ASSOCIATES INC.
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Portland Oregon 97201
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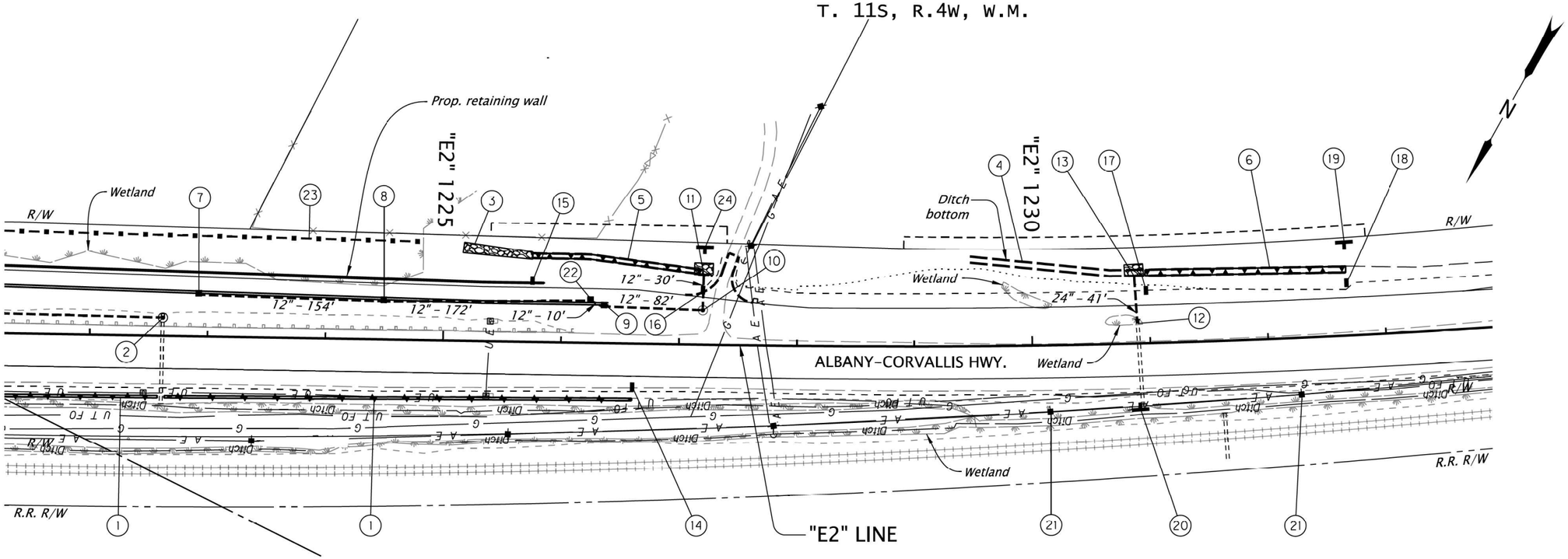
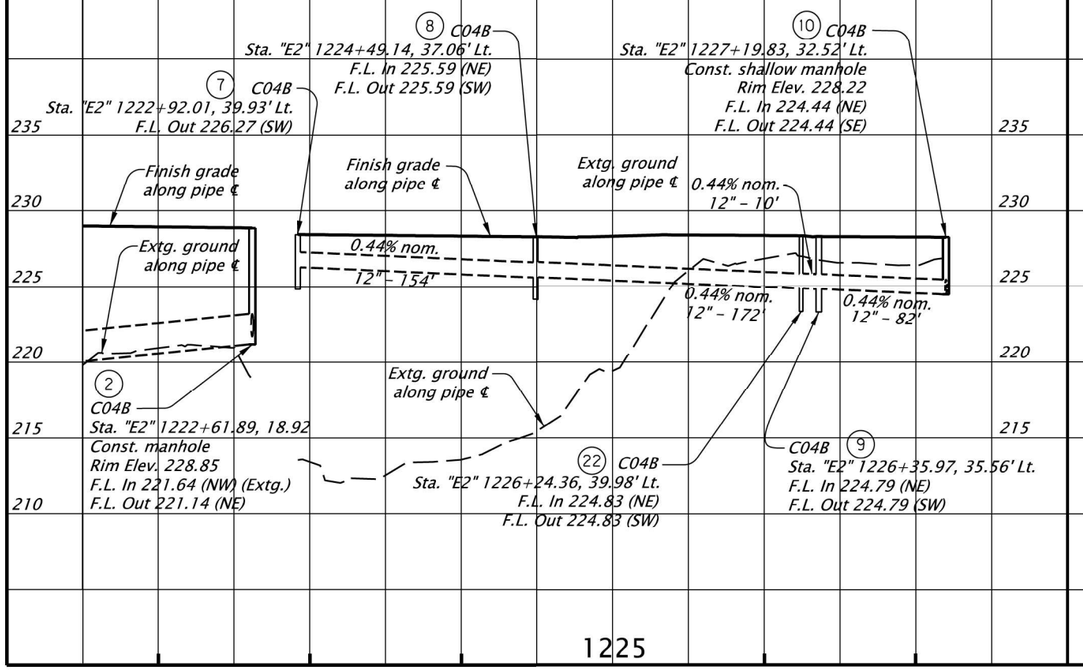
Designer: Mike Rice | Reviewer: Mike Rice
Drafter: Edita Boguslawski | Checker: Julie McCaskill

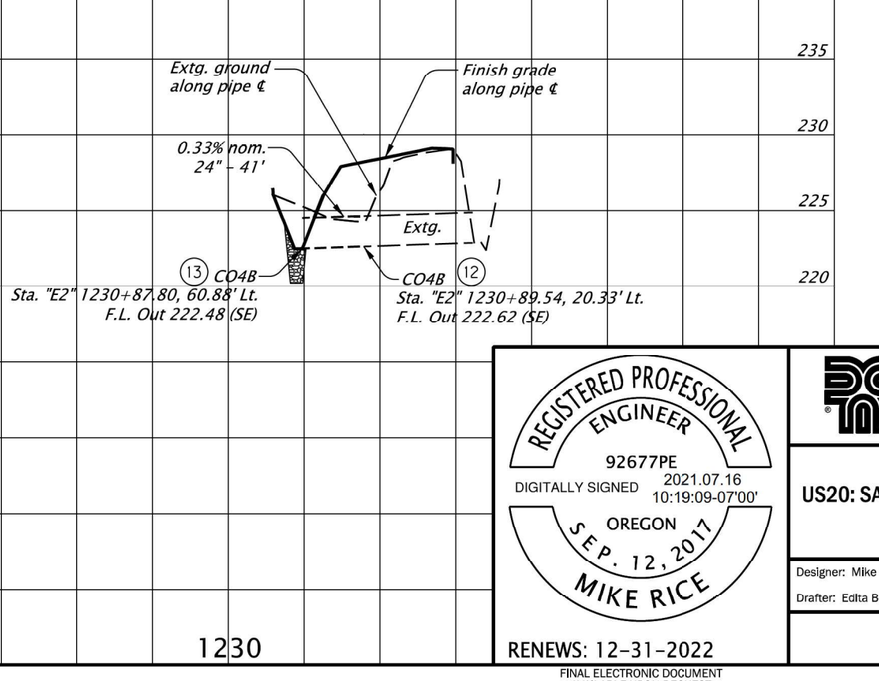
DRAINAGE & UTILITIES NOTES

SHEET NO. C03C



PROFILE ALONG PIPE ℄
Sta. "E2" 1230+89.54





REGISTERED PROFESSIONAL ENGINEER
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OREGON
SEP. 12, 2017
MIKE RICE
RENEWS: 12-31-2022

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OREGON DEPARTMENT OF TRANSPORTATION

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ALBANY - CORVALLIS HIGHWAY
BENTON COUNTY

Designer: Mike Rice | Reviewer: Mike Rice
Drafter: Edita Boguslawski | Checker: Julie McCaskill

DRAINAGE & UTILITIES

SHEET NO. C04B

(1) *See sht. C03B, note 7*
Const. bio-slope - D01421

(2) *Sta. "E2" 1222+61.89, 18.92' Lt.*
Const. manhole
Connect to extg. culv.

(3) *Sta. "E2" 1224+15.80, Lt. to Sta. "E2" 1225+74.96, Lt.*
Const. loose rirap (Class 50) - 25 cu. yd.
Tr. exc. - 25 cu. yd.
(For details, see sht. HA02)

(4) *Sta. "E2" 1229+51.41, 75.21' Lt. to*
Sta. "E2" 1230+97.25, 63.32' Lt.
Const. ditch
4' Flat bottom, 1:4 slopes
(For details, see sht. HA03)

(5) *Sta. "E2" 1225+75, Lt. to Sta. "E2" 1227+19, Lt.*
Const. water quality swale - D01421
(For details, see shts. HA02 & HA04)

(6) *Sta. "E2" 1230+97, Lt. to Sta. "E2" 1232+69, Lt.*
Const. water quality swale - D01425
(For details, see shts. HA03 & HA04)

(7) *Sta. "E2" 1222+92.01, 39.93' Lt.*
Const. type "G-2" inlet w/ 1.5' sump

(8) *Sta. "E2" 1224+49.14, 37.06' Lt.*
Const. type "G-2" inlet w/ 1.5' sump
Inst. 12" storm sew. pipe - 154'
5' depth

(9) *Sta. "E2" 1226+35.97, 35.56' Lt.*
Const. type "G-2" inlet w/ 1.5' sump
Inst. 12" storm sew. pipe - 10'
5' depth

(10) *Sta. "E2" 1227+19.83, 32.52' Lt.*
Const. shallow manhole
Inst. 12" storm sew. pipe - 82'
5' depth

(11) *Sta. "E2" 1227+20.19, 62.93' Lt.*
Inst. 12" storm sew. pipe - 30'
5' depth
Const. sloped end
Const. paved end slope
Const. riprap basin
(For details, see shts. HA02 & HA05)
(See drg. no. RD320)

(12) *Sta. "E2" 1230+89.54, 20.33' Lt.*
Connect to extg. pipe

(13) *Sta. "E2" 1230+87.80, 60.88' Lt.*
Inst. 24" culv. pipe - 41'
5' depth
Const. sloped end
Const. paved end slope
Const. riprap basin
(For details, see sht. HA05)

(14) *Sta. "E2" 1226+60.53, 38.00' Rt.*
Inst. drainage facility ID marker, Type S1

(15) *Sta. "E2" 1225+74.99, 55.50' Lt.*
Inst. drainage facility ID marker, Type S1

(16) *Sta. "E2" 1227+19.67, 49.58' Lt.*
Inst. drainage facility ID marker, Type S1

(17) *Sta. "E2" 1230+97.56, 48.00' Lt.*
Inst. drainage facility ID marker, Type S1

(18) *Sta. "E2" 1232+68.73, 48.00' Lt.*
Inst. drainage facility ID marker, Type S1

(19) *Sta. "E2" 1232+68.34, 82.71' Lt.*
Inst. drainage faciliy ID marker, Type S2
DFI no. D01425
MP 6.14

(20) *Sta. "E2" 1230+92.47, 52.94' Rt.*
Inst. culv. ID marker, Type 2
DFI no. D050157
MP 6.17
(See drg. no. RD398)

(21) *Relocate utility pole (By others) - 2*

(22) *Sta. "E2" 1226+24.36, 39.98' Lt.*
Const. type "G-2" inlet w/ 1.5' sump
Inst. 12" storm sew. pipe - 172'
5' depth

(23) *No work zone.*
See sht. C04A, note 8

(24) *Sta. "E2" 1227+20.90, 86.16' Lt.*
Inst. drainage facility ID marker, Type S2
DFI no. D01424
MP 6.25

REGISTERED PROFESSIONAL ENGINEER
92677PE
DIGITALLY SIGNED 2021.07.23 16:37:50-07'00'
OREGON
SEP. 12, 2017
MIKE RICE
RENEWS: 12-31-2022

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BENTON COUNTY

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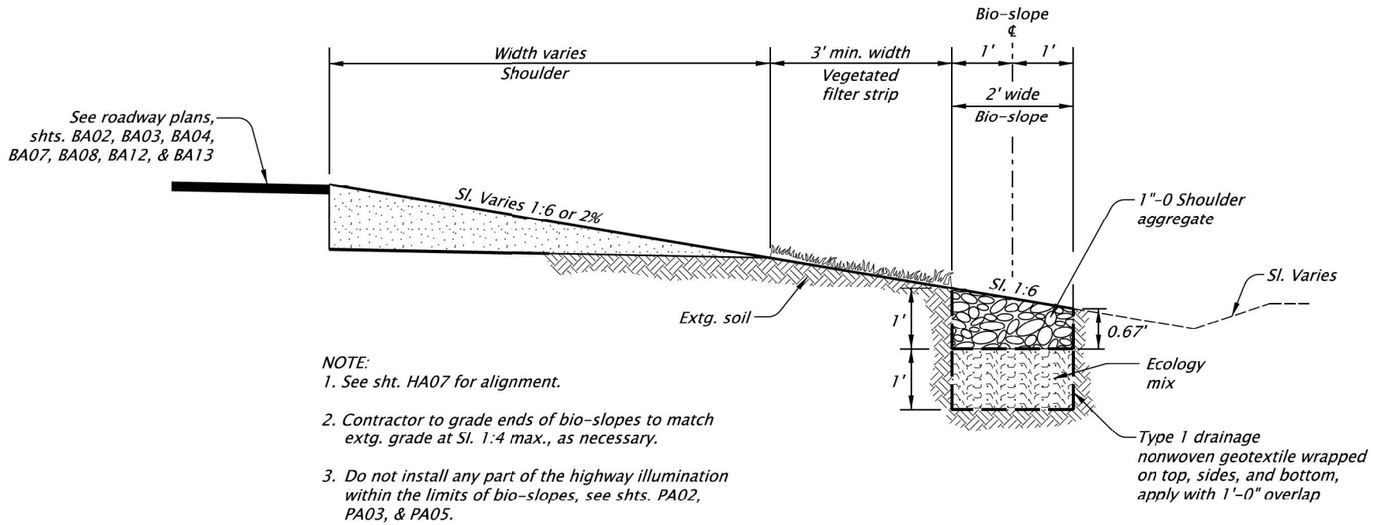
Reviewer: Mike Rice
Drafter: Edita Boguslawski
Checker: Julie McCaskill

DRAINAGE & UTILITIES NOTES

SHEET NO. C04C

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



NOTE:
1. See sht. HA07 for alignment.

2. Contractor to grade ends of bio-slopes to match extg. grade at Sl. 1:4 max., as necessary.

3. Do not install any part of the highway illumination within the limits of bio-slopes, see shts. PA02, PA03, & PA05.

BIO-SLOPE "D01420" SECTION A-A
STA. "E2" 1206+88, RT. TO STA. "E2" 1213+65, RT.

BIO-SLOPES "D01421a", "D01421b, & "D01421c" SECTION A-A
STA. "E2" 1219+79, RT. TO STA. "E2" 1226+61, RT.

BIO-SLOPE "D01422" SECTION A-A
STA. "E2" 1260+82, RT. TO STA. "E2" 1270+79, RT.

N.T.S.

REGISTERED PROFESSIONAL ENGINEER
92677PE
DIGITALLY SIGNED 2021.07.16 10:30:31-07'00'
OREGON
SEP. 12, 2017
MIKE RICE
RENEWS: 12-31-2022

DAVID EVANS AND ASSOCIATES INC.
2100 S River Parkway
Portland Oregon 97201
Phone: 503.223.6663

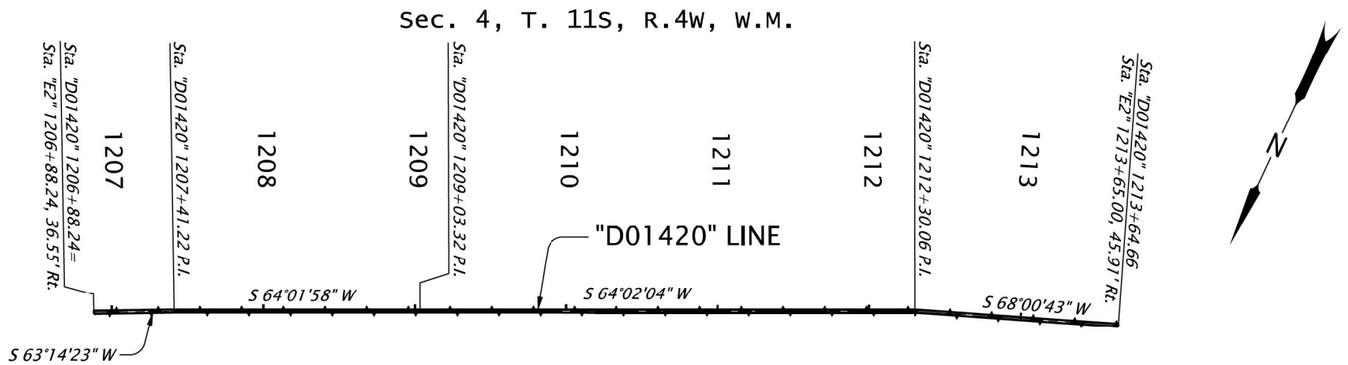
US20: SAFETY UPGRADES (ALBANY TO CORVALLIS) SEC.
ALBANY - CORVALLIS HIGHWAY
BENTON COUNTY

Designer: Mike Rice | Reviewer: Mike Rice
Drafter: Edita Boguslawski | Checker: Julie McCaskill

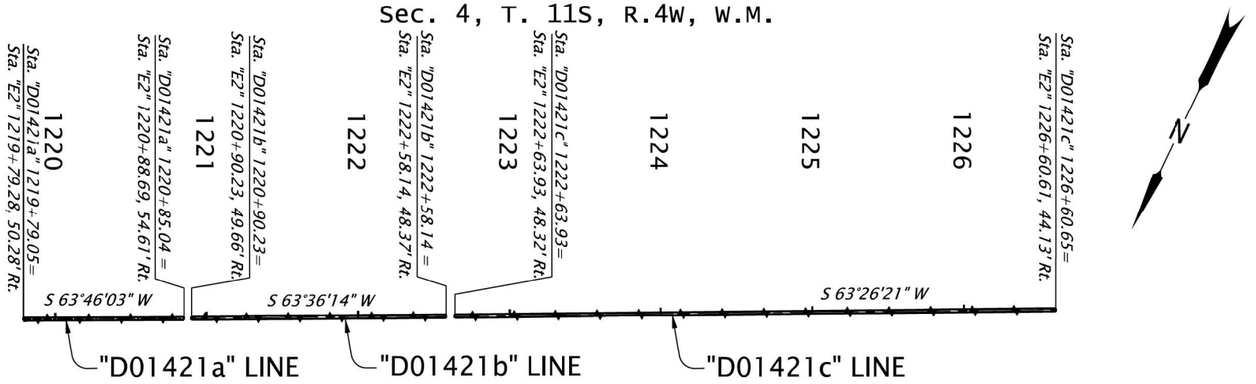
DETAILS

SHEET NO. HA06

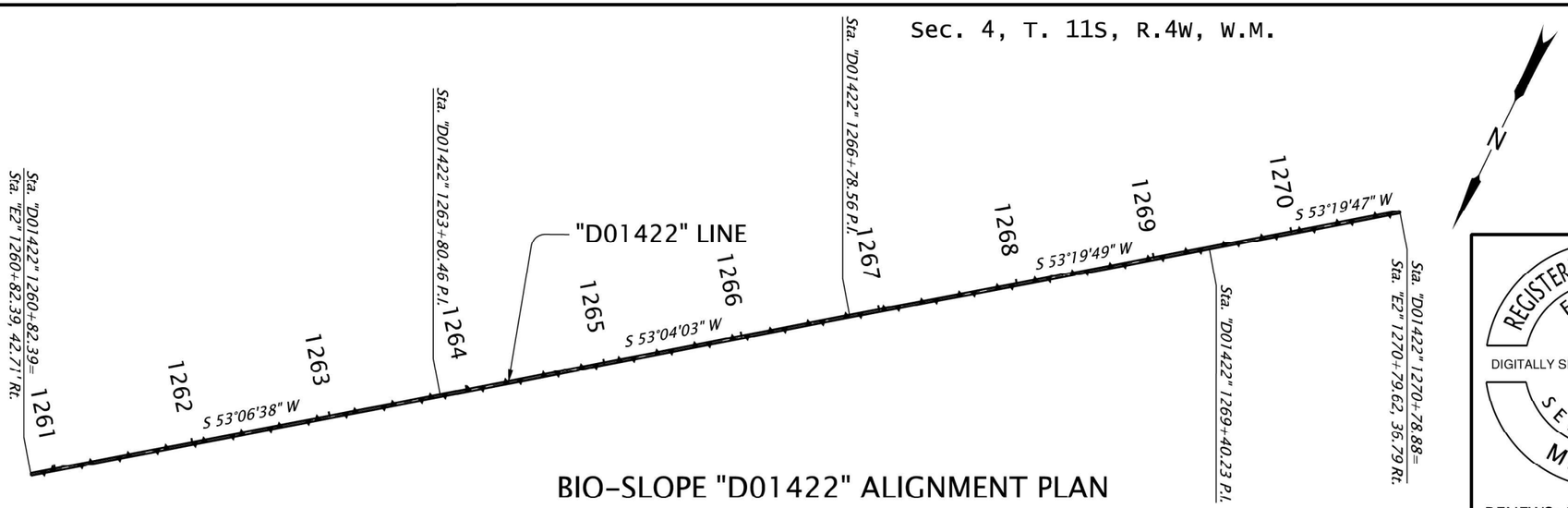
54V-102



BIO-SLOPE "D01420" ALIGNMENT PLAN



BIO-SLOPES "D01421a", "D01421b" & "D01421c" ALIGNMENTS PLAN



BIO-SLOPE "D01422" ALIGNMENT PLAN

REGISTERED PROFESSIONAL ENGINEER
92677PE
DIGITALLY SIGNED 2021.07.16 10:31:23-07'00'
OREGON
SEP. 12, 2017
MIKE RICE
RENEWS: 12-31-2022

DAVID EVANS AND ASSOCIATES INC.
2100 S River Parkway
Portland Oregon 97201
Phone: 503.223.6663

OREGON DEPARTMENT OF TRANSPORTATION

US20: SAFETY UPGRADES (ALBANY TO CORVALLIS) SEC.
ALBANY - CORVALLIS HIGHWAY
BENTON COUNTY

Designer: Mike Rice | Reviewer: Mike Rice
Drafter: Edita Boguslawski | Checker: Julie McCaskill

DETAILS

SHEET NO. HA07

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 154.0314° Scale: 1"=100'